

Danish Ingolf-Expedition, 1895-1896
The Danish Ingolf-expedition

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THE DANISH
INGOLF-EXPEDITION.

VOL. III, PART 13.

CONTENTS:

K. STEPHENSEN: CRUSTACEA MALACOSTRACA VIII: AMPHIPODA IV.

PUBLISHED AT THE COST OF THE GOVERNMENT

BY

THE DIRECTION OF THE ZOOLOGICAL MUSEUM OF THE UNIVERSITY.



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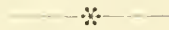
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VOL. III D

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THE DANISH INGOLF-EXPEDITION

VOLUME III

13

CRUSTACEA MALACOSTRACA VIII
(AMPHIPODA IV)

BY

K. STEPHENSEN

WITH 38 FIGURES AND 10 CHARTS IN THE TEXT

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1944

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Introduction.

The present fourth (and last) part of the Amphipoda of the Ingolf-Expedition is written after another scheme than that of the three first parts (vol. 3, nos. 8, 9 and 11, 1923-31). These three first parts, comprising the Hyperidea and the Gammaridea up to and including the fam. Calliopiidae (the families are listed in the same order as in STEBBING, Amphipoda Gammaridea, Tierreich, vol. 21, 1906) were written according to the primary plan, the aim of which was that the report should be a fauna of the area of the Ingolf-Expedition, and thus comprise all the species found in the seas round the Faroes, Iceland, and Greenland.

Later on, however, the issue of special faunas of the Faroes, Iceland and East Greenland was started (a fauna of West Greenland has not been planned as yet), and these faunas comprise all species from depths down to about 300-400 m. If all these, mainly littoral and sublittoral, species should be included in the Ingolf-report the result would be a needless repetition of numerous species and localities¹⁾.

Therefore it was decided that the present paper should comprise

only species found at depths > 400 m, and it includes the remaining part of the Gammaridea + Ingolfiellidea and Caprellidea, altogether 80 species. The majority are found only at depths > 400 m.

No less than 32 species are new to the area²⁾, 11 even new to science; they are as follows:

- No. 303. *Eusirus abyssi* n. sp.
- 319. *Rhachotropis faeroensis* n. sp.
- 323. *Melita abyssorum* n. sp.
- 330. *Eurysthene abyssalis* n. sp.
- 331. *Bathyphotis tridentata* n. gen. n. sp.
- 336. *Ischyrocerus hansenii* n. sp.
- 353. *Dulichia abyssi* n. sp.
- 351. — *spinosa* n. sp.
- 356. *Protellina ingolfi* n. gen. n. sp.
- 357. *Parvipalpina verrucosa* n. gen. n. sp.
- 358. *Thorina spinosa* n. gen. n. sp.

Abbreviations in the explanation of the figures.

A.1-2: antenna 1-2.
ac.fl.: accessory flagellum of antenna 1.
C: cephalon, head.
E.1-3: epimeral plates 1-3 of the metasome segments.
L.: anterior lip, upper lip.
l.: posterior lip, lower lip.
M., *Mts.*: metasome.
Md.: mandible.

Mr.1-2: maxillae 1-2.
Mxp.: maxilliped.
P.1-7: pereopods 1-7.
p.: palp.
T.: telson.
U.: urosome.
Up.1-3: uropods 1-3.
Us.1-3: urosome segments 1-3.

II Tribe: Gammaridea.

Family: Calliopiidae G. O. Sars.

Appendix.

271. *Halirages quadridentatus*. G. O. Sars.

Halirages quadridentatus K. Stephensen, "Ingolf"-Exped., vol. 3, part 11, 1931, p. 268, p. 271.

Additional localities:

67°57' N, 6°44' W, 2386 m. ÷ 1°1. "Ingolf" St. 112.

2 ♂ about 38-45 mm, very defective. The determination is not certain, for second joint in pereopod 7 has lower hind corner rounded.

70°05' N, 8°26' W, 699 m. ÷ 0°4. "Ingolf" St. 116: 23-VII-1896.

1 specimen about 24 mm.

¹⁾ 79 species belonging to these families and not included in the present Ingolf-report are known from the area from depths of 0-400 m: 43 out of these are found at the Faroes, 70 at Iceland, 53 at East Greenland and 61 at West Greenland.

69° 13' N, 8°23' W, 1889 m. ÷ 1°0. "Ingolf" St. 117: 24-VII-1896.
3 specimens up to about 30 mm.

68°27' N, 8°20' W, 1996 m. ÷ 1°0. "Ingolf" St. 118: 24-VII-1896.
4 specimens up to 35 mm.

64°40' N, 15°40' W, 932 m. ÷ 0°6. "Ingolf" St. 121: 28-VII-1896.
2 specimens up to about 30 mm.

272. *Halirages elegans* (Norman?) Stappers.

Halirages elegans K. Stephensen, "Ingolf"-Exped., vol. 3, part 11, 1931, p. 268, 272.

Additional locality:

64°07' N, 11°12' W, 446 m. 2°5. "Ingolf" St. 4: 13-V-1895. 2 specimens about 25 mm.

²⁾ See Contents, the species marked with an asterisk *.

Family: **Pleustidæ** Stebbing.

Paramphithoida G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 343.
Pleustidæ Stebbing, Tierreich, vol. 21, 1906, p. 309.
Pleustida Chevreux & Fage, Faune de France, vol. 9, 1925, p. 184.

Genus: **Pleustes** Spence Bate.286. **Pleustes panoplus** (Kroyer).

Pleustes panoplus G. O. Sars, l. c. 1895, p. 344, pl. 121.
Pleustes panoplus Stebbing, l. c. 1906, p. 310.

Occurrence:

64°07' N, 11°12' W, 446 m, 2°5. "Ingolf" St. 4: 13-V-1895.
 1 specimen.
 61°42' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 44: 14-VIII-1895.
 1 small specimen.

These depths are extraordinarily great; usually the species lives in the littoral and sublittoral zones.

Distribution. Probably a panarctic(-boreal) species; for further details see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 253, and my paper on the Amphipods of East Greenland, soon going into the press.

Genus: **Parapleustes** Buchholz.287. **Parapleustes pulchellus** (Kroyer).

Paramphithoë euacantha G. O. Sars, Norske Nordhavs-Exp., vol. 6, Crust., 1885, p. 168, pl. 14 fig. 3.
Paramphithoë pulchellus G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 346, pl. 122 fig. 1.
Neopleustes pulchellus Stebbing, Tierreich, vol. 21, 1906, p. 312.

Occurrence:

65°14' N, 55°42' W, 791 m, 3°5. "Ingolf" St. 28: 1-VII-1895.
 1 specimen.
 65°14' N, 30°39' W, 1416 m, 2°1. "Ingolf" St. 95: 27-VI-1896.
 3 specimens.
 65°24' N, 29°00' W, 1384 m, 1°2. "Ingolf" St. 96: 28-VI-1896.
 1 specimen.
 66°16' N, 26°08' W, 600 m, ÷ 0°1. Capt. Wandel leg. 1889.
 1 specimen.

The last-named specimen is the form *exacanthus* G. O. Sars 1885; the specimens from the three "Ingolf"-Stations belong to the form *pulchellus* G. O. Sars 1895.

These depths are extraordinarily great; the usual depths seem to be 150-300 m.

Distribution. An arctic-boreal species, distributed from Kara Sea and Arctic America to the Skagerrak; for further details see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 255.

Genus: **Stenopleustes** G. O. Sars.288. **Stenopleustes nodifer** (G. O. Sars).

Stenopleustes nodifer G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 356, pl. 125 fig. 2.
Stenopleustes nodifer Stebbing, Tierreich, vol. 21, 1906, p. 316.
Stenopleustes nodifer Chevreux & Fage, Faune de France, vol. 9, 1925, p. 187, figs.

Occurrence:

61°42' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 44: 14-VIII-1895.
 3 specimens.

65°14' N, 30°39' W, 1416 m, 2°1. "Ingolf" St. 95: 27-VI-1896.
 1 specimen.

Two of the specimens from St. 44 have nodi also on 6th mesosome segment, so that there are in all 4 (not 3) pairs of nodi. The depths are extraordinarily great (see below).

Distribution. From the Trondheimfjord to the Faroes and NW. France, 60-285 m; Connecticut. For further details see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 259.

289. **Stenopleustes malmgreni** (Boeck).

Stenopleustes malmgreni G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 355, pl. 125 fig. 1.
Stenopleustes malmgreni Stebbing, Tierreich, vol. 21, 1906, p. 316.

Occurrence:

65°14' N, 30°39' W, 1416 m, 2°1. "Ingolf" St. 95: 27-VI-1896.
 1 specimen.

This specimen was not dissected, but it seems to agree well with Sars l. c. and it has the very large eyes characteristic of the genus.

Distribution. Norway from Oslofjord to about 70° N, 150-350 m (K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 259). S. and SW. of Iceland, 143-326 m (K. STEPHENSEN, Zool. of Iceland, vol. 3, no. 26, 1940, p. 45).

Genus: **Sympleustes** Stebbing.290. **Sympleustes latipes** (M. Sars).

Parapleustes latipes G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 360, pl. 127.
Sympleustes latipes Stebbing, Tierreich, vol. 21, 1906, p. 317.
Sympleustes latipes Chevreux & Fage, Faune de France, vol. 9, 1925, p. 189, fig.

Occurrence:

63°04' N, 9°22' W, 493 m, 5°3. "Ingolf" St. 2: 12-V-1895.
 1 specimen.
 65°14' N, 55°42' W, 791 m, 3°5. "Ingolf" St. 28: 1-VII-1895.
 2 specimens.
 65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895.
 1 specimen.
 62°00' N, 21°36' W, 1591 m, 3°3. "Ingolf" St. 40: 9-VIII-1895.
 1 specimen.
 61°42' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 44: 14-VIII-1895.
 3 specimens.
 65°24' N, 29°00' W, 1384 m, 1°2. "Ingolf" St. 96: 28-VI-1896.
 1 specimen.
 61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. About 10 specimens.
 70°32' N, 8°10' W, about 900 m, clay. H. DEICHMAN leg. 27-VI-1891. 3 specimens.

Distribution. Widely distributed from W. Greenland and northeastern U.S.A. to Murman Coast and Açores; depths from 60-1600 m. For special localities, see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 260, and Zool. of Iceland, vol. 3, no. 26, 1940, p. 45.

291. **Sympleustes dentatus** Chevreux.

Sympleustes dentatus Chevreux, Amphip.; in: Expéd. sci. Travailleur et Talisman, 1927, p. 91, pl. 7 figs. 13-26.

Occurrence:

64°54' N, 55°10' W, 710 m, 3°8. "Ingolf" St. 27: 1-VII-1895.
1 specimen.

The specimen is rather defective, it has lost urosome; length 7.5 mm. As far as could be ascertained without dissection, it agrees excellently with CHEVREUX's specimen (ovigerous ♀, except



Fig. 1. *Sympleustes megacheir* ♂, pereopod 2. "Ingolf" St. 11.

that the hand of pereopod 2 is somewhat broader in the "Ingolf"-specimen. No marsupial plates could be found.

Distribution. Near the Canaries 28°33' N, 15°39' W, 946 m, sand etc., 1 ♀ (type-locality; CHEVREUX l.c.).

292. *Sympleustes megacheir* (Walker 1897) (Fig. 1).
(= ? *S. grandimanus* (Chevreux 1887)).

Parapleustes megacheir Walker, Jour. Linn. Soc., vol. 26, 1897, p. 230, pl. 18 fig. 4 (4 specimens (all ♂?), up to 8 mm).

Sympleustes megacheir Stebbing, Tierreich, vol. 21, 1906, p. 317.

Sympleustes megacheir Chevreux, Amphip., in: Expéd. sci. Travailleur et Talisman, 1927, p. 88, pl. 7 figs. 6-12 (1 ♂ 6.5 mm, 1 ovigerous ♀ 8.5 mm).

Sympleustes megacheir Chevreux, Rés. Camp. Sci. Monaco, vol. 90, 1935, p. 101 ("un exemplaire"), pl. 1 fig. 15 (col. fig.).

Probably synonymous with:

Amphithopsis grandimana Chevreux, Bull. Soc. Zool. France, vol. 12, 1887, p. 570 (1 ♀, 7.5 mm).

Dautzenbergia grandimana Chevreux, Rés. Camp. Sci. Monaco, vol. 16, 1900, p. 73, pl. 10 fig. 1, a-k (1 ♀ 7.5 mm).

Dautzenbergia grandimana Stebbing, Tierreich, vol. 21, 1906, p. 728.

Sympleustes grandimana Stebbing, ibid. p. 318.

Sympleustes grandimana Sexton, Proc. Zool. Soc. London, 1910, p. 857, pl. 80 figs. 8-32 (5 ♀ 3-7.5 mm).

Sympleustes grandimanus Chevreux, Amphip., in: Expéd. sci. Travailleur et Talisman, 1927, p. 86, pl. 7 figs. 1-5 (1 ♀ 8 mm).

Sympleustes (Dautzenbergia) grandimana Barnard, Amphip.; John Murray Exped., vol. 4, no. 6, 1937, p. 158 (1 immature ♀ 6.5 mm).

Occurrence:

64°34' N, 31°12' W, 2418 m, 1°6. "Ingolf" St. 11: 21-V-1895.
2 ♂ about 11-12 mm, on a finely ramose Gorgonid.

Remarks. It is not quite clear if *S. grandimanus* (Chevreux 1887) and *S. megacheir* (Walker 1897) are synonymous or not. Of *S. grandimanus* only ♀♀ are described; of *S. megacheir* ♂♂ are described, + a single ovigerous ♀ (Chevreux 1927).

The "Ingolf"-specimens are ♂♂ which are much larger (11-12 mm) than the largest specimens hitherto described (8-8.5 mm). They agree fairly well with ♂♂ of *S. megacheir*, as described and drawn by WALKER l.c. and CHEVREUX 1927. Pereiopod 1 (= gnathopod 1) has the finger finely denticulate as recorded by CHEVREUX 1927 for *S. megacheir* (this character is not mentioned in WALKER's original description 1897). Pereiopod 2 (= gnathopod 2) differs however from WALKER l.c. fig. 1 b and CHEVREUX 1927 fig. 9 in having the proximal process on the palm triangular and much more projecting than in the figures cited; this difference is possibly due to the difference in size of the specimens. Telson is apically notched to about 1/3 of the length and agrees with WALKER's fig. 4 c; CHEVREUX 1927 fig. 12 shows the notch much shorter.

Distribution. 48°7' 1/2 N, 8°13' W, depth? (SEXTON l.c., and Jour. Mar. Biol. Assoc. Unit. Kingdom, vol. 9, 1911, p. 209). 13°12'50"-43°12'15" N, 11°53'30"-11°52' W, 363-510 m (*S. grandimana*, type-locality; CHEVREUX 1887 and 1900). SW. of Ireland, about 1400 m (*S. megacheir*, type-locality; WALKER 1897). 38°16'35" N, 28°17'20" W, 1022 m (*S. megacheir*; CHEVREUX 1935). 29°03' N, 14°48' W, 1220 m, and 29°01' N, 11°51' W, 1180 m (*S. megacheir*; CHEVREUX 1927). 21°53' N, 0°19'50" W, 655 m (*S. grandimana*; CHEVREUX 1927). - Indian Ocean: South Arabian Coast, St. 54: 21°50' N, 59°52' E, 1046 m (*S. grandimana*; BARNARD 1937).

293. *Sympleustes pulchellus* (G. O. Sars).

Parapleustes pulchellus G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 359, pl. 126 fig. 2.

Sympleustes pulchellus Stebbing, Tierreich, vol. 21, 1906, p. 319.

Occurrence:

63°13' N, 15°14' W, 1130 m, 4°5. "Ingolf" St. 7: 17-V-1895.
1 specimen.

61°30' N, 22°30' W, 1886 m, 3°0. "Ingolf" St. 67: 3-VI-1896.
1 specimen.

66°18' N, 25°59' W, 621 m, ÷ 0°75. "Ingolf" St. 15: 4-VI-1895.
2 specimens.

63°06' N, 56°00' W, 2258 m, 2°4. "Ingolf" St. 24: 25-VI-1895.
About 15 specimens.

65°14' N, 55°42' W, 791 m, 3°5. "Ingolf" St. 28: 1-VII-1895.
2 specimens.

Distribution. From Greenland to Novaja Zemlya, with the deep Polar Basin, depths 30->1000 m; for special localities see K. STEPHENSEN, Tromso Mus. Skr., vol. 3, 1935-42, p. 263.

Family: **Paramphithoidæ** Stebbing.

Epimerida G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 362.

Paramphithoidæ Stebbing, Tierreich, vol. 21, 1906, p. 320.

Paramphithoidæ Chevreux & Fage, Faune de France, vol. 9, 1925, p. 190.

Genus: **Epimeria** Costa.294. *Epimeria parasitica* (M. Sars).

Epimeria parasitica G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 366, pl. 129 fig. 1.

Epimeria parasitica Stebbing, Tierreich, vol. 21, 1906, p. 321.

Occurrence:

61°07' N, 9°35' W, 835 m. "Thor" St. 78: 12-V-1904. Numerous specimens.

Distribution. Northern Norway and western Norway, deep water; Bay of Biscay 411 m (K. STEPHENSEN, Tromso Mus. Skr., vol. 3, 1935-42, p. 264).

295. *Epimeria loricata* G. O. Sars.

Epimeria loricata G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 368, pl. 129 fig. 3.

Epimeria loricata Stebbing, Tierreich, vol. 21, 1906, p. 322.

Occurrence:

- 63°21' N, 25°21' W, 320 m, temp.? "Ingolf" St. 85: 17-VI-1896.
1 specimen.
62°58' N, 7°09' W, 731 m. ÷ 0°4. "Ingolf" St. 143: 11-VIII-1896.
1 specimen.
66°35' N, 56°38' W, 599 m, 3°9. "Ingolf" St. 32: 11-VII-1895.
4 specimens.
65°37' N, 56°37' W, 500 m. "Dana" 22-VI-1925, Ad. S. Jensen.
1 specimen.
66°32' N, 18°50' W, 480 m. "Dana" St. 3241: 12-VIII-1927.
1 specimen.
66°18.7' N, 18°36' W, 360 m. "Dana" St. 5982: 19-VII-1938.
Numerous specimens.

Distribution. From Greenland to Spitsbergen, Barents Sea, and Skagerrak; also about 43° N, 51° W, 1100 m; depths 100–1400 m. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935–42, p. 265, and Zool. of Iceland, vol. 3, no. 26, 1940, p. 46.

296. *Epimeria cornigera* (I. C. Fabricius).

Epimeria cornigera G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 364, pl. 128.

Epimeria cornigera Stebbing, Tierreich, vol. 21, 1906, p. 323.

Epimeria cornigera Chevreux & Fage, Faune de France, vol. 9, 1925, p. 191, figs.

Occurrence:

- 61°08' N, 9°28' W, 820 m. "Thor" St. 78: 12-V-1904. Numerous specimens.
61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 3 specimens.

Distribution. From northern Norway and Iceland to the Mediterranean; also South and East Africa, depths 64–900 m. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935–42, p. 266, and Zool. of Iceland, vol. 3, no. 26, 1940, p. 47.

Genus: *Paramphithoë* Bruzelius.297. *Paramphithoë hystrix* (Ross).

Acanthozone euspidata G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 370, pl. 130.

Paramphithoë hystrix + *P. euspidata* Stebbing, Tierreich, vol. 21, 1906, p. 325, p. 326.

Occurrence:

- 65°34' N, 7°31' W, 1435 m, ÷ 0°8. "Ingolf" St. 105: 11-VII-1896.
1 specimen.

Distribution. Widely distributed in the arctic seas with adjacent waters, probably circumpolar; depths 10–300(1435) m. For special localities, see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935–42, p. 267.

Family: *Amathillopsidæ* Pirlot.

Amathillopsidæ Pirlot, Siboga-Exped., Amphip., vol. 2 pt. 2, 1934, p. 201, and pt. 3, 1936, p. 238.

According to PIRLOT this new family comprises the following three genera, viz., *Amathillopsis* Heller, *Acanthopleustes* Holmes, and *Cleonardopsis* Barnard (= *Amathillopleustes* Pirlot). Two of them are represented in the "Ingolf"-material.

Genus: *Amathillopsis* Heller.

Amathillopsis Stebbing, Tierreich, vol. 21, 1906, p. 384.

Amathillopsis Pirlot, l. c. 1934, p. 201.

298. *Amathillopsis atlantica* Chevreux.

Amathillopsis atlantica Chevreux, Bull. Inst. Océanogr. Monaco, no. 122, 1908, p. 3, fig.

Amathillopsis atlantica Chevreux, Rés. Camp. Sci. Monaco, vol. 90, 1935, p. 113, pl. 1 fig. 20 (col. fig.), pl. 12 fig. 4.

Occurrence:

- 61°30' N, 22°30' W, 1836 m, 3°0. "Ingolf" St. 67: 3-VI-1896.
2 specimens up to about 20 mm.

Distribution. 39°11' N, 30°24'15" W, 1600 m; 38°18' N, 28°14'45" W, 1692 m; 37°40' N, 26°26'15" W, 1919 m (CHEVREUX l. c.).

299. *Amathillopsis spinigera* Heller (Chart I).

Amathillopsis spinigera G. O. Sars, Crust., Norske Nordhavs-Exp., 1885, p. 181, pl. 15 fig. 2.

Amathillopsis spinigera Stebbing, Tierreich, vol. 21, 1906, p. 384.

Occurrence:

- 65°00' N, 11°16' W, 584 m, ÷ 0°1. "Ingolf" St. 59: 20-V-1896.
1 ♀ about 42 mm.

- 66°23' N, 12°15' W, 1011 m, ÷ 0°7. "Ingolf" St. 101: 10-VII-1896.
2 specimens, including 1 ♀ with marsupium.

- 66°23' N, 10°26' W, 1412 m, ÷ 0°9. "Ingolf" St. 102: 10-VII-1896.
1 ♀ with big young.

- 66°23' N, 8°52' W, 1090 m, ÷ 0°6. "Ingolf" St. 103: 10-VII-1896. 1 ♀.

- 66°23' N, 7°25' W, 1802 m, ÷ 1°0. "Ingolf" St. 104: 11-VII-1896. 4 ♀.

- 65°34' N, 7°31' W, 1435 m, ÷ 0°8. "Ingolf" St. 105: 11-VII-1896. 1 ♀.

- 65°34' N, 8°54' W, 842 m, ÷ 0°6. "Ingolf" St. 106: 12-VII-1896. 1 ♀.

- 65°29' N, 13°25' W, 72 m, 1°5. "Ingolf" St. 109: 18-VII-1896. 2 ♀.

- 66°44' N, 11°33' W, 1471 m, ÷ 0°8. "Ingolf" St. 110: 19-VII-1896. 1 ♀ with young.

- 69°13' N, 8°23' W, 1889 m, ÷ 1°0. "Ingolf" St. 117: 24-VII-1896. 5 specimens including 1 ♀ with young, 38 mm.

- 68°27' N, 8°20' W, 1996 m, ÷ 1°0. "Ingolf" St. 119: 25-VII-1896. 2 specimens including 1 ovigerous ♀.

- 67°29' N, 11°32' W, 1666 m, ÷ 1°0. "Ingolf" St. 120: 25-VII-1896. 1 specimen.

- 67°40' N, 15°40' W, 932 m, ÷ 0°6. "Ingolf" St. 124: 28-VII-1896. 5 specimens including 1 ♀ with marsupium 43 mm.

- 68°08' N, 16°02' W, 1373 m, ÷ 0°8. "Ingolf" St. 125: 29-VII-1896. 1 specimen.

- 63°29' N, 6°59' W, 1469 m, ÷ 0°9. "Ingolf" St. 140: 11-VIII-1896. 1 specimen.

Distribution. The deep Polar Basin with adjacent seas, from East Greenland to Franz Joseph Land (type locality) and Kara Sea, depths 66 m (Kara Sea) to 2000 m (Polar Basin), usually at negative temperatures. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935–42, p. 299, and Zool. of Iceland, vol. 3, no. 26, 1940, p. 49, with chart p. 79, and my paper on the Amphipods of East Greenland (species no. 111), shortly going into the press.

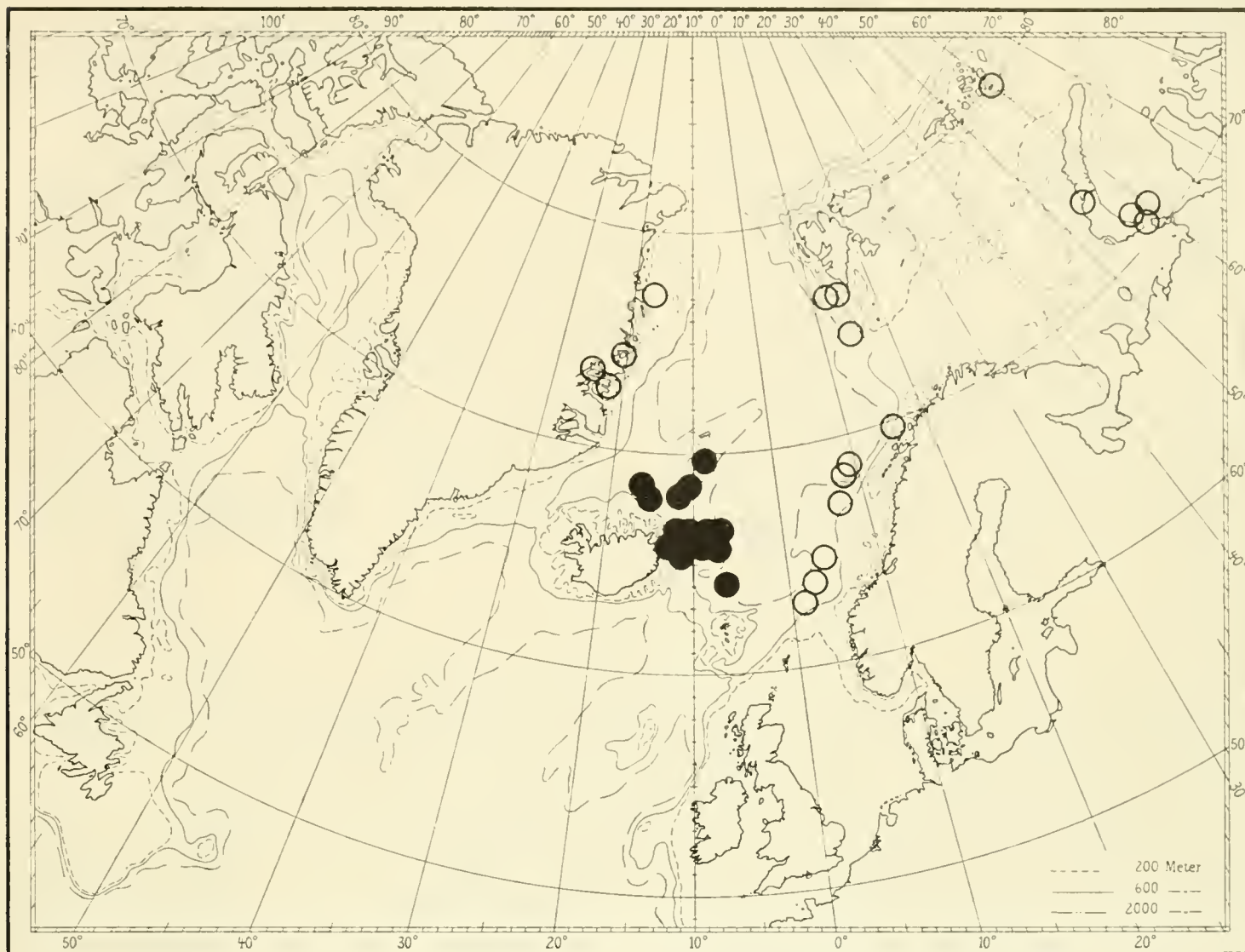


Chart I. Distribution of *Amathillopsis spinigera*. ● = new localities, ○ localities from the literature.

Genus: **Cleonardopsis** Barnard.

Cleonardopsis Barnard, Ann. South Afric. Mus., vol. 15, 1916, p. 175.
Amathillopleustes Pirlot, Siboga-Exped., Monogr. 33 d, 1934,
 p. 204 (fide Pirlot, ibid., Monogr. 33 e, 1936, p. 237).

300. **Cleonardopsis carinata** Barnard.

Cleonardopsis carinata Barnard, l. c. 1916, p. 176, pl. 27 figs. 7-9.
Amathillopleustes alticora Pirlot, l. c. 1934, p. 205, figs.
Cleonardopsis carinata Pirlot, l. c. 1936, p. 237 (synonymy, etc.).

Occurrence:

64°54' N, 55°10' W, 740 m, 3°8. "Ingolf" St. 27: 1-VII-1896.
 1 ovigerous ♀ about 10 mm.

61°07' N, 9°30' W, 850 m. "Thor" St. 78: 12-V-1904. 1 specimen
 (♂?) about 7 mm.

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 6 specimens
 (all ♂?) up to about 7 mm.

The largest specimen (from "Ingolf" St. 27) was dissected
 (except the oral parts), and I find no difference from PIRLOT's
 description and figures.

Distribution. South Africa: Cape Point NE. by E., distant
 36 miles, 1200 m (BARNARD l. c.). Moluccas: 2°40' S, 128°37'5 E,
 835 m (PIRLOT l. c. 1934).

Family: **Atylidæ** G. O. Sars.

Atylidæ G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 461.
Atylidæ Stebbing, Tierreich, vol. 21, 1906, p. 327.
Atylidæ Chevreux & Fage, Faune de France, vol. 9, 1925, p. 193.

Genus: **Nototropis** Costa.

301. **Nototropis (smitti)** (Goës?) (Fig. 2).

Paratylus smitti G. O. Sars l. c., p. 468, pl. 165 fig. 1.
Nototropis smitti Stebbing l. c., p. 332.

Occurrence:

61°07' N, 9°30' W, 835 m. "Thor" St. 78: 12-V-1904. 1 ♂ juv.,
 about 9 mm.

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 1 ♂(?) about
 13 mm.

Remarks. These two specimens are very close to *N. smitti*
 and should probably be referred to that species. I have compared
 them with SARS l. c. and with specimens from varying depths

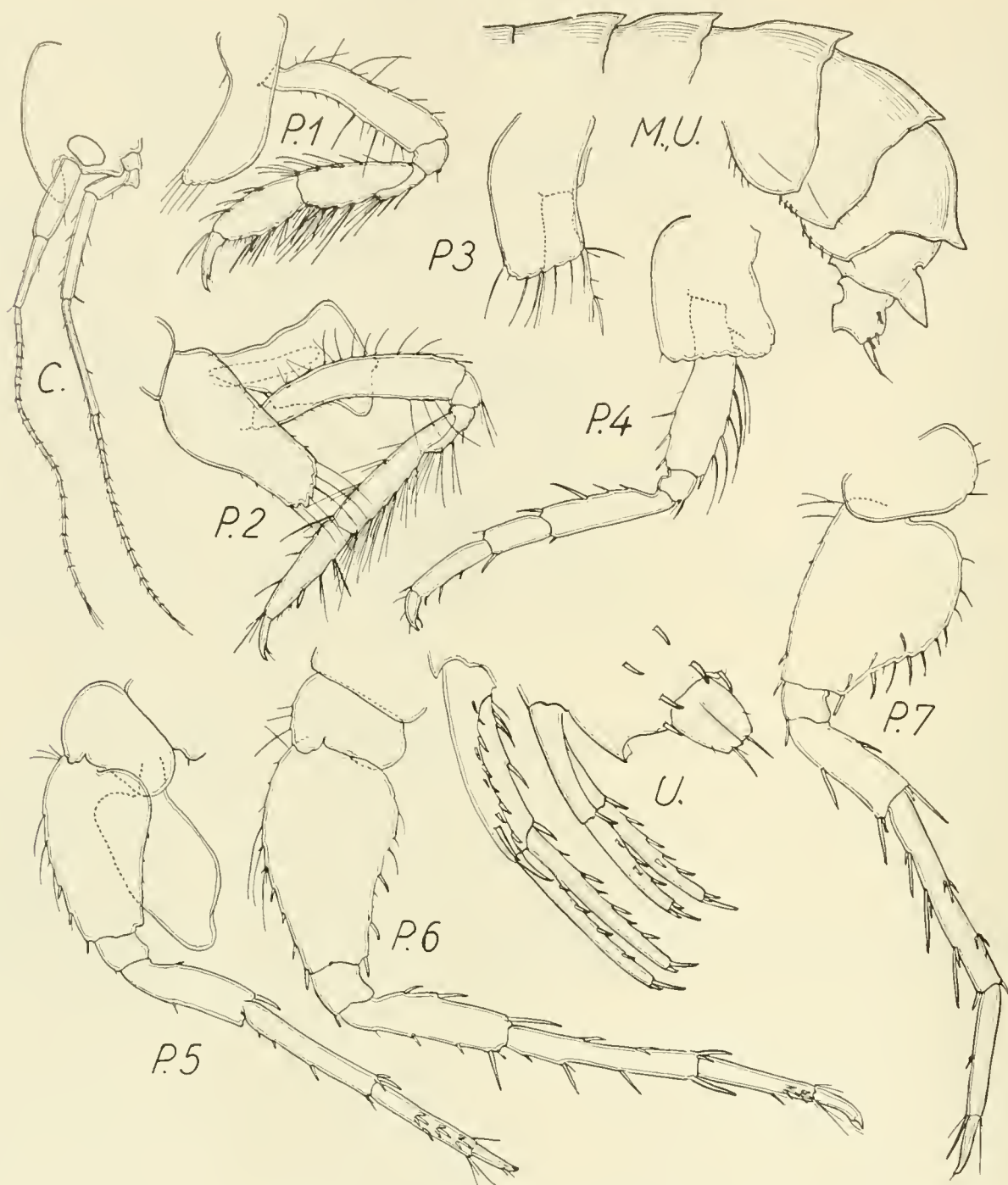


Fig. 2. *Nototropis (smitti?)*. "Thor" St. 78, 1904.

(down to 200 m) in East Greenland and find the following differences (but I give drawings of all the limbs).

Rostrum more stout and apically more blunt. The lappet under the eyes broader than deep and posteriorly defined by a rectangular notch (as in specimens from East Greenland); in Sars's figure the lappet is deeper than broad and the notch acute-angled. The eyes are colourless, rather large and oblong (as in East Greenland specimens); in Sars's figure they are rounded and smaller. In antennae 1-2 flagella have rather few joints (about 20 in ant. 1, about 16 in ant. 2); in Sars's drawing and in East Greenland specimens there are many more joints, probably due to the larger length of the specimens. The oral parts were dissected out, but I have found no differences from *N. swammerdami* (M.-Edw.) (see G. O. Sars l. c., p. 463, pl. 163). Pereiopod 2 has sideplate widened in the proximal end (fore and hind edges are not

parallel), and metacarpus somewhat narrower than in Sars's fig. and in East Greenland specimens. Pereiopod 5: forelobe of sideplate rounded, not acute, and lower hind corner of second joint rounded rectangular, not acute-angled. Pereiopod 7: hind margin of second joint with a few setae in upper half, in *N. smitti* densely setose, and with a few spines near lower hind corner. Uropod 3 totally lost.

These disagreements are so small that I dare not erect a new species; but the "Thor"-specimens are taken from much greater depths (835-900 m) than those in which the species usually is found (down to about 250 m).

Distribution. A mainly arctic species, found from Greenland to the New Siberian Islands; for special localities see K. STEPHENSON, Tromsø Mus. Skr., vol. 3, 1935-42, p. 277.

302. *Nototropis nordlandicus* (Boeck) (Fig. 3).

Paratyphlus nordlandicus G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 469, pl. 165 fig. 2.

Nototropis nordlandicus Stebbing, Tierreich, vol. 21, 1906, p. 332.

Occurrence:

61°07' N, 9°30' W, 835 m. "Thor" St. 78: 12-V-1901. About 20 specimens.

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1901. 3 small specimens.

Remarks on ♂, about 8 mm. Agrees on the whole with Sars l. c., but differs in the following essentials. (I have, however, dissected a specimen from West Norway, determined by Sars, and find that it in all details agrees with the "Thor"-specimens).

Rostrum a trifle more stout and a little shorter, half as long as first joint of antenna 1; ocular lobe ending in a tooth, and lower lobe more protruding than in Sars's figure. Branchiae distinctly lobular in pereopods 2-5, but simple in pereopods 6-7 (Sars l. c. writes: "branchial lamellae distinctly lobular", but does

not say that in the two last pairs of pereopods they are simple). Pereiopod 2: side-plate has lower hind corner a little more rounded

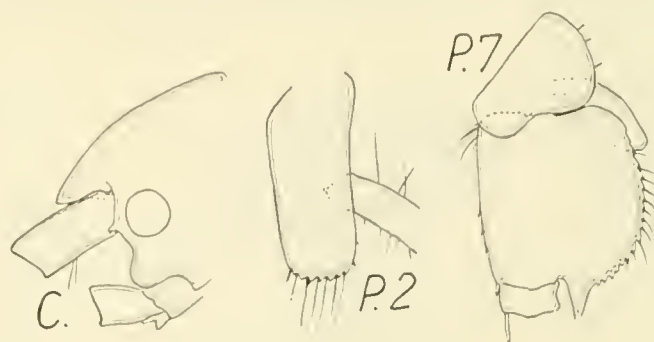


Fig. 3. *Nototropis nordlandicus*.

than in Sars's fig., and the acute projection on lower hind corner of second joint of pereopod 7 more narrow.

Distribution. From southern Norway to eastern Murman Coast, 30-230 m. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935: 12, p. 277.

Family: *Eusiridae* Stebbing.

Eusirida G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 411.

Eusirida Stebbing, Tierreich, vol. 21, 1906, p. 338.

Genus: *Eusirus* Krøyer.

Eusirus G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 415.

Eusirus Stebbing, Tierreich, vol. 21, 1906, p. 338.

Between 1906 (STEBBING l. c.) and 1938 (Zoological Record) the following species were erected.

1. *E. laticarpus* Chevreux, Exp. Antarct. Française, Sci. Nat., Docum. Sci., Paris 1906, p. 49, figs. - Chevreux, 2e Exp. Antarct. . . ., Paris 1913, p. 167.
2. *E. bowicri* Chevreux, Anal. Mus. Nac. Buenos Aires, ser. 3 a, vol. 14, 1911, p. 405, figs.
3. *E. tjalfiensis* K Stephensen 1912, see below, p. 11.
4. *E. splendidus* Chilton, Edinburgh Trans. R. Soc., vol. 48, pt. 2, 1912, p. 492, figs.
Synonymous with
E. perdentatus Chevreux, l. c. 1913, p. 163, fig. - Schellenberg, D. Südpolar-Exp., Zool., vol. 10, 1926, p. 350. - Barnard, Terra Nova-Exp. (British Antarct. Exped.), Natural Hist. Rep., Zool., vol. 8, no. 4, 1930, p. 387. - Schellenberg, Further Results Swed. Antarct. Exped. 1901-1903 . . . edited by Sixten Bock, vol. 2, no. 6, 1931, p. 173. - Barnard, Discovery Rep., vol. 5, 1932, p. 189, fig. - Nicholls, Austral. Antarct. Exped. 1911-14, ser. C, Zool. and Bot., vol. 2, part 4, 1938, p. 98.
5. *E. microps* Walker, see Barnard, Discovery Rep., vol. 5, 1932, p. 191.
6. *E. parvus* Pirlot, Siboga-Exp., Monogr. 33 d, Leiden 1934, p. 210, figs.
7. *E. sp.* Pirlot, ibid. 1934, p. 212, figs.

303. *Eusirus* (?) *abyssi* n. sp. (Figs. 4-5).

Occurrence:

60°37' N, 27°52' W, 1505 m, 4°5. "Ingolf" St. 78: 13-VI-1895. 2 ♀ with large marsupium, length exclusive of telson (which is lost) 15 mm.

Description. The specimens are very defective; telson and distal part of several appendages are lost. The integument is somewhat horny as in *Eusirus*, not papyraceous and thin as in *Eusirogenes*.

Rostrum short. The 3 metasome segments and first urosome segment are carinate, each with a medio-dorsal tooth. Hind margin of third epimeral plate very finely serrate. Telson lost.

Eyes could not be found. Antenna 1, first joint as long as head + first segment, terminating in two dentiform processes; second joint a little shorter and more slender, ending in a single dentiform lappet; third joint very short, with a tongue-shaped lappet; the preserved part of flagellum as long as first joint of peduncle. Accessory flagellum a trifle longer than third joint of peduncle. Antenna 2, ultimate joint of peduncle a little shorter than penultimate joint; the preserved part of flagellum as long as peduncle, with numerous short joints.

Oral parts agree fairly well with those described and drawn by STEBBING (Trans. Linn. Soc. London, ser. 2, vol. 10, 11, 1904, p. 15, pl. 2 A) for *Eusirogenes dolichocarpus*, but differ in the following characters: epistome very high, higher than upper lip; mandibles: third joint in palp about as long as first + second joints (as in *Eusirus*), not shorter (as in *Eusirogenes*); lower lip: nothing noteworthy to remark; maxilla 1: inner plate very narrow, ending in two setae (STEBBING: "seemingly very slight"); palps: right palp has the two joints of equal length, in left palp second joint is twice as long as first joint (STEBBING: "first joint scarcely half as long as second"); maxilla 2 agrees fairly well with STEBBING l. c.; maxillipeds: outer plates about twice as broad as inner plates (STEBBING: "little broader . . ."); palp: first joint about half as long as second, which is a trifle longer than third joint; fourth joint in length about $\frac{3}{4}$ of 3rd joint (STEBBING: "second, third and fourth joints elongate, . . . subequal in length").

Pereopod 1: side-plate rather similar to *E. propinquus* (G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 417, pl. 147 fig. 1); the following joints of the limb not different from pereopod 2, but a trifle shorter. Pereopod 2: side-plate not deeper than broad, with fore corner rounded, and hind corner rectangular; second joint rather long, also fourth joint long; process on fifth joint

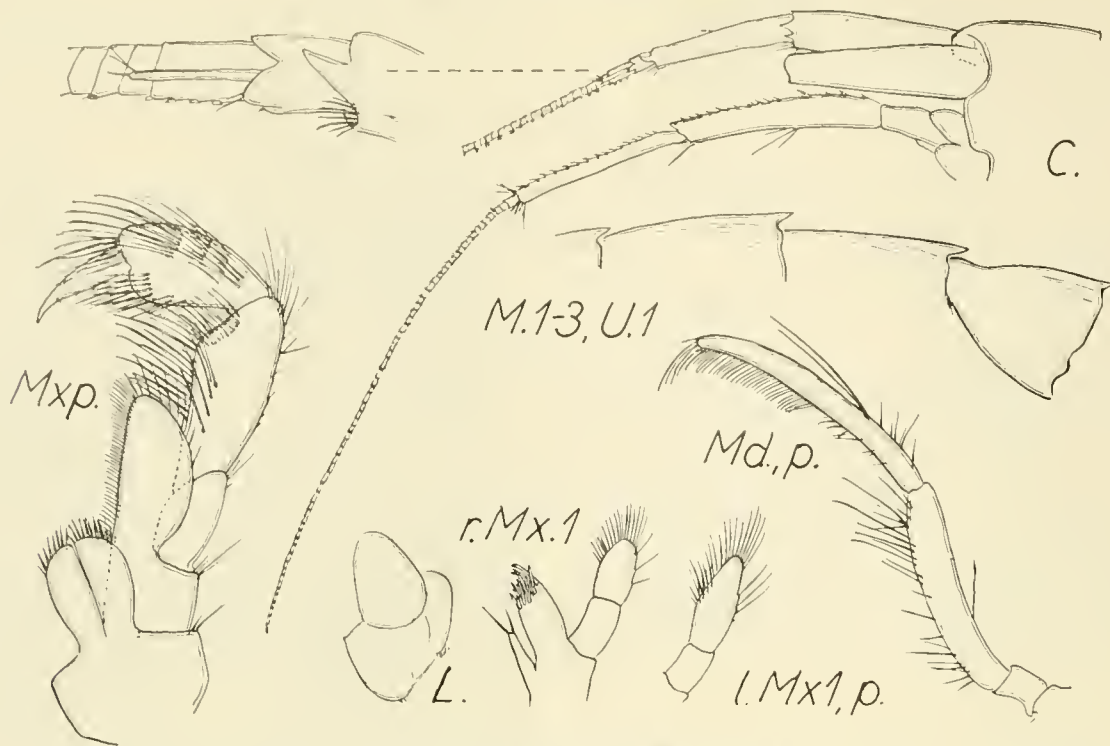


Fig. 4. *Eusirus abyssii*. *r.Mx.1* = maxilla 1 from the right side. *l.Mx.1p.* = palp of maxilla 1 from the left side.

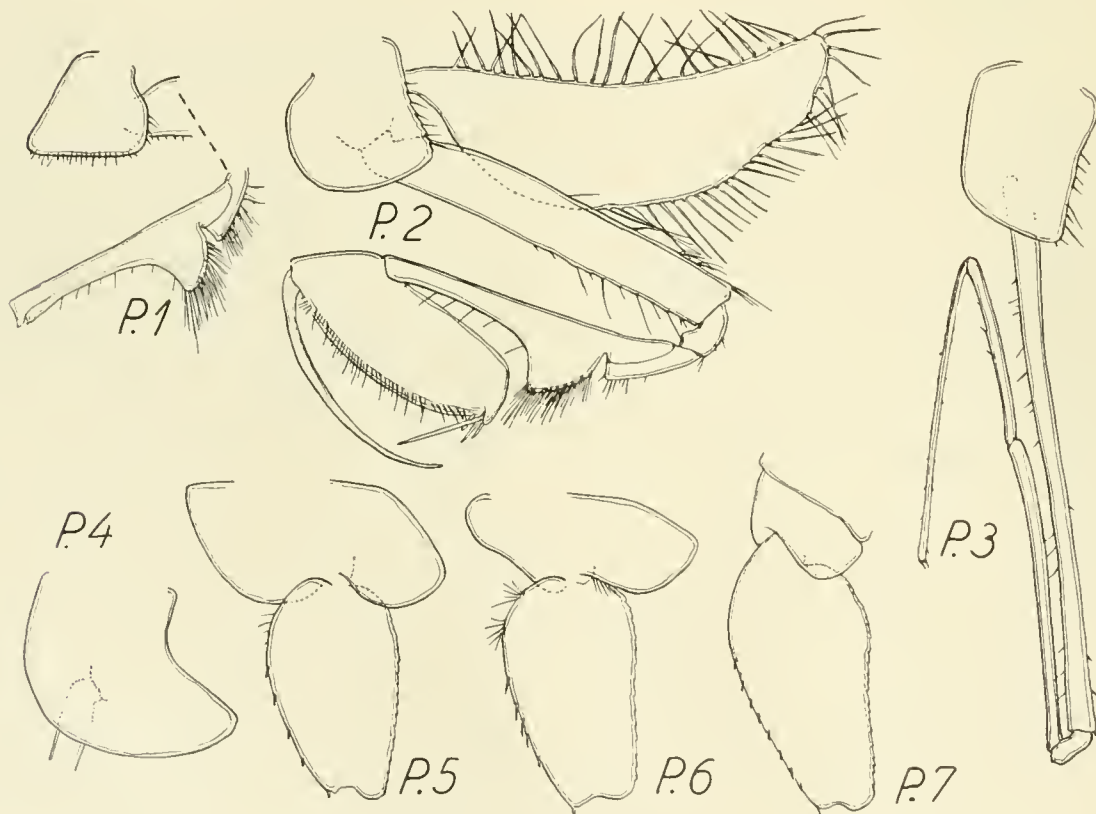


Fig. 5. *Eusirus abyssii*.

(carpus) very broad, broader than high; sixth joint (metacarpus), length about $\frac{2}{5}$ of breadth; the obtuse projection armed with 3 short and one very long spine; dactylus slender and curved. Pereiopod 3, side-plate somewhat rhomboid, but deeper than broad and deeper than side-plate 2; second joint very long, but a trifle shorter than fourth + fifth joints combined; 6th joint half as long as second, dactylus lost. Pereiopod 4, side-plate falcate,

about as broad as deep. Pereiopods 5-7, second joint of about equal length and breadth, hind margin finely serrate; joints 4-7 lost. Uropod 1 (rather defective) seems to be similar to *Eusirus*; uropods 2-3 and telson lost.

Affinities. This species belongs perhaps to *Eusirus* (head not arching over base of antennae 1; third joint of mandibular palp as long as first and second joints combined; pereopod 1



Chart II. Distribution of *Eusirus holmi*. ● = new localities, ○ = localities from the literature. + = the type-locality

not smaller than pereopod 2), perhaps to *Eusirogenes*¹) (distal margin of upper lip straight; inner plates of maxillipeds completely separate; shape of process on fifth joint of pereopods 1-2).

On the whole it seems to be more close to *Eusirus* than to *Eusirogenes*. It differs from all other species of *Eusirus*²) in the very broad process on fifth joint of pereopods 1-2 and in the very narrow 6th joint in the same limbs. The specific name *abyssi* is proposed in allusion to the very great depth (1505 m) in which it was taken.

304. *Eusirus tjalfiensis* K. Stephensen.

Eusirus tjalfiensis K. Stephensen, Vid. Medd. Naturh. Foren. Kjobenhavn, vol. 64, 1912 (1913), p. 94, fig. 5.

Occurrence:

70°41' N, 52°07' W, 750 m, 800 m wire out. "Tjalfe" St. 171: 6-VIII-1908.

Not taken outside this locality.

¹) Genus *Eusirogenes* Stebbing, Trans. Linn. Soc. London, ser. 2, vol. 10, II, 1904, p. 15, with the following 3 species:

1. *E. dolichocarpus* Stebbing (Bay of Biscay, mesoplankton trawl, 2000 to 1000 fathoms); *ibid.* p. 15, pl. 2 A.
2. *E. propinquus* Scott (59°36' N, 7°00' W, 1140 m); Scott, Ann. Mag. Nat. Hist., ser. 8, vol. 4, 1909, p. 31, pl. 2 figs. 1-9.
3. *E. deflexifrons* Shoemaker (Cabot Strait, Gulf of St. Lawrence, 387 m) Shoemaker, Contrib. Canad. Biol., vol. 5, 1930, p. 311, figs.

²) List of species, see above p. 9.

305. *Eusirus biscayensis* Bonnier.

Eusirus biscayensis Bonnier, Ann. Univ. Lyon, vol. 26, 1896, p. 651, pl. 39 fig. 1.

Eusirus biscayensis Stebbing, Tierreich, vol. 21, 1906, p. 342.

Eusirus biscayensis Sexton, Proc. Zool. Soc. London, 1909, p. 865, figs.

Occurrence:

61°07' N, 9°28' W, 820 m. "Thor" St. 78: 12-V-1904. 3 specimens (1 ♀ with marsupium, 2 ♂?), all rather defective.

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. About 10 specimens (♂, ♀), all rather defective.

In all these specimens uropod 3 is lost.

Distribution. Bay of Biscay 44°36' N, 4°38' W, 950 m, mud, 1 ♀ (type-locality; BONNIER). 48°7½' N, 8°13' W, about 475 m, fine sand, 1 ♂, 6 ♀ (SEXTON).

306. *Eusirus holmi* H. J. Hansen (Chart II).

Eusirus holmi H. J. Hansen. Dijnphna-Expedit., Kjobenhavn, 1886, p. 224, pl. 22 fig. 1.

Eusirus holmi Stebbing, Tierreich, vol. 21, p. 342.

Occurrence:

66°23' N, 12°05' W, 1011 m, ÷ 0°7. "Ingolf" St. 101: 10-VII-1896. 2 specimens, the largest (♂) 51.5 mm.

70°05' N, 8°26' W, 699 m, \pm 0°4. "Ingolf" St. 116: 23-VII-1896.
8 specimens, including 3 smaller and 5 larger specimens, two of which are ovigerous ♀ (length up to 48 mm).
67°40' N, 15°10' W, 932 m, \pm 0°6. "Ingolf" St. 124: 28-VII-1896.
2 specimens: one of them medium-sized, the other (♀ with marsupium) 49 mm.

Amerdlokfjord near Holsteinsborg, West Greenland, 250–450 m, several occurrences, numerous specimens. POUL M. HANSEN leg. 1935–1938, AD. S. JENSEN ded.

Distribution. Between Greenland and Arctic America 61°–78° N, 250–>700 m (see K. STEPHENSEN, Meddel. om Gronl.,

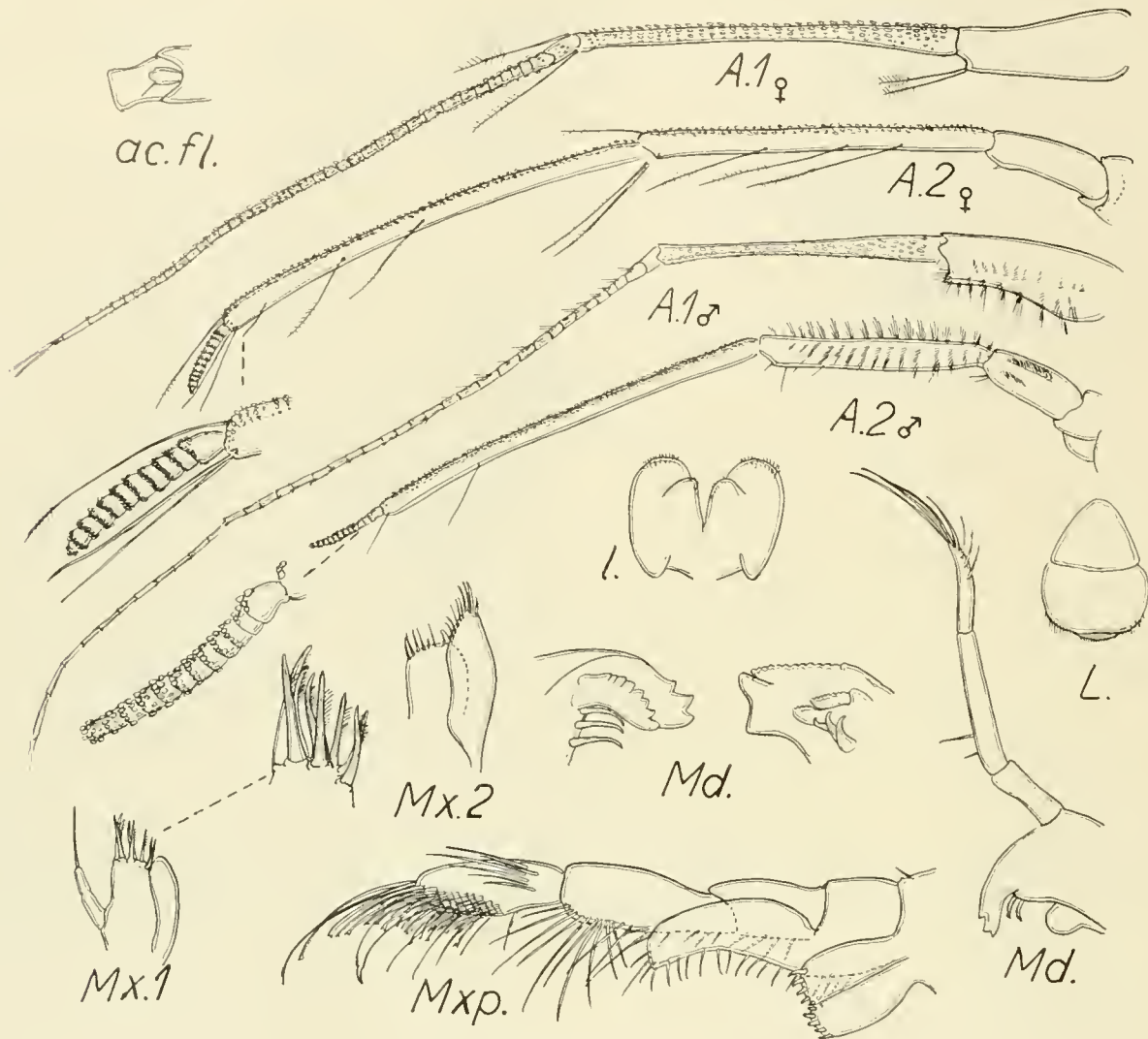


Fig. 6. *Eusirella elegans*.

69°19' N, 15°52' W, 552 m, \pm 0°5. "Ingolf" St. 126: 29-VII-1896.
1 ovigerous ♀ 49 mm.
63°26' N, 7°56' W, 887 m, \pm 0°6. "Ingolf" St. 138: 10-VIII-1896.
1 ♀ without marsupium 49.5 mm.
63°29' N, 6°57' W, 1469 m, \pm 0°9. "Ingolf" St. 140: 11-VIII-1896.
5 specimens, including 2 smaller and 3 larger; two of these are ♂, the largest of them 49.5 mm.
63°22' N, 6°58' W, 1279 m, \pm 0°6. "Ingolf" St. 141: 11-VIII-1896. 5 badly preserved specimens.
61°23' N, 4°21' W, about 900 m, \pm 0°4, mnd. Capt. WANDEL 1890.
1 medium-sized specimen.
61°23' N, 5°04' W, about 475 m. 0°. WANDEL 1890. 1 specimen.
63°10' N, 7°31' W, 1090 m, 1200 m wire out. "Thor" St. 230: 4-VIII-1904. 3 specimens.
63°36' N, 6°20' W, about 1900 m, 600 m wire out. "Thor" St. 12: 11-V-1913. 1 specimen.
67°19' N, 17°55' W, 820 m, 800 m wire out. "Thor" St. 204: 22-VII-1904. 1 specimen.
70°32' N, 8°10' W, 900 m. Clay with small stones. DEICHMANN leg. 2 specimens.

vol. 79, No. 7, 1933, p. 36, with chart); the Polar Basin from East Greenland to North of Siberia 96° E, depths usually 600–1900 m. For special localities, see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935–42, p. 285.

307. *Eusirus* spp.

Occurrence:

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 3 specimens (2 species, very defective).
61°07' N, 9°28' W, 820 m. "Thor" St. 78: 12-V-1904. 1 specimen, extremely defective.

Remarks. From "Thor" St. 99 3 specimens are available; they are, however, so defective, that they cannot be determined; probably they represent new species.

One of these species is represented by 2 specimens (♂), about 8 and 12 mm. The dorsal armature with teeth etc. is as in *E. cuspidatus* Kr. (G. O. SARS, Crust. of Norway, vol. 1, 1895, p. 416, pl. 116), but telson (lost in the small specimen) is apically entire, not cleft, of a shape rather similar to *Apherusa borealis* (Boeck)

(G. O. Sars l. c., pl. 155 fig. 2), but a little more slender. Rostrum half as long as first joint of antenna 1.

The other species from St. 99 (♂?, about 6 mm) has no dorsal teeth on first and second metasome segments. Rostrum short, telson apically damaged.

The specimen from St. 78 has dorsal teeth on the two first metasome segments.

Genus: *Meteuroides* Pirlot.

Meteuroides Pirlot, Siboga-Exp., Monogr. 33 d. 1931, p. 218.

308. *Meteuroides curvidactyla* (Pirlot).

Eusiroides curvidactyla Pirlot, Mem. Soc. R. Sc. Liège, 3e sér., vol. 15, 1919, p. 10, figs.

Meteuroides curvidactyla Pirlot, l. c. 1931, p. 218.

Occurrence:

56°56' N, 51°56' W, 3500 m, 3000 m wire out. "Godthaab" St. 10: 3-VI-1928. 1 specimen (♂?), 12 mm (K. STEPHENSEN, Meddel. om Gronl., vol. 79, No. 7, 1933, p. 38).

Distribution. Off Lissabon 37°31' N, 10°32' W, 2500 m wire out, 1 specimen (type-locality; PIRLOT l. c. 1931).

Genus: *Eusirella* Chevreux.

Eusirella Chevreux, Bull. Inst. Océan. Monaco, No. 121, 1908, p. 12.

Eusirella Schellenberg, D. Tiefsee-Exp., vol. 23, 1926, p. 228.

Eusirella Chevreux, Rés. Camp. Sci. Monaco, vol. 90, 1935, p. 103.

CHEVREUX has no true diagnosis of the genus. SCHELLENBERG l. c. has a good diagnosis, but neither CHEVREUX nor SCHELLENBERG had adult specimens. An important essential is the extremely short flagellum in antenna 2, in length but one fifth of the ultimate joint of peduncle.

309. *Eusirella elegans* Chevreux (Figs. 6-7).

Eusirella elegans Chevreux l. c. 1908, p. 12, figs. (= Chevreux l. c. 1935, p. 103, pl. 11, figs. 4, 8).

Eusirella elegans Barnard, Discovery Reports, vol. 5, 1932, p. 194. *Eusirella valdivia* Schellenberg l. c. 1926, p. 228, fig. (*vide* Barnard l. c.).

Occurrence:

61°08' N, 9°28' W, 820 m. "Thor" St. 78: 12-V-1904. About 10 specimens.

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. About 25 specimens up to 10 mm.

Remarks. The species is well described by CHEVREUX, SCHELLENBERG, and BARNARD; though each of these authors had but a single and not adult specimen (CHEVREUX: 1 "♂" (probably a ♀ juv.), 5 mm; SCHELLENBERG: 1 specimen (♀?), 5.5 mm; BARNARD: "1 ♂", 8.5 mm)), I have not much to add to their descriptions, but give figures of all the appendages.

The material contains several ♀♀ 10 mm in length, with well developed marsupiums. Antenna 1 as long as head + mesosome + metasome; length ratio of first and second joints: 3:8; third joint is very short, not essentially longer than the joints in flagellum. Accessory flagellum (seen only by SCHELLENBERG) is squamiform, minute. Flagellum a trifle longer than peduncle, with about 38 joints. Antenna 2 a little shorter than antenna 1; length ratio of third to fifth joints: 1 $\frac{1}{3}$:4:5; flagellum very short, in length but one fifth of ultimate joint of peduncle, 11-articulate. Oral parts are described by CHEVREUX (with figures) and SCHELLENBERG; numbers of spines and setae on oral parts are greater than recorded by SCHELLENBERG. First side-plate has lower hind corner

acute. Hands in pereopods 1-2 agree with CHEVREUX's figures (1908, fig. 7, G II—1935, pl. 11 figs. 7, G II); they are much broader than in SCHELLENBERG's figure. Pereopod 6 a trifle longer than pereopods 5 and 7; a few ciliated setae are preserved on pereopods 3-7, but no doubt there have been many more.

The adult male (about 8.5 mm) is easily recognizable from the female in the setose armature of antennae 1-2: first joint in peduncle of antenna 1 and penultimate joint of peduncle in antenna 2 have several transversal rows of stiff setae, but probably no calceoli as in the ♀. Antennae 1-2 not longer than in ♀. Length ratio of first and second joints in peduncle of antenna 1 is 5:8; flagellum nearly twice as long as peduncle, with about 39 joints. Antenna 2 reaches to middle of flagellum of antenna 1; length ratio of third to fifth joints: 2:4:7. Third joint of peduncle has two longitudinal rows of (sensory?) hairs. Flagellum in length but $\frac{1}{5}$ of last joint of peduncle, 12-articulate; upper side of last joint of peduncle and flagellum covered with calceoli.

I have not been able to find any sexual differences in other appendages than antennae.

Males are probably fairly rare: in the sample from "Thor" St. 99 there are 4 adult males, but 8 ♀ with marsupium.

Distribution. 47°01' N, 5°48' W, 1800 m, 1600 m wire out, 2¹⁰ p.m.: "Thor" St. 76: 10-III-1909; 3 specimens (in the Zoological Museum, Copenhagen). Azores 38°04' N, 26°07'30" W, 0-2500 m, 1 specimen (type-locality; CHEVREUX l. c.). 33°53' S, 9°26' E, 1000-0 m, day, 1 ♂ (BARNARD l. c.). 31°21' S, 9°46' E, 3000-0 m, depth of the sea 5283 m, 1 specimen (*E. valdivia*; SCHELLENBERG l. c.).

Genus: *Cleonardo* Stebbing.

Cleonardo Stebbing, Tierreich, vol. 21, 1906, p. 346.

310. *Cleonardo appendiculatus* (G. O. Sars).

Tritropis appendiculata G. O. Sars, Norske Nordhavs-Exp., Crust., vol. 1, 1885, p. 194, pl. 16 fig. 3.

Cleonardo appendiculatus Stebbing, Tierreich, vol. 21, 1906, p. 347.

Cleonardo appendiculata K. Stephensen, Meddel. om Gronl., vol. 79, No. 7, 1933, p. 39, figs.

Occurrence:

Baffin Bay 69°50' N, 61°37' W, 1880 m, 3000 m wire out. "Godthaab" St. 51: 14-VII-1928. 2 specimens (K. STEPHENSEN l. c. 1933).

Distribution. NW. of Northern Norway 70°51' N, 13°03' E, 2354 m, ÷ 1°2, Biloculina clay (type-locality: G. O. Sars l. c.).

311. *Cleonardo microdactylus* K. Stephensen.

Cleonardo microdactylus K. Stephensen, Vid. Meddel. Naturh. Foren. Kjobenhavn, vol. 64, 1912 (1913), p. 90, figs.

Cleonardo microdactylus K. Stephensen, Meddel. om Gronl., vol. 79, No. 7, 1933, p. 10, figs.

Occurrence:

64°06' N, 55°18' W, 1040-1100 m, 1200 m wire out (type-locality; K. STEPHENSEN 1912).

63°19' N, 26°50' W, 1130 m, 1000 wire out; 62°19' N, 56°00' W, 2550 m, 2500 m wire out; 56°56' N, 3500 m, 3000 m wire out (K. STEPHENSEN 1933).

Distribution. 17°10' N, 18°02' W, 2240 m wire out (PIRLOT, Mém. Soc. R. Sci. Liège, sér. 3, fasc. 3, 1929, p. 16).

Genus: *Rhachotropis* S. J. Smith.

Rhachotropis G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 123.

Rhachotropis Stebbing, Tierreich, vol. 21, 1906, p. 347.

The following species were erected from 1906 (STEBBING, l. c.) to 1938 (Zoological Record):

R. anomala Barnard (close to *R. gracilis* Bonnier; near Cape Point, 650 fath.). Barnard, Ann. S. Afr. Mus., vol. 15, 1916, p. 182, no fig.

R. lomonosovi Gurjanova (near *R. macropus* G. O. Sars and *R. leucophthalma* G. O. Sars; Kara Sea, 500–350 m). Gurjanova, Zool. Anzeiger, vol. 108, 1934, p. 124, figs.

R. natator (Holmes) (Santa Catalina Island, California, 2196–2228 fath.; Santa Cruz Island, 447–510 fath.). *Gracilipes natator* Hol-

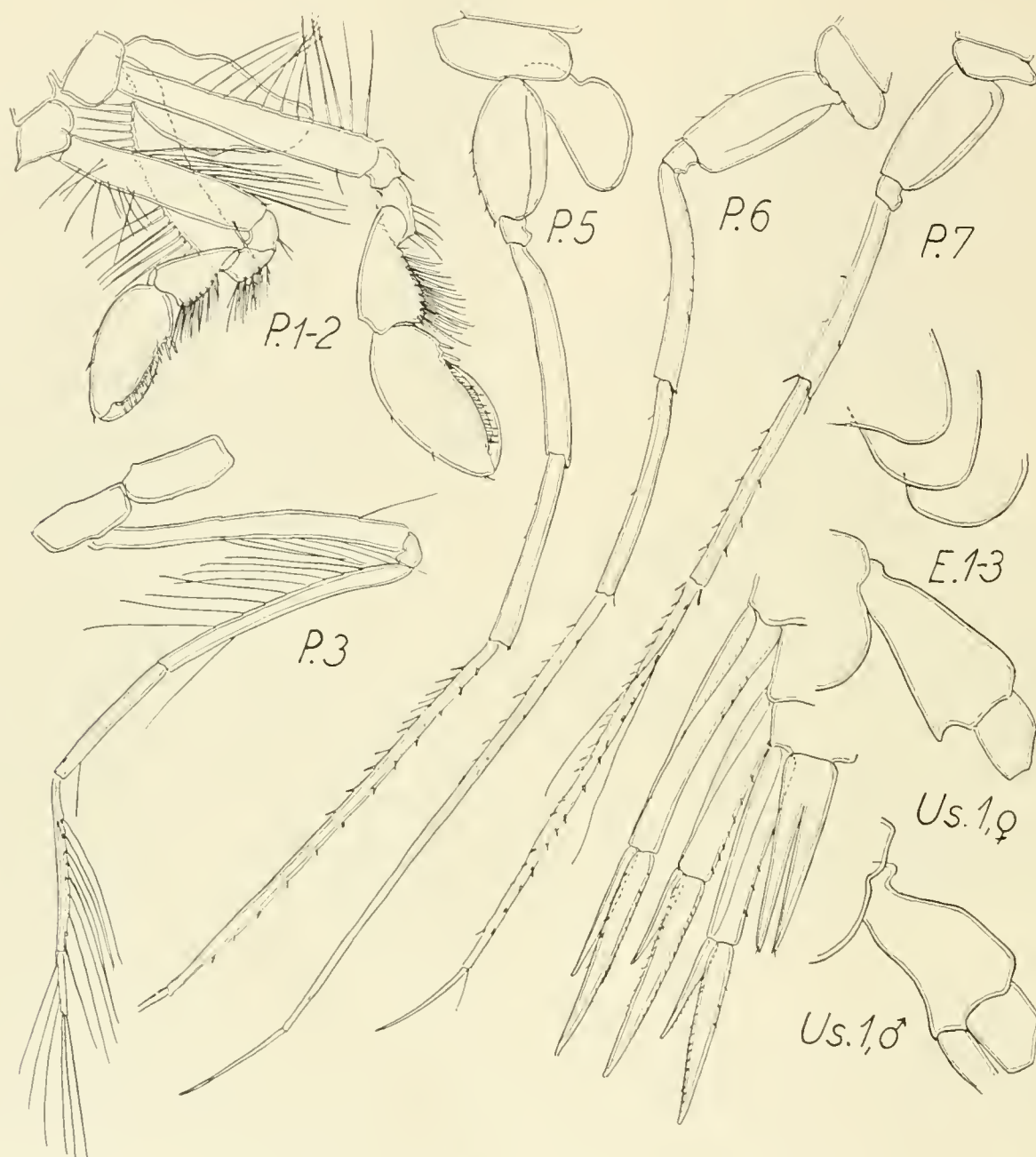


Fig. 7. *Eusirella elegans* ♀, and urosome segment 1 ♂.

R. antarctica Barnard (close to *R. inflata* (G. O. Sars); South Shetlands etc.). Barnard, Discovery Rep., vol. 5, 1932, p. 194, no fig.

[*R. diploops* Strauss (nomen nudum; Atlant.). Strauss, D. Tiefsee-Exp., vol. 20, 1909, p. 38 (no description), pl. 4 figs. 24, 25. Does not belong to this genus, see Barnard, Discovery Rep., vol. 5, 1932, p. 193.]

R. distincta (Holmes), see below, species No. 319.

R. hunteri Nicholls (near *R. kergueleni* Stebbing; antarctic) Nicholls, Australas. Antaret. Exped. 1911–14, Sci. Rep. 2, part 2, 1938, p. 98, figs.

R. lobata Shoemaker (c. 18°40' N, 64°50' W, 350–550 m). Shoemaker, Smithsonian Misc. Coll., vol. 91, no. 12, 1934, p. 3, figs.

mes, Proc. U. S. Nat. Mus., vol. 35, 1909, p. 527, figs. – *R. natator* Shoemaker, Contrib. Canad. Biol., vol. 5, 1929 (1930), p. 316.

R. paeneglaber Barnard (near Cape Point, 250–400 fath.). Barnard, Ann. S. Afr. Mus., vol. 15, 1916, p. 181, pl. 27 fig. 10

R. palporum Stebbing (59°36' N, 7° W, 400 m). Stebbing, Jour. Zool. Soc. London, vol. 30, 1908, p. 194, pl. 28. – Barnard, Ann. S. Afr. Mus., vol. 15, 1916, p. 179.

R. palporum f. *pacifica* Schellenberg (8°7.5' S, 104°10.5' W, 2084 fath.). Schellenberg, Bull. Mus. Comp. Zool., Harvard Coll., vol. 69, No. 9, 1929, p. 201.

R. platycera Barnard (close to *R. kergueleni* Stebbing; Great Barrier Reef). – Barnard, Great Barrier Reef Exped., vol. 4, No. 4, 1931, p. 122, fig.

R. proxima Chevreux (close to *R. rostrata* Bonnier; Bay of Biscay, 4380 m). — Chevreux, Bull. Inst. Monaco, No. 201, 1911, p. 11, figs. = Chevreux, Rés. Camp. Sci. Monaco, vol. 90, 1935, p. 110, figs.

R. siboga Pirlot (close to *R. kergueleni* Stebbing; 8° S, 117° E, 1310 m). Pirlot, Siboga-Exp., vol. 33d, 1931, p. 216, figs.

R. sp. (close to *R. helleri* (Boeck)). Schellenberg, Further Zool. Res. Swed. Antaret. Exped. 1901-03 . . . edited by Sixten Bock, vol. 2, No. 6, Stockholm 1931, p. 173.

313. *Rhachotropis (kergueleni)* Stebbing (?) (Fig. 8).

Rhachotropis kergueleni Stebbing, "Challenger", vol. 29, 1888, p. 955, pl. 85.

Rhachotropis kergueleni Stebbing, Tierreich, vol. 21, 1906, p. 349.

Rhachotropis kergueleni Barnard, Ann. S. Afr. Mus., vol. 15, 1916, p. 718.

The species was established by STEBBING on two specimens, probably males. Later BARNARD l. c. recorded an ovigerous female; he writes that it agrees with STEBBING's males "in all respects

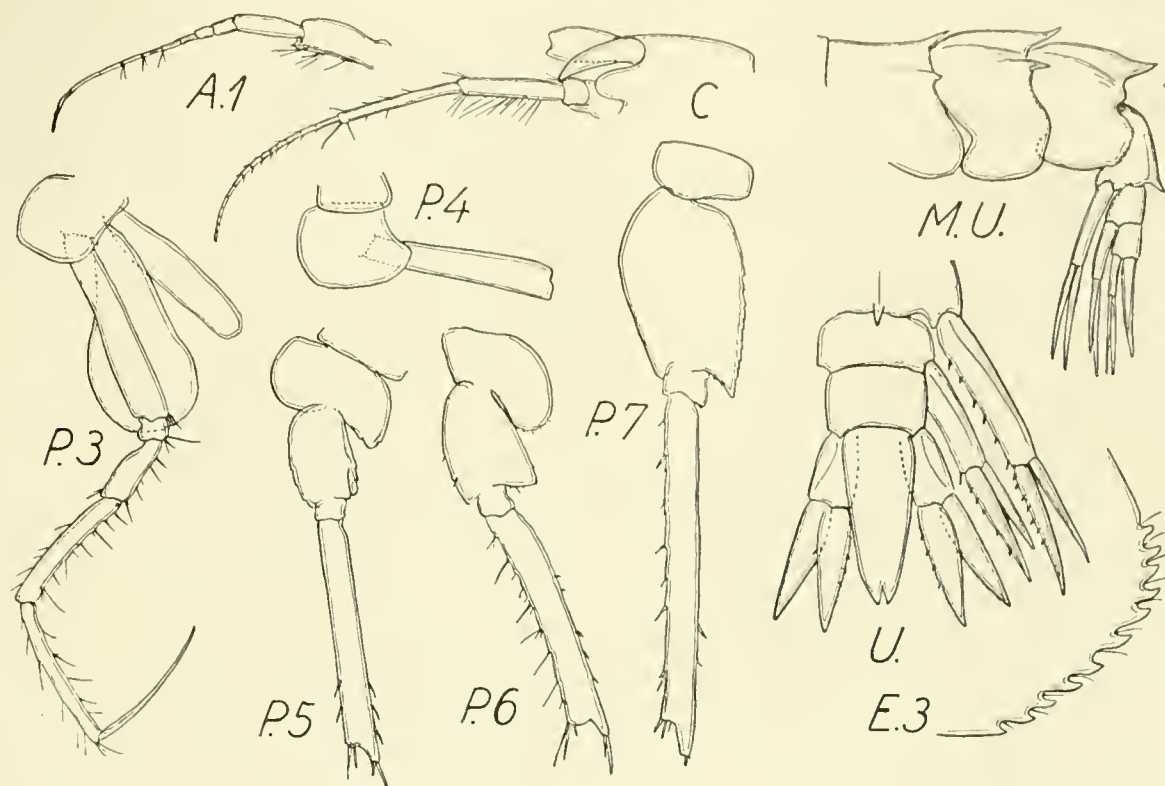


Fig. 8. *Rhachotropis (kergueleni)* ♀; "Ingolf" St. 35.

312. *Rhachotropis aculeata* (Lepechin).

Rhachotropis aculeata G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 424, pl. 149.

Rhachotropis aculeata Stebbing, Tierreich, vol. 21, 1906, p. 348.

Occurrence:

64°07' N, 11°12' W, 446 m, 2°5. "Ingolf" St. 4: 13-VI-1895. 2 specimens up to about 20 mm.

65°00' N, 11°16' W, 584 m, ÷ 0°1. "Ingolf" St. 59: 20-V-1896. 1 specimen about 35 mm.

Though it is very abundant along the coasts of Greenland and Iceland (but not the Faroes) at depths from about 20-300 m, it is very rarely found at depths so great as the two above-named from the "Ingolf"-Expedition. The occurrences hitherto known from depths > 400 m are nearly all in the "Ingolf"-area and are as follows: NW. Greenland 77°17' N, 69°59' W, 930 m, ÷ 0°4 (K. STEPHENSEN, Meddel. om Grøn., vol. 79, No. 7, 1933, p. 42); North of Iceland 66°32' N, 18°50' W, 480 m, and East Iceland 63°25' N, 10°30' W, 505 m (K. STEPHENSEN, Zool. of Iceland, vol. 3, No. 26, 1940, p. 48); 40°59' N, 51°15' W, 1100 m, 3°7 (J. GRIEG, Rep. Sci. "Michael Sars", vol. 5, 1931, p. 3).

Distribution. Widely distributed in the Arctic with adjacent areas, probably circumpolar; for special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 287, for map see K. STEPHENSEN, Zool. of Iceland, vol. 3, No. 26, 1940, p. 80.

except the shorter antennæ and the slightly more dehiscent apices of the telson".

Occurrence:

64°54' N, 55°10' W, 740 m, 3°8. "Ingolf" St. 27: 1-VII-1895. 1 ovigerous ♀.

65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895. 2 ♀ with marsupium.

Remarks on ♀ with large marsupial plates (but without marginal setæ), about 12 mm ("Ingolf" St. 35). In the long rostrum, the dorsal armature of metasome segments 1-3 and urosome segment 1, the serrate hind margin of metasome segment 3, the very small second joint of pereopods 5-6, the acute lower hind corner of second joint of pereopod (6-7), and the telson, this form is very close to *R. kergueleni* Stebbing (STEBBING's two specimens were probably males).

Rostrum is only a trifle shorter than first joint of antenna 1 (regarding *R. kergueleni* Stebbing says only that "the rostrum is very long and narrow, depressed between the upper antennæ"). Eyes could not be found. Metasome segment 1 has a dorsal tooth, but no dorsal carina; metasome segments 2 and 3 and urosome segments have each a high dorsal carina ending in a large tooth. Epimeral part of metasome segment 3 dentate only along the lower two thirds, not also along the upper third. Antennæ 1 rather similar to STEBBING's figure, but much shorter (STEBBING's specimens of *R. kergueleni* were ♂?); they are as long as head + 3 (or 4) mesosomic segments, reach a trifle beyond peduncle of an-

tenna 2. There is a little, bud-like accessory flagellum, as in *R. rostrata* (Fig. 9), and flagellum has 8-9 joints. Peduncle of antenna 2 rather similar to that of ♂, but shorter: flagellum as long as the two distal joints combined, 14-15-articulate. Oral parts were not dissected out. Pereiopods 1-7 similar to *R. kergueleni* (distal joints of prp. 4-7 are lost), except that prp. 5 (STEBBING: prp. 3) has lower hind corner of second joint rounded, not acute, and prp. 6 (STEBBING: prp. 4) has hind edge of second joint rather smooth, not markedly serrate as in STEBBING's figure. Also uropods 1-3 and telson agree with *R. kergueleni*: but I have not been able to find the plumose setae and small spinules on telson drawn by STEBBING.

Length 12 mm (STEBBING: 11 mm (♂?); BARNARD: 15 mm (♀ ovig.)).

As stated above the "Ingolf"-species is very close to *R. kergueleni*.

According to the literature 7 species are said to be closely allied to the said species; this means probably that the lower hind corner of second joint of pereiopod 7 is acute, and that rostrum is rather long.

But some of the species have an other arrangement of the dorso-lateral teeth (see the table). Regarding the number of the

Rhachotropis, species close to *R. kergueleni*
(for literature, see above, pp. 14-15).

	Dorsal tooth				Dorso-lateral teeth				
	Mss. 7	Mts. 1	Mts. 2	Mts. 3	Us. 1	Mts. 1	Mts. 2	Mts. 3	Us. 1
<i>R. anomala</i>	-	-	x	-	x	-	-	-	-
<i>R. antarctica</i>	-	x	x	o	x	x	x	-	o
<i>R. hunteri</i>	-	x	x	+	x	x	x	o	-
<i>R. kergueleni</i>	-	x	x	x	x	x	x	o	-
<i>R. paeneglaber</i>	-	-	x	-	x	-	x	-	-
<i>R. platycera</i>	x	x	x	x	x	x	x	-	-
<i>R. proxima</i>	-	x	x	x	+	x	x	-	-
<i>R. siboga</i>	-	x	x	x	o	x	x	+	-
The "Ingolf"-species ...	-	x	x	x	x	x	x	-	-

Explanation of table. Mss. 7 = mesosome segment 7. — Mts. 1-3: metasome segments 1-3. — Us. 1: Urosome segment 1. + is a minute terminal point, not a real tooth.

said teeth only three agree with the "Ingolf"-species; they are: *R. hunteri*, *R. kergueleni*, and *R. proxima*. But *R. proxima* differs in apex of telson (apically simply cleft, the two apices not dehiscent): *R. hunteri* has the median carina on metasome segment 3 "rounded above, produced into minute terminal point". The present specimens are more closely allied to *R. kergueleni* than to any of the other species, and the differences from STEBBING's description and drawings are rather small. Therefore I have determined them as *R. (kergueleni)*!

Distribution. Kerguelen, depth not specified (type-locality; STEBBING 1888). Cape Point N. 81° E., distant 32 miles, 400 fathoms (BARNARD 1916).

314. *Rhachotropis grimaldii* (Chevreux).

Rhachotropis grimaldii Chevreux, Rés. Camp. Sci. Monaco, vol. 16, 1900, p. 68, p. 9 fig. 1 (1 ovigerous ♀).

Rhachotropis grimaldii Stebbing, Tierreich, vol. 21, 1906, p. 350.

Rhachotropis elegans Bonnier, Ann. Univ. Lyon, vol. 26, 1896, p. 658, pl. 39 fig. 4 (2 ♂).

Rhachotropis elegans Stebbing, Tierreich, vol. 21, 1906, p. 350.

Rhachotropis grimaldii Baruaud, Ann. S. Afr. Mus., vol. 15, 1916, p. 179 (= *R. elegans*).

Rhachotropis grimaldii + *R. elegans* Chevreux, Travailleur et Talisman, Amphip. 1927, p. 95, figs., p. 96.

Occurrence:

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 2 ♂.

62°10'08" N, 19°36' W, 1900-2150 m. "Thor" St. 164: 12(13)-VII-1903. 1 ♀ with marsupium.

Remarks. The specimens from "Thor" St. 99 (1904) have the proximal joints of antenna 1 preserved; a small accessory flagellum is present (as in BONNIER l. c., fig. 4c). The two ♂♂ have mesosome segments dorsally undulating behind as in BONNIER's fig. (♂), the ♀ has the mesosome segments dorsally smooth as in CHEVREUX's fig. (♀); the difference seems to be a sexual character.

Distribution. 1. Atlantic Ocean. 44°17' N, 4°45' W, 960 m, mud (*R. elegans*, type-locality; BONNIER l. c.). Between 43°12'50" N, 11°53'30" W, 510 m, and 43°12'15" N, 11°52' W, 363 m, mud (*R. grimaldii*, type-locality; CHEVREUX 1900). 43°46' N, 4°27' W, 1143 m, mud: 38°06' N, 11°31' W, 460 m, mud; 21°53' N, 19°22' W, 888 m, clayish sand; 21°53' N, 19°50' W, 655 m, clayish sand (*R. grimaldii*; CHEVREUX 1927). Cape Point E by N, distant 29 miles, 250-300 fm.; Cape Point N 81° E, distant 32 miles, 460 fm.; Cape Natal N by E., distant 24 miles, 440 fm. (*R. grimaldii* = *R. elegans*, BARNARD 1916).

2. Mediterranean. 43°2'57" N, 2°58'30" E (off Marseille), 555 m, mud (*R. grimaldii*, CHEVREUX 1927).

315. *Rhachotropis helleri* (Boeck).

Rhachotropis helleri G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 426, pl. 150.

Rhachotropis helleri Stebbing, Tierreich, vol. 21, 1906, p. 351.

Rhachotropis helleri Sexton, Proc. Zool. Soc. London, 1909, p. 869, figs.

Occurrence:

65°14' N, 55°42' W, 791 m, 3^o5. "Ingolf" St. 28: 1-VII-1895. 1 ♀ with large but empty marsupium, about 14 mm: most of the legs are missing.

64°15' N, 29°06' W, 1070 m, 4^o4. "Ingolf" St. 90: 21-VI-1896. 1 ♀ with large but empty marsupium, about 13 mm; very defective, the determination not certain.

It is new to these West Atlantic waters, but recorded from East Greenland.

Distribution. From Kara Sea and Spitsbergen to Bay of Biscay; also from recorded Bering or Okhotsk Sea. It has however, frequently been confused with the next species, *R. macropus*, and therefore several records are not certain. Further see K. STEPHENSEN, Tromso Mus. Skr., vol. 3, 1935-42, p. 289.

316. *Rhachotropis (macropus)* G. O. Sars(?).

Rhachotropis macropus G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 428, pl. 151 fig. 1.

Rhachotropis macropus Stebbing, Tierreich, vol. 21, 1906, p. 352.

Occurrence:

66°23' N, 8°52' W, 1090 m, ÷ 0°6. "Ingolf" St. 103: 10-VII-1896. 1 ♀ with large, but empty marsupium, very defective, length from head to urosome segment 1 17 mm (urosome segments 2-3 and telson are lost); the determination not certain.

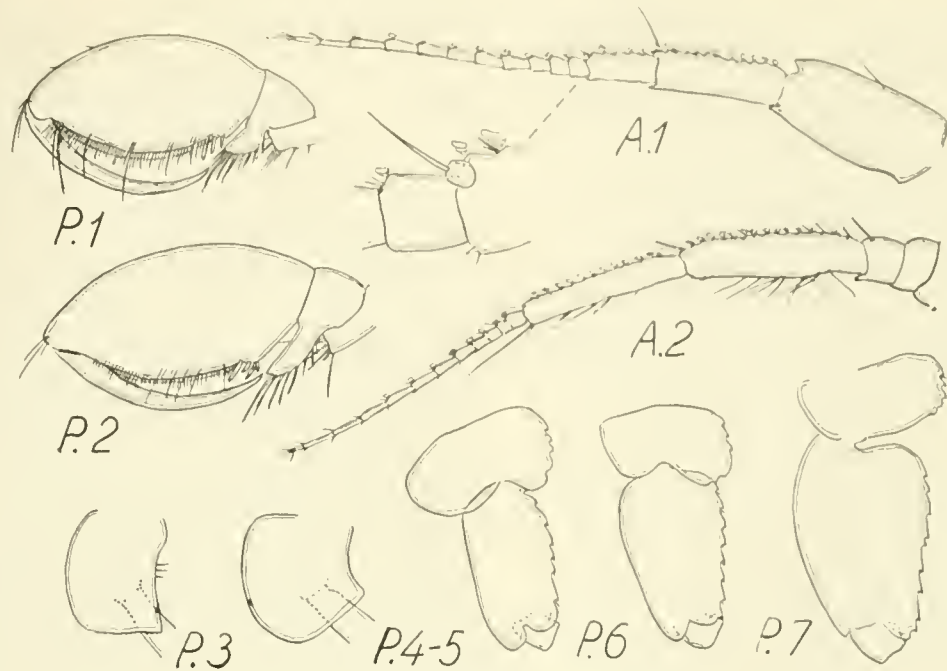
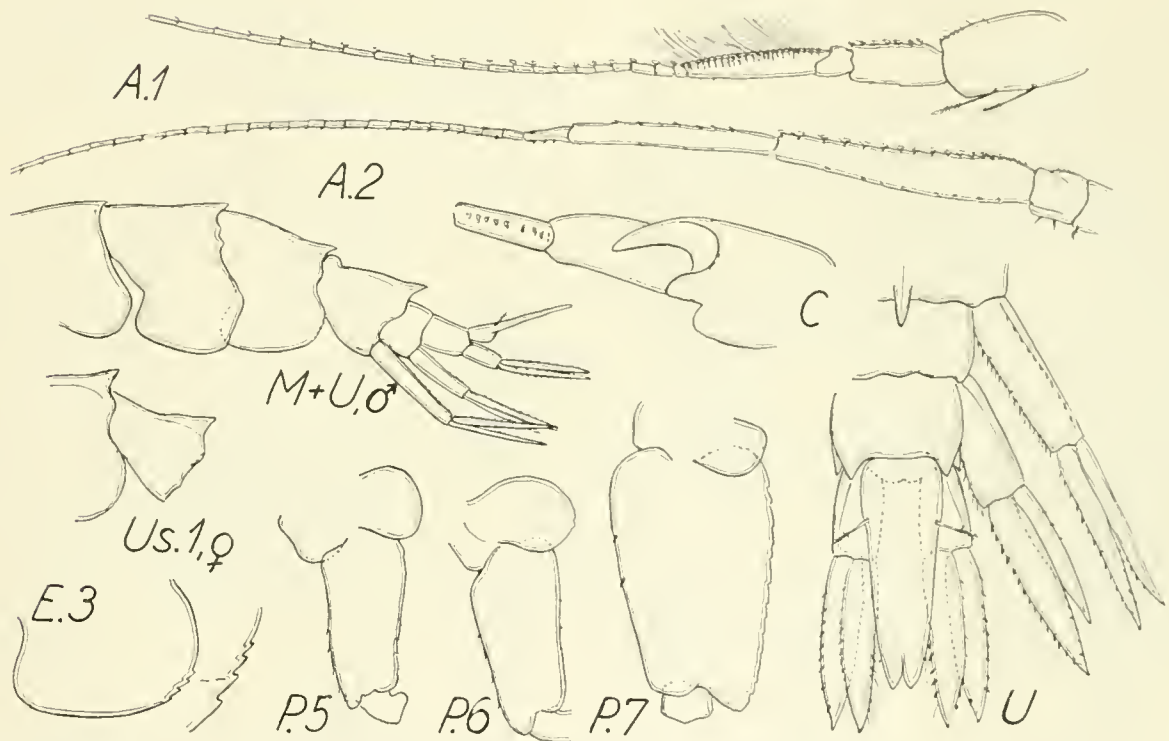
Distribution. About as *R. helleri* (above), see K. STEPHENSEN l. c. 1935-42, p. 290.

317. *Rhachotropis rostrata* Bonnier (Fig. 9).

Rhachotropis rostrata Bonnier, Ann. Univ. Lyon, vol. 26, 1896, p. 653, pl. 39 fig. 2 (1 ♂, 13 mm).

Rhachotropis rostrata Stebbing, Tierreich, vol. 21, 1906, p. 353.

Rhachotropis rostrata Sexton, Proc. Zool. Soc. London, 1909, p. 869, pl. 81, figs. 46-48 (4 ♂, 9-10 mm).

Fig. 9. *Rhachotropis rostrata* ♀.Fig. 10. *Rhachotropis faeroensis*. All the figures are from ♂, except urosome segment 1 in lateral view which is from ♀.

Rhachotropis rostrata Pesta, Zool. Anzeiger, vol. 51, 1920, p. 33, fig. 4 (1 specimen (sex?), 10.5 mm).

Rhachotropis rostrata Chevreux, Rés. Camp. Sci. Monaco, vol. 90, 1935, p. 110 (2 specimens, sex?).

Occurrence:

61°07' N, 9°30' W, 835 m. "Thor" St. 78: 12-V-1904. 7 specimens, including 6 ♀ with marsupium, about 10 mm, very defective.

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. About 10 specimens, including 2 ♀ with large, but empty marsupium, 11 mm, very defective.

Remarks on ♂. Like BONNIER I have not found accessory flagellum, though it is present in ♀ (see below); on the whole the few ♂♂ seem to agree well with BONNIER l. c. and PESTA l. c. The oral parts were not dissected out.

Remarks on ♀. As no ♀ is described in the literature, I give some remarks and some figures of this sex.

♀ 10 mm, very defective. Antenna 1 as long as head + mesosome: first joint of peduncle rather stout: length ratio of joints in peduncle: 3:2:1; upper edge of second joint has about 12, third joint has 5 calceoli. There is a little, bud-like accessory

flagellum. Flagellum, in length equal to peduncle, has about 11 joints. Antenna 2 a trifle longer than antenna 1, the two distal joints in peduncle somewhat equal in length and calceoliferous along upper edge; flagellum in length $\frac{2}{3}$ of peduncle, 12-articulate. Hands of pereopods 1-2 more stout than drawn by BONNIER (1896, fig. 2n) and PESTA (1920, fig. 7d). Pereopods 3-7 more or less defective; I give figures of side-plates 3-7 and of basal parts of pereopods 5-7, of which BONNIER has description but no figures. Uropods 1-3 do not differ from ♂.

Distribution. 44°17' N, 4°38' W, 950 m, clay (type-locality: BONNIER 1896). 48°07'5 N, 8°13' W, about 450 m, fine sand (SEXTON 1909). 33°59'30" N, 8°12'15" W, 851 m, red clayish sand with *Globigerina* (CHEVREUX 1935). Adria 42°11' N, 17°51'30" E, 1216 m (PESTA 1920).

318. *Rhachotropis distincta* (Holmes).

Graeilipes distincta Holmes, Proc. U. S. Nat. Mus., vol. 35, 1908, p. 529, fig.

Rhachotropis distincta Shoemaker, Contrib. Canad. Biol. Fish., new ser., vol. 5, 1930, p. 98, figs.

It is probably synonymous with

Rhachotropis gracilis Bonnier, Ann. Univ. Lyon, vol. 26, 1896, p. 657, pl. 39 fig. 3.

Rhachotropis gracilis Stebbing, Tierreich, vol. 21, 1906, p. 353.

Rhachotropis gracilis Chevreux, Amphip. Travailleur-Talisman, 1927, p. 97.

Occurrence:

62°57' N, 19°58' W, 957 m. "Thor" St. 166: 14-VII-1903. 1 ♀ with marsupium, about 8 mm.

Remarks. The present specimen is rather defective; antenna 1 and distal joints of pereopods 4-7 are entirely missing. It was not dissected; but it seems to agree excellently with SHOEMAKER's description of *R. distincta* which is said (SHOEMAKER l. c., p. 99) to be "either identical or very closely related" to *R. gracilis* Bonnier.

Distribution. 1. *R. distincta*. Santa Cruz island, California, about 900-1200 m, 1 ♀ (type-locality; HOLMES l. c.). Cabot Strait (south of New Foundland), 378 m, soft mud, 15 specimens (♂, ♀) (SHOEMAKER l. c.). Off Martha's Vineyard 39°49' N, 71°25' W, 400 m, 2 specimens (in the Zool. Museum, Copenhagen, kindly presented by U. S. Nat. Mus.).

2. *R. gracilis*. Bay of Biscay 44°17' N, 4°38' W, 950 m, mud, 17 specimens, and 44°05' N, 4°45' W, 960 m, mud, 4 specimens (type-localities; BONNIER l. c.). 43°46' N, 4°27' W, 1143 m, mud, 1 specimen (CHEVREUX l. c.).

319. *Rhachotropis faeroensis* n. sp. (Fig. 10).

Occurrence:

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 4 specimens. 61°08' N, 9°28' W, 820 m. "Thor" St. 78: 12-V-1904. 2 specimens.

Description. Rostrum extends to the middle of first joint of antenna 1, slightly curved; lateral lobes of head half as long as rostrum, obtuse. Eyes probably absent. Pereion not carinate, but the three metasome segments and first urosome segment each with a median tooth, second metasome segment besides with two pairs of very small dorso-lateral teeth. Urosome segment 1 in ♂, but not in ♀, with a deep dorsal depression behind a knob. Third epimeral plate evenly rounded, with a few (3-4) small denticulations. Telson covers the proximal two thirds of the rami of uropod 3, evenly tapering, cleft for about $\frac{1}{8}$ of the length, apices acute.

Antennae 1-2 in ♂ at least as long as head + mesosome (apices lost); accessory flagellum could not be found. Antenna 1 ♂ has in flagellum > 22 joints, antenna 2 > 26 joints. Antennae 1-2 ♀ are lost. Oral parts but slightly differing from *R. helleri* (G. O. Sars, Crust. of Norway, vol. 1, 1895, pl. 150), but palp of mandibles a little longer. Pereopods 1-2 agree fairly well with those of *R. rostrata* (fig. 9), except that lobe on fifth joint is shorter and broader. On pereopods 3-4 nothing is noteworthy. Side-plates of pereopods 5-7 with hind margin entire, except for a couple of very minute serrations in pereopod 6. Pereopods 5-6, second joint with hind margin entire; in prp. 7 it is faintly serrate, with lower hind corner rounded quadrate; distal parts of prp. 5-7 lost. Uropod 1 slender, rami in length subequal to peduncle, outer ramus a trifle shorter than inner. Uropods 2-3, rami lanceolate; outer ramus in urop. 2 in length $\frac{3}{4}$ of inner. Uropod 3, the two rami equal in length.

All the specimens are more or less defective.

Length: ♂ about 10 mm; ♀ with large marsupium about 8 mm.

This species is rather close to *R. paeneglaber* Barnard (Ann. S. Afr. Mus., vol. 15, 1916, p. 181, pl. 27 fig. 10). There seem to be the following differences:

	<i>R. paeneglaber</i>	<i>R. faeroensis</i>
Metasome segment 2	1 pair of dorso-lateral teeth	2 pairs of very small dorso-lateral teeth
Metasome segment 3	no dorsal teeth	1 dorsal tooth
Epimeral plate 3	many (according to BARNARD'S fig. at least about 10) teeth	3-4 very small teeth
Telson	cleft for $\frac{1}{3}$ of its length	cleft for $\frac{1}{8}$ of its length
Pereopod 7, lower hind corner of second joint	quadrate, somewhat acute	quadrate, somewhat rounded

Family: *Lepechinellidae* Schellenberg.

Dorbanellidae Schellenberg, Mitt. Zool. Mus. Berlin, vol. 11, 1925, p. 205.

Lepechinellidae Schellenberg, D. Südpolar-Exped., vol. 18, 1926, p. 344.

Lepechinellidae Pirlot, Siboga-Exp., Monogr. 33c, 1933, p. 156.

This family is probably (PIRLOT l. c., p. 167) close to the fam. *Gammaridae*, representing an abyssal branch of that family; previously SCHELLENBERG and BARNARD had placed it near the fam. *Atylidae*.

Up to 1938 two genera are described.

Key of the genera.

Palp of mandible enormous *Paralepechinella* Pirlot l. c., p. 161 (with one sp.: *P. longipalpa* Pirlot l. c., p. 161, figs.; Makassar Strait, 1300 m).

Palp of mandible normal *Lepechinella* Stebbing

Genus: *Lepechinella* Stebbing.

Lepechinella Stebbing, Jour. Linn. Soc., Zool., vol. 30, 1908, p. 191.

Dorbanella Chevreux, Bull. Inst. Océanogr., Monaco, No. 296, 1914.

Lepechinella Pirlot, l. c. 1933, p. 156 (with lit.).

Up to 1938 six species are described.

Type-species: *L. chrysotheras* Stebbing 1908 (see below).

Key to the species.

- 1 a. Side-plate 1 apically cleft 2.
- 1 b. Side-plate 1 not cleft 3.
- 2 a. Lateral lobe of head produced into two spines
L. schellenbergi n. nom. (see below)
- 2 b. Lateral lobe of head not produced into two spines ...
L. chrysotheras Stebbing (see below).
- 3 a. No dorsal spines on mesosome segments ... *L. ectrata* Barnard
 (Discovery Rep., vol. 5, 1932, p. 186, fig.; South
 Shetlands, 312 m)
- 3 b. Dorsal spines or teeth on mesosome segments 4.
- 4 a. Dorsal spines on metasome segments much longer than
 those on mesosome segments ... *L. curvispinosa* Pirlet
 (l. c. 1933, p. 156, figs.; east of Celebes, 835 m)
- 4 b. Dorsal spines on metasome segments not much longer
 than those on mesosome segments 5.
- 5 a. Lateral lobe of head produced into two spines, in length
 equal to rostrum *L. drygalskyi* Schellenberg
 (l. c. 1926, p. 345, fig.; "Gauss"-Station, depth?)

5 b. The upper of the two spines on lateral lobe of head much longer than rostrum, the lower minute ... *L. echinata* (= *Dorbanella ech.* Chevreux) (l. c. 1908, p. 1, figs.; Bay of Biscay 46 17'30" N, 5 42' W, 1380 m).

320. *Lepechinella chrysotheras* Stebbing.

Lepechinella chrysotheras Stebbing, Jour. Linn. Soc. London, Zool., vol. 30, 1908, p. 192, pl. 27.

Occurrence:

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 3 ♂ up to about 8 mm.

STEBBING had only a single specimen (a ♂). I have nothing to add to his description.

Distribution. 59°41' N, 3°08' W, 850 m, 1 ♂ (type-locality; STEBBING l. c.).

321. *Lepechinella schellenbergi* nom. nov. (Fig. 11).

Lepechinella sp. Schellenberg, Mitt. Zool. Mus. Berlin, vol. 11, 1925, p. 206, fig.

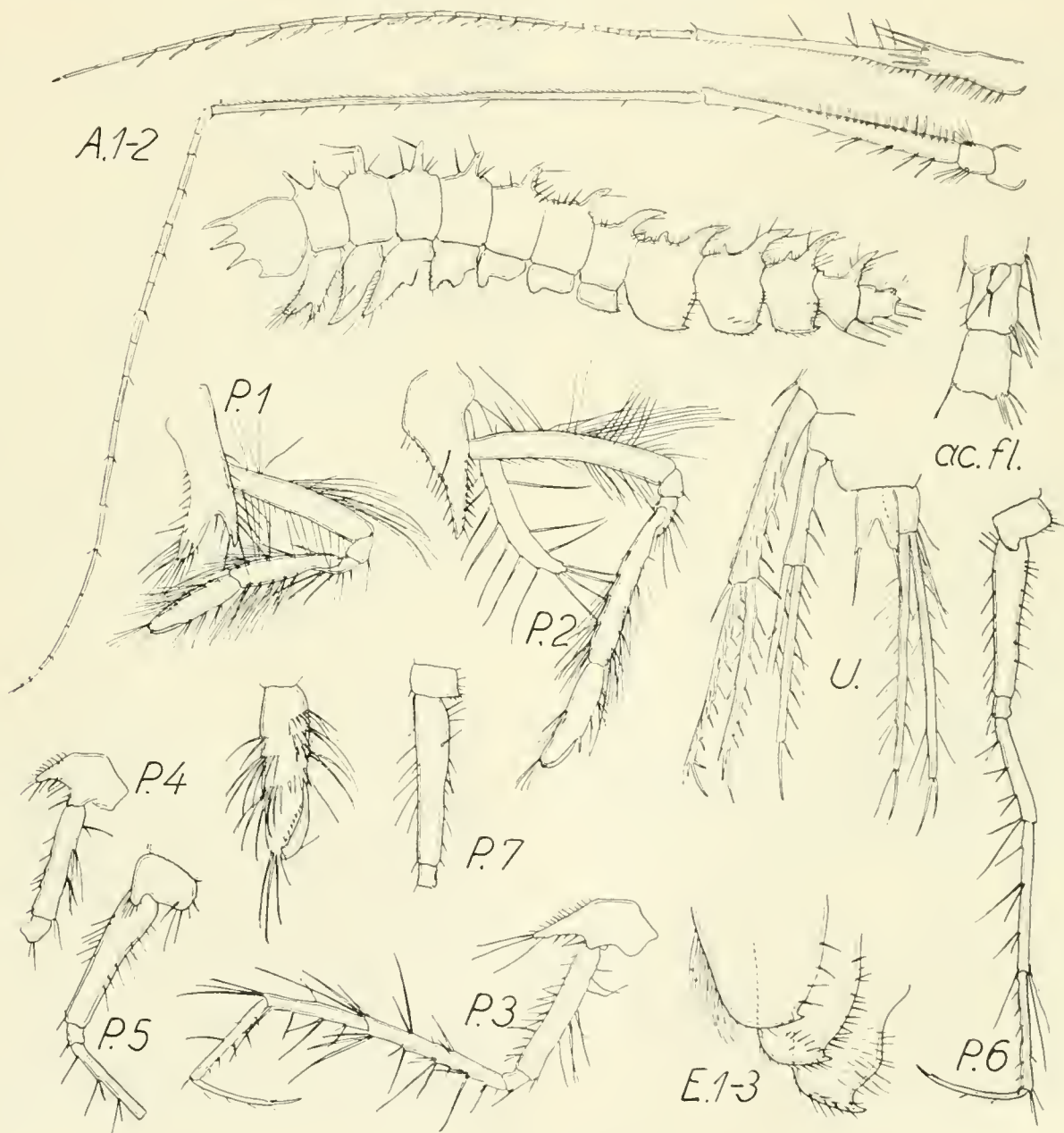


Fig. 11. *Lepechinella schellenbergi*.

Lepechinella sp. K. Stephensen, Tromsø Mus. Skr., vol. 3, 1935-42, p. 271 (translation from SCHELLENBERG l. c.).

Occurrence:

66°35' N, 56°38' W, 599 m, 3°9. "Ingolf" St. 32: 11-VII-1895.
3 specimens.

65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895.
About 10 specimens.

Remarks. These specimens agree fairly well with SCHELLENBERG l. c. (S. had but a single, rather defective specimen); a few additions or corrections are, however, needed, and I add figures of all appendages except oral parts.

SCHELLENBERG writes: "Integument stark inkrustiert"; but in the "Ingolf"-specimens it is rather soft. Rostrum of somewhat varying length, equal to or longer than upper spine in lateral lobe of head. SCHELLENBERG writes: "II-IV Seitenplatte nehmen an Länge gleichmässig ab"; by a miswriting I have (l. c.) written "Increasing in length".

Antenna 1 about as long as mesosome + metasome, antenna 2 about 1½ times as long. Flagellum in antenna 1 twice as long as peduncle, has about 26 joints. Antenna 2, ultimate joint of peduncle very slender, in both sexes nearly twice as long as penultimate joint; flagellum somewhat longer than ultimate joint of peduncle, has about 20 joints, most of them very long. Oral parts were not dissected out.

Uropoda (not described by SCHELLENBERG) long, slender, reaching equally far behind. Uropod 1, rami in length equal to peduncle, in uropod 2 somewhat longer than peduncle, in uropod 3 even 5 times as long as peduncle. Telson somewhat longer than peduncle in uropod 3, slender, cleft in distal half; either half terminating in a tooth and a long spine.

Length up to 7 mm; SCHELLENBERG had a single specimen, length without urus 5.5 mm.

There is no sexual difference in antennæ 1-2 and pereopods 1-2.

Distribution. North of Spitsbergen 81°20' N, 20°30' E, 1000 m (SCHELLENBERG l. c.).

Family: Gammaridæ Leach.

Gammarida G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 481.

Gammarida Stebbing, Tierreich, vol. 21, 1906, p. 364.

Genus: *Melita* Leach.

322. *Melita richardi* Chevreux (Fig. 12).

Melita richardi Chevreux, Rés. Camp. Sci., Monaco, vol. 16, 1900, p. 81, pl. 10 fig. 3.

Occurrence:

63°06' N, 56°00' W, 2258 m, 2°4. "Ingolf" St. 24: 25-VI-1895.
1 specimen, about 6 mm.

62°10'08" N, 19°36' W, 1900-2150 m. "Thor" St. 164: 12(13)-VII-1903. 2 specimens, about 6-9 mm.

Remarks. On the whole these specimens agree well with CHEVREUX l. c., but are more or less defective; i. a. uropod 3 is lost in all the specimens.

The largest specimen is probably ♀ (pereopod 2!; see CHEVREUX l. c., fig. 2c), but I have found no marsupial plates. It differs from CHEVREUX l. c. in the following details: second joint in pereopods 5-7 is broader; epimeral plates of metasome segments 1 and 2 have lower hind corner rectangular (according to CHEVREUX plate 1 is "arrondi", plate 2 is "légèrement prolongé et aiguë"), that of segment 3 is denticulate not only in upper edge, but especially along under edge. Urosome segment I has 3 dorsal teeth (not one), the central of which is the largest; also urosome segment 2 has dorsally 3 teeth, + 2 spines (CHEVREUX writes "cinq petites dents"). Uropod I has a stout spine at proximal fourth of peduncle.

Distribution. 38°34'30" N, 30°26'30" W, 1287 m, fine sand, 28 specimens (type-locality), and 38°38' N, 30°28'15" W, 620 m, sand and gravel, 1 specimen (CHEVREUX l. c.). 39°21'20" N, 31°05'53" W, 1360 m; 39°21'20" N, 31°05'45" W, 1360 m; 37°39' N, 25°17'45" W, 1230 m; 38°17' N, 30°16' W, 1331 m (CHEVREUX, Rés. Camp. Sci., Monaco, vol. 30, 1935, p. 115).

323. *Melita abyssorum* n. sp. (Figs. 13-14).

Occurrence:

63°06' N, 56°00' W, 2258 m, 2°4. "Ingolf" St. 24: 25-VI-1895.
About 10 specimens (♀; no ♂?), length up to about 25 mm.

Description of ♀ with empty marsupium, 25 mm. Back rounded; all segments entirely smooth, but urosome segment 1 with one small dorsal tooth, segment 2 with one pair of dorso-lateral teeth. Head, lateral lobe rounded, very little protruding; post-antennal corner rectangular. Eyes entirely missing. Antenna 1 nearly as long as body; first joint with two hairs on under edge; second joint in length equal to first joint, but more slender, with a few hairs on upper edge; third joint about 1/3 the length of second joint. Flagellum twice as long as peduncle, with about 45 joints. Accessory flagellum 5-articulate, as long as three first joints of flagellum. Antenna 2 half the length of antenna 1, the two distal joints of peduncle subequal in length; flagellum half the length of peduncle, about 12-jointed. Oral parts not essentially different from *M. palmata* (G. O. Sars, Crust. of Norway, vol. 1,



Fig. 12. *Melita richardi*.

1895, pl. 179), but mandibles have palp much more slender, with first joint longer, and with much fewer setae, about as in *M. obtusata* (G. O. Sars l. c. 1895, p. 180 fig. 1M); maxilla 1, inner plate with 13-14 marginal setae.

Pereiopods 1-3, side plates somewhat oval, Nos. 1-2 each with a small tooth on lower hind corner; side-plate of pereiopod 1

Uropod 3 a little shorter than urop. 1, outer ramus over twice the length of peduncle, inner ramus very short. Telson half as long as peduncle of urop. 3, lobes acute, each half with a dorsal spine near apex.

This species is characterised by the combination of the following essentials: no eyes; metasome segments smooth, but one dorsal

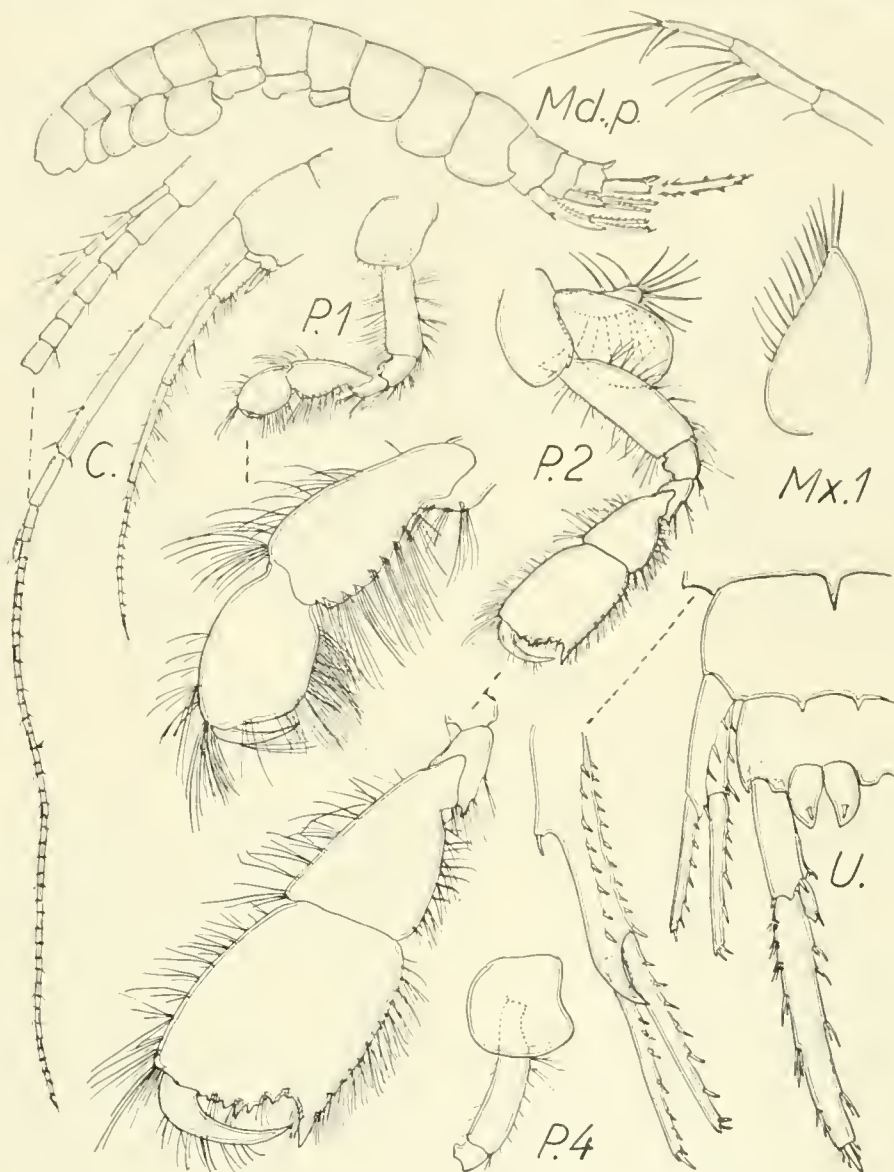


Fig. 13. *Melita abyssorum* ♀. Mx.1 = inner plate of maxilla 1.

much broader, breadth nearly equal to depth. Pereiopod 1, 5th joint about $1\frac{1}{3}$ times the length of 6th joint; 6th joint oval, palm oblique, not defined from under edge; finger acute. Pereiopod 2 much stronger, 5th joint broad, 6th joint still broader, a little longer than 5th joint, with parallel edges; palm oblique, dentate, angular near finger hinge, defined by a tooth-like process; finger large, curved, acute. Pereiopods 3-4 have rather long hairs on 5th and 6th joints, fingers short. Pereiopods 5-7 increasing in length from prp. 5 to prp. 7; second joint large, oblong oval, hind margin finely serrate and in prp. 7 a little concave in lower half; lower hind corners sub-rectangular. Epimeral plate 1 rounded behind; No. 2 rounded, with a minute tooth on lower hind corner; No. 3 acutely produced.

Uropods 1 and 2 reaching equally far back. Uropod 1, peduncle has in the middle of underside a hump with a spine, and ends in a large dentiform process: the two rami equal in length, as long as peduncle. Urop. 2, outer ramus a trifle shorter than inner.

tooth on urosome segment 1, and two sub-dorsal teeth on urosome segment 2; a spine in the middle of underside of peduncle of uropod 1. Besides it is found at much greater depth than any other species of the genus, except *M. richardi*.

One of the large ♀♀ had in marsupium a rhizocephalid(?) parasite, globular, about 4 mm in diameter.

324. *Melita dentata* (Kroyer).

Melita dentata G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 513, pl. 181 fig. 1.

Melita dentata Stebbing, Tierreich, vol. 1, 1906, p. 427.

Occurrence:

78°14' N, 74°20' W, 672 m, ± 0°5. "Godthaab" St. 99: 8-VIII-1928 (K. STEPHENSEN, Meddel. om Grønland, vol. 79, No. 7, 1933, p. 43).

Distribution. Widely distributed in the northern Atlantic with adjacent arctic seas, etc., usually in the littoral-sublittoral zones. It has never before been recorded from depths so great as that cited above. For special localities, see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 307.

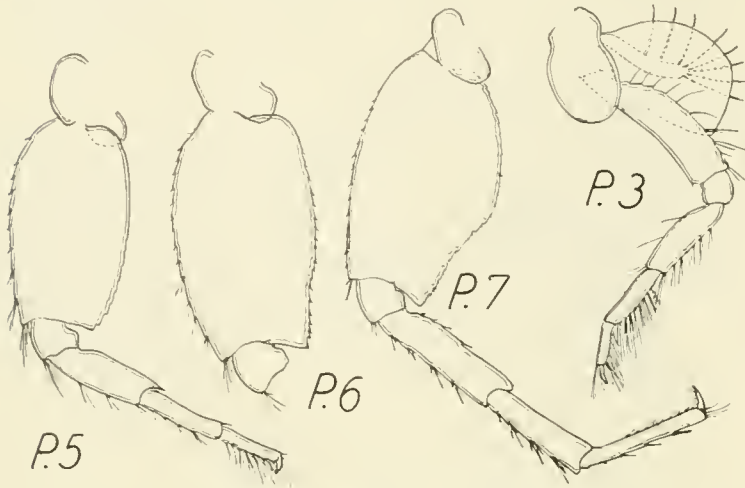


Fig. 14. *Melita abyssorum* ♀.

Genus: *Ceradocus* Costa.

Ceradocus Stebbing, Tierreich, vol. 21, 1906, p. 430.

325. *Ceradocus torelli* (Goës).

Ceradocus torelli Stebbing l. c., p. 432.

Ceradocus torelli Brüggén, Mem. Acad. Sci., St.-Petersbourg, sér. 8, vol. 18, 1909, p. 38, pl. 1 fig. 4.

Ceradocus torelli K. Stephensen, Zool. of Iceland, vol. 3, No. 26, 1940, p. 54.

Occurrence:

West Greenland: Amerdlokkfjord near Holsteinsborg, 350-500 m, numerous specimens (K. STEPHENSEN l. c.).

Distribution. From West Greenland (see above) to Bering or Okhotsk Sea, depths usually 24-240 m. An arctic species. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 310.

326. *Ceradocus baffini* K. Stephensen.

Ceradocus baffini K. Stephensen, Meddel. om Gronl., vol. 79, No. 7, 1930, p. 43, figs.

Occurrence:

Baffin Bay 67°48' N, 60°46' W, 1600 m, temp. ?. "Godthaab" St. 162 (type-locality; K. STEPHENSEN l. c.).

Not found anywhere else.

Family: *Aoridae* Stebbing.

Photida (in parte) G. O. Sars, Crust. of Norway, vol. 1, 1895, pp. 539-551 (not pp. 551-577).

Aorida Stebbing, Tierreich, vol. 21, 1906, p. 585.

Genus: *Aora* Krøyer.

327. *Aora typica* Krøyer.

Aora gracilis G. O. Sars l. c., p. 545, pl. 193.

Aora gracilis Stebbing l. c., p. 587.

Occurrence:

63°30' N, 54°25' W, 1096 m, 3°3. "Ingolf" St. 25: 26-VI-1895. 2 ♀, defective.

Hitherto it was not found at so great a depth, and it is not known from Greenland, Iceland, or the Faroes.

Distribution. Very widely distributed in nearly all seas except the Arctic and Antarctic areas, see CHEVREUX & FACE, Faune de France, vol. 9, 1925, p. 293.

Genus: *Lembos* Bate.

Autonoë G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 540.

Lembos Stebbing, Tierreich, vol. 21, 1906, p. 594.

328. *Lembos (longidigitans)* (Bonnier?) (Fig. 15).

Autonoë longidigitans Bonnier, Ann. Univ. Lyon, 1896, p. 659, pl. 40 fig. 1.

Lembos longidigitans Stebbing l. c., p. 595.

Occurrence:

63°30' N, 54°25' W, 1096 m, 3°3. "Ingolf" St. 25: 26-VI-1895. 3 specimens about 4-6 mm.

Remarks. With some doubt I have referred these specimens to BONNIER's species, i. a. because of the absence of eyes, and the very long dactyli on pereopods 3-4, almost as long as the preceding joints. All the specimens are probably ♂ (they have no marsupial plates).

But they do not agree entirely with BONNIER's description and figures; the disagreements are as follows: lateral lobes of head oval, projecting, not "not at all prominent". Antenna 1 (lost in BONNIER's specimen) about as long as mesosome + metasome: first joint in length equal to head, second joint a trifle longer, but more slender, and thrice as long as third joint; flagellum about twice the length of peduncle, with about 23 joints. Accessory flagellum 3-articulate. Antenna 2 (lost in BONNIER's specimen) half as long as antenna 1; the two distal joints of peduncle subequal in length, flagellum half as long as peduncle, with about 8 joints. Oral parts were not dissected out, but seem to agree with BONNIER's figures. Pereiopod 1 not as heavy as in BONNIER's fig. 11; second and 5th joints more slender, but hand and finger agree with BONNIER's specimen; there is a strong spine a little behind the tooth on the palm (not mentioned by BONNIER). Pereiopods 2-4 agree with BONNIER, but dactyli in prp. 3-4 a trifle shorter than the preceding joints, not "exactement de même longueur que le propodite"; prp. 3-4 are entirely alike; side-plate of prop. 4 almost quadrate. Prp. 5-7 have second joint much narrower than in BONNIER's figure (B. writes "les basipodites élargis et ovulaires"); dactylus in prp. 6 two thirds the length of metacarpus, in prp. 7 not half as long as metacarpus. Epimeral plates of metasome segments 1-3 rounded, in segment 3 not as protruding as in B.'s figure. Uropods 1-3 and telson seem (without dissection) to agree with BONNIER l. c.

Distribution. 44°17' N, 4°38' W, 950 m, mud (type-locality; BONNIER l. c.).

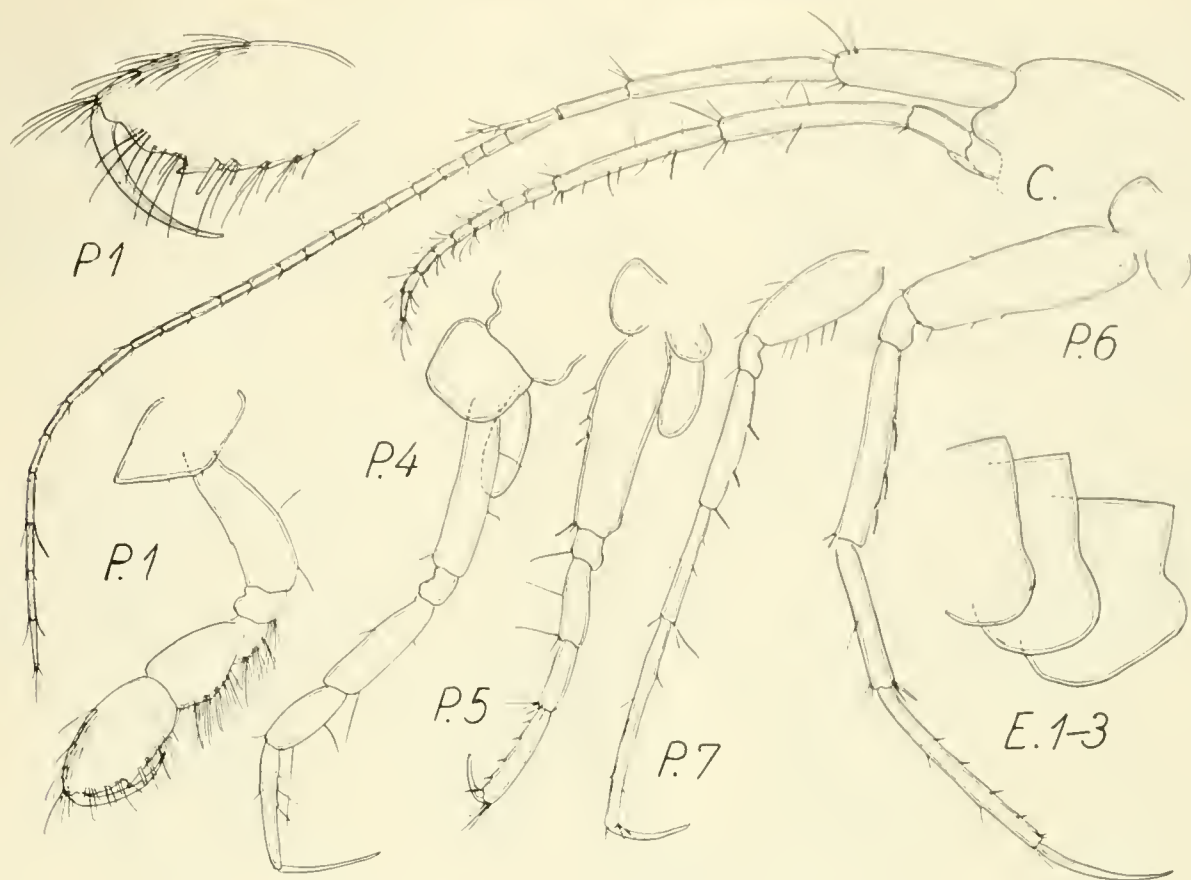


Fig. 15. *Lembos (longidigitus?)*. Pereiopod 7 is from the small specimen.

Family: Photidæ Boeck.

Photidæ (in parte) G. O. Sars, Crust. of Norway, vol. 1, 1895, pp. 551-577 (non pp. 538-551).

Photidæ Stebbing, Tierreich, vol. 21, 1906, p. 603.

Genus: *Photis* Krøyer.

329. *Photis reinhardti* Krøyer.

Photis reinhardti G. O. Sars l. c., p. 569, pl. 202.

Photis reinhardti Stebbing l. c., p. 607.

Occurrence:

64°07' N, 11°12' W, 446 m, 2°5. "Ingolf" St. 4: 13-VI-1895. 1 ♂ juv.

65°16' N, 55°42' W, 791 m, 3°5. "Ingolf" St. 28: 1-VII-1895. 1 ♂.

64°44' N, 32°52' W, 1838 m, 1°4. "Ingolf" St. 92: 25-VI-1896. 1 ♂.

Though these specimens are secured at extraordinary great depth (- the usual depths are 10-100(200) m -), they agree well with Sars's figures.

Distribution. Widely distributed in the northern Atlantic with adjacent arctic waters, etc. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 369.

Genus: *Eurystheus* Bate.

Gammaropsis G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 557.

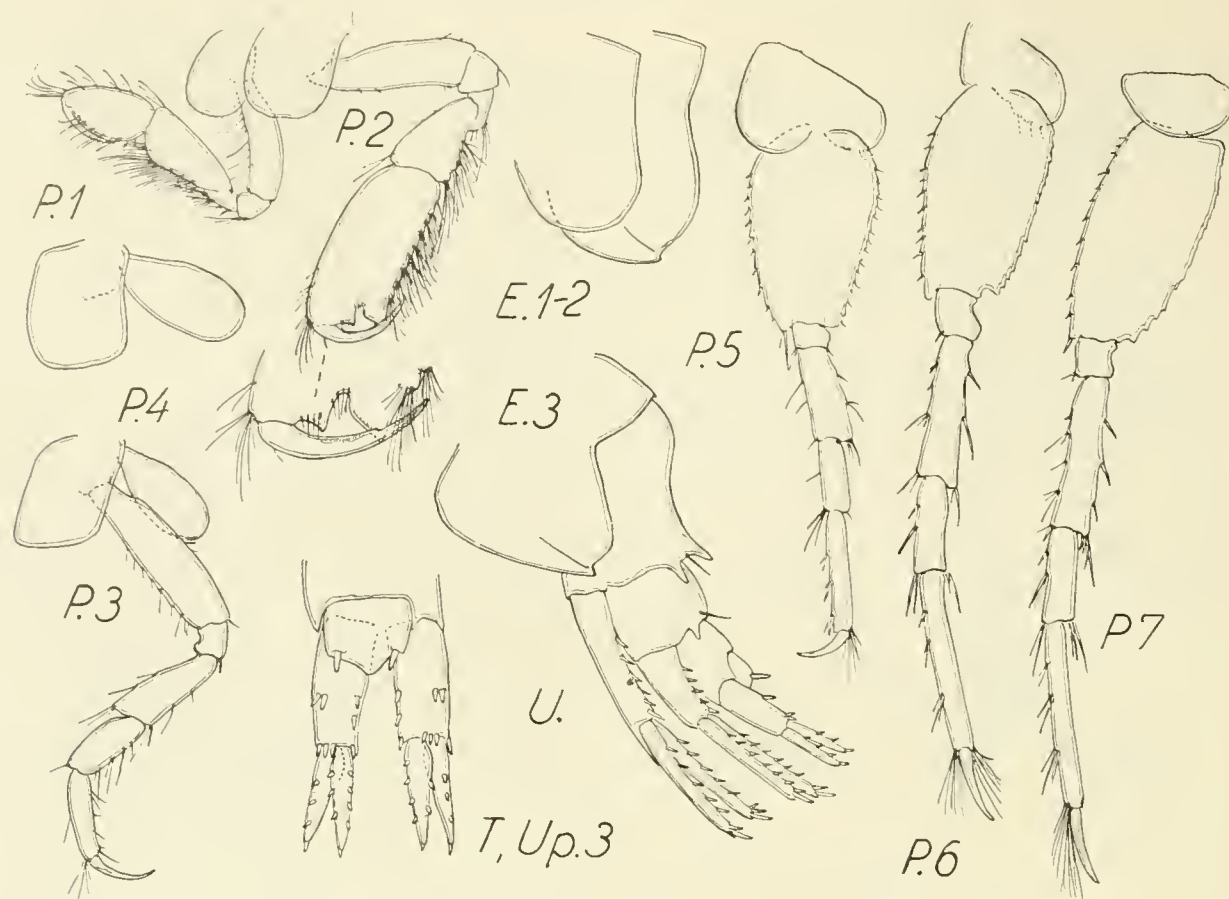
Eurystheus Stebbing, Tierreich, vol. 21, 1906, p. 610.

330. *Eurystheus abyssalis* n. sp. (Fig. 16).

Occurrence:

61°15' N, 9°55' W, 900 m. "Thor" St. 99: 22-V-1904. 2 specimens (♂), about 6 mm.

Description of ♂, 6 mm (♀ unknown). Head as long as the two first segments combined, with lateral lobes acute, as in *E. melanops* (G. O. Sars l. c., pl. 199.1C). Dorsal side of body rounded, not dentate, except on metasome segments 1-2 (see below). Eyes small, round, colourless. Antenna 1, second and third joints subequal in length; flagellum has > 8 joints (apex lost); accessory flagellum 4-articulate. Antenna 2 as long as mesosome; relative lengths of joints as in *E. melanops* (Sars l. c.); flagellum 11-articulate. Oral parts were not dissected out; epistome has no acute process. Pereiopod 1, side-plate oval, apically broader, 5th joint about $1\frac{1}{4}$ times as long as 6th joint which is ovate, with the slightly convex palm not defined from hind margin; dactylus in length $\frac{2}{3}$ of 6th joint. Pereiopod 2, side-plate as deep as the corresponding segment, with edges almost parallel, and corners evenly rounded; 6th joint twice as long as 5th, with edges almost parallel, palm oblique, with two truncate teeth separated by a rather deep notch; dactylus rather strong and curved. As regards pereiopods 3-4 nothing is noteworthy. Pereiopods 5-7, second joints very broad, broadest and oval in prp. 5, narrowest (length twice breadth) and with edges almost parallel in prp. 7; hind margins of second joints in prp. 5-7 denticulate, lower hind corners somewhat rectangular. Epimeral plate of metasome segment 1 rounded, in segment 2 rounded with a small tooth, in segment 3 with a larger tooth. Urosome segment 1 on hindmargin with one medio-dorsal tooth with a spine on either side, and one pair of

Fig. 16. *Eurystheus abyssalis* ♂.

dorso-lateral teeth; uros. segment 2 with one pair of medio-dorsal teeth and one pair of dorsal spines. Uropod 1, rami in length somewhat equal to peduncle. Uropod 2, rami somewhat longer than peduncle; inner ramus somewhat longer than outer. Uropod 3, rami in length nearly equal to peduncle, apically tapering. Telson about as broad as it is long, with edges almost parallel, but with apex triangular, and with a pair of dorsal spines, but no hairs.

Affinities. The present species is characterized mainly by the hand of pereopod 2, and by the presence of teeth on the urosome segments, viz., 3 on segment 1 and 2 on segment 2.

A few species have pereopod 2 not very different from the present species, but with urosome segments dorsally smooth. They are as follows:

E. eurypodii Barnard, Discovery Report, vol. 5, 1932, p. 231, fig. (Falklands). Differs in having defining angle of palm in pereopod 2 minute crenulated and rounded.

?*E. scissimanus* Barnard, Ann. S. Afr. Mus., vol. 20, 1925, p. 361, pl. 34 fig. 15 (South Africa, 230 m).

Several other species have, like these, two teeth on palm of pereopod 2 ♂, but shape and size of the two teeth are rather different from those of *E. abyssalis*.

The following species have dorsal teeth on urosome segments 1 and 2:

E. anomalus Chevreux, Bull. Soc. Zool. France, vol. 50, 1925, p. 381 (Senegal). 1 + 1 teeth¹⁾.

E. crassipes (Haswell) Stebbing, Tierwelt, vol. 21, 1906, p. 612 (East Australia). 3 + 0 teeth¹⁾.

E. dentatus (Chevreux). *Gammaropsis dentata* Chevreux, Rés. Camp. Sci. Monaco, vol. 16, 1900, p. 93, pl. 12 fig. 1 (Azores). 3 + 2 teeth.

¹⁾ 1 + 1 teeth = 1 tooth on urosome segment 1, 1 tooth on segment 2. - 3 + 0 teeth = 3 teeth on urosome segment 1, 0 on segment 2, etc.

E. dimorphus Barnard, Discovery Rep., vol. 5, 1932, p. 244, figs. (South Georgia). "Three to four denticles on hind margin of pleon segments 4 and 5 dorso-laterally".

E. holmesi Stebbing, Ann. S. Afr. Mus., vol. 6, 1908, p. 85, pl. 40A (South Africa). 3 + 2 teeth.

E. longitarsus Schellenberg, Further Results Swed. Antart. Exped. 1901-1903 (O. Nordenskiöld, edit. by Sixten Boek), vol. 2, No. 6, Stockh. 1931, p. 242, figs. (Falkland Is.). 2 + 4 teeth.

E. lophomeria Barnard, John Murray Exped., vol. 4, No. 6, 1937, p. 166, figs. (South Arabian coast). 3 + 2 teeth.

E. ostroumoui (Sowinsky). Chevreux & Fage, Faune de France, vol. 9, 1925, p. 311, figs. (Mediterranean). 1 + 1 teeth.

E. semidentatus Barnard, Ann. S. Afr. Mus., vol. 15, 1916, p. 250, pl. 18 figs. 13-14 (South Africa). 3 + 2 teeth.

E. serrius Barnard, Discovery Rep., vol. 5, 1932, p. 228, figs. (South Georgia and South Shetland). 2 + 2 teeth.

E. tenuicornis (Holmes). Shoemaker, Proc. U. S. Nat. Mus., vol. 78, art. 18, 1931, p. 5, figs. (California). 2 + 2 teeth.

E. thompsoni (Stebbing). *Gammaropsis t.* Stebbing, Challenger-Exped., vol. 29, 1888, p. 1103, pl. 115 (east of New Zealand, 2000 m?) (♂ not known) ♀: 1 (+ 2 small) + 0 teeth.

According to the above the following four species have the same number of dorsal teeth on the two anterior urosome segments, viz., 3 on segment 1, and 2 on segment 2; but in other essentials they are very different from *E. abyssalis*. The four species are:

E. dentatus: side-plate of pereopod 1 dentate below; pereopod 2 ♂: palm tridentate.

E. holmesi: pereopod 2 most different; prp. 5: 5th joint broader, with deep incision in the middle of hind margin.

E. lophomeria: pereopod 2 most different; prp. 7: second joint with strong teeth on fore margin.

E. semidentatus: pereopod 2 most different; prp. 7: second joint with strong teeth on fore margin (in ♂).

Distribution. *E. abyssalis* is not found outside the locality recorded above, and as far as I am aware, it is found in greater depths than any other species of the genus.

Genus: Bathyphtis n. gen.

Head, lateral lobes moderately produced, post-antennal corner well marked. Side-plates 1-4 rather deep and broad, increasing in length from first to fourth, 5th with frontlobe short. Antennae

1-2 rather elongate, subequal in length; accessory flagellum well developed. Oral parts normal. Upper lip sub-symmetrical, distal margin rounded, with a median notch; lower lip with inner lobes and acute mandibular processes. Mandibles normal; palp 3-articulate, very long. Maxilla 1, inner plate naked(?), outer plate with 4 spines; palp two-jointed, with 3 heavy spines and 5 rather slender spines. Maxilla 2, outer plate the broader; both of the plates with numerous spines. Pereiopods 1-2 subchelate, pereopod 2 in ♂ very stout. Pereiopods 6-7 longer than prp. 5. Gills short

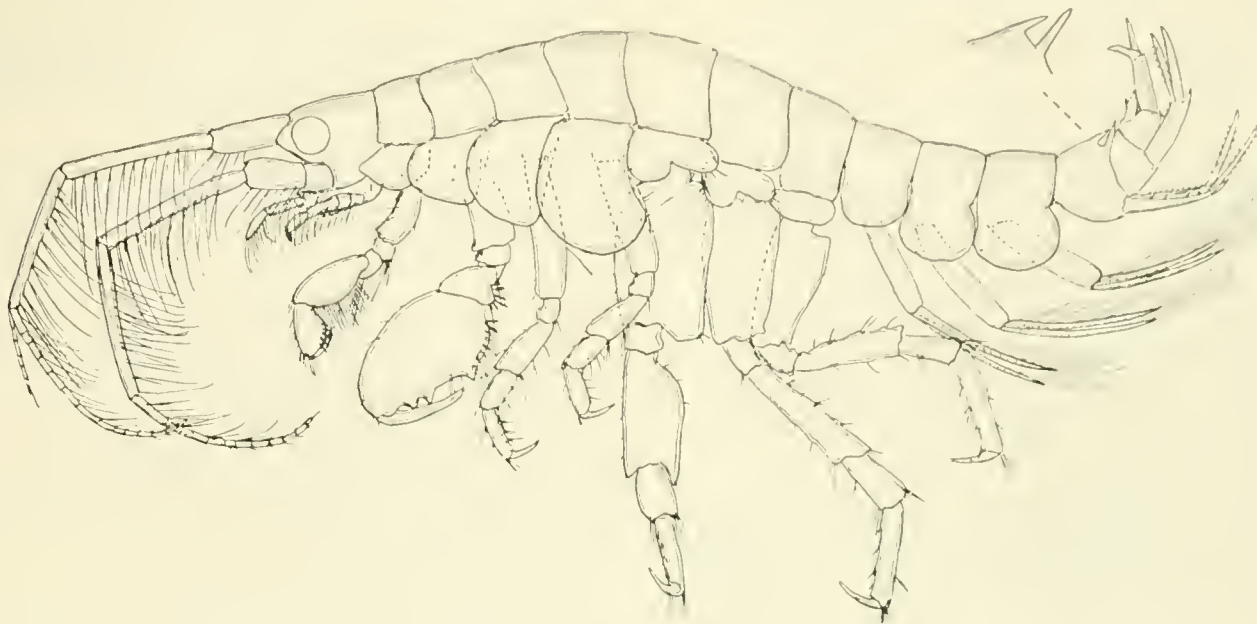


Fig. 17. *Bathyphtis tridentata* ♂.

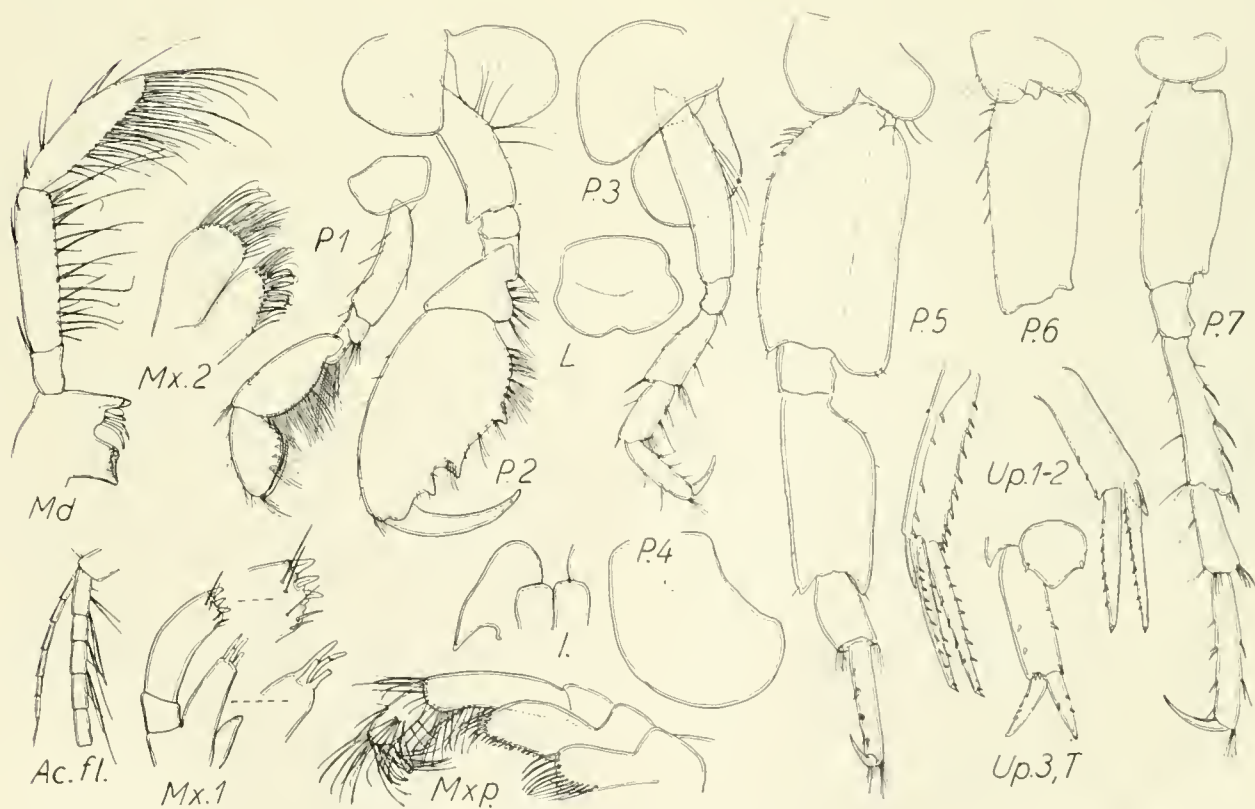


Fig. 18. *Bathyphtis tridentata* ♂.

and broad. Uropods 1-2 normal; uropod 3, rami narrow, acute, equal in length and breadth. Telson entire, sub-pentagonal, with apex triangular and somewhat projecting.

This genus is rather close to *Eurystheus*, but differs in having very few heavy spines on maxilla 1 (4 on outer plate, 3 on palp; *Eurystheus* has several spines); the very deep side-plate of pereopod 4, and the very broad and almost circular gills (in *Eurystheus* they are narrow).

331. *Bathyphtis tridentata* n. sp. (Figs. 17-18).

Occurrence:

63°30' N, 54°25' W, 1096 m, 3°3. "Ingolf" St. 25: 26-VI-1895. 1 ♂.

Description of ♂, 10 mm in length (♀ is unknown). Body rather slender, with back evenly rounded (but there are teeth on urosome segment 1, see below). Head about as long as the two first segments combined, lateral lobes rectangular. Eyes large, round, entirely colourless (in spirits). Antennæ 1-2 subequal in length, as long as head + mesosome. Antenna 1, the two distal joints of peduncle subequal in length, flagellum a little shorter than these two joints, 14-articulate; accessory flagellum has 7 joints including a minute apical joint. Antenna 2, the two distal joints of peduncle subequal in length; flagellum somewhat longer than ultimate joint, 11-articulate. Upper lip has no epistomal projection.

Pereopod 1, side-plate has lower forecorner somewhat acute; 5th joint longer than 6th, broad, with hind margin convex; 6th joint not broader than 5th; palm smooth, oblique, and in length two thirds of hind margin; dactylus rather slender. Pereopod 2, side-plate has length = breadth; foremargin evenly curved, hindmargin straight; second joint broad; 5th joint cup-shaped; 6th joint oval, very broad, in length = second to 5th joints combined; palm about half as long as 6th joint, with two teeth + a defining tooth; dactylus stout. Pereiopods 3-4 subequal in length: prp. 3, side-plate deeper than side-plate 2, foremargin evenly curved, hindmargin straight; side-plate 4 still deeper than side-plate 3, foremargin curved, hindmargin a little concave. Pereiopod 5 about $\frac{2}{3}$ times longer than prp. 3-4; side-plate with front lobe short; second joint broad, with hindmargin straight and lower hind corner rounded-quadrangular; fourth joint very broad, over half the breadth of second joint, with the edges almost parallel and lower hind corner projecting; 5th joint broad. Pereiopods 6-7 subequal both in shape and length, somewhat longer than prp. 5. Pereiopod 6, side-plate has a very short frontlobe; second joint rather large and lamellar, but much narrower than in prp. 5, with the edges almost parallel, and lower hind corner sub-rectangular; upper hind corner in second joint in prp. 6 rounded, in prp. 7 rectangular; the following joints not broad.

Epimeral plates of metasome, lower hind corners rounded. Urosome segment 1 has on hindmargin one medio-dorsal tooth and one pair of somewhat longer dorso-lateral teeth. Urosome segment 2 dorsally smooth. Uropod 1, rami subequal in length, and in length = peduncle, which ends in a spine. Uropod 2 rather similar to urop. 1, but shorter. Uropod 3, rami subequal in length, half as long as peduncle. Telson about as broad as it is long, terminating in a triangular projection, with one pair of dorsal spines.

Genus: *Bonnierella* Chevreux.

Bonnierella Chevreux, Rés. Camp. Sci. Monaco, vol. 16, 1900, p. 97.

332. *Bonnierella abyssi* (Chevreux).

Podoceroopsis abyssi Chevreux, Bull. Soc. Zool. France, vol. 12, 1887, p. 577.

Bonnierella abyssi Chevreux, l. c. 1900, p. 97, pl. 11 fig. 3 (♂).

Podoceroopsis abyssi (in parte) Stebbing, Tierreich, vol. 21, 1906, p. 619.

Podoceroopsis abyssi Chevreux, Amphip., Travailleux et Talisman, 1927, p. 115, pl. 10 figs. 21-24 (♀).

Occurrence:

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 2 ♀ with marsupium, about 3 mm.

These specimens have lost antennæ and pereiopods 3-7; but the very characteristic pereiopods 2 agree excellently with CHEVREUX's figure (CHEVREUX 1927, pl. 10 fig. 22).

STEBBING (l. c.) considers it synonymous with *Gammaropsis abyssorum* Bonnier 1896; but though closely allied the two species are not identical (CHEVREUX 1927, p. 116).

Distribution. Near Cape Finisterre 43°12'50''(15'') N, 11°51'-11°53'30'' W. 363-510 m, mud (type-locality; CHEVREUX 1900). Arguin bank 21°53' N, 19°50' W, 655 m, greenish clayish sand (CHEVREUX 1927).

Genus: *Podoceroopsis* Boeck.

333. *Podoceroopsis nitida* (Stimpson).

Podoceroopsis excavata G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 576, pl. 205.

Podoceroopsis nitida Stebbing, Tierreich, vol. 21, 1906, p. 620.

Podoceroopsis nitida Chevreux & Fage, Faune de France, vol. 9, 1925, p. 317, figs.

Occurrence:

63°06' N, 56°00' W, 2258 m, 2°4. "Ingolf" St. 24: 25-VI-1895. 2 young specimens (♂?), 2 mm.

60°07' N, 3°42' E, 360 m, 6°12. "Michael Sars" 1902, Ad. S. Jensen, 1 ♂.

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 1 ♂.

61°07' N, 9°30' W, 835 m. "Thor" St. 78: 12-V-1904. 3 ♂.

65°30' N, 55°26' W, 550 m, 4°5. Sand, stones. Wandel 1889. 1 ♀.

Remarks. The ♂ from the "Thor" and the "Michael Sars" are typical. The two small "Ingolf"-specimens (♂?; chelæ of pereiopod 2!) are somewhat defective (antennæ 1-2 and pereiopods 5-7 lost), but seem to agree well with SARS's figures, except that dactyli of pereiopods 3-4 are rather long, as long as 6th joint.

Distribution. Northern Atlantic, from northeastern U.S.A. to northern Norway and the English Channel, rarely deeper than 100 m. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 373.

Genus: *Protomedeia* Kroyer.

334. *Protomedeia fasciata* Kroyer?

Protomedeia fasciata, G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 552, pl. 196.

Protomedeia fasciata Stebbing, Tierreich, vol. 21, 1906, p. 623.

Protomedeia fasciata K. Stephensen, Tromsø Mus. Skr., vol. 3, 1935-42, p. 376, figs.

Occurrence:

63°30' N, 54°25' W, 1096 m, 3°3. "Ingolf" St. 25: 26-VI-1895. 1 ♀ juv. (no marsupium), about 4 mm.

The determination is possibly not quite certain; but pereiopods 3-4 and uropod 3 seem to agree with SARS l. c.

Distribution. Widely distributed in the northern Atlantic with adjacent arctic seas in the littoral and sublittoral zones. For special localities, see K. STEPHENSEN l. c.

Family: **Jassidæ** Stebbing.

Podocerida (in parte) G. O. Sars, Crust. of Norway, vol. 1, 1895, pp. 587-600 (not pp. 578-587 and 601-606).

Jassida Stebbing, Tierreich, vol. 21, 1906, p. 647.

Jassida Chevreux & Fage, Faune de France, vol. 9, 1925, p. 313.

Genus: **Ischyrocerus** Krøyer.

Ischyrocerus G. O. Sars, l. c., p. 587.

Ischyrocerus Stebbing, l. c., p. 657.

Explor. mers U. R. S. S., vol. 21, 1935, p. 77, figs.; accessory flagellum not described.

I. parvus Stout, Zool. Jahrb., Syst., 1913, p. 657, no figs.; "accessory flagellum two-jointed", but length not noted.

I. rhodomela Gurjanova, l. c. 1938, pp. 372, 401, figs.; "accessory flagellum quite rudimentary".

I. serratus Gurjanova, l. c. 1938, pp. 368, 403, figs.; 1:2.

I. spitzbergensis Schellenberg, see *I. megacheir* (above); 1:1 or > 1:1.

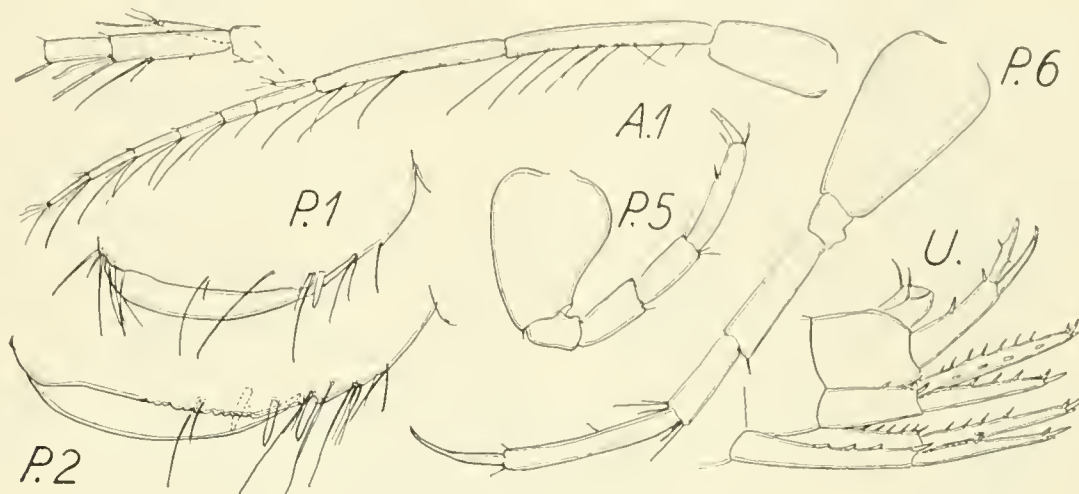


Fig. 19. *Ischyrocerus nanooides* ♀, one of HANSEN's type specimens.

As the length of accessory flagellum is a rather important specific character, I give the length ratio of accessory flagellum and first joint of flagellum in all species of the genus, established up to 1940 (according to Zool. Record, including the volume for 1940).

I. anguipes Kr. (incl. *I. minutus* G. O. Sars), Stebbing, l. c. 1906, p. 658; 2:3.

I. assimilis (G. O. Sars), present paper p. 31, species no. 339; 1:3.

I. brevicornis (G. O. Sars), present paper p. 32, species no. 341; 1:1.

I. brasilovi Gurjanova, present paper p. 32, species no. 342; 1:2.

I. carinatus Barnard, Ann. S. Afr. Mus., vol. 15, 1916, p. 266, fig.; 1:2.

I. commensalis Chevreux, present paper p. 28, species no. 337; 1:1.

I. cristatus Gurjanova, Rep. Japan Sea Hydrobiol. Exped. of the Zool. Inst. Acad. Sci. U.S.S.R. in 1934, pt. 1, 1938, pp. 366, 403, figs.; "accessory flagellum 2-jointed", but length not noted.

I. elongatus Gurjanova, l. c. 1938, pp. 370, 404, figs.; "accessory flagellum 2-jointed", but length not noted.

I. enigmaticus Gurjanova, Zool. Anz., vol. 108, 1934, p. 128, fig.; 1:1.

I. gorgonia Barnard, Ann. S. Afr. Mus., vol. 32, 1940, p. 481, fig.: I have not had access to this paper.

I. hanseni n. sp., present paper p. 28, species no. 336; 1:1.

I. hocki (Stebbing), ? = *I. brasilovi* (see above).

I. latipes Krøyer, Stebbing l. c. 1906, p. 660; 1:2.

I. megacheir (Boeck), present paper p. 29, species no. 338; 1:1 or > 1:1.

I. megalops G. O. Sars, present paper p. 32, species no. 340; 1:3.

I. minutus G. O. Sars, see *I. anguipes* (above).

I. nanooides (H. J. Hansen), present paper p. 27, species no. 335; 1:2.

I. pachusovi Gurjanova, Zool. Anz., vol. 103, 1933, p. 126, and

I. tenuicornis (G. O. Sars), Stebbing, l. c. 1906, p. 660; 1:2.

I. tuberculatus (Hock), ? = *I. brasilovi* (see above); < 1:2.

335. **Ischyrocerus nanooides** (H. J. Hansen) (Fig. 19).

Podocerus nanooides H. J. Hansen, Vid. Medd. 1887, p. 162, pl. 6 figs. 4-4b.

Ischyrocerus nanooides Stebbing, Tierreich, vol. 21, 1906, p. 657.

Ischyrocerus nanooides Schellenberg, Mitt. Zool. Mus. Berlin, vol. 11, 1925, p. 209.

Occurrence:

61°41' N, 27°00' W, 913 m, 6° E. "Ingolf" St. 81: 14-VI-1896. 1 specimen (sex?), 3 mm, very defective, and the determination therefore not certain. Antennae 1-2 and pereopods 5-7 are lost, but uropod 3 is of the typical form.

Remarks. In the Zoological Museum, Copenhagen, we have one of H. J. HANSEN's two type specimens, a ♀ 4 mm. I have dissected out some of the appendages and compared them with HANSEN's description and figures. On the whole they agree well with H. l. c., but some additions should be made (H. had only very few figures, viz., a specimen in lateral view, pereopod 2, and urosome + epimeral plate 3). Antenna 1, flagellum has 6 (not 7-8) joints; accessory flagellum half as long as first joint in flagellum, not longer than first joint (H. J. HANSEN writes: "articulo primo flagelli longius"). Palm in pereopod 1 defined by two spines, in pereopod 2 defined by three spines (HANSEN: (prp. 1-2) "ad apicem posteriorem spinis duabus minoribus armata"). Pereopod 5, second joint pearshaped-oval, broader than in prp. 6; prp. 7 lost. Uropod 3, peduncle has probably but two spines; inner ramus has one spine near the middle.

It will be seen that this specimen differs from H. J. HANSEN

l. c. mainly in the accessory flagellum being not longer than first joint of flagellum, but only half as long,

A male, 5.5 mm, was described by SCHELLENBERG l. c., but without figures.

Distribution. Baffin Bay 71°10' N, 58°56' W, 400 m, clay (type-locality: H. J. HANSEN l. c.). West Greenland 66°35' N, 55°54' N, 166 m, 1°6' ("Ingolf" St. 31: 11-VII-1895), 1 ovigerous ♀ 4 mm, defective (antenna 1 and pereopods 5-7 lost, but uropod 3

longer than prp. 1; 6th joint oval, with finger closing up on inner surface; palm near finger hinge with a triangular process, then follows a notch; palm defined by three spines on inner side of hand. Pereiopods 3-4 rather slender. Pereiopods 5-6 (7 is lost) increasing in length, with second joints very narrow, over twice as long as they are broad, and fingers long. Epimeral plate 3, lower hind corner rounded. Uropod 1, rami equal in length and a trifle shorter than peduncle; outer ramus naked, inner ramus with a spine near the middle. Uropod 2, inner ramus as long as

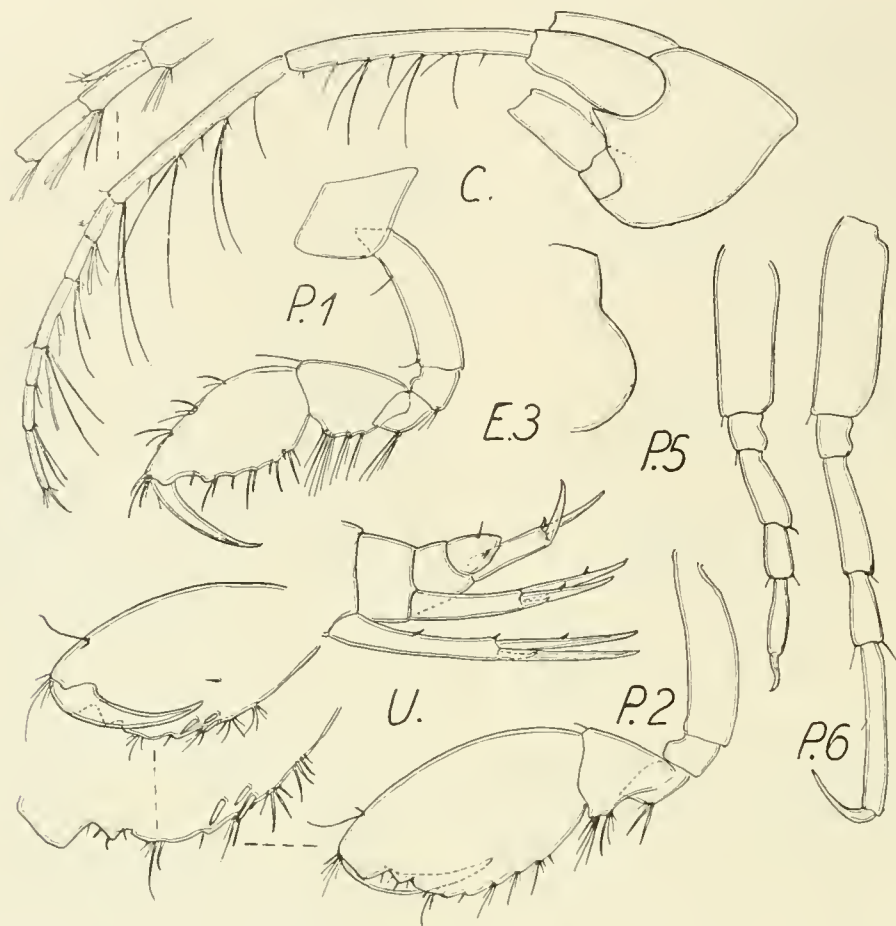


Fig. 20. *Ischyrocerus hanseni*.

typical). North of Spitsbergen 81°20' N, 19° E, 1000 m (SCHELLENBERG l. c.).

Two specimens from 78°15'5 N, 73°29' W, 290 m, with some doubt referred to this species by K. STEPHENSEN 1933, p. 49 (Meddel. om Grøn., vol. 79, no. 7), belong in reality to *I. brusilovi* Gurj. (see below, p. 33).

336. *Ischyrocerus hanseni* n. sp. (Fig. 20).

Occurrence:

64°24' N, 28°50' W, 1484 m, 3°5. "Ingolf" St. 10: 20-V-1895. 1 ♂(?).

Description of ♂(?), 2.5 mm (♀ unknown). On the body nothing is noteworthy. Head a trifle longer than the two first segments combined, or as long as first joint of antenna 1; lateral lobes very acute; no eyes. Antenna 1 as long as head + mesosome; second and third joints subequal in length; flagellum longer than third joint, 6-articulate, third joint longer than the others; accessory flagellum about as long as first joint of flagellum, 1-articulate. Antenna 2 lost. Pereiopod 1, side-plate with lower forecorner rounded rectangular; 6th joint oblong oval; palm not well defined from hind edge, near finger hinge concave, then follows a triangular tooth; finger long, slender, smooth. Pereiopod 2

peduncle, outer ramus shorter; both rami have each a spine near the middle. Uropod 3, inner ramus a trifle shorter than peduncle, outer ramus shorter than inner; both rami straight and naked. Telson acute, with a pair of dorsal setae.

This species is well characterized by the long accessory flagellum, the shape of pereopods 1-2, the narrow second joints of pereopods 5-6 (and 7?), the almost naked uropods 1-2, and the very long naked rami of uropod 3.

The specific name was chosen in honour of the carcinologist H. J. HANSEN, who found the species.

337. *Ischyrocerus commensalis* Chevreux.

Ischyrocerus commensalis Chevreux, Rés. Camp. Sci. Monaco, vol. 16, 1900, p. 104, pl. 12 fig. 2.

Ischyrocerus commensalis Shoemaker, Contrib. Canad. Biol. and Fish., n. ser., vol. 5, 1929-30, p. 126, figs.

Occurrence:

65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895.

A few specimens, more or less defective.

Distribution. West Greenland 65°17' N, 54°17' W, 104 m, "Ingolf" St. 34, 18-VII-1895, from *Boltenia*, several specimens (♂,

♀). Off Cheticamp Island, Gulf of St. Lawrence, 3 hauls 40-75 m (SHOEMAKER l.c.). Jugor Strait, depth not noted (GURJANOVA, Zoogeographica, vol. 2, 1935, p. 558). Off St. John's, Newfoundland, 47°33' N, 53°28' W, 150 m (type-locality: CHEVREUX l.c.).

61 17' N, 31 33' W, 1171 m, 3°0. "Ingolf" St. 13: 22-V-1895. 1 specimen.
66 18' N, 25 29' W, 621 m, ± 0 75. "Ingolf" St. 15: 1-VI-1895. About 20 specimens.

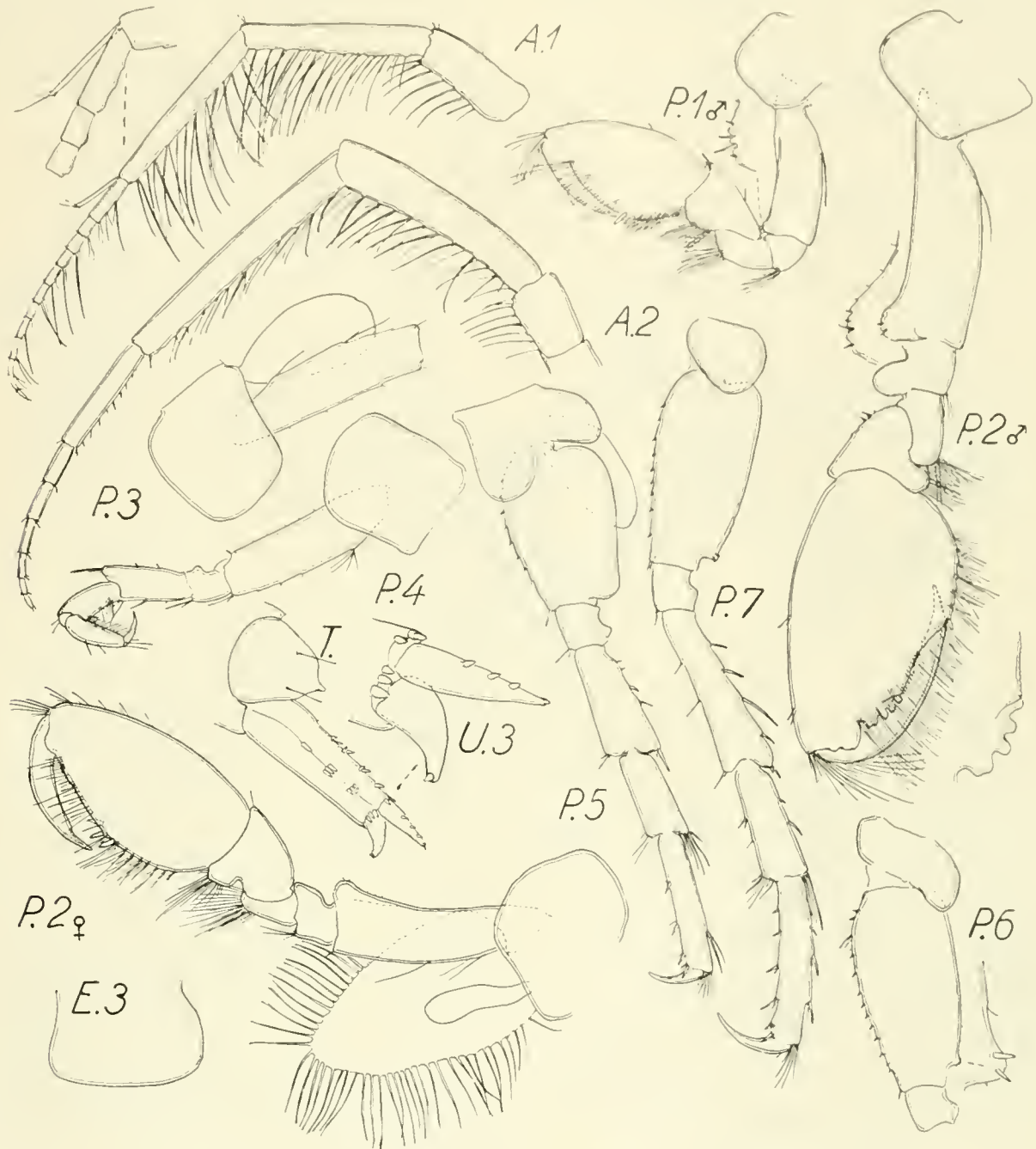


Fig. 21. *Ischyrocerus megacheir*. ♂ 14 mm, and pereiopod 2 of ♀ 12 mm. "Ingolf" St. 15.

338. *Ischyrocerus megacheir* (Boeck) (Fig. 21; Chart III).

Ischyrocerus megacheir G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 592, pl. 211.

Ischyrocerus megacheir Stebbing, Tierreich, vol. 21, 1906, p. 659.

Ischyrocerus spitzbergensis Schellenberg, Mitt. Zool. Mus. Berlin, vol. 11, 1924, p. 209, figs.

Occurrence:

63°04' N, 9°22' W, 495 m, 5°3. "Ingolf" St. 2: 12-V-1895. A few specimens, determination not certain.

64°07' N, 11°12' W, 446 m, 2°5. "Ingolf" St. 4: 13-V-1895. About 15 specimens (♂, ♀).

63°30' N, 54°25' W, 1096 m, 3°3. "Ingolf" St. 25: 26-VI-1895.

A few specimens, partly very defective.

64°54' N, 55°10' W, 740 m, 3°8. "Ingolf" St. 27: 1-VII-1895.

A few specimens.

65°11' N, 55°12' W, 791 m, 3°5. "Ingolf" St. 28: 1-VII-1895.

1 ovigerous ♀ 9 mm, 2 smaller specimens.

66°35' N, 56°58' W, 599 m, 3°9. "Ingolf" St. 32: 11-VII-1895.

3 specimens up to 6 mm.

65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895.

Numerous specimens up to 8 mm.

61°42' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 44: 14-VIII-1895.

Numerous specimens.

- 60°37' N, 27°52' W, 1505 m, 4°5. "Ingolf" St. 78: 13-VI-1896.
1 specimen.
- 65°14' N, 30°39' W, 1416 m, 2°1. "Ingolf" St. 95: 27-VI-1896.
About 10 specimens.
- 62°58' N, 7°09' W, 731 m, ÷ 0°4. "Ingolf" St. 143: 11-VII-1896.
About 10 specimens.

than in Sars's fig.; also pereopods 6-7 are heavier than in Sars's fig. Epimeral plate 3, lower hind corner rounded, not rectangular. Uropods 1-2, spinose armature rather similar to that of *I. assimilis* (fig. 22); uropod 3, inner ramus has on the upper edge 3 spines, not one. Telson triangular, acute, length = breadth.
♀ with marsupium, 12 mm: Antenna 1, flagellum 11-ar-

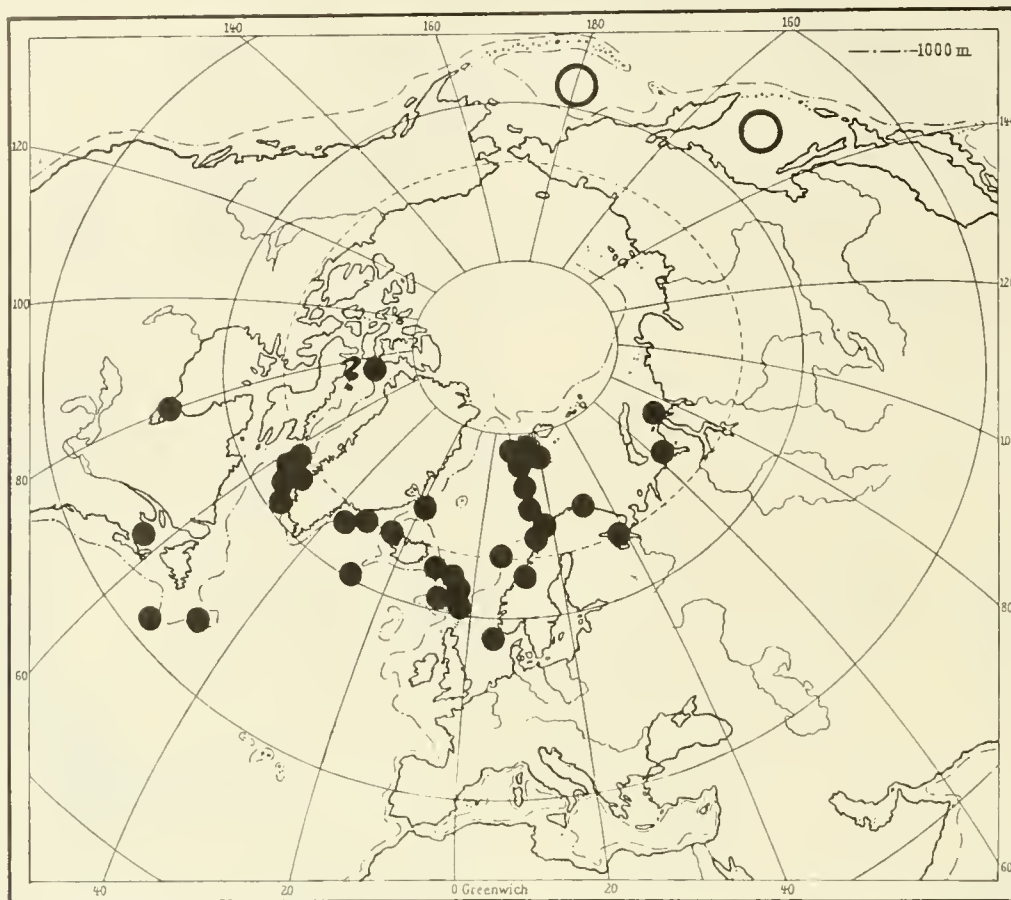


Chart III. Distribution of *Ischyroccrus megacheir*. The rings indicate localities which could not be noted exactly.

- 62°53' N, 9°06' W, 575 m. "Michael Sars" 20-VIII-1902. AD. S. JENSEN. 3 specimens.
- 60°19' N, 5°22' W, 1200 m, ÷ 0°15. "Michael Sars" 10-VIII-1902, AD. S. JENSEN. About 15 specimens.
- 66°16' N, 26°8' W, 600 m, ÷ 0°1. WANDEL 1891. A few specimens.
- 63°15' N, 9°35' W, 510 m. WANDEL 1891. 1 specimen 9 mm.
- 61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. A few specimens incl. ovigerous ♀, but determination not certain, for antenna 1 (and several other limbs) are lost.

Remarks. Accessory flagellum has a minute apical joint and is rather long, as long as or a trifle longer than the long first joint in flagellum.

G. O. Sars (1895) writes: "length of adult female 7, of male 8 mm. Maximum length of Arctic specimens 12 mm". In the "Ingolf" collection there are, however, specimens of lengths up to 14 mm. I have dissected two of these large specimens (♂ and ♀; "Ingolf" St. 15) and give drawings (Fig. 21) of some of the limbs. They agree fairly well with Sars l. c., but there are some differences, probably due to difference in size.

♂, 14 mm. Antenna 1, flagellum has 12 (not 10) joints. Pereopod 2, the distal portion of the palm has 4 teeth (Sars writes that it has an "irregularly crenulated prominence"); the inner (median) side of the hand is rather concave as in *I. assimilis*. Pereopod 5 not very slender, second joint suboval, a trifle broader

ticulate; antenna 2, flagellum 8-articulate, first joint shorter than in ♂. Pereopod 1 as in ♂. Pereopod 2 not essentially different from pereopod 1, but larger. The other limbs not different from ♂.

The oral parts of these large specimens were not dissected out.

I. spitzbergensis Schellenberg is probably this species; it agrees with the large "Ingolf"-specimens described above, except in the setose armature of telson, and the eyes are said to be black. Also in some of the "Ingolf"-specimens there are traces of black pigment in the eyes.

In my paper 1935-42, p. 398, I have considered *I. spitzbergensis* "possibly synonymous with *I. assimilis*", because of the rounded hind corner of epimeral plate 3 (cf. the key in STEBBING 1906, p. 657, § 5). But this corner seems to be of varying shape (square or rounded) in both *I. megacheir* and *I. assimilis*. In other, more constant specific characters the agreement of *I. spitzbergensis* and *I. megacheir* is very close; viz., the long accessory flagellum, and outer ramus of uropod 3 not being hooked.

Distribution (Chart III). Widely distributed in the northern Atlantic with adjacent seas, from East of America 43° N and the Skagerrak, to(?) Baffin Bay, Spitsbergen and Bering or Okhotsk Sea, depths (20)80-1400 m, ÷ 1°4-6°5. For special localities, see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 396, and Zool. of Iceland, vol. 3, no. 26, 1940, p. 65. Additional localities:

Jugor Strait (GURJANOVA, Zoogeographica, vol. 2, 1935, p. 558), and Kara Sea 74°35' N, 75°26' E, 32 m (GURJANOVA, Explor. Mers U. R. S. S., vol. 21, 1935, p. 77).

339. *Ischyrocerus assimilis* (G. O. Sars) (Figs 22-23).

Podocerus assimilis G. O. Sars, Crust., vol. 1; Norske Nordhavs-Exp., 1885, p. 205, pl. 17 fig. 1.

Ischyrocerus assimilis Stebbing, Tierreich, vol. 21, 1906, p. 659.

(SARS: 9), accessory flagellum 1-articulate and very short, about one third of the length of first joint in flagellum, as described by SARS. Antenna 2, flagellum has 7 (not 8) joints, and first joint in length about two thirds of the other joints together. Pereiopod 1 differs a little from SARS l. c.; palm not evenly curved, but divided into a straight (distal) and a concave (proximal) portion, posteriorly defined by two spines; dactylus which is minutely serrate, has its apex closing upon inner surface of hand. Pereiopod 2 much larger and heavier than pereiopod 1; it agrees well with SARS

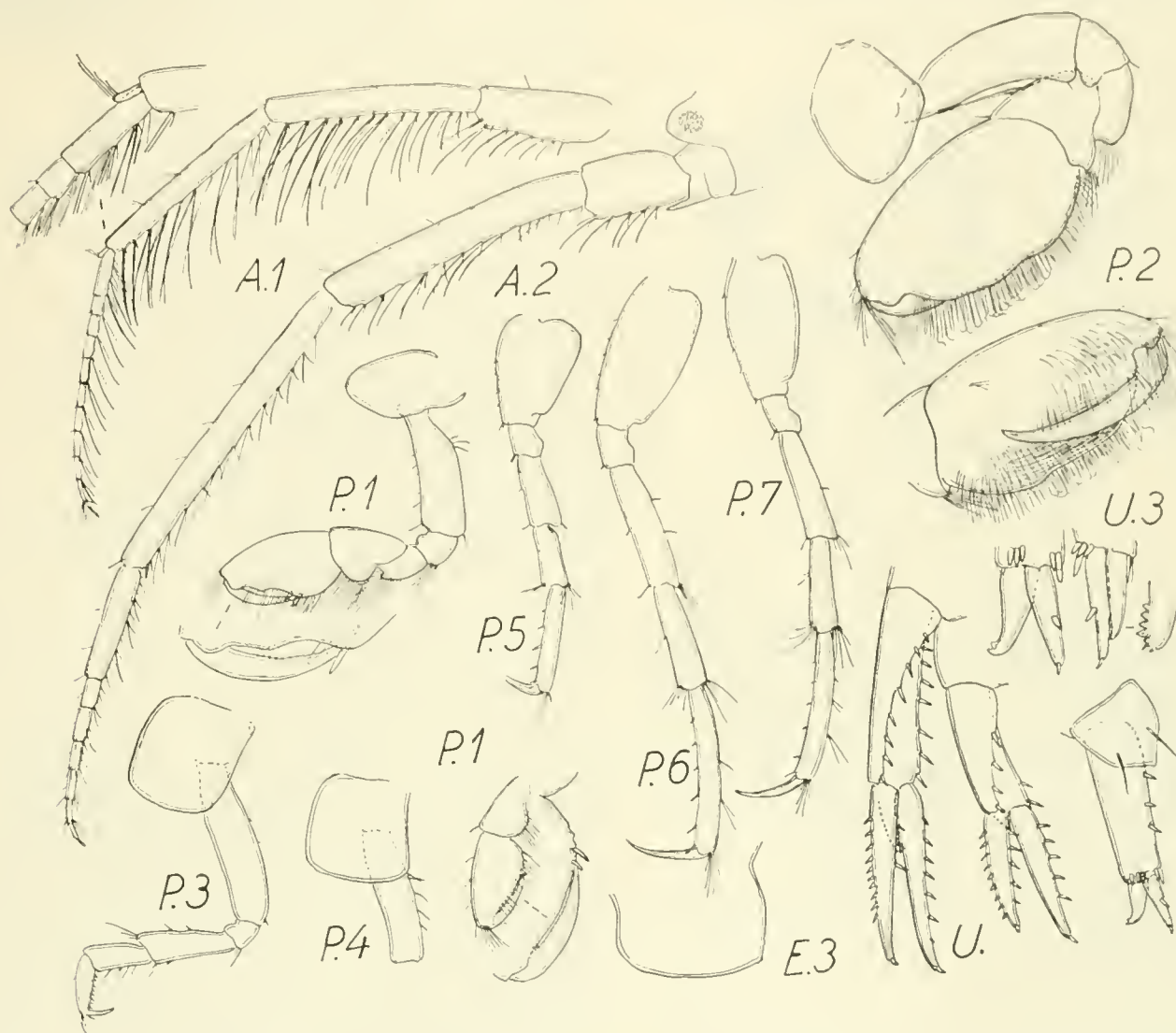


Fig. 22. *Ischyrocerus assimilis* ♂. The detail figure of P.1 was taken from another specimen.

Occurrence:

61°12' N, 9°36' W, 1026 m, 4°8 "Ingolf" St. 44: 14-VIII-1895. 2 ♀.
60°19' N, 5°22' W, about 1200 m. ÷ 0°2. "Michael Sars" 10-VIII-1902. AD. S. JENSEN leg. A few specimens.
66°16' N, 25°20' W, 550 m. ÷ 0°2. WANDEL leg. 1891. 1 ♀.
66°16' N, 26°08' W, 600 m. ÷ 0°1. WANDEL leg. 1891. ♀ with marsupium, 11 mm.

Remarks. The largest ♂, about 9 mm, differs from SARS l. c. in the following characters. Eyes small, but not very small, and they are round, not oval; ocellus distinct, but colourless (SARS: dark brown). Antenna 1 as long as head + mesosome, antenna 2 about as long as head + mesosome + metasome (SARS: "the antennae are . . . well-nigh equal in size, appreciably exceeding half the body in length"). Antenna 1, flagellum has 10 joints

l. c., but 6th joint (hand) is broader. SARS writes that 6th joint is tumid; in the "Ingolf" specimen the upper (anterior) part of outer side is somewhat concave, while the lower (posterior) part is convex; lower part of inner side is most concave. As regards pereopods 3-4 nothing is noteworthy; but their side-plates have forecorners rounded rectangular, not somewhat projecting as in SARS's figure. SARS writes that pereopods 5-7 "are somewhat robust, with the basal joint lamelliform dilated". If SARS's figure is quite correct, second joint of pereiopod 5 is proximally broader in the present specimen; but second joint of pereiopods 6-7 agrees with SARS's figure, in that this joint has margins almost parallel, and length about twice the breadth. Epimeral plate 3 has hind corner rectangular, not obtusely rounded. Uropods 1-2 have the usual shape, spinose; uropod 3, peduncle about three times as long as rami; inner ramus has one central and one apical spine,

outer ramus terminates in two small recurved spines (in left uropod 3), or in four deminutive teeth (in right uropod 3). Telson has one pair of dorsal setae.

These differences from Sars's specimens are probably due to different size and age; the specimen described above is probably an adult ♂ (9 mm), while Sars's description was based on a specimen a trifle smaller (8 mm) and probably not quite mature.

Two other ♂♂ which are in length equal to Sars's specimen, have pereopod 1 shaped as in Sars's figure, with palm evenly curved and with also pereopod 2 agreeing with Sars.

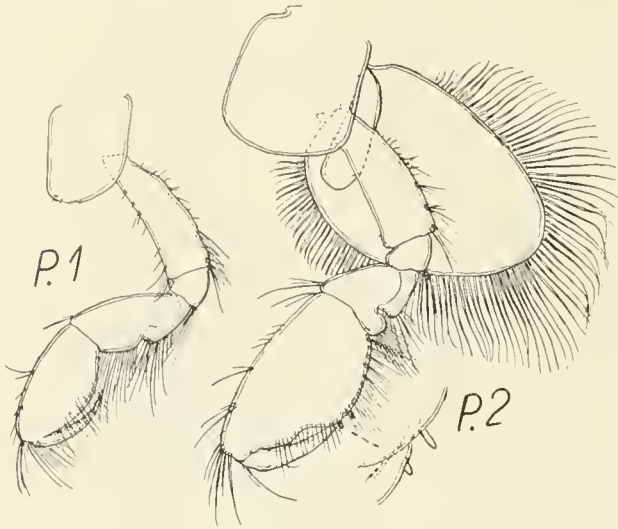


Fig. 23. *Ischyrocerus assimilis* ♂.

♀ with marsupium, 8 mm, differs from the large ♂ in but few characters: flagellum in antenna 1 has 8 (not 10) joints (but flagellum in antenna 2 has 6-7 joints in both sexes). Pereiopod 1 has palm evenly curved as in Sars's figure, but pereiopod 2 has palm divided into two portions as in pereiopod 1 ♂.

Distribution. The deep Arctic Basin 827 m, $\div 1^{\circ}0$; South of Bear Island, 64 m, $+ 1^{\circ}1$; North of Spitsbergen, 1000 m; Hudson Bay; for references see K. STEPHENSEN 1935-42, p. 398.

340. *Ischyrocerus megalops* G. O. Sars.

Ischyrocerus megalops G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 591, pl. 210 fig. 2.

Ischyrocerus megalops Stebbing, Tierreich, vol. 21, 1906, p. 660.

Occurrence:

$61^{\circ}42' N$, $9^{\circ}36' W$, 1026 m, $4^{\circ}8$. "Ingolf" St. 44: 9-VIII-1895. 10 specimens.

Distribution. Northern Norway $65\frac{1}{2}^{\circ}$ - $70^{\circ} N$, 1-75 m; eastern Spitsbergen 60 m. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 398.

341. *Ischyrocerus brevicornis* (G. O. Sars).

Podocerus brevicornis G. O. Sars, Crust., vol. 1: Norske Nordhavs-Exp., 1885, p. 207, pl. 17 fig. 2.

Ischyrocerus brevicornis Stebbing, Tierreich, vol. 21, 1906, p. 661.

Occurrence:

$66^{\circ}23' N$, $12^{\circ}05' W$, 1011 m, $\div 0^{\circ}7$. "Ingolf" St. 101: 10-VII-1896. 1 ♀ with marsupium, 6.5 mm.

$67^{\circ}19' N$, $15^{\circ}52' W$, 552 m, $\div 0^{\circ}5$. "Ingolf" St. 126: 29-VII-1896. 1 specimen, no marsupium, 6 mm.

$62^{\circ}30' N$, $1^{\circ}56' W$, 500-550 m, $\div 1^{\circ}17$. "Michael Sars", AD. S. JENSEN leg. 1 specimen, no marsupium, 5 mm.

$62^{\circ}40' N$, $1^{\circ}56' W$, 700 m, $\div 0^{\circ}3$. "Michael Sars", AD. S. JENSEN leg. 1 specimen, no marsupium, 5 mm.

$60^{\circ}19' N$, $5^{\circ}22' W$, e. 1200 m, $\div 0^{\circ}15$. "Michael Sars" 10-VIII-1902, AD. S. JENSEN leg. 1 specimen, no marsupium, 5 mm.

Remarks. Accessory flagellum is (as in Sars's fig. 2a) only half as long as first joint of the primary flagellum, but Sars's text says "almost as long as 1st joint of flagellum".

Distribution. From East Greenland and Arctic Polar Basin to eastern Barents Sea, possibly to Kara Sea, 160-1400 m, negative temperatures. For special localities, see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 399.

342. *Ischyrocerus brusilovi* Gurjanova (Fig. 24).

Ischyrocerus brusilovi Gurjanova, Zool. Anzeiger, vol. 103, 1933, p. 126, no figs. (♂, ♀).

Ischyrocerus brusilovi Gurjanova, Explor. des mers de l'U. R. S. S., vol. 21, 1935, p. 78 (Russian), figs. (♂, ♀).

Probably synonymous with:

Podocerus hoeki Stebbing, Amphip. "Challenger", 1888, p. 1136, pl. 120 (♂, ♀), which is, according to STEBBING 1894 (see below), synonymous with

Podocerus tuberculatus Hoek, Nederl. Arch. f. Zool., Suppl.-bd. 1, 1882, Crust., p. 64, pl. 3 fig. 32 (♂).

Podocerus tuberculatus Stebbing, Bijdragen Dierkunde, Amsterdam, vol. 17, 1894, p. 45 (sex not noted).

Ischyrocerus tuberculatus Stebbing, Tierreich, vol. 21, 1906, p. 661.

Ischyrocerus tuberculatus K. Stephensen, Tromsø Mus. Skr., vol. 3, 1935-42, p. 400, with reproduction of HOEK's fig. (♂).

Occurrence:

$65^{\circ}34' N$, $7^{\circ}31' W$, 1435 m, $\div 0^{\circ}8$. "Ingolf" St. 105: 11-VII-1896.

3 ♂ 5-8 mm (and ? 3 smaller specimens).

$70^{\circ}05' N$, $8^{\circ}26' W$, 699 m, $\div 0^{\circ}4$. "Ingolf" St. 116: 23-VII-1896. 1 ♂ about 6 mm, 2 small specimens.

Remarks. The largest ♂ (8 mm; "Ingolf" St. 105) agrees fairly well with GURJANOVA's description and figures of *I. brusilovi*, but differs in a few small details, and some additions should be made. Antenna 1, first joint of peduncle in length two thirds of second joint, or two thirds of the head measured from hind margin to apex of lateral lobe (GURJANOVA: "kürzer als der Kopf"); third joint in length = second joint; flagellum 7-articulate (GURJANOVA: 8-articulate). Accessory flagellum a trifle over half the length of first joint of flagellum (not mentioned or drawn by GURJANOVA). Antenna 2 much heavier than antenna 1; the two distal joints of peduncle equal in length; flagellum a trifle shorter than ultimate joint of peduncle, 5-articulate, first joint nearly as long as the following joints combined (in GURJANOVA's figure not much longer than the other joints). Pereiopod 1, denticles on palm extremely small; palm defined by two spines. Pereiopod 2, the knots on palm somewhat smaller than shown in GURJANOVA's figure; the knot close to finger hinge has a small apical notch; dactylus smooth (not dentate). Pereiopods 3-7 not described by GURJANOVA. Pereiopods 3-4 rather stout, especially in second joint; emargination in hind margin of 4th side plate not deep. Pereiopod 5 longer than prp. 3, but shorter than prp. 6-7; anterior lobe of side plate not deep; second joint not much longer than broad, with margins smooth and nearly parallel, upper hind corner rounded and protruding upwards, lower hind corner rounded but not protruding. Pereiopod 6 has second joint much narrower than in prp. 5, maximal length nearly twice the breadth, fore margin smooth and nearly straight, hind margin slightly convex with upper hind corner protruding upwards and rounded triangular, and lower hind corner somewhat rounded but very little protruding. Pereiopod 7, second joint twice as long as it is broad,

with margins almost parallel; upper hind corner slightly protruding, rounded, lower hind corner rectangular. Uropods 1-2 spinose, each with peduncle terminating in a long spine. Uropod 3 agrees with GURJANOVA's figure. In the ♂ from St. 105 I was not able to find the two lateral spines and the two long setae in telson mentioned by GURJANOVA, but the setae are present in the ♂ from St. 116.

Distribution. Kara Sea 71°26' N, 57°34' E, 280 m, gray mud, 2 specimens, and 74°35' N, 75°26' E, 32 m, 2 specimens (type-

localities; GURJANOVA 1933 and 1935). Baffin Bay 78°15' N, 73°29' W, 290 m, 2 ♂ ("Godthaab" Exp. St. 97, 8-VIII-1928, by K. STEPHENSEN in Meddel. om Grønl., vol. 79, no. 7, 1933 determined as *I. (nanoides)* (H. J. H.?).)

The two species with which *I. brasilori* is probably synonymous, are found in the following places. Near New Zealand 40°28' S, 177°13' E, 2071 m, 1 ♂ and 1 ♀ (*P. hooki*, type-locality; STEBBING 1888). Barents Sea 71°23' N, 18°38' E, 125 m, 1 ♂ (*P. tuberculatus*, type-locality; HOEK 1882) and 77°07' N, 19°37' E, 320 m, some specimens (*P. tuberculatus*; STEBBING 1891).

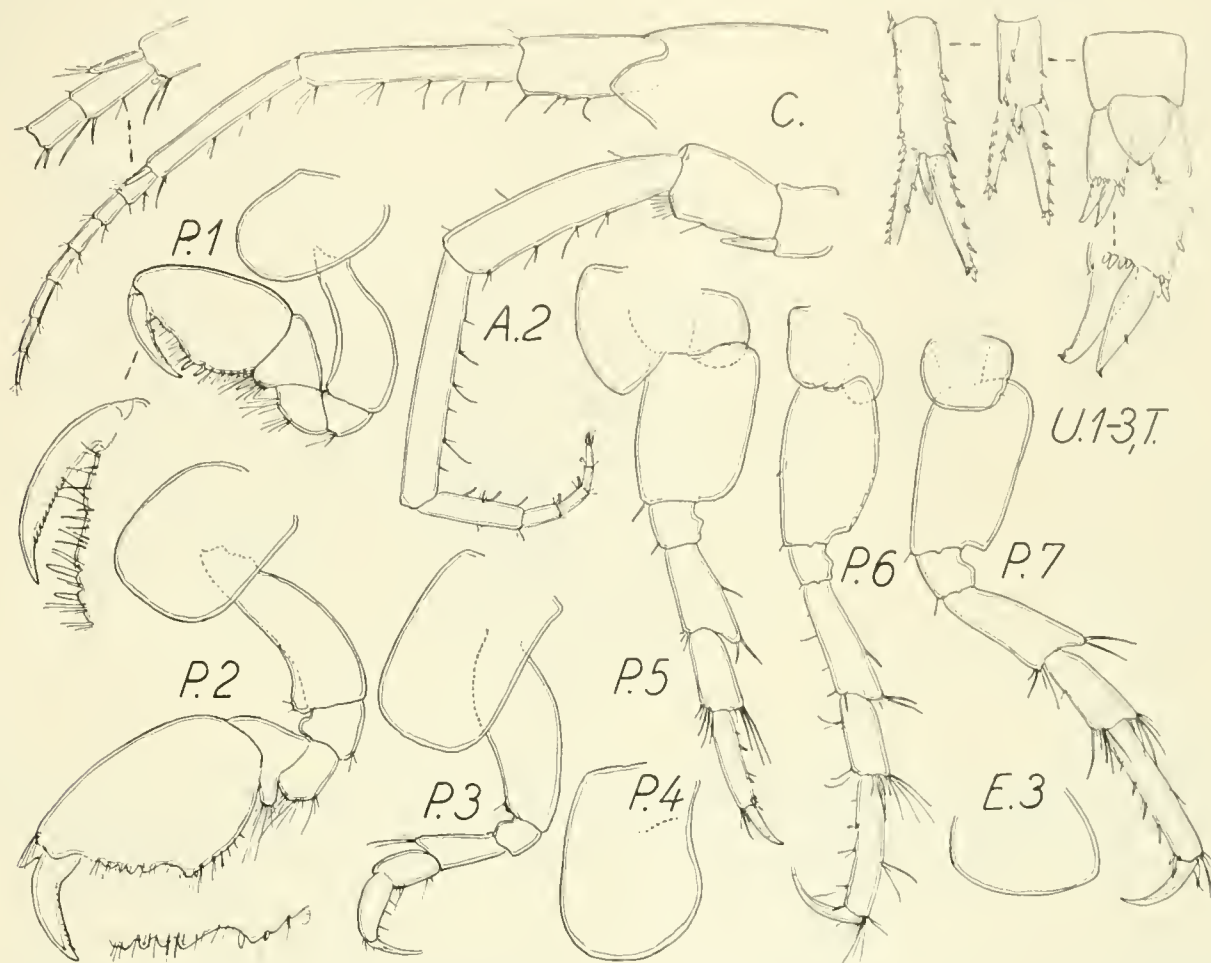


Fig. 24. *Ischyrocerus brasilori* ♂, "Ingolf" St. 105.

Family: Corophiidae Dana.

Corophiidae G. O. Sars, Crust. of Norway, vol. 1, 1895, pp. 606-626, + *Podoceridae* (in parte) pp. 601-605.

Corophiidae Stebbing, Tierreich, vol. 21, 1906, p. 662.

Genus: *Eriethonius* Milne-Edwards.

343. *Eriethonius megalops* (G. O. Sars) (Chart IV).

Eriethonius megalops G. O. Sars, Crust. I. Norske Nordhavs Exp., 1885, p. 210, pl. 17 fig. 4.

Eriethonius megalops Stebbing, Tierreich, vol. 21, 1906, p. 673.

Occurrence:

63°13' N, 15°41' W, 1130 m, 4°5. "Ingolf" St. 7: 17-V-1895. 1 ♂.
66°18' N, 25°59' W, 621 m, ÷ 0°75. "Ingolf" St. 15: 4-VI-1895. 1 ♂.
63°30' N, 54°25' W, 1096 m, 3°3. "Ingolf" St. 25: 26-VI-1895. 2 ♀.

61°42' N, 9°36' W, 1026 m, 1°8. "Ingolf" St. 44: 9-VIII-1895.
Several specimens (♂, ♀, juv.).

66°16' N, 26°8' W, 600 m, ÷ 0°1. WANDEL 1891. 1 big ♂.

60°19' N, 5°22' W, 1200 m, ÷ 0°15. "Michael Sars" 18-VIII-1902.
AD. S. JENSEN leg. 3 ♀, determination not certain.

Distribution (Chart IV). From Labrador(?) and Baffin Bay to White Sea; also the deep Polar Basin, depths 10-1100 m. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 403.

Eriethonius, spp. indeterminata.

66°35' N, 56°38' W, 599 m, 3°9. "Ingolf" St. 32: 11-VII-1895.
1 specimen.

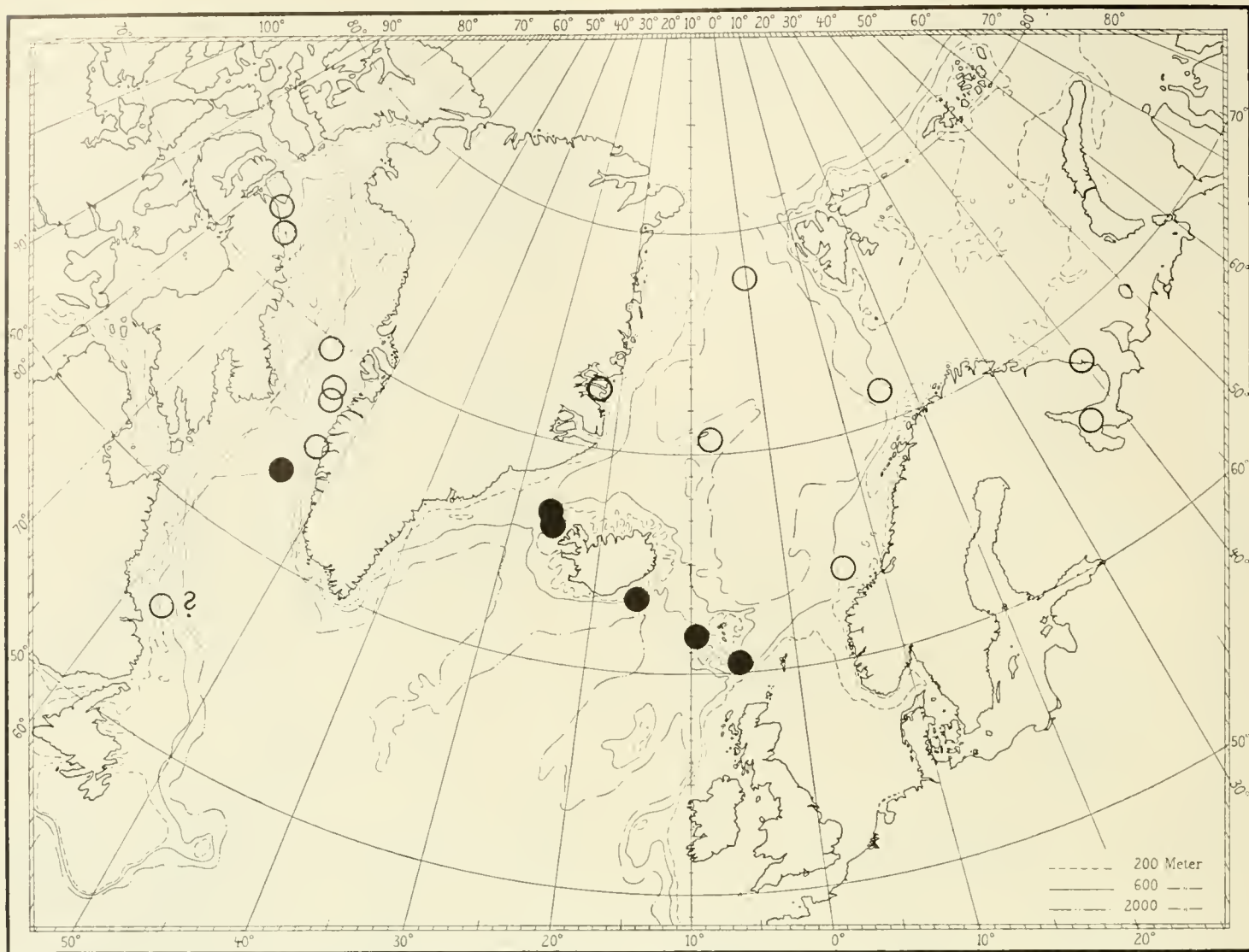


Chart IV. Distribution of *Erithonius megalops*. ● = new localities, ○ = localities from the literature.

63°26' N, 7°56' W, 887 m, ÷ 0°6. "Ingolf" St. 138: 10-VIII-1896.

A few specimens.

70°32' N, 8°10' W, 900 m. 27-VI-1891. 2 specimens.

Genus: *Neohela* S. I. Smith.

344. *Neohela monstrosa* (Boeck) (Chart V).

Neohela monstrosa G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 624, pl. 224.

Neohela monstrosa Stebbing, Tierreich, vol. 1, 1906, p. 675.

Occurrence:

66°23' N, 7°25' W, 1802 m, ÷ 1°1. "Ingolf" St. 104: 11-VII-1896.

1 ♂, 1 ♀ with marsupium.

69°13' N, 8°23' W, 1889 m, ÷ 1°0. "Ingolf" St. 117: 24-VII-1896.

4 specimens.

69°29' N, 11°32' W, 1667 m, ÷ 1°0. "Ingolf" St. 120: 25-VII-1896. About 10 specimens.

67°19' N, 15°52' W, 552 m, ÷ 0°5. "Ingolf" St. 126: 29-VII-1896.

1 small, defective.

63°26' N, 7°58' W, 887 m, ÷ 0°6. "Ingolf" St. 138: 10-VIII-1896. 1 ♂.

66°32' N, 18°50' W, 492 m. "Dana" St. 4616: 1-VIII-1933. 1 ♂.

It has been recorded from the following localities at depths > 400 m: 73°12' N, 58°08' W, 860 m, 0°5 (K. STEPHENSEN, Meddel. om Grøn., vol. 79, no. 7, 1933, p. 51), and two samples in Bredefjord, SW. Greenland, 410-560 m (K. STEPHENSEN, *ibid.*, vol. 53, 1916, p. 295).

Length up to 31 mm (♂) and 25 mm (♀).

Distribution (Chart V). From Arctic America (Gaasefjord) and the New England States to Denmark, northern Norway and Spitsbergen; depths down to > 2200 m. For special localities see K. STEPHENSEN, Zool. of Iceland, vol. 3, no. 26, 1940, p. 65, and Tromsø Mus. Skr., vol. 3, 1935-42, p. 404.

Genus: *Unciola* Say.

345. *Unciola laticornis* H. J. Hansen (Fig. 25).

Unciola laticornis H. J. Hansen, Vid. Medd. Naturh. Foren. Kjøbenhavn, 1887, p. 166, pl. 6 figs. 7-7 b.

Unciola laticornis Stebbing, Tierreich, vol. 21, 1906, p. 677.

Occurrence:

64°35' N, 31°12' W, 2448 m, 1°6. "Ingolf" St. 11: 21-V-1895. 1 ♂.

65°43' N, 26°58' W, 471 m, 6°1. "Ingolf" St. 16: 6-VI-1895. 1 ♂ (+ ? 1 defective ♀).

Remarks. H. J. HANSEN had a single ♂, 5.7 mm, and since then no author has seen any specimen. The "Ingolf" Expedition has secured 2 ♂♂ and a rather defective small ♀, possibly belonging to the same species.

HANSEN has given an excellent description (in Latin), accompanied by 3 drawings, viz., antenna 2, pereopod 1, and uropod 3. Therefore I give drawings of the majority of the limbs with some supplemental remarks on the largest ♂, 9 mm, from St. 11. Rostrum acute, covers about $\frac{1}{5}$ of first joint of antenna 1

rami about half the length of peduncle, with a few spines. Uropod 3 agrees with HANSEN, but inner ramus has no setae preserved.

The species is characterized by the 4 spines on under edge of first joint of antenna 1; accessory flagellum short (2 joints + short apical joint); lateral lobes of head truncate but narrow; shape of epimeral plates; uropod 3.

Distribution. Baffin Bay 69°16' N, 58°08' W, 350 m, stones and clay, 1 ♂ (type-locality; H. J. HANSEN l. c.).

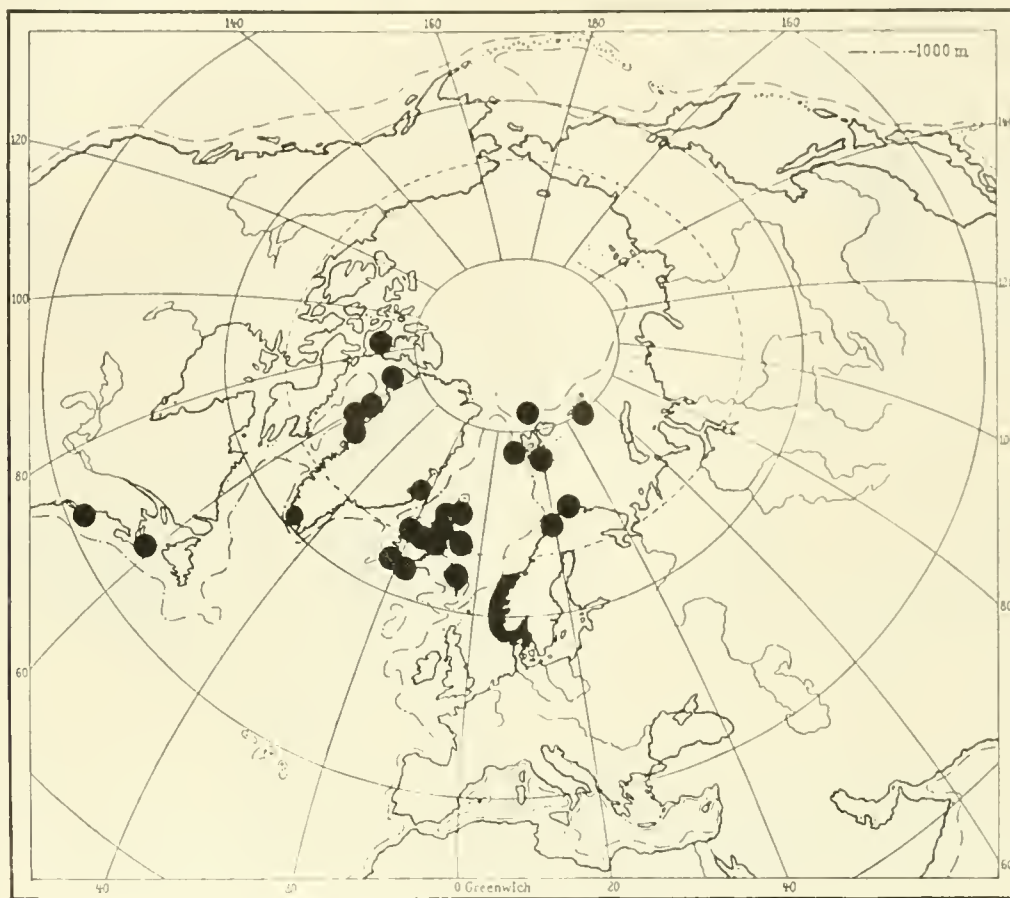


Chart V. Distribution of *Neohela monstrosa*.

(HANSEN: "cornu frontale brevius"), a trifle more protruding than lateral lobes. No eyes could be found (HANSEN: "oculi manifesti, deluti"). Antenna 1 (lost in the type-specimen) as long as body from rostrum to apex of telson, possibly even still longer, for apex seems to be lost. The two proximal joints of peduncle subequal in length, reach to middle of ultimate joint of peduncle of antenna 2; first joint heavier than second, with 4 spines along under edge; third joint very short, about $\frac{1}{5}$ of second joint. Flagellum longer than peduncle, consists of > 24 joints, for apex is probably lost. Accessory flagellum very short, consists of two long and one very short joint. Antenna 2 agrees with HANSEN l. c. (with figure), but penultimate joint of peduncle is a little longer, length about $2\frac{1}{2}$ times the breadth (HANSEN: "vix duplo longior quam lator"), and also antepenultimate joint is longer than described by HANSEN; flagellum in length equal to penultimate joint, has 13-14 joints. Pereiopod 1, hand somewhat more stout than shown by HANSEN (fig. 7a); dactylus minutely serrate. Pereiopods 2-7 agree fairly well with HANSEN's description.

All three pairs of epimeral plates have each a tooth on lower hind corner, increasing in length from first to third plate, and in the two last segments with a sinus above. Uropod 1, peduncle ends in a triangular acute process not drawn in HANSEN's figure;

346. *Unciola crassipes* H. J. Hansen (Figs. 26-27; Chart VI).

Unciola crassipes H. J. Hansen, Vid. Medd. 1887, p. 165, pl. 6 fig. 6, 6a.

Unciola crassipes Stebbing, Tierreich, vol. 21, 1906, p. 679.

Occurrence:

63°04' N, 9°22' W, 493 m, 5°3. "Ingolf" St. 2: 12-V-1895. 2 specimens.

64°54' N, 55°10' W, 740 m, 3°8. "Ingolf" St. 27: 1-VII-1895. 5 specimens.

66°35' N, 56°38' W, 599 m, 3°9. "Ingolf" St. 32: 11-VII-1895. Several specimens.

65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895. Numerous specimens.

62°57' N, 19°58' W, 957 m. "Thor" St. 166: 14-VII-1903. 4 specimens.

It has been recorded from the following locality at depth > 400 m: Davis Strait 66°22' N, 57°16' W, 686 m (K. STEPHENSEN, Vid. Medd., vol. 64, 1912, p. 97).

Remarks on ♂, length up to 12 mm (H. J. HANSEN: 9 mm). The "Ingolf"-specimens agree well with H. J. HANSEN l. c., except in the following characters. Rostrum varies somewhat in length

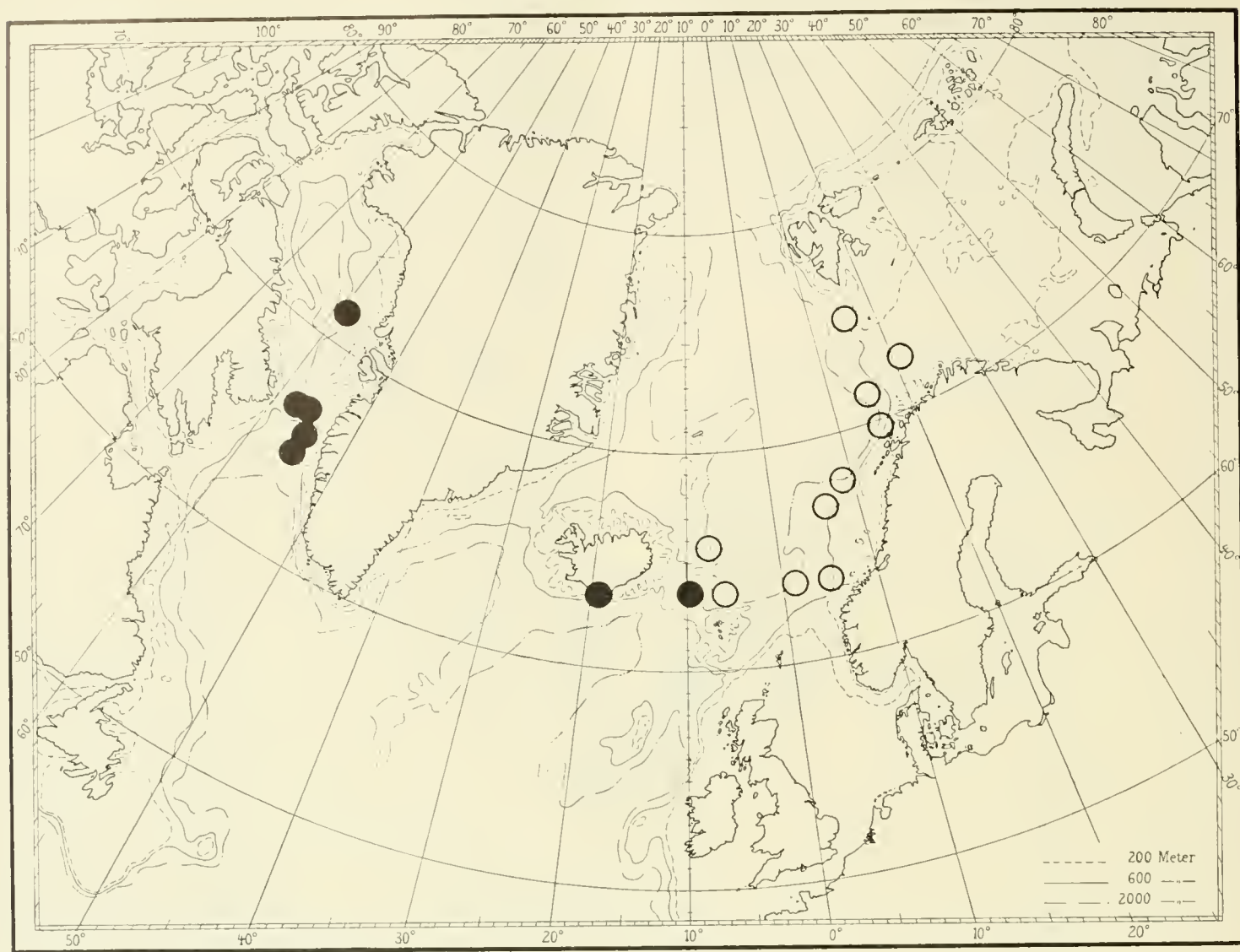


Chart VI. ● Distribution of *Unciola crassipes*. ○ *U. petalocera*.

(HANSEN: "cornu frontale sat longum"), covers from about $\frac{1}{6}$ to about $\frac{1}{4}$ of the length of first joint of antenna 1. Under rostrum is a notch, and then a rather high epistomal plate follows (Fig. 26,C). Lateral lobes of head truncate, much broader than in *U. laticornis*. Epimeral plates of metasome have hind margins rounded; lower hind corner in plate 1 almost rectangular, without tooth, in plate 2 with a small tooth, and in plate 3 with a somewhat larger tooth with a small sinus above. Antenna 1, flagellum in length equal to peduncle, about 25 joints; accessory flagellum has 4 joints + the minute apical joint. Antenna 2, 3rd joint almost as long as and a trifle broader than next joint; flagellum has about 17 joints. Pereiopod 1, hand differs a little from HANSEN l. c., in that the tooth on palm is nearer to finger hinge than in H.'s figure, and not with fore and hind edges symmetrical, but with apex turned toward finger hinge. Pereiopods 2-7 agree fairly well with *U. laticornis* (fig. 25). Uropod 1, peduncle twice as long as rami which have rather few spines (outer ramus, on outer edge 4, on inner edge 2). Uropod 2, peduncle twice as long as rami; outer ramus has on outer edge 2(3), on inner edge 2 spines; inner ramus on outer edge 1, on inner edge 3 spines. Uropod 3, peduncle somewhat triangular, longer than broad; outer ramus ovate, half the length of peduncle, with 3-4 spines and about 7 setae; inner ramus shorter and narrower than outer, with 2-3 terminal spines and two setae; it is articulate, but has no muscles. As regards inner

ramus HANSEN writes (l. c., p. 166) "ramo interiore non a pedunculo membrana articulari separato, parvo", and (p. 167, Danish), "in *U. crassipes* inner ramus is distinct, but not separated by an articulation from peduncle".

Description of ♀ with marsupium, 11 mm (♀ was hitherto not described). Antenna 1, the two proximal joints of peduncle subequal in length, third joint in length $\frac{1}{3}$ of second joint; flagellum as in ♂. Accessory flagellum has 5 joints + the minute apical joint. Antenna 2 not heavier than antenna 1, and third and fourth joints of peduncle cylindrical, not with lamellar expansion as in ♂; fifth joint a trifle shorter than fourth which is about twice the length of third joint; flagellum not much longer than fourth joint of peduncle, 14-articulate. Pereiopod 1, 5th joint much larger than in ♂; also 6th joint differs, in that process defining palm is lower, but much broader than in ♂, and apically with a spine, and also tooth near finger hinge is lower and broader. Pereiopods 2-7 not differing from ♂. There are 5 pairs of marsupial plates: very large and oval in pereiopods 2-5, but narrow and short (- not broader and not much longer than gills -) in prp. 6. Other characters not different from ♂.

This species is characterised by the following features: lateral lobes of head very broad, apically truncate; antenna 1, peduncle with a few hairs, but without spines, and accessory flagellum has

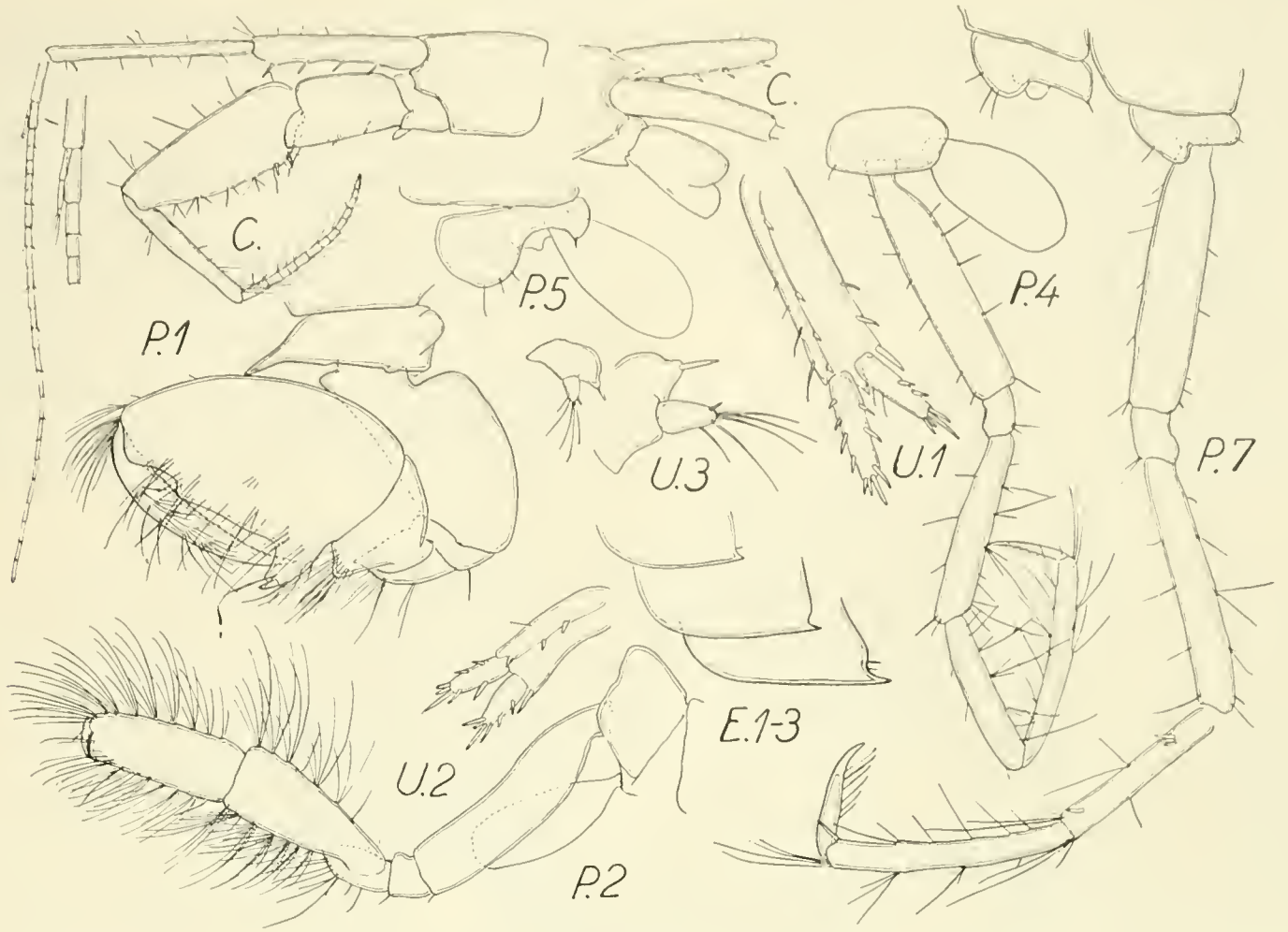


Fig. 25. *Unciola laticornis* ♂. "Ingolf" St. 11.

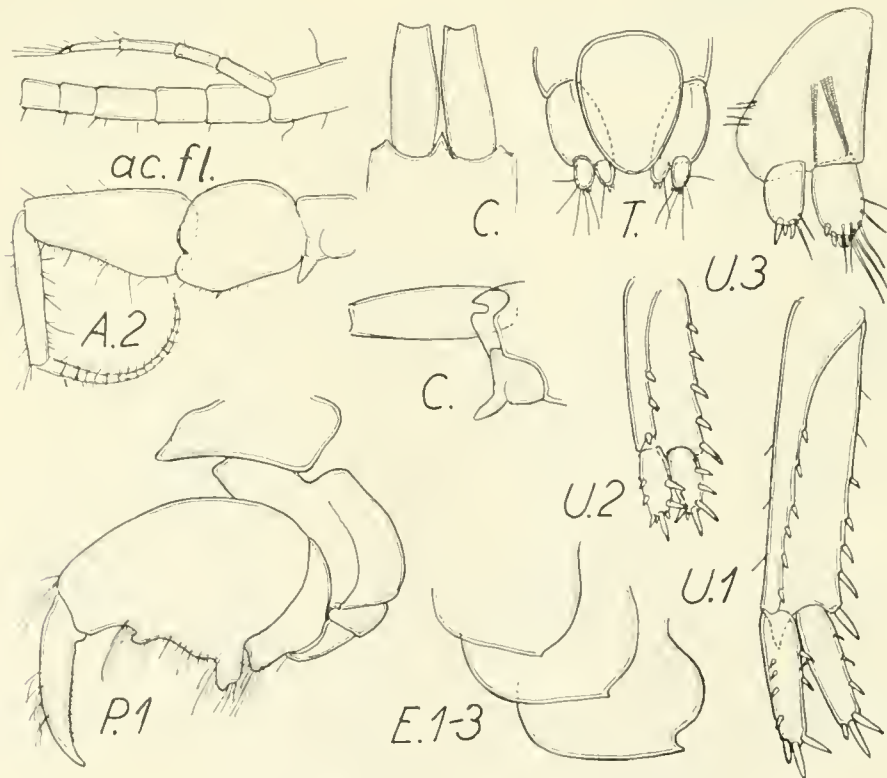


Fig. 26. *Unciola crassipes* ♂. "Ingolf" St. 35.

4 or 5 joints, + minute apical joint; shape of epimeral plates (see fig. 26); uropods 1-2, rami about half as long as peduncle; uropod 3, inner ramus articulate, shorter and narrower than outer, apically with 2-3 short spines.

Distribution. Baffin Bay 71°10' N, 58°56' W, 375 m, clay (type-locality; H. J. HANSEN l. c.).

347. *Unciola petalocera* (G. O. Sars) (Fig. 28; Chart VI).

Unciola petalocera G. O. Sars, Crust., I, Norske Nordhavs-Exp., 1885, p. 212, pl. 17 fig. 5.

Unciola petalocera Stebbing, Tierreich, vol. 21, 1906, p. 681.

Occurrence:

65°34' N, 7°31' W, 1435 m, ÷ 0°8. "Ingolf" St. 105: 11-VII-1896.

1 ♂, 1 ♀.

63°36' N, 7°30' W, 1322 m, ÷ 0°6. "Ingolf" St. 139: 10-VIII-1896. Fragments of 3 large ♂ and a few very defective young specimens.

Remarks. The ♂ from St. 105 is 13 mm (SARS's type-specimens were 10 mm). Distal end of antenna 2 is lost, but it is easily recognizable e. g. by the very characteristic pereopod 1 with the long dactylus. On the whole the specimen agrees well with SARS l. c., but a few details are noteworthy. A very short rostrum is present (see fig. 28); SARS writes "the head occurs truncate anteriorly, without exhibiting any distinctly prominent rostrum". Antenna 1, flagellum > 26 joints (apex probably lost); accessory flagellum a trifle longer than the two first joints of flagellum, has 3 joints + the minute apical joint (SARS: "two-jointed"). Antenna 2, only the 3 proximal joints are preserved. Oral parts were not dissected out. Epimeral plates, each has on lower hind corner a tooth with a sinus above; both tooth and notch are

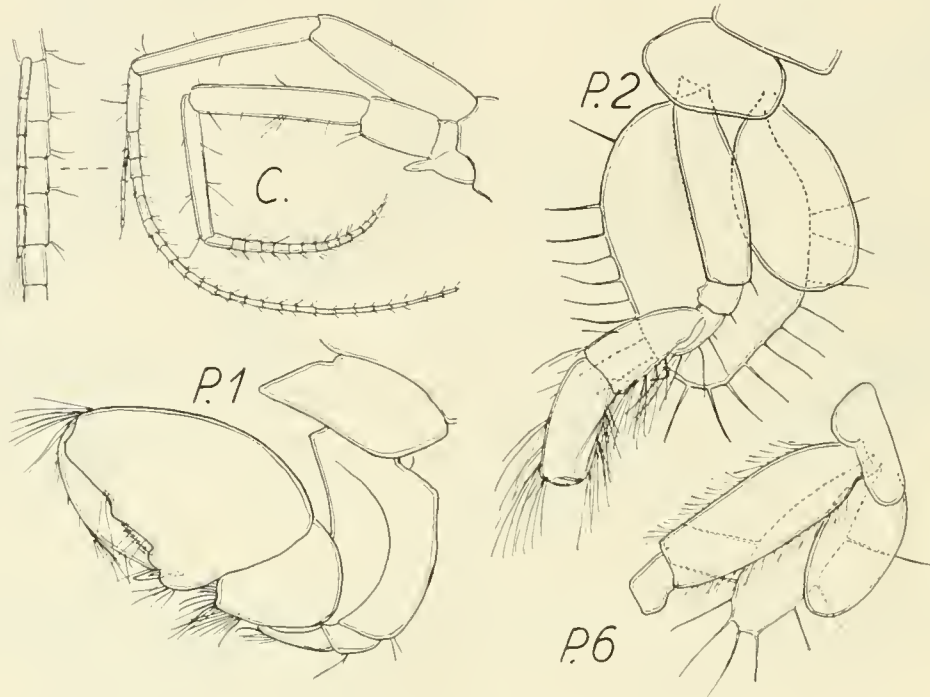


Fig. 27. *Unciola crassipes* ♀. "Ingolf" St. 35.

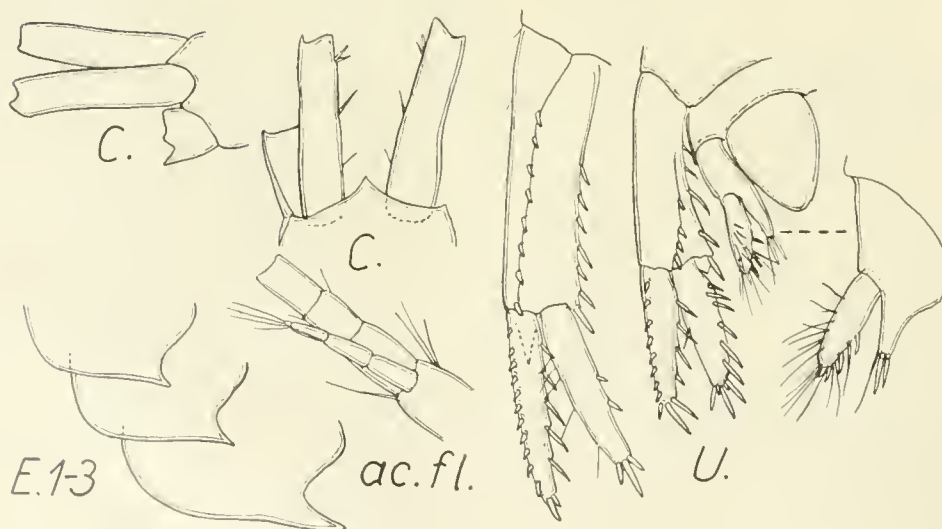


Fig. 28. *Unciola petalocera* ♂. "Ingolf" St. 105.

largest in segment 3 (SARS shows no sinus). Uropods 1-2 more spinose than in SARS's figure; peduncle of uropod 1 terminates in a strong tooth. Uropod 3, outer ramus twice as long as inner ramus which ends in two spines, but in the ♀ from St. 105 there is but one spine (SARS: 1 spine). I have found no setae on telson (SARS: "furnished at the extremity with 2 short bristles").

The ♀ from St. 105, 9.5 mm, is still more defective than the ♂, but seems to agree well with SARS's description, except for the differences mentioned above.

Distribution (see Chart VI, p. 36). About 63°-75° N, 2°-

16° E, 610-1200 m, ±0°9' - ±1°2, clay, 6 hauls (type-localities; SARS l. c.).

Unciola spp., defective or young specimens.

63°06' N, 56°00' W, 2258 m, 2°4. "Ingolf" St. 21: 25-VI-1895.

66°35' N, 56°38' W, 599 m, 3°9. "Ingolf" St. 32: 11-VII-1895.

65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895.

59°12' N, 51°05' W, 3521 m, 1°3. "Ingolf" St. 38: 30-VII-1895.

63°08' N, 15°40' W, 1301 m, 3°9. "Ingolf" St. 51: 18-V-1896.

Family: Podoceridæ Stebbing (= Dulichiidæ aut.).

Dulichiidæ G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 628.

Podoceridæ Stebbing, Tierreich, vol. 21, 1906, p. 694.

Genus: *Lætmatophilus* Bruzelius.

348. *Lætmatophilus armatus* Norman (Chart VII).

Lætmatophilus armatus G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 632, pl. 227 fig. 1.

Lætmatophilus armatus Stebbing, Tierreich, vol. 21, 1906, p. 697.

Lætmatophilus armatus K. Stephensen, Tromsø Mus. Skr., vol. 3, 1935-42, p. 414 (lit., etc.).

Occurrence:

64°57' N, 57°10' W, 740 m, 3°8. "Ingolf" St. 27: 1-VII-1895.
Numerous specimens.

65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895.
Numerous specimens.

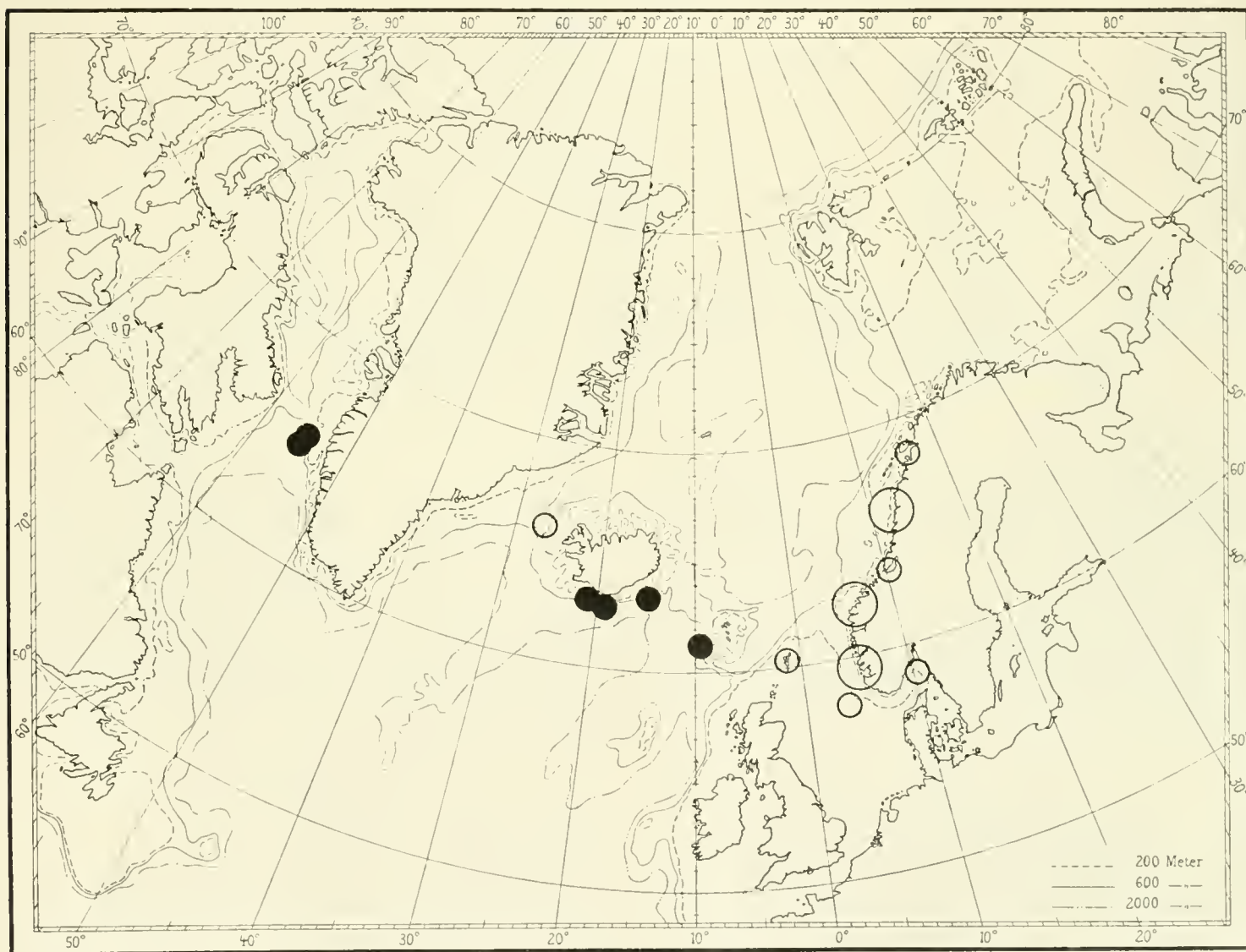


Chart VII. Distribution of *Lætmatophilus armatus*. ● new localities, ○ = localities from the literature, ○ = localities which could not be noted exactly.

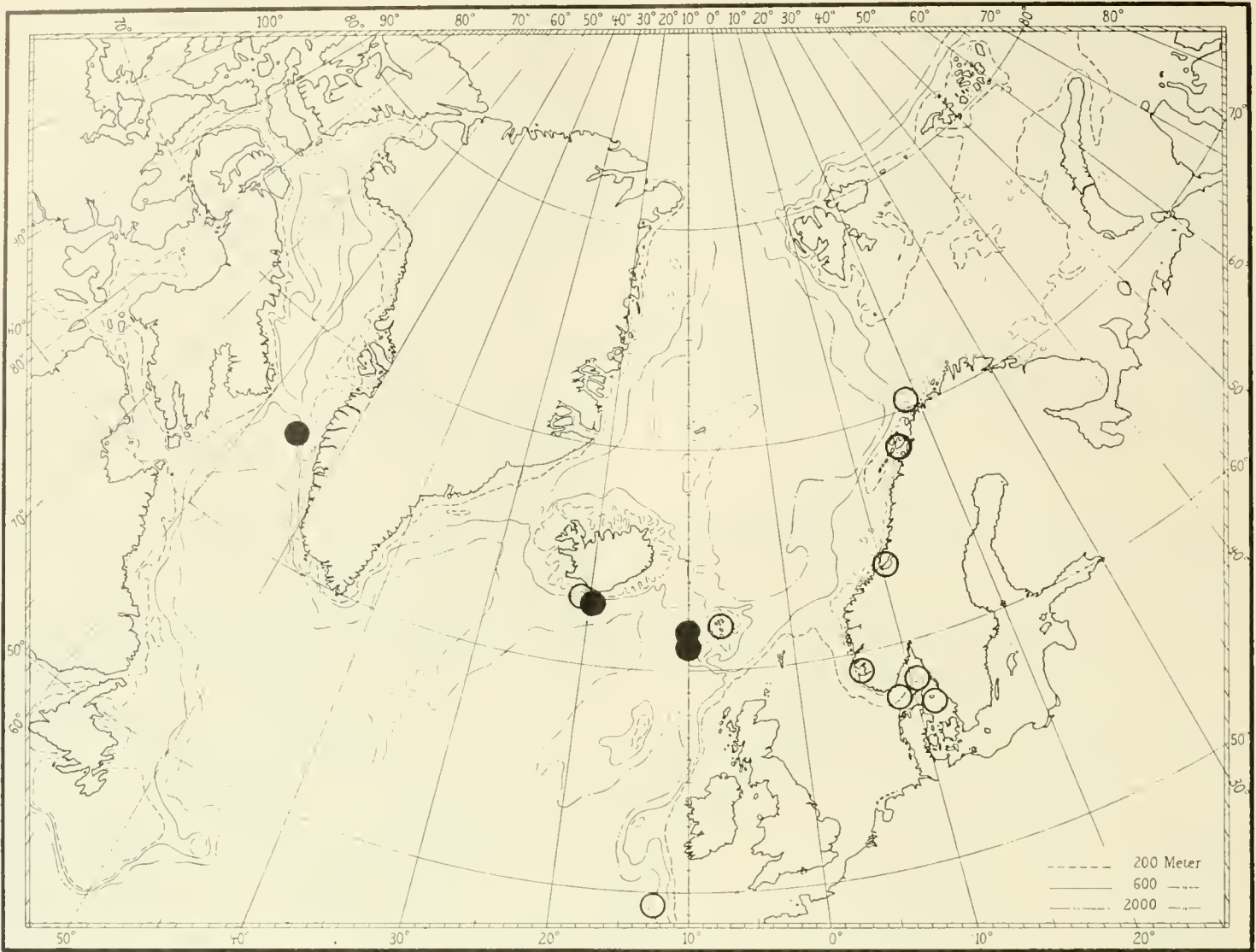


Chart VIII. Distribution of *Xenodice frauenfeldti*. ● = new localities, ○ = localities from the literature.

63°08' N, 15°40' W, 1301 m, 3°9. "Ingolf" St. 54: 18-V-1896. 1 specimen.

62°57' N, 19°58' W, 957 m. "Thor" St. 166: 14-VII-1903. Numerous specimens, incl. ovigerous ♀.

63°05' N, 20°07' W, 557 m. "Thor" St. 167: 14-VII-1903. A few specimens.

61°15' N, 9°35' W, 900 m. "Thor" St. 89: 22-V-1904. About 10 specimens.

Distribution (Chart VII). In addition to the localities above it is distributed at NW. and S. Iceland 216-326 m, and from N. Norway (Lofoten) to W. Africa 22° N, depths 36-900 m. For special localities see K. STEPHENSEN l. c., and Zool. of Iceland, vol. 3, no. 26, 1940, p. 67.

Genus: *Xenodice* Boeck.

349. *Xenodice frauenfeldti* Boeck (Chart VIII).

Xenodice frauenfeldti G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 633, pl. 227 fig. 2.

Xenodice frauenfeldti Stebbing, Tierreich, vol. 21, 1906, p. 700.

Occurrence:

65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895. A few specimens including ovigerous ♀.

62°57' N, 19°58' W, 957 m. "Thor" St. 166: 14-VII-1903. 2 specimens.

63°05' N, 20°07' W, 557 m. "Thor" St. 167: 14-VII-1903. 3 specimens.

61°07' N, 9°30' W, 835 m. "Thor" St. 78: 12-V-1904. 1 specimen.

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 2 specimens.

Distribution (Chart VIII). In addition to the localities above it has been found 49°25' N, 12°20' W, 1270-1180 m, "Thor" St. 93, 25-VI-1905. 1 specimen (in the Zool. Museum, Copenhagen). S. of Iceland 216-326 m, the Faroes 23-30 m, and from N. Norway 71° N to the Skagerrak and Kattegat, 56-640 m (K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 414, and Zool. of Iceland, vol. 3, no. 26, 1940, p. 67).

Genus: *Dulichia* Krøyer.

Dulichia G. O. Sars, l. c. 1895, p. 634.

Dulichia Stebbing, l. c. 1906, p. 708.

After 1906 (STEBBING, Amphip. Tierreich) the following species have been established (according to Zool. Record up to 1940):

1. *D. bispina* Gurjanova, Zool. Anz., vol. 86, 1930, p. 245, figs.
2. *D. knipowitschi* Gurjanova, Zool. Anz., vol. 103, 1933, p. 127, no fig.

- D. knipowitschi* Gurjanova, Explor. mers U.R.S.S., fasc. 20, Inst. Hydrol. Leningrad, 1931, p. 87 (in Russian), figs.
D. aspina K. Stephensen, Meddel. om Gronl., vol. 79, no. 7, 1933, p. 57, figs.
D. knipowitschi Gurj. — *D. aspina* K. Steph., lide Gurjanova Zool. Anz., vol. 116, 1936, p. 151.

61°19' N, 5°22' W, 1200 m, ÷ 1°15. "Michael Sars" 10-VIII-1902, Ad. S. JENSEN leg. About 10 specimens (♂, ovigerous ♀), 10-11 mm.

Remarks. Though the large specimens (from the "Michael Sars") agree fairly well with G. O. Sars l. c., there are some differ-

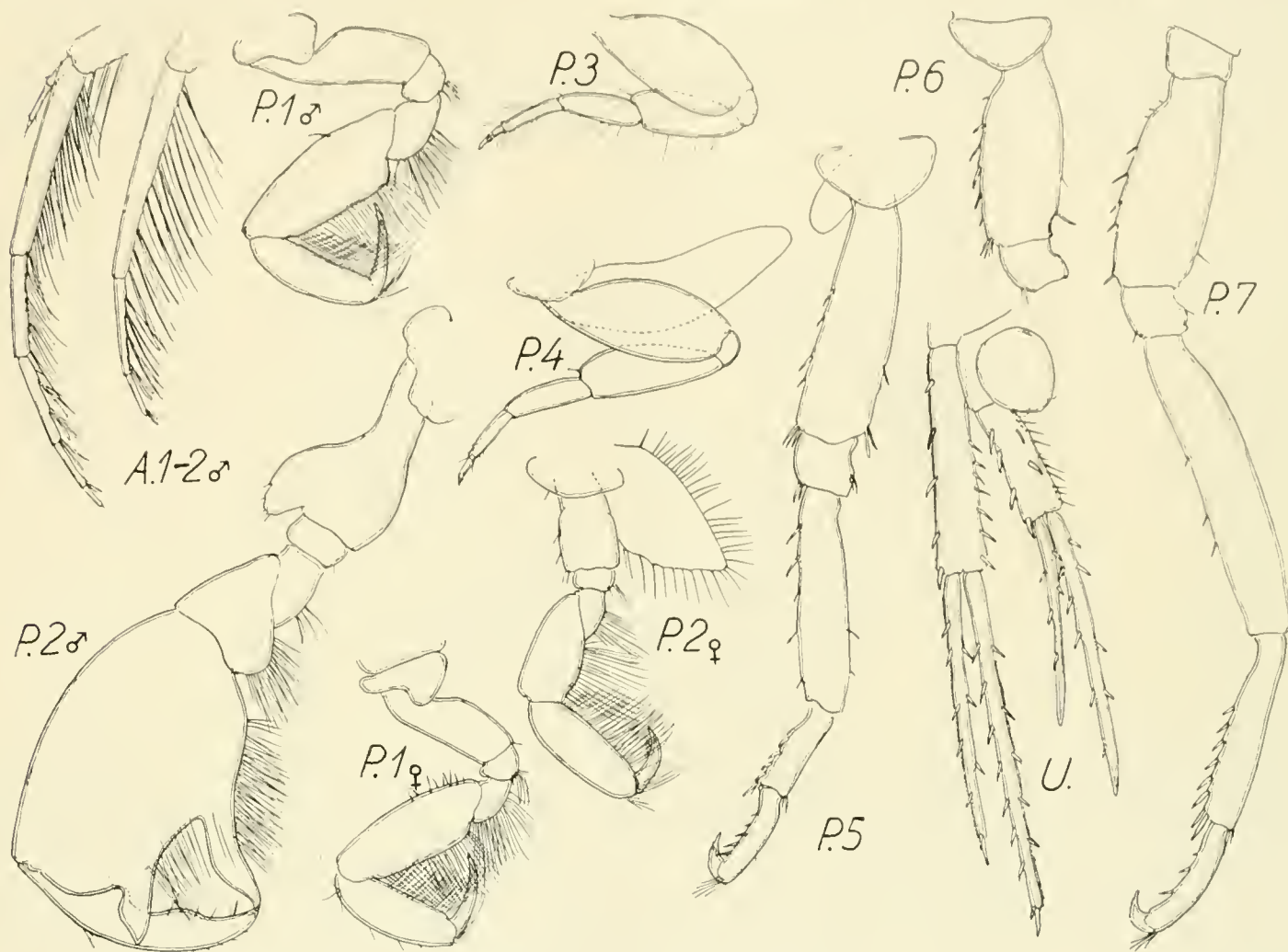


Fig. 29. *Dulichia hirticornis* ♂, and P.1-2 ♀.

350. *Dulichia macera* G. O. Sars.

Dulichia macera G. O. Sars, Crust., Norske Nordhavs-Exp., vol. 1, 1885, p. 220, pl. 18 fig. 2.

Dulichia macera Stebbing, Tierreich, vol. 21, 1906, p. 710.

Occurrence:

Jan Mayen 70°32' N, 8°10' W, 885 m, clay with small stones (H. J. HANSEN, Meddel. om Gronl., vol. 19, 1895, p. 130). The specimen is a ♂, about 9 mm in length, and very defective; antennae 1-2, and pereopods 3 and 5-7 are lost.

Distribution. The deep Polar Basin: 69°41' N, 15°51' E, 1591 m, ÷ 1°2, sabulous clay, and 72°57' N, 14°32' E, 817 m, ÷ 0°8, clay (type-localities: G. O. Sars l. c.). Not found elsewhere.

351. *Dulichia hirticornis* G. O. Sars (Fig. 29).

Dulichia hirticornis G. O. Sars, Crust., Norske Nordhavs-Exp., vol. 1, 1885, p. 218, pl. 18 fig. 1.

Dulichia hirticornis Stebbing, Tierreich, vol. 21, 1906, p. 711.

Occurrence:

61°30' N, 4°21' W, 950 m, ÷ 0°5, mud. WANDEL leg. 1890. Several specimens up to 8-9 mm.

ences. Antenna 1 ♂, flagellum, in length equal to last joint of peduncle, and consisting of 5 joints, the first of which is a trifle shorter than the following taken together (SARS: "the flagellum is shorter than the last joint of the peduncle, and composed of 4 segments, of which the 1st is considerably longer than are all the other three taken together"). Accessory flagellum is 3-articulate (SARS: "very small"). Antenna 2 ♂, flagellum has 3 joints: their length ratio: 9:4:2 (SARS says only that it is "somewhat shorter than on the 1st pair"). Antennae 1-2 ♀ not different from ♂. Eyes (in both sexes) colourless, round, rather little projecting, but not smaller than in *D. porrecta* (SARS: "very small, do not project toward the sides; they are oval-rotund in form, somewhat oblique as to position, and furnished with very light whitish-yellow pigment").

Pereopod 1 ♂ is not described by SARS. 5th joint is rather broad, nearly $1\frac{1}{2}$ times as long as 6th joint which is rather narrow, with hind margin straight; dactylus two thirds the length of 6th joint. Pereopod 2 ♂ agrees fairly well with SARS l. c.; but SARS does not mention the large lobe at the distal end of 2nd joint and the tubercle on dactylus near finger hinge. Pereopod 1 ♀ not essentially different from pereopod 1 ♂. Pereopod 2 ♀ similar to pereopod 1; the most important differences are: 2nd

joint has a "wing" along the fore margin, it is, however, much narrower than in pereopod 2♂; 5th joint rather short, a trifle shorter than 6th joint; dactylus setose at the concave side. Pereiopods 3-4 in both sexes, second joint elliptical, maximal breadth about two fifth the length; in pereopod 3 second joint is about as long as 4th and 5th joints together, in pereopod 4 it is $1\frac{1}{2}$ times the length of 4th joint; 4th joint somewhat broader than the following joints. Pereiopods 5-6 ♂ and ♀ subequal in length, somewhat shorter than pereopod 7; second joint in pereopod 6 shorter than in prp. 5 and 7, and in breadth equal to the same joint in prp. 7, but narrower than in prp. 5. The

61°50' N, 56°21' W, 2702 m, 1°5. "Ingolf" St. 36: 28-VII-1895.

A few specimens up to 5 mm (♂, ♀; and a few juv., belonging to the same species?).

60°17' N, 54°05' W, 3229 m, 1°4. "Ingolf" St. 37: 29-VII-1895. 1 ♂, 6 mm (type).

The few ♂♂ in the material are rather defective (antennæ 1-2 and several other appendages are lost); but in all of them pereopods 1-2 and uropoda are kept.

Description of ♂, about 6 mm, from St. 37 (Fig. 30). Body rather slender, smooth. Head shorter than the two first segments

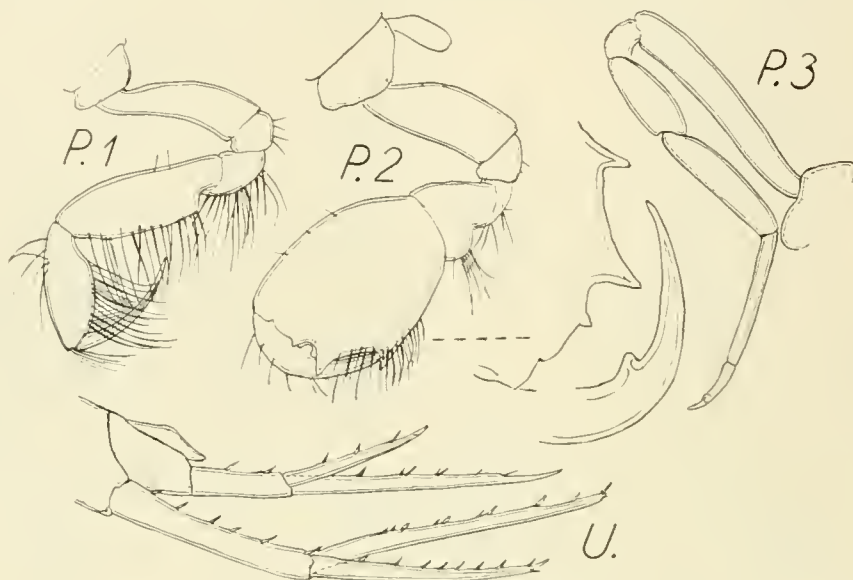


Fig. 30. *Dulichia abyssis* ♂. "Ingolf" St. 37.

uropods are said by Sars to have the usual structure. Uropod 1, length ratio of rami and peduncle: 6:5:4; in uropod 2 the length ratio is: 9:6:4; peduncle of uropod 1 about twice the length of peduncle of uropod 2; both of the uropods are spinulose. There is no marked sexual difference in the uropods.

Distribution. The deep Polar Basin: 62°44' N, 1°48' E, 733 m, ÷ 1°0, clay; 63°10' N, 5°0' E, 763 m, ÷ 1°0, sabulous clay; and 71°25' N, 15°41' E, 1134 m, ÷ 1°0, clay (type-localities; G. O. Sars l. c.).

352. *Dulichia nordlandica* Boeck.

Dulichia nordlandica G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 641, pl. 231 fig. 2, pl. 232 fig. 1.

Dulichia nordlandica Stebbing, Tierreich, vol. 21, 1906, p. 711.

Occurrence:

63°06' N, 56°00' W, 2258 m, 2°4. "Ingolf" St. 24: 25-VI-1895. 1 ♂.

64°54' N, 55°10' W, 740 m, 3°8. "Ingolf" St. 27: 1-VII-1895. 1 ♂.

62°0' N, 21°36' W, 1591 m, 3°3. "Ingolf" St. 40: 9-VIII-1895.

1 juv., defective, determination not certain.

63°05' N, 20°07' W, 557 m. "Thor" St. 167: 14-VII-1903. 1 ♂.

Distribution. From the Skagerrak along Norway to Lofoten, 200-640 m; for special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 418.

353. *Dulichia abyssis* n. sp. (Figs. 30-31).

Occurrence:

64°34' N, 31°12' W, 2448 m, 1°6. "Ingolf" St. 11: 21-V-1895.

1 ♂, 4 mm.

63°30' N, 54°25' W, 1096 m, 3°3. "Ingolf" St. 25: 26-VI-1895.

1 ♂, 5 mm.

combined, not much produced. No traces of eyes could be found. Antennæ 1-2 lost. Side-plates all rather small, none of them armed with spines or teeth. Pereiopod 1, 5th joint about $1\frac{1}{2}$ times as long as 6th joint; dactylus in length equal to 6th joint. Pereiopod 2, 5th joint cup-shaped, short, 6th joint broad oval, rather similar to *D. spinosissima* (G. O. Sars 1895, pl. 228); palm defined by a strong tooth, and having a larger and a smaller tooth near finger-hinge; dactylus strong, overlapping palm, with a tooth on inner margin near base. Pereiopod 3, second joint not dilated, in length equal to 4th and 5th joints together. Pereiopod 4, the distal joints are lost; but in specimens from other stations, with the limb preserved, second joint is widened in the central part and shorter than $1\frac{1}{2}$ times the length of 4th joint; thus second joint is much shorter than 4th and 5th joints together. Pereiopods 5-7 lost. Uropod 1, peduncle with 5 spines on outer margin; peduncle in length subequal to outer ramus, or two thirds of inner ramus. Uropod 2, peduncle shorter than in uropod 1, two thirds of outer ramus or one third if inner ramus.

The ♂ from the other stations agree fairly well with the type described above, but are somewhat smaller, 4-5 mm; in the smallest ♂, 4 mm (Stat. 11), pereopod 2 has a form intermediate between the type and the specimen from St. 24 described below as *D. (abyssi?)*.

Ovigerous ♀, 5 mm. In the sample from St. 36 there are a few ♀, including a single ovigerous ♀ and a ♀ with marsupium; but they are rather defective. Antenna 1 seems to be normal, but is rather damaged; articulation in flagellum cannot be stated with certainty. Antenna 2 lost. Pereiopod 1 not essentially different from prp. 1 ♂. Prp. 2, second to fourth joints similar to ♂; 5th joint much shorter than second, but a trifle broader; 6th joint in length equal to 5th, oval, maximal breadth about three fifths of length, with a short, slightly concave palm, and with spines and setae on under margin; dactylus not essentially longer than

palm, not very stout. Pereiopods 3-4 not essentially different from ♂. Pereiopods 5-7 lost. Uropods 1-2 not very different from ♂, but peduncles shorter in relation to rami.

This new species differs from all other species of the genus, except *D. spinosissima* Kr. (G. O. Sars 1895, pl. 228), in the oval

It seems to be very close to, if not identical with, *D. abyssi*. But the hand of pereiopod 2 is a little different: in the present specimen it is somewhat longer, with longer interspace between the two large teeth of palm, and the small tooth on palm near finger hinge in *D. abyssi* is still smaller in the specimen from

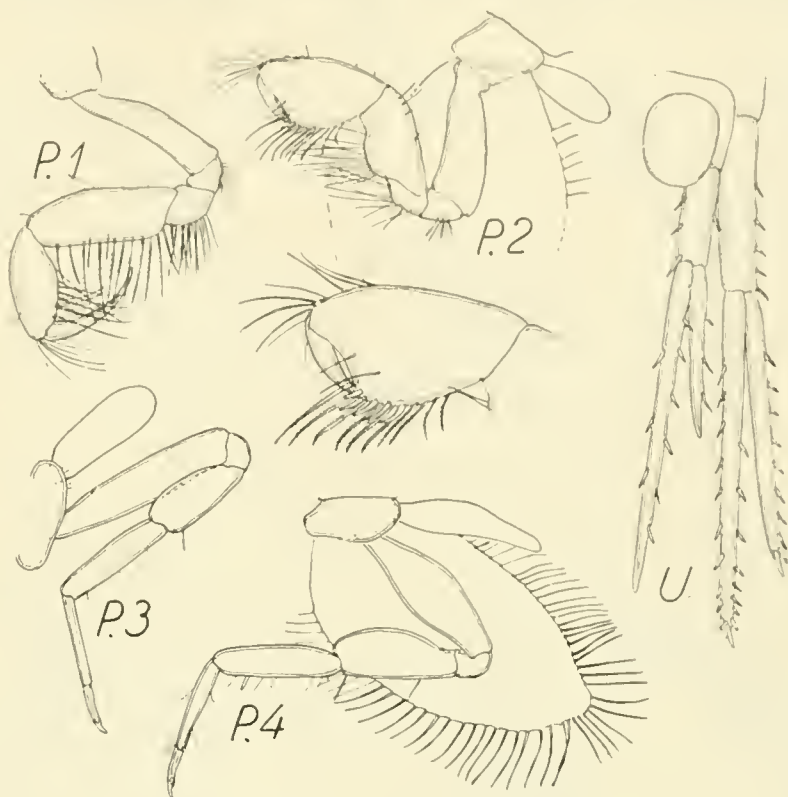


Fig. 31. *Dulichia abyssi* ♀. "Ingolf" St. 36.

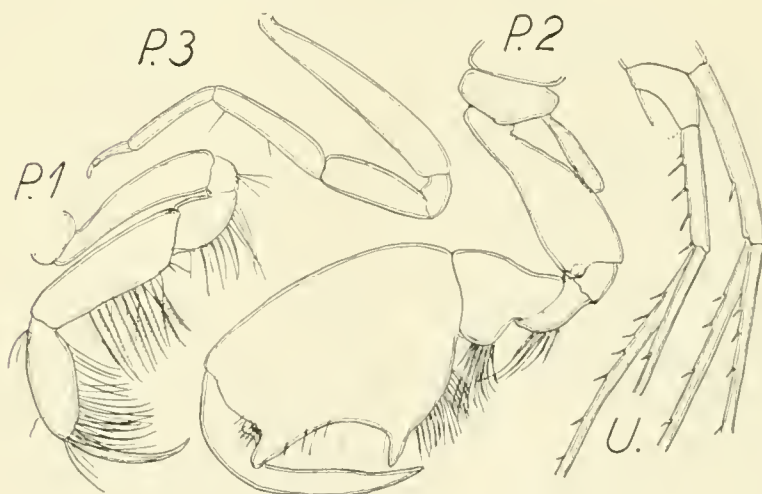


Fig. 32. *Dulichia (abyssi?)*. "Ingolf" St. 21.

hand of pereiopod 2 in both sexes. Especially in ♀ pereiopod 2¹⁾ is very different from all other species (except *D. spinosissima*): usually 6th joints in pereiopods 1 and 2 in the other species are fairly alike.

353 a. *Dulichia (abyssi?)* (Fig. 32).

Occurrence:

63°06' N, 56°00' W, 2258 m, 2¹⁾. "Ingolf" St. 24: 25-VI-1895.

1 ♂ about 6 mm.

Description. This specimen is rather defective: antennae 1-2, pereiopods 5-7, and apices of rami of uropods are lost.

¹⁾ pereiopod 2²⁾ is not described in *D. arctica* Murdoch 1885, *D. bipinna* Gurjanova 1930, and *D. macera* G. O. Sars 1879.

Stat. 21: dactylus somewhat longer. Also in uropod 2 there is a difference: peduncle is longer, viz., two thirds (not half) the length of peduncle of uropod 1. Pereiopods 1 and 3-4 agree well with *D. abyssi*.

354. *Dulichia spinosa* n. sp. (Figs. 33-34).

Occurrence:

61°42' N, 9°36' W, 1026 m, 4-8. "Ingolf" St. 41: 14-VIII-1895.

1 ♂ ad., 1 ♂ juv., and a few ♀ ovig., all rather defective.

Description of ♂ ad., 6 mm (Fig. 33). Head and body nearly as in *D. porrecta*. Eyes well developed, round, colourless, size as

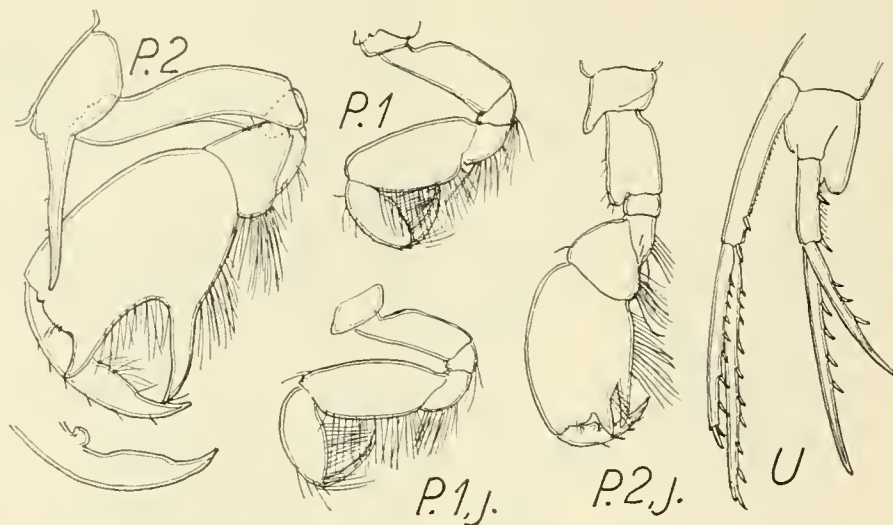


Fig. 33. *Dulichia spinosa* ♂ and young ♂ (*J* = young specimen).

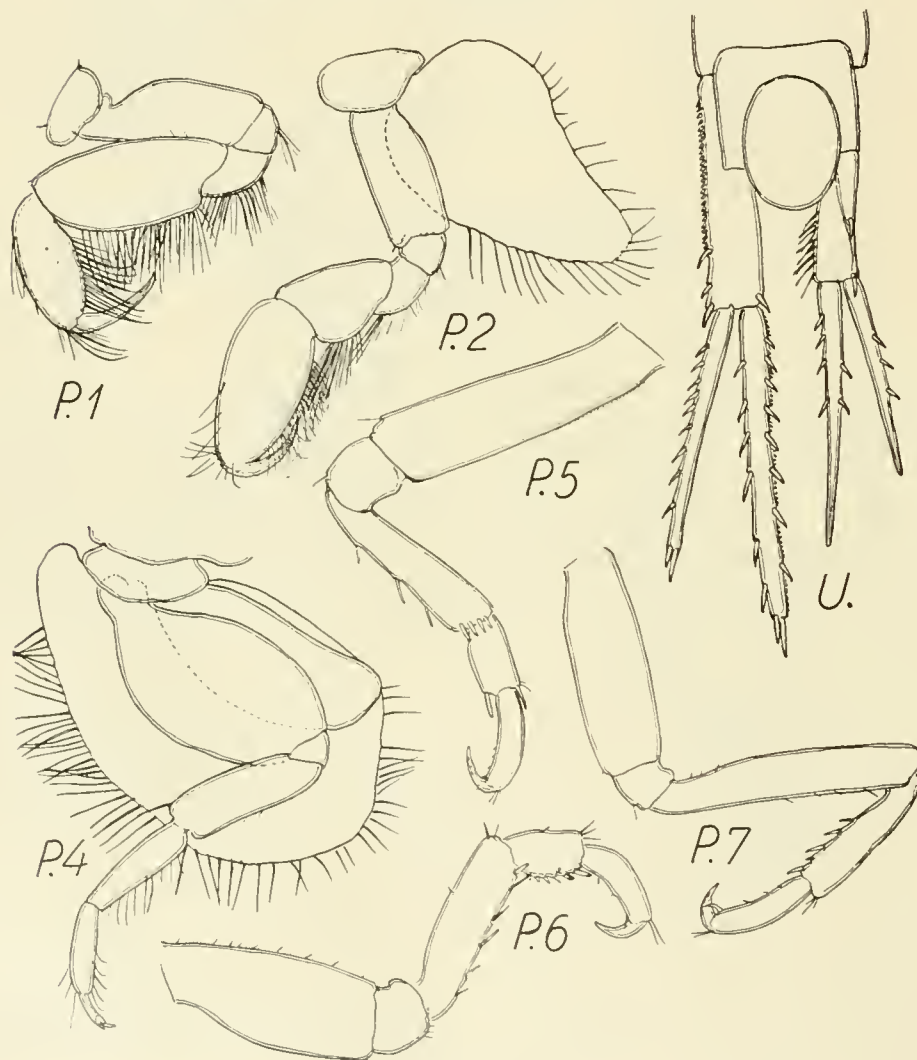


Fig. 34. *Dulichia spinosa* ♀.

in *D. porrecta*. Antennæ 1-2 lost. Pereiopod 1, side plate rather small, rounded rectangular, without spiniform process; 5th joint very broad, ov. $1\frac{1}{2}$ times as broad as the oblong oval next joint. Pereiopod 2, side plate has a long spiniform process, two thirds the length of second joint; second joint long, distally with a rounded lobe; 6th joint in length equal to second joint, broad, with a large, oblique thumb-like process and a shorter process

near finger hinge; dactylus has at base inside a process. Pereiopods 3-4 rather short, second joint dilated; pereiopods 5-7 lost. Uropods 1-2 agree in the relative lengths of peduncles and rami fairly well with *D. porrecta*; and as in the said species uropod 1 has both outer margin of peduncle and inner margin of inner ramus (not drawn in my fig. of ♂) minutely spinulose.

A ♂ juv., about 1.5 mm, differs from the adult ♂ mainly in pereopod 2 which has the spine on the side plate much smaller; second joint very short, and likewise the thumb on metacarpus very short. Pereopod 2 is not much longer than pereopod 1 which is of an appearance not mainly different from the adult ♂.

Description of ♀ ovig., about 6 mm (Fig. 34). Antennae 1-2 as in *D. porrecta*. Pereopods 1 and 3-4 not different from ♂. Pereopod 2, side plate evenly rounded, without spine; 5th joint over two thirds the length of second joint; 6th joint oval, 1½ times as

long as 5th joint; dactylus evenly curved, half as long as 6th joint. Pereopods 5-7 not essentially different from *D. porrecta*; second joint in pereopod 6 broader and shorter than in pereopod 5. Uropods 1-2 agree well with those of ♂.

Dulichia, species indeterminata.

65°16' N, 55°05' W, 682 m, 3'6. "Ingolf" St. 35: 18-VII-1895. 1 ♀, very defective.

III. Tribe: Ingolfiellidea.

Ingolfiellina H. J. Hansen, The Ingolfiellidae, fam. n., a new Type of Amphipoda. — Jour. Linn. Soc., Zool., vol. 29, 1903, p. 131.

Family: **Ingolfiellidae** H. J. Hansen.

Ingolfiellidae H. J. Hansen, l. c. 1903, p. 130.

Genus: **Ingolfiella** H. J. Hansen.

Ingolfiella H. J. Hansen, l. c. 1903, p. 130.

355. **Ingolfiella abyssii** H. J. Hansen.

Ingolfiella abyssii H. J. Hansen, l. c. 1903, p. 118, pl. 14 figs. 1-18, pl. 15 figs. 19-21.

Occurrence:

59°12' N, 51°05' W, 3521 m, 1°3. "Ingolf" St. 38: 30-VII-1895. 1 specimen (type-locality: H. J. HANSEN l. c.).

Not found elsewhere.

IV. Tribe: Caprellidea.

Family: **Caprellidae** Dana.

Since 1903, when P. MAYER issued his list and key to all genera of Caprellidae (Siboga-Exp., vol. 34, pp. 14-16), the following new genera have been erected (according to Zool. Record up to 1938):

Liriarchus, for *L. perplexus* n. sp. (SW. Australia), P. Mayer, in Fauna Südwest Austral., herausgeb. v. W. Michaelsen u. R. Hartmeyer, vol. 4, 1912, p. 5, figs.

Mayerella, for *M. limicola* n. sp. (Bay of Fundy), Huntsman, Contrib. Canad. Biol. 1911-14, fasc. I, 1915, p. 40, figs.

Eginoidea, for *E. gaussi* n. sp. (S. Indian Ocean), Schellenberg, D. Südpolar-Exp., vol. 18, 1926, p. 465, figs.¹⁾

Pseudocaprellina, for *P. pambanensis* n. sp. (Gulf of Manar, shallow water), Raj, Bull. Madras Mus., vol. 1, 1927, p. 127, figs.

Dodecasella, for *D. elegans* n. sp. (S. Georgia), Barnard, Ann. Mag. Nat. Hist., (10), vol. 7, 1931, p. 430, and Discovery Rep., vol. 5, 1932, p. 304, fig.

Eugastrularx, for *E. japonicus* n. sp. (Japanese Sea), Schurin, Zool. Anz., vol. 112, 1935, p. 200, figs.

Haploarthron, for *H. laeve* n. sp. (Japanese Sea), Schurin, ibid., p. 202, figs.

¹⁾ *Neoxenodice caprellinoides* n. gen. n. sp. Schellenberg 1926, is in Zool. Record 1926 erroneously listed under *Caprellidea*; belongs to fam. *Podoceridae* (= *Dulichidae*).

Proaginina n. gen., for *Parrivalpus norvegicus* K. St. 1931, K. Stephensen, Zool. of Iceland, vol. 3, no. 26, 1940, p. 70.

Pedoculina Bacesei n. gen. et n. sp. Un nouveau caprellide des parages de Monaco. — A. Carausu, Bull. Inst. Océanogr. Monaco, no. 796, 20 mai 1941, 8 pp., figs.

Parrivalpina, *Protellina*, and *Thorina* n. gen., are described below.

Genus: **Protellina** n. gen.

Pereopods 3-4 missing, the other pairs normal. 3 pairs of gills (on second to fourth segment). Antenna 1, a short accessory flagellum present. Antenna 2, flagellum 6-articulate. Mandible with molar process and three-articulate palp; maxillipeds normal (the other oral parts are not examined). 1 pair of three-articulate pleopods in ♂. ♀ unknown.

Genotype: *Protellina ingolfi* n. sp.

356. **Protellina ingolfi** n. sp. (Fig. 35).

Occurrence:

65°34' N, 7°31' W, 1435 m, ÷ 0°8. "Ingolf" St. 105: 11-VII-1896. 1 ♂, about 19 mm.

Description of ♂ (adult?), 19 mm (Fig. 35). Body rather narrow and elongate; the coalesced cephalon + first mesosome

List of the most important characters of the new genera¹⁾.

	Ant. 1, no. of joints in flagellum	No. of free joints in the limbs on segments III—V			Gills on segment II	Palp of mandible		Maxillipeds I = inner lobe O = outer lobe	No. of pairs of limbs on abdomen	
		III	IV	V		No. of joints	No. of setae on apical joint		♂	♀
<i>Liriarchus</i>	2	0	0	0	×	3	4	1 = O?	1. 1-artic.	as ♂
<i>Mayerella</i>	2	2	2	3	0	3	1	1 < O	1. 1-artic. + 1 pair of series of bristles	1 (bristles) no legs
<i>Eginoides</i>	4	1	1	4	0	3	8	1 > O	2. 1-artic.	?
<i>Pseudocaprellina</i>	0	0	0	3	×	3	several	?	2. 1-artic.	?
<i>Dodecasella</i>	6	6	0	4	0	3	several	?	2. 2-artic.	as ♂
<i>Eugastrular</i>	5	0	0	6	0	?	?	1 = O	?	?
<i>Haploarthron</i>	?	0	0	6	0	?	?	1 = O	?	?
<i>Proëginina</i>	1	0	0	6	0	3	> 2	1 < O	2. 2-artic.	as ♂
<i>Pedoculina</i>	2	1	1	4	0	0	0	1 < O	?	?
<i>Protellina</i>	6	0	0	6	×	3	numerous	1 < O	1. 3-artic.	?
<i>Parvipalpina</i>	2	0	0	1	0	3	2	?	0	?
<i>Thorina</i>	2	0	0	6	0	3	numerous	1 = O	?	2. 2-artic.

¹⁾ Arranged like the "tabellarische Übersicht der Gattungen" in P. MAYER, Siboga-Exp., vol. 34, 1903, p. 14; but the "Ruderhaare" (for definition see P. MAYER, Fauna u. Flora Golf Neapel, vol. 6, 1882, p. 107) are omitted, as the literature on the new genera has no mention of them.

segment in length about two thirds of second segment. Third to fifth segments subequal in length, about 1½ times as long as second segment; 6th segment in length equal to first; 7th segment not longer than deep. Urosome very short, with a short dorsal lobe and a pair of short lateral lobes; on pleopods see below.

First to 5th segments have each one spine at the posterior end in the dorsal line, and second to 5th segments have besides a pair of spines nearly at the central part of the dorsal side; 6th segment has a pair of dorsal spines at the hind end, and 7th segment is dorsally smooth. In addition to the spines mentioned above second segment has two spines at each side of the fore end; third and fourth segments have one pair of lateral spines at the fore end, and third to 7th segments have a spine above the basal part of the corresponding gill or limb. Besides second to sixth segments have some small acute warts along the dorsal and ventral sides.

Eyes small, orbicular, colourless.

Antenna 1 (apex lost), at least as long as head + three first segments; second and third joints subequal in length, twice as long as first joint; the preserved part of flagellum as long as third joint of peduncle, and consisting of 17 joints; accessory flagellum half as long as first joint of flagellum, has one joint. Antenna 2 reaches to distal end of second joint of antenna 1; the two distal joints of peduncle subequal in length; flagellum in length two thirds of 5th joint of peduncle, 6-articulate.

Pereiopod 1 with carpus expanded below to a rounded lobe; hand longer than carpus and oval triangular in form, palm straight and defined by an obtuse angle carrying a short spine. Pereiopod 2 has none of the proximal joints apically produced into acute projections; carpus very short, hand exceedingly large and oblong fusiform in outline, with upper edge slightly arcuate, and with lower edge forming two distant acute lappets, the posterior of which is tipped with a small spine, and having in front a broad, denticulate projection, defined behind by a deep sinus; dactylus strong, falciform, as long as the long palm. Pereiopods 5-7 are alike, but a trifle increasing in length from prp. 5 to prp. 7; 6th joint rather strong and with palm spinulose and defined by a projection with 2-3 juxtaposed spines (also 4th-5th joints have short, but rather strong spines along fore edge); dactylus strong, slightly curved. Pereiopod 5 is fixed not at hind end, but a trifle behind middle of 5th segment.

The gills are narrow, and in segment 2 much shorter than in segments 3-4. No penis could be found.

The three joints in the pleopods are subequal in length, but tapering toward the apex.

Genus: *Parvipalpina* n. gen.

Pereiopods 3-4 missing, pereiopod 5 consists of a single bud-like joint. Pereiopods 6-7 normal. 2 pairs of gills (on third and fourth segment). Antennæ 1-2 rather short; accessory flagellum very short. Antenna 2 has no "Ruderhaare"; flagellum 2-articulate.

Oral parts were not dissected out. Palp of mandible is 3-articulate, with two spines on third joint; maxillipeds, palp seems to be normal; inner and outer lobes could not be examined.

Abdomen of ♂ has no appendages. ♀ unknown.

Genotype: *Parvipalpina verrucosa* n. gen. n. sp.

357. *Parvipalpina verrucosa* n. sp. (Fig. 36).

Occurrence:

60°37' N, 27°52' W, 1505 m, 4°5. "Ingolf" St. 78: 13-VI-1896. 1 ♂, 8 mm.

Description of ♂. 8 mm (Fig. 36). Body very slender. First segment a trifle shorter than head. Length ratio of body segments: 2 (head + first segment):3:5:7:10:5:1. Head, 1st and 7th segments are smooth. There are no dorsal or lateral spines, but 2nd to 6th segments have small warts or tubercles on dorsal side, 5th and 6th also on ventral side.

Pereiopod 1 rather slender. Pereiopod 2, second joint long and narrow, longer than 6th joint, and without spine-tooth at lower end; hand rather powerful, oval, with palm evenly curved, without teeth or other projections, but defined by a triangular lobe tipped with a rather long and stout spine. Pereiopods 3-4 quite missing, but there are gills on the segments in question. Pereiopod 5 is a small bud-like, 1-articulate process, fixed at the middle of 5th segment and tipped with a seta. Pereiopod 6 is a trifle longer than pereiopod 7, because of the greater length of the first free joint; but these two pairs of pereiopods are quite alike and of the normal, subcheliform shape; 4th and 5th joints have setae on fore margin, palm has a few short spines. Abdomen very short,

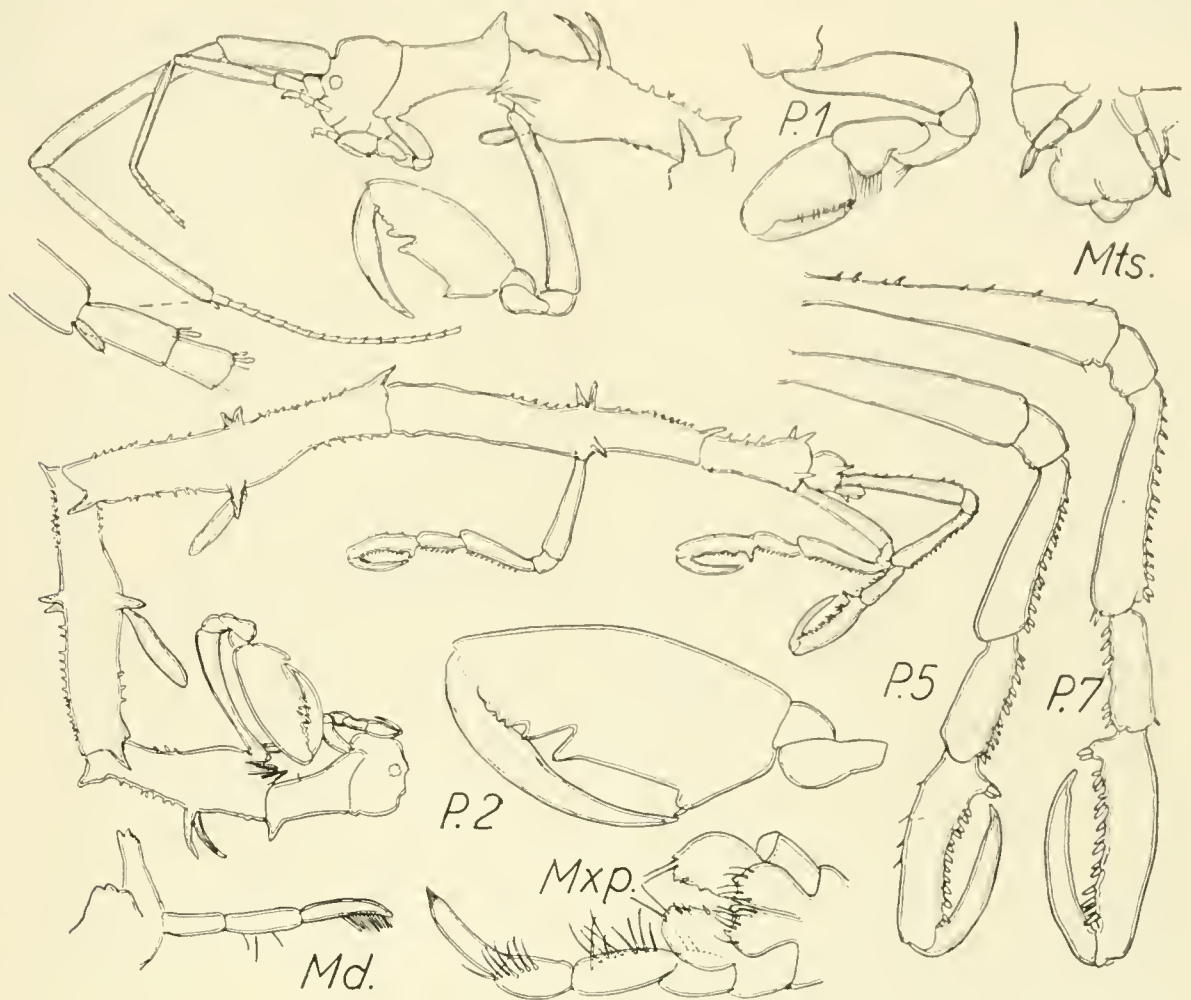


Fig. 35. *Protellina ingolfi* ♂.

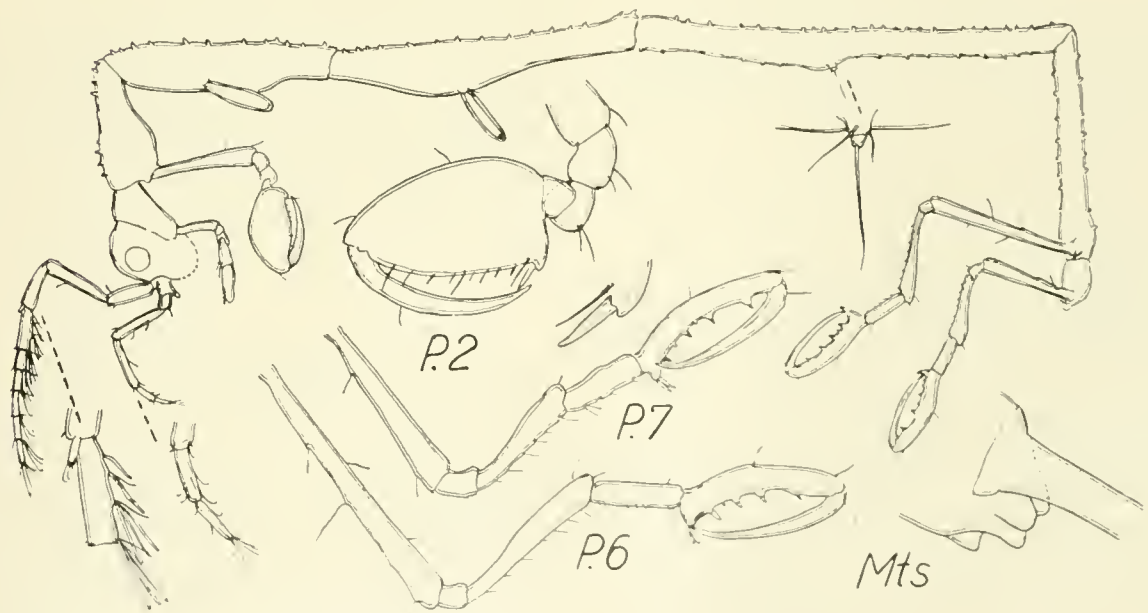


Fig. 36. *Parvipalpina verrucosa* ♂.

with a single medio-dorsal lobe and a pair of ventro-lateral lobes as in several other genera, but without limbs.

♀ unknown.

Genus: *Thorina* n. gen.

Pereiopods 3-4 missing, the other pairs normal. Two pairs of gills (on third and fourth segments). Antenna 1, no accessory flagellum. Antenna 2, flagellum 2-articulate. Mandible with molar

longer than first; flagellum about as long as peduncle, 16-articulate; no accessory flagellum. Antenna 2 as long as peduncle of antenna 1, rather narrow; flagellum short, 2-articulate.

Pereiopod 1 about as in *Protellina ingolfi* (fig. 35), but the hand is somewhat narrower. Pereiopod 2, second and third joints each terminate in a spine-like process on fore-margin; hand very powerful, oval, with upper edge boldly curved and terminating in front in a small conical projection; palm evenly curved, defined by a triangular lobe tipped with a small spine, and with two

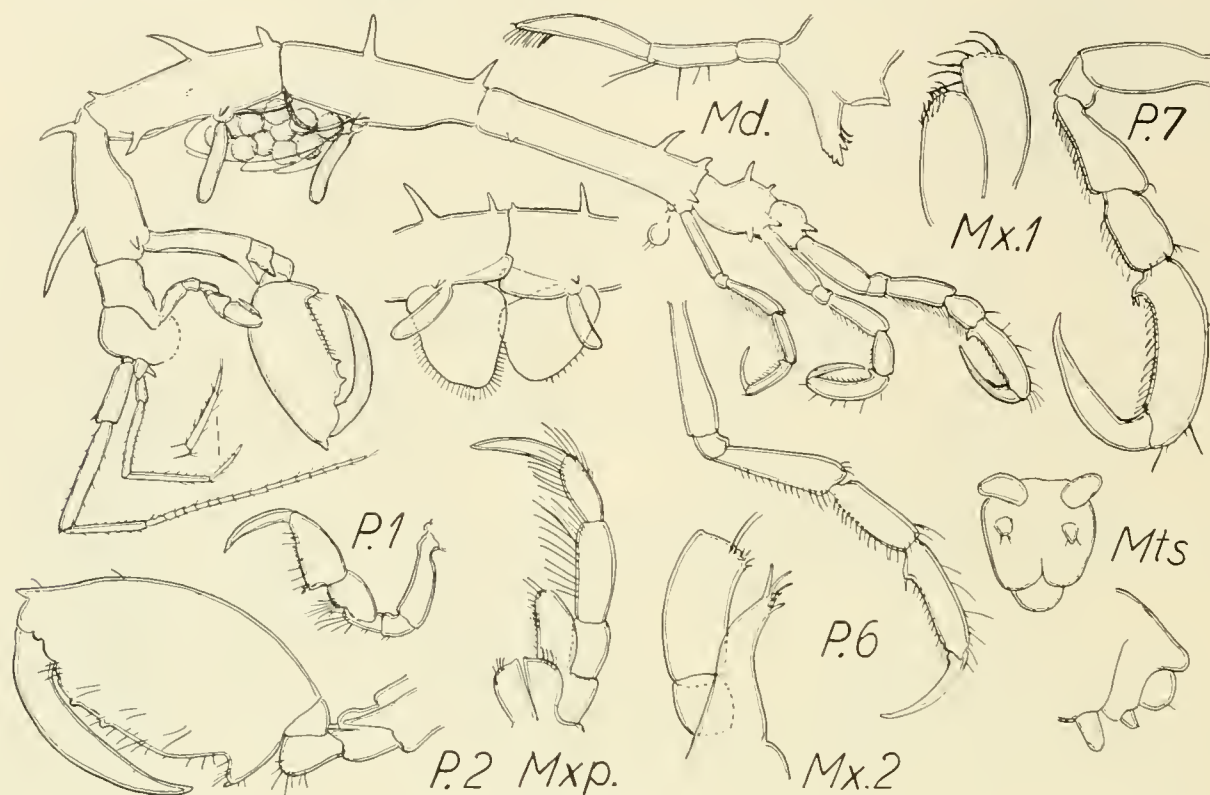


Fig. 37. *Thorina spinosa* ♀ ovig.

process and 3-articulate palp; palp of maxilla 2 has two joints. ♀ has two pairs of short, bud-like, 1-articulate appendages on abdomen (♂ unknown). Of the two pairs of marsupial plates the first pair is ciliated both on fore and hind margin, the second pair only at the lower corner.

Genotype: *Thorina spinosa* n. gen. n. sp.

358. *Thorina spinosa* n. sp. (Fig. 37).

Occurrence:

61°15' N, 9°35' W, 900 m. "Thor" St. 99: 22-V-1904. 7 ♀ 8-10 mm (5 ♀ juv. 8-9 mm, 1 ovig. ♀ 10 mm, and 1 ♀ with large but empty marsupium 10 mm).

Description of ovigerous ♀, 10 mm (Fig. 37). Body rather slender. First segment very short, not longer than head, and in length only about one third of segment 2. Segments 3-4 subequal in length, but longer than second segment; 5th segment a trifle longer than 4th; 6th and 7th segments short. Head and first segment are dorsally smooth; 2nd and 4th to 6th segments have two dorsal spines each, 3rd segment has 3, and 7th segment is dorsally smooth; all the dorsal spines are unpaired. Third and 5th segments have a pair of ventro-lateral spines near fore end, and there is a short spine above base of all pereopods (except first pair) and gills; besides there is a pair of rather short ventro-lateral spines in front of base of pereopod 6.

Eyes could not be traced. Antenna 1 a trifle longer than head - 3 first segments; second joint the longest, third joint a trifle

small teeth near finger linge; dactylus very strong, a trifle shorter than palm. Pereiopods 5-7 are slightly increasing in length from no. 5 to no. 7; pereiopod 5 is much more slender than pp. 6-7, but of a similar shape; on fore margin of 4th-6th joints of these three pairs of legs there are very slender spines, not short heavy spines as in *Protellina ingolfi* (fig. 35). The gills are narrow.

♂ unknown.

Genus: *Aeginella* Boeck.

359. *Aeginella spinosa* Boeck (Chart IX).

Aeginella spinosa G. O. Sars. Crust. of Norway, vol. 1, 1895, p. 653, pl. 235 fig. 1.

Occurrence:

63°04' N, 9°22' W, 493 m, 5°2. "Ingolf" St. 2: 12-V-1895.
 64°07' N, 11°12' W, 446 m, 2°5. "Ingolf" St. 4: 13-V-1895.
 64°54' N, 55°10' W, 740 m, 3°8. "Ingolf" St. 27: 1-VII-1895.
 65°16' N, 55°05' W, 682 m, 3°6. "Ingolf" St. 35: 18-VII-1895.
 61°42' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 14: 14-VIII-1895.
 62°49' N, 7°12' W, 520 m, 1°6. "Ingolf" St. 144: 11-VIII-1896.
 68°28' N, 54°47' W, 450-350 m. "Tjalfe" St. 199: 18-VIII-1908.
 68°08' N, 57°30' W, 398 m. "Dana" St. 2361: 26-VI-1925, Ad. S. JENSEN leg.
 62°30' N, 1°56' E, 525 m, 4°9. "Michael Sars" 29-VII-1902. Ad. S. JENSEN leg.

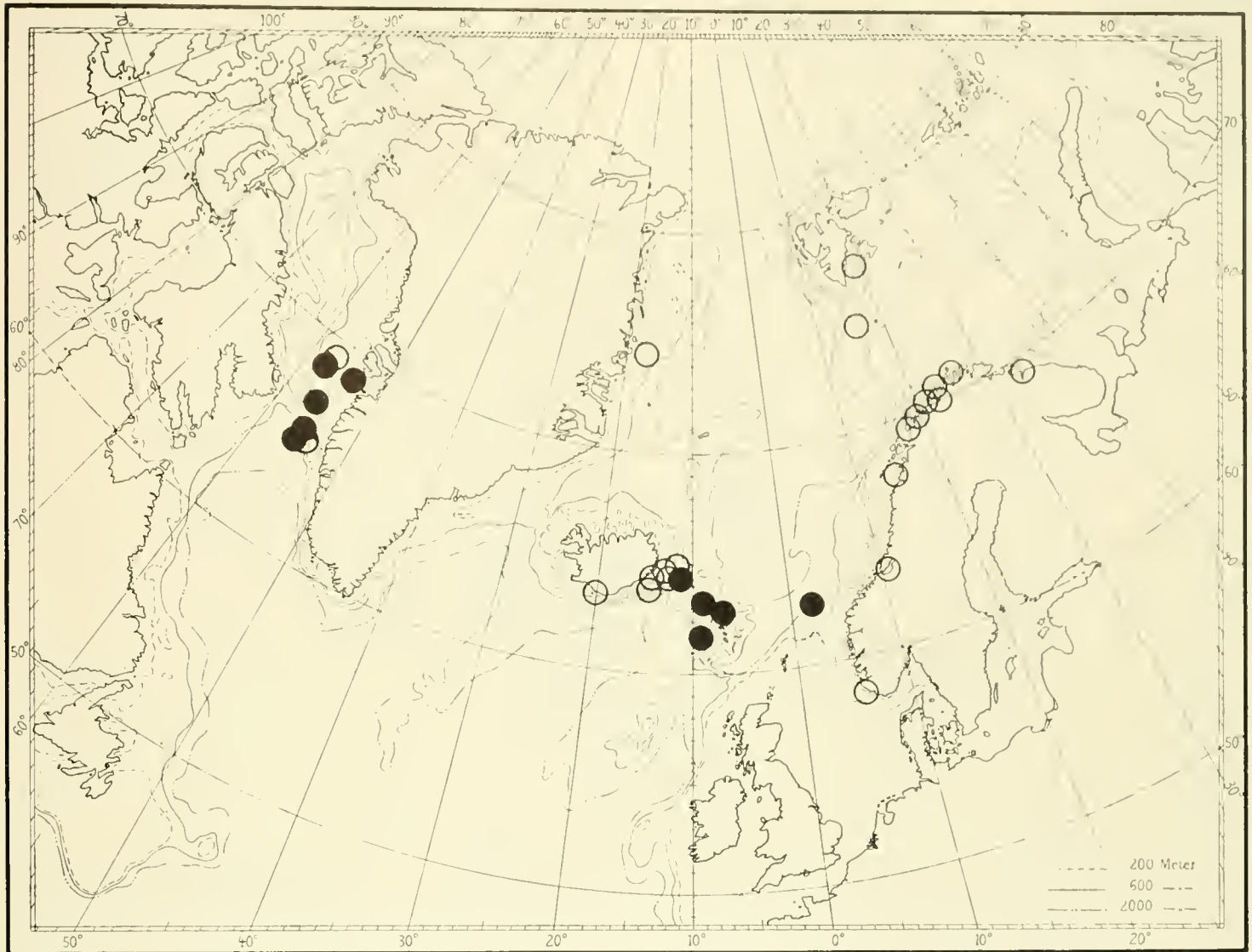


Chart IX. Distribution of *Aeginella spinosa*. ● = new localities, ○ = localities from the literature.

66°49' N, 56°28' W, 435 m, 4°4, sand, mud. WANDEL 1889.
Only 1 or 2 specimens were taken at a time.

Distribution (Chart IX). West and East Greenland; East and South Iceland; from South East Spitsbergen and Murman Coast along Norway to Hangesund; depths usually (15)100–400 m. For special localities see K. STEPHENSEN, Tromso Mus. Skr., vol. 3, 1935–42, p. 429, and Zool. of Iceland, vol. 3, no. 26, 1940, p. 69.

Genus: *Aeginina* Norman.

360. *Aeginina longicornis* (Kroyer) (Chart X).

Aegina cchinata G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 651, pl. 234 fig. 2.

Aeginina longicornis Shoemaker, Contrib. Canad. Biol. and Fish., vol. 5, 1930, p. 352 (134), lit.

Occurrence:

63°35' N, 10°24' W, 512 m, 0°5. "Ingolf" St. 3: 12-V-1895.
64°07' N, 11°12' W, 446 m, 2°5. "Ingolf" St. 4: 13-V-1895.
66°18' N, 25°59' W, 621 m, ÷ 0°75. "Ingolf" St. 15: 14-VI-1895.
63°06' N, 56°00' W, 2258 m, 2°4. "Ingolf" St. 24: 25-VI-1895.
1 small specimen on *Thujaria*; determination not certain.
69°46' N, 51°22' W, 475 m. "Tjalfe" 27-VII-1908.

68°28' N, 54°47' W, 450–350 m. "Tjalfe" St. 199: 18-VIII-1908.
68°08' N, 57°30' W, 398 m. "Dana" St. 2361: 26-VI-1925. Ad. S.
JENSEN leg.

Usually only one or a few specimens were taken at a time. The length is up to about 36 mm (♂).

Distribution (Chart X). Widely distributed, especially in the arctic area, mainly littoral-sublittoral. For special localities see STAPPERS, in Duc d'Orléans, Camp. Arctique, Crust. Malac., 1911, p. 74, SHOEMAKER l. c. 1930, p. 352 (134), and K. STEPHENSEN, Tromso Mus. Skr., vol. 3, 1935–42, p. 430, and Zool. of Iceland, vol. 3, no. 26, 1940, p. 69.

Genus: *Proaeginina* K. Stephensen.

Proaeginina K. Stephensen, Zool. of Iceland, vol. 3, no. 26, 1940, p. 70.

Genotype: *Proaeginina norvegica* = *Parvipalpus norvegicus* K. Stephensen 1931.

361. *Proaeginina norvegica* (K. Stephensen).

Parvipalpus norvegicus K. Stephensen, K. Norske Vid. Selsk. Skr., 1931, no. 5. Trondhjem, figs.

Proaeginina norvegica K. Stephensen, l. c. 1940, p. 70, figs.

Proægina norvegica K. Stephensen, Tromsø Mus. Skr., vol. 3, 1935-42, p. 433, figs.

Occurrence:

63°06' N, 56°00' W, 2258 m, 2°4. "Ingolf" St. 24: 24-VI-1895-
1/2 specimen + 1 ♀.
61°50' N, 56°21' W, 2702 m, 1°5. "Ingolf" St. 36: 28-VII-1895.
1 ♂ (?), 1 ♀.

63°35' N, 10°24' W, 512 m, 0°5, Hydroids. "Ingolf" St. 3: 12-V-1895. Numerous specimens.

61°42' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 44: 14-VIII-1895. 1 specimen.

The length is up to about 20 mm.

Distribution. East Greenland 66°-72° N, 40-200 m (K. STEPHENSEN, Meddel. om Grøn. vol. 12I, no. 14, going into the



Chart X. Distribution of *Aegina longicornis*. The ring indicates a locality which could not be noted exactly.

Remarks. The ♂ (?) is 8 mm, the two ♀ have large marsupium and are 9-10 mm in length. These specimens are much smaller than the specimens hitherto described (which were 19-32 mm) 5th segment is only twice the length of segment 2; pereopods 5-7 are lost, but one pereopod 6 is preserved in the ♂.

Distribution. North Norway c. 70°40' N, 200-350 m, rocky bottom (type-locality; K. STEPHENSEN 1931). South of Iceland 63°21' N, 16°22' W, 500-560 m (K. STEPHENSEN 1910).

Genus: *Caprella* Lamarek.

362. *Caprella microtuberculata* G. O. Sars.

Caprella microtuberculata G. O. Sars, Norske Nordhavs-Exp., Crust., vol. 1, 1885, p. 222, pl. 18 fig. 3.

Caprella microtuberculata G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 661, pl. 239 fig. 1.

Caprella microtuberculata K. Stephensen, Tromsø Mus. Skr., vol. 3, 1935-42, p. 436 (lit.).

Occurrence:

63°04' N, 9°22' W, 493 m, 5°2. "Ingolf" St. 2: 12-V-1895. 4 specimens.

press). From North Norway (Hammerfest) to Spitsbergen, Franz Joseph Land and Siberia 147° E, from the shore down to 329 m; for special localities see K. STEPHENSEN, l. c.

363. *Caprella punctata* Boeck.

Caprella punctata G. O. Sars, Crust. of Norway, vol. 1, 1895, p. 660, pl. 237 fig. 2.

Occurrence:

61°42' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 44: 14-VIII-1895. 2 ♀ with large, but empty marsupium 10-12 mm, 1 ♀ with very small marsupial plates.

These specimens agree fairly well with G. O. Sars l. c.

Distribution. From North Sea (Agger in West Jutland) along Norway to Spitsbergen and Novaja Zemlya; possibly also the Faroes. For special localities see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935-42, p. 442. A revision has shown that specimens from East Iceland, 397 m, recorded with ? in K. STEPHENSEN, Zool. of Iceland, vol. 3, no. 26, 1940, p. 74, no doubt belong to this species.

364. *Caprella horrida* G. O. Sars.

Caprella spinosissima G. O. Sars, Norske Nordhavs-Exp., Crust., vol. 1, 1885, p. 225, pl. 18 fig. 4.

Caprella horrida K. Stephensen, Tromsø Mus. Skr., vol. 3, 1935 42, p. 438 (with lit.).

Occurrence:

63°04' N, 9°22' W, 493 m, 5°2. "Ingolf" St. 2: 12-V-1895. Several specimens (♂, ♀ with marsupium).

365. *Caprella rinki* K. Stephensen (Fig. 38).

Caprella rinki K. Stephensen, Meddel. om Grøn., vol. 53, 1916, p. 296, figs.

Occurrence:

61°12' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 44: 14-VIII-1895.

4 ♀ with large but empty marsupium up to 9 mm; 3 ♂ up to 10 mm.

65°41' N, 30°39' W, 1416 m, 2°1. "Ingolf" St. 95: 27-VI-1896.

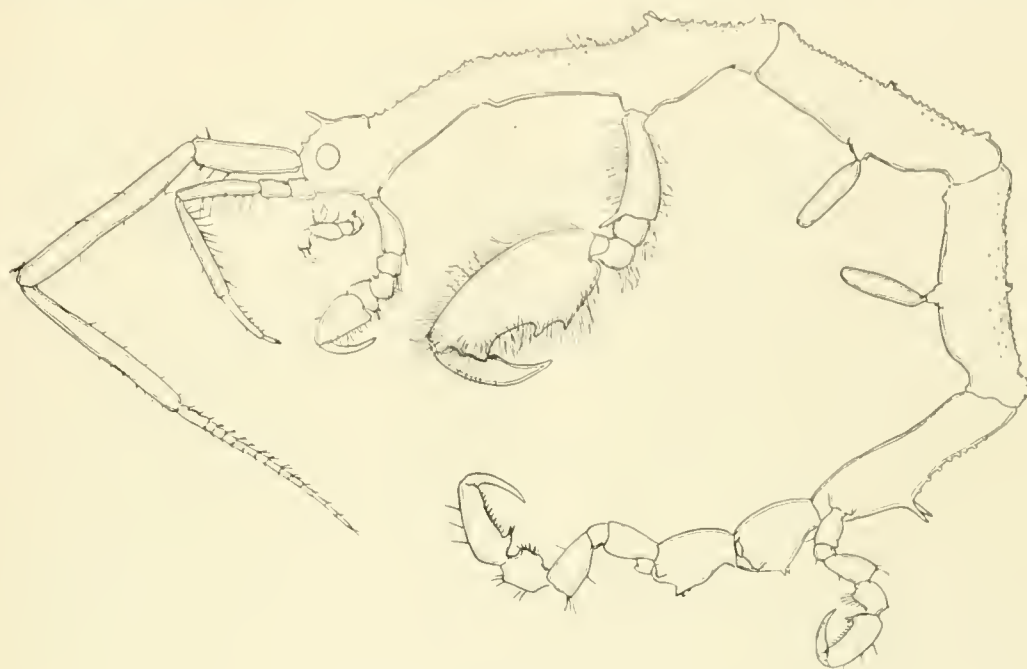


Fig. 38. *Caprella rinki* ♂, St. 95.

63°35' N, 10°24' W, 512 m, 0°5. "Ingolf" St. 3: 12-V-1895. Numerous specimens (♂, ♀ with marsupium).

64°07' N, 11°12' W, 446 m, 2°5. "Ingolf" St. 4: 13-V-1895. About 10 specimens (♂, ♀ with marsupium).

66°18' N, 25°59' W, 621 m, ÷ 0°75. "Ingolf" St. 15: 4-VI-1895. 2 specimens, determination not certain.

61°42' N, 9°36' W, 1026 m, 4°8. "Ingolf" St. 44: 14-VII-1895. 2½ ♀ with marsupium.

63°26' N, 7°56' W, 887 m, ÷ 0°6. "Ingolf" St. 138: 10-VIII-1896. A few specimens (♂, ♀).

62°30' N, 1°56' W, 550-600 m, ÷ 0°17. "Michael Sars" 29-VI-1902, AD. S. JENSEN leg., 1 ♂.

62°40' N, 1°56' W, 700 m, ÷ 0°3. "Michael Sars" 19-VII-1902, AD. S. JENSEN leg. Several ♂, ♀.

60°19' N, 5°22' W, 1200 m, ÷ 0°15. "Michael Sars" 10-VIII-1902, AD. S. JENSEN leg. Numerous ♂, ♀.

The length is up to 25 mm, but the majority, both ♂ and ♀, are smaller: 15-20 mm.

Distribution. The Arctic deep basin with adjacent waters, from Arctic America and East Greenland to Spitsbergen, Siberia and the Faroe Channel. For special localities and references see K. STEPHENSEN, Tromsø Mus. Skr., vol. 3, 1935 42, p. 438, Zool. of Iceland, vol. 3, no. 26, 1940, p. 75, and Meddel. om Grøn., vol. 121, no. 14, just going into the press.

A few specimens: ♀ with embryos in marsupium up to 10 mm 2 ♂ 10-15 mm.

65°30' N, 55°26' W, 550 m, 4°5. WANDEL 1889. 1 ♀ juv., c. 9 mm, 1 small specimen.

Remarks. The ♀ agree on the whole well with the type specimens, but the hand in pereiopod 2 is a trifle narrower; in some cases the paired dorsal teeth are longer, and segments 6-7 are dorsally smooth.

♂ were previously not known. The largest ♂ (15 mm, "Ingolf" St. 95; fig. 38) has the hand of pereiopod 2 much narrower than in ♀ and the palm provided with a large poison fang ("Giftzahn"). Besides the limb is all over covered with delicate ciliae, about as in *C. eiliata* G. O. Sars (G. O. Sars 1895, pl. 239 fig. 2). In this large specimen the paired dorsal teeth on segment 5 are much higher than on the other segments, and the dorsal warts are much fewer than in ♀.

In the smaller ♂ (10 mm) pereiopod 2 is much more scarcely setose than in the large ♂, and in some segments (nos. 2, 3, 4, 6, 7) the paired dorsal teeth are in one of the small ♂ quite missing.

Distribution. Mouth of Bredefjord, South West Greenland, 460-550 m (type-locality; K. STEPHENSEN l. c.).

THE INGOLF-EXPEDITION

1895-1896

THE LOCALITIES, DEPTHS, AND BOTTOMTEMPERATURES OF THE STATIONS

Sta- tion Nr.	Date	Lat. N.	Long W.	Depth in m	Bot- tom- temp.	Sta- tion Nr.	Date	Lat. N.	Long W.	Depth in m	Bot- tom- temp.	Sta- tion Nr.	Date	Lat. N.	Long W.	Depth in m	Bot- tom- temp.	
	1895												1896					
1	11 - V	62° 30'	8° 21'	249	7°2	24	25 - VI	63° 06'	56° 00'	2258	2 4	45	11 - V	61° 32'	9° 43'	1211	4 17	
2	12 -	63° 04'	9° 22'	493	5°3	25	26 -	63° 30'	54° 25'	1096	3 3	46	- -	61° 32'	11° 36'	1356	2°40	
3	- -	63° 35'	10° 24'	512	0°5			63° 51'	53° 03'	256		47	12 -	61° 32'	13° 40'	1789	3°23	
4	13 -	64° 07'	11° 12'	446	2°5	26	- -	63° 57'	52° 41'	64	0°6	48	- -	61° 32'	15° 11'	2165	3°17	
5	- -	64° 40'	12° 09'	292				64° 37'	54° 24'	205		49	13 -	62° 07'	15° 07'	2109	2°91	
6	16 -	63° 43'	14° 34'	170	7°0	27	1 - VII	64° 54'	55° 10'	740	3°8	50	- -	62° 43'	15° 07'	1921	3°13	
7	17 -	63° 13'	15° 41'	1130	4°5	28	- -	65° 14'	55° 42'	791	3°5	51	15 -	64° 15'	14° 22'	128	7°32	
8	19 -	63° 56'	24° 40'	256	6°0	29	5 -	65° 34'	54° 31'	128	0°2	52	- -	63° 57'	13° 32'	791	7°87	
9	20 -	64° 18'	27° 00'	555	5°8	30	10 -	66° 50'	54° 28'	41	1°05	53	16 -	63° 15'	15° 07'	1497	3°08	
10	- -	64° 24'	28° 50'	1484	3°5	31	11 -	66° 35'	55° 54'	166	1°6	54	18 -	63° 08'	15° 40'	1301	3°9	
11	21 -	64° 34'	31° 12'	2448	1°6	32	11 -	66° 35'	56° 38'	599	3°9	55	19 -	63° 33'	15° 02'	595	5°9	
12	22 -	64° 38'	32° 37'	1958	0°3	33	12 -	67° 57'	55° 30'	66	0°8	56	- -	64° 00'	15° 09'	128	7°57	
13	- -	64° 47'	34° 33'	1171	3°0	34	18 -	65° 17'	54° 17'	104		57	20 -	63° 37'	13° 02'	659	3°4	
14	- -	64° 45'	35° 05'	331	4°4	35	- -	65° 16'	55° 05'	682	3°6	58	- -	64° 25'	12° 09'	397	0°8	
15	4-VI	66° 18'	25° 59'	621	-0°75	36	28 -	61° 50'	56° 21'	2702	1°5	59	- -	65° 00'	11° 16'	581	-0°1	
16	5 -	65° 43'	26° 58'	471	6°1	37	29 -	60° 17'	54° 05'	3229	1°4	60	21 -	65° 09'	12° 27'	234	0°9	
17	16 -	62° 49'	26° 55'	1403	3°4	38	30 -	59° 12'	51° 05'	3521	1°3	61	- -	65° 03'	13° 06'	104	0°4	
18	17 -	61° 44'	30° 29'	2137	3°0	39	9-VIII	62° 00'	22° 38'	1629	2°9	62	31 -	63° 18'	19° 12'	136	7°92	
19	18 -	60° 29'	34° 14'	2949	2°4	40	- -	62° 00'	21° 36'	1591	3°3	63	1-VI	62° 40'	19° 05'	1506	4°0	
20	20 -	58° 20'	40° 48'	3192	1°5	41	12 -	61° 39'	17° 10'	2345	2°0	64	- -	62° 06'	19° 00'	1960	3°1	
21	21 -	58° 01'	44° 45'	2505	2°4	42	14 -	61° 41'	10° 17'	1177	0°4	65	2 -	61° 33'	19° 00'	2051	3°0	
22	22 -	58° 10'	48° 25'	3474	1°4	43	- -	61° 42'	10° 11'	1215	0°05	66	- -	61° 33'	20° 43'	2124	3°3	
23	24 -	60° 43'	56° 00'			44	- -	61° 42'	9° 36'	1026	4°8	67	3 -	61° 30'	22° 30'	1836	3°0	

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Station Nr.	Date	Lat. N.	Long W.	Depth in m	Bottom-temp.	Station Nr.	Date	Lat. N.	Long W.	Depth in m	Bottom-temp.	Station Nr.	Date	Lat. N.	Long W.	Depth in m	Bottom-temp.
68	3 VI	62° 06'	22° 30'	1587	3°4	92	25 - VI	64° 44'	32° 52'	1838	1°4	118	24 - VII	68° 27'	8° 20'	1996	-1°0
69	- -	62° 40'	22° 17'	1109	3°9	93	26 -	64° 24'	35° 14'	1444	1°46	119	25 -	67° 53'	10° 19'	1902	-1°0
70	4 -	63° 09'	22° 05'	252	7°0	94	- -	64° 56'	36° 19'	384	4°1	120	- -	67° 29'	11° 32'	1666	-1°0
71	- -	63° 46'	22° 03'	87				65° 31'	30° 45'	401		121	- -	66° 59'	13° 11'	996	-0°7
72	8 -	63° 12'	23° 04'	371	6°7	95	27 -	65° 14'	30° 39'	1416	2°1	122	26 -	66° 42'	14° 44'	217	1°8
73	- -	62° 58'	23° 28'	915	5°5	96	28 -	65° 24'	29° 00'	1384	1°2	123	28 -	66° 52'	15° 40'	273	2°0
74	9 -	62° 17'	24° 36'	1309	4°2	97	- -	65° 28'	27° 39'	847	5°5	124	- -	67° 40'	15° 40'	932	-0°6
		61° 57'	25° 35'	1433		98	- -	65° 38'	26° 27'	260	5°9	125	29 -	68° 08'	16° 02'	1373	-0°8
		61° 28'	25° 06'	1561		99	7 - VII	66° 13'	25° 53'	352	6°1	126	- -	67° 19'	15° 52'	552	-0°5
75	11 -	61° 28'	26° 25'	1469	4°3	100	9 -	66° 23'	14° 02'	111	0°4	127	2 - VIII	66° 33'	20° 05'	83	5°6
76	12 -	60° 50'	26° 50'	1518	4°1	101	10 -	66° 23'	12° 05'	1011	0°7	128	- -	66° 50'	20° 02'	365	0°6
77	- -	60° 10'	26° 59'	1791	3°6	102	- -	66° 23'	10° 26'	1412	-0°9	129	3 -	66° 35'	23° 47'	220	6°5
78	13 -	60° 37'	27° 52'	1505	4°5	103	- -	66° 23'	8° 52'	1090	-0°6	130	8 -	63° 00'	20° 40'	636	6°55
79	- -	60° 52'	28° 58'	1230	4°4	104	11 -	66° 23'	7° 25'	1802	-1°1	131	- -	63° 00'	19° 09'	1314	4°7
80	- -	61° 02'	29° 32'	1761	4°0	105	- -	65° 34'	7° 31'	1435	-0°8	132	- -	63° 00'	17° 04'	1407	4°6
81	14 -	61° 44'	27° 00'	913	0°1	106	12 -	65° 34'	8° 54'	842	-0°6	133	9 -	63° 14'	11° 24'	433	2°2
82	- -	61° 55'	27° 28'	1552	4°1			65° 29'	8° 40'	878		134	- -	62° 34'	10° 26'	563	4°1
83	- -	62° 25'	28° 30'	1717	3°5	107	- -	65° 33'	10° 28'	926	-0°3	135	10 -	62° 48'	9° 48'	508	0°4
		62° 36'	26° 01'	889		108	13 -	65° 30'	12° 00'	183	1°1	136	- -	63° 01'	9° 11'	482	4°8
		62° 36'	25° 30'	755		109	18 -	65° 29'	13° 25'	72	1°5	137	- -	63° 14'	8° 31'	559	-0°6
84	17 -	62° 58'	25° 24'	1192	4°8	110	19 -	66° 44'	11° 33'	1471	0°8	138	- -	63° 26'	7° 56'	887	-0°6
85	- -	63° 21'	25° 21'	320		111	20 -	67° 14'	8° 48'	1619	-0°9	139	- -	63° 36'	7° 30'	1322	-0°6
86	23 -	65° 03'6	23° 47'6	143		112	- -	67° 57'	6° 44'	2386	-1°1	140	11 -	63° 29'	6° 57'	1469	-0°9
87	- -	65° 02'3	23° 56'2	207		113	21 -	69° 31'	7° 06'	2465	-1°0	141	- -	63° 22'	6° 58'	1279	-0°6
88	- -	64° 58'	24° 25'	143	6°9	114	22 -	70° 36'	7° 29'	1456	-1°0	142	- -	63° 07'	7° 05'	1105	-0°6
89	24 -	64° 45'	27° 20'	584	8°4	115	23 -	70° 50'	8° 29'	162	0°1	143	- -	62° 58'	7° 09'	731	-0°4
90	- -	64° 45'	29° 06'	1070	4°4	116	- -	70° 05'	8° 26'	699	-0°4	144	- -	62° 49'	7° 12'	520	1°6
91	25 -	64° 44'	31° 00'	2328	3°1	117	24 -	69° 13'	8° 23'	1889	-1°0						

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THE DANISH
INGOLF-EXPEDITION

VOL. III, PART 14

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HJALMAR BROCH: CIRRIPIEDIA THORACICA
WITH 12 FIGURES IN THE TEXT

PUBLISHED AT THE COST OF THE GOVERNMENT

BY

THE DIRECTION OF THE ZOOLOGICAL MUSEUM OF THE UNIVERSITY



COPENHAGEN
H. HAGERUP
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1953

THE DANISH INGOLF-EXPEDITION

VOLUME III

14

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BY

HJALMAR BROCH

OSLO

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Introduction

The present extensive collections of Thoracic Cirripeds which were procured by the "Ingolf" Expedition and other Danish oceanographical expeditions in the northern parts of the Atlantic waters, have filled a gap in our knowledge of the geographical distribution of the cirripeds and disclosed some surprising features of their occurrence in the northern Atlantic. I wish to express my sincere thanks to my old colleagues and friends, Dr. P. L. KRAMP and the late curator K. STEPHENSEN, who placed these collections at my disposal. A special thank is due to Mrs. A. VOLSØE for her

careful revision of the language. The present investigation constitutes a continuation of my previous paper on the Thoracic Cirripeds of Norway and the Norwegian North Atlantic (1924) which deals with the occurrence in these northeastern waters.

It seems strange that almost only one genus, *Scalpellum*, is represented in the collections. This, however, is the most widespread deep-sea genus of the Thoracic Cirripeds, whereas other genera like *Pocillosma*, *Megalasma*, or *Verruca* living at greater depths, evidently prefer more temperate parts of the deep-sea.

Systematic Account, with Remarks on the Species

Family Scalpellidae

Genus *Scalpellum* Leach.

It would be beyond the scope of this paper to enter into a discussion of the systematic grouping of this extensive genus, but I cannot refrain from mentioning the group *Neoscalpellum*, which was established by PILSBRY (1907) to comprise all species with "Plates imperfectly calcified, at least the tergum V-shaped". This group needs revision. In some cases the retrogressive development of the calcification doubtless depends on age (compare BROCH 1924, Fig. 3, *Scalpellum scalpellum*), and the V-shape may have developed in different ways as pointed out for the genera *Ocotolasmis* and *Temnaspis* (see BROCH 1947). Lack of material, and especially of series of postlarval growth stages, at present prevents closer investigations of these problems.

Scalpellum scalpellum (Lin.) Leach.

Description: see BROCH, 1924, p. 15.

Material: Swedish west-coast, between Stångholm and Stångehuvud near Lysekil, depth about 30 m. MORTENSEN 1910. 3 specimens.

Kristineberg Zoological Station (no further data). Several specimens of different sizes.

Group of *Scalpellum stroemii*.

Scalpellum stroemii M. Sars.

Description and Synonymy: see BROCH, 1924, p. 23.

Material:

- 66°18' N., 25°59' W., 621 m., \pm 0.75° C., "Ingolf" St. 15. 1 small specimen.
63°30' N., 54°25' W., 1096 m., 3.3° C., "Ingolf" St. 25. 1 small specimen.
64°54' N., 55°10' W., 740 m., 3.8° C., "Ingolf" St. 27. 1 ad. specimen.
65°16' N., 55°05' W., 682 m., 3.6° C., "Ingolf" St. 35. 1 ad. specimen.

- 62°00' N., 22°38' W., 1629 m., 2.9° C., "Ingolf" St. 39. 1 ad. specimen.
63°37' N., 13°02' W., 659 m., 3.4° C., "Ingolf" St. 57. 3 spec.
62°58' N., 23°28' W., 915 m., 5.5° C., "Ingolf" St. 73. Several, from pupa to ad.
60°37' N., 27°52' W., 1505 m., 4.5° C., "Ingolf" St. 78. 1 ad. specimen.
64°45' N., 29°06' W., 1070 m., 4.4° C., "Ingolf" St. 90. 10 spec.
62°49' N., 7°12' W., 520 m., 1.6° C., "Ingolf" St. 144. 2 spec.
66°44' N., 56°08' W., 330 m., "Tjalfe" St. 100. 3 spec.
68°28' N., 54°47' W., 336—461 m., "Tjalfe" St. 199. 7 ad. spec.
64°05' N., 55°20' W., 1100 m., "Tjalfe" St. 337. 1 ad. spec.
63°54' N., 53°15' W., 988 m., "Tjalfe" St. 428. 1 ad. spec.
68°08' N., 57°30' W., 398 m., "Dana" St. 2361.
73°12' N., 58°08' W., 850 m., 0.5° C., "Godthaab" St. 64. 4 spec.
58°12' N., 4° E. (off Stavanger) 120 m. ØRSTED. Numerous spec. Trondheimsfjord, at Roberg, about 300 m. MORTENSEN. Numerous spec.
— Skarnsund, 250—150 m. MORTENSEN. Numerous spec.

The large collections display the same great variations which were mentioned by BROCH (1924), and there seems to be no traceable connection between the distribution of the variants and the ecological conditions.

GRUVEL (1905) gives 13 mm as the maximum height of the species, and normally the height of the capitulum does not surpass one cm (BROCH, 1924). In the collection from the North Sea, off Stavanger, one specimen was conspicuous by its great size. By first sight it reminded strongly of *Scalpellum scalpellum*, as the features of the capitulum plates were obscured by a rich overgrowth of small hydroids. Generally the capitulum of *Scalpellum stroemii* is quite clean and white. In this case, however, the plates had to be cleaned first, and then they showed the characteristic features of *Scalpellum stroemii* in spite of the great size of the

specimen which is no less than 17 mm with a capitulum height of some 12 mm. This is by far the largest specimen observed by me, and it must be characterized as an abnormally large individual.

Scalpellum scopulicola Hoek.

Description and synonymy: see BROCH, 1924, p. 30.

Material:

67°19' N., 15°52' W., 552 m., ± 0.5° C., "Ingolf" St. 126. 1 ad. and 1 juv.

Scalpellum cornutum G. O. Sars.

Description: see BROCH, 1924, p. 33.

Material:

63°04' N., 9°22' W., 193 m., ± 5.3° C., "Ingolf" St. 2. 1 ad. specimen.
62°58' N., 7°09' W., 731 m., ± 0.4° C., "Ingolf" St. 143. 1 small specimen.

The adult specimen from "Ingolf" St. 2 differs slightly from the specimens previously recorded, since rostrum is triangular. Normally, the rostrum is rectangular, or sometimes approaching the shape of an hour-glass. In every other detail the specimen agrees with typical specimens of *Scalpellum cornutum*, and the triangular shape of the rostrum must be looked upon as an extreme variant in a line starting from the hour-glass shape.

Group of *Scalpellum portoricanum*.

Scalpellum hispidum G. O. Sars.

Description: see BROCH, 1924, p. 39.

Material:

63°30' N., 54°25' W., 1096 m., 3.3° C., "Ingolf" St. 25. 3 small specimens.
64°54' N., 55°10' W., 740 m., 3.8° C., "Ingolf" St. 27. 1 spec.
65°16' N., 55°05' W., 682 m., 3.6° C., "Ingolf" St. 35. 1 spec.
Skraven in Lofoten (Norway), 300 fathoms. STEENSTRUP. 1 complete and the remains of 4 spec.

Evidently none of the specimens is fullgrown. The largest specimen from "Ingolf" St. 35 has a capitulum height of only 7 mm, all the others are smaller. The present specimens are so few that I would not sacrifice any of them for a detailed study of the cirri and mouth parts.

Scalpellum tritonis Hoek.

Description: see HOEK, 1883, p. 122; GRUVEL, 1905, p. 89.

Material:

61°44' N., 27°00' W., 913 m., 6.1° C., "Ingolf" St. 81. 2 small specimens.

Scalpellum longicarinatum Pilsbry.

Description: see PILSBRY, 1907, p. 37.

Material:

64°44' N., 32°52' W., 1838 m., 1.4° C., "Ingolf" St. 92. 1 large, somewhat mutilated specimen.

According to the literature, the group of *Scalpellum portoricanum* comprises rather small-sized species only, and among these also *Scalpellum longicarinatum*, the size of which, according to PILSBRY (1907), is "about 1 cm". The present specimen, however, has a capitulum height of 38 mm and a stalk of 23 mm (i.e. its total height amounts to 61 mm), and the breadth of the capitulum is 30 mm. Otherwise the specimen agrees with the descriptions and drawings given by PILSBRY, the only difference being that the basi-carinal margin of latus superius is a little more rounded than in his figure, a feature which may depend on different age. The basal (youngest) part of the capitulum plates are covered

by a well developed cuticle furnished with a rather thick pelt of fairly short hairs.

PILSBRY (1907) suggests that the species is closely related to *Scalpellum mamillatum* Aurivillius (1898), and the description given by GRUVEL (1920) corroborates this, although GRUVEL does not seem to be aware of this. GRUVEL, on the other hand, considers *Scalpellum semisculptum* Pilsbry to be identical with *Scalpellum mamillatum*. A near relationship seems undeniable, although PILSBRY placed his species in the group of *Scalpellum aurivillii* owing to its somewhat narrower inframedian latus. It is questionable, whether we should attach any great importance to this character, which varies so much both from one species to another and within the same species. Nevertheless, we must admit that *Scalpellum longicarinatum* and *Scalpellum mamillatum* are nearly related.

It should, however, be pointed out that our knowledge of the anatomical details of these species is very slight. As the present specimen was a little damaged, I seized the opportunity to examine it more thoroughly.

The cirri are to a great extent defective. Cirrus I, however, is intact, with branches consisting of 10 and 13 segments respectively (fig. 1. a). In the longer, posterior branch the segments are somewhat swollen, in the shorter, anterior branch the 4—5 median segments are strongly protruding in a way which is not very commonly found in the genus, although similar

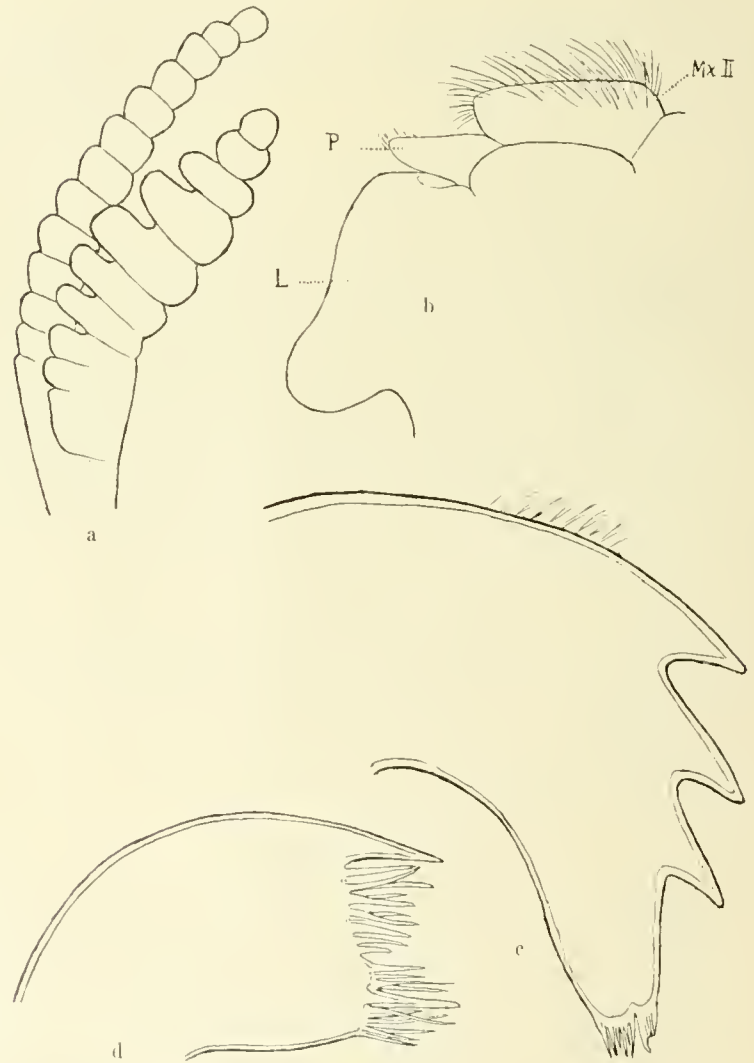


Fig. 1.

Scalpellum longicarinatum. a cirrus I, without setae ($\times 8$). b labrum in side view (L), with palpa (P) and distal segment of second maxilla (Mx II) ($\times 15$). c mandible, and d first maxilla ($\times 30$).

conditions have been observed by PILSBRY (1907) in the group of *Scalpellum velutinum*.

Abdominal appendages are wanting, and no penis was observed.

Labrum (fig. 1, b) is bulky and somewhat protruding, although less so than in the groups of *Scalpellum scalpellum* and *Scalpellum stroemii*. The inner (oral) side of the labrum is smooth, without teeth or hairs. Palpae medium-sized.

Mandible (fig. 1, c) with three equidistant acute teeth and a comparatively long underpart terminating in an angle armed with a row of powerful bristles or slender spines. Near the middle of this row there is a small incision, or notch, and on the outer side of this one more powerful spine is seated. These finer details may be accidental, but nothing definite can be said at present.

First maxilla (fig. 1, d) seems to hold an aberrant position within the genus: the lower one-third or a little more of the cutting edge is slightly protruding. The bristles of this lower, protruding part are comparatively long and slender, mostly paired, but in the middle one unpaired and very powerful spine is placed. Between the protruding part and the very strong, uppermost spine the cutting edge is furnished with a row of bristles, the median ones arranged in pairs.

Second maxilla of the common type, its distal segment rather triangular in lateral view.

PILSBRY (1907) characterizes *Scalpellum longicarinatum* as "a robust little species" and says that the largest specimen from the type locality had a capitulum "fully 11 mm. long". He did not give any details of the finer structure of his specimens, and it is not certain whether he had fully grown animals before him; his material came from three different stations of the American "Albatross" expeditions in Atlantic waters.

Group of *Scalpellum striolatum*.

According to GRUVEL (1920) *Scalpellum idioplax* Pilsbry (1907) which PILSBRY uses as type for this group, is synonymous with *Scalpellum anceps* Aurivillius 1898 which, however, was first sufficiently described by GRUVEL in 1920 on the basis of AURIVILLIUS' type (it is to be regretted that the photographs accompanying GRUVEL's report from 1920 are so indistinct that also in this species they are not convincing). GRUVEL holds that the species is closely related with *Scalpellum nymphocola*; this, however, is certainly erroneous.

The above synonymy stated by GRUVEL (1920) has induced me to speak of PILSBRY's (1907) group of *Scalpellum idioplax* as the group of *Scalpellum striolatum*. This species is the oldest known species of the group and today better known than any other of these species.

GRUVEL (1920) mentions that AURIVILLIUS (1898) in *Scalpellum rigidum* (syn. *Scalpellum striatum* Gruvel 1900) overlooked the small rostrum "réduit parfois à une toute petite tige, étroite et allongée, entièrement cachée, la plupart du temps entre les bords occlusifs des rostro-latérales, existe néanmoins, si rednit soit il, chez *Sc. rigidum*". This points in the direction that a retrograde development of the rostrum like that described below in *Scalpellum striolatum* and *Scalpellum albatrossianum* is rather common in the present group of the genus.

Scalpellum striolatum G. O. Sars.

Scalpellum striolatum, Broch, 1924 (older synonymy here).

— *albatrossianum*, Nilsson-Cantell, 1925, Neue und wenig bekannte Cirripeden.

(non — — — — — Pilsbry, 1907, The Barnacles (Cirripedia) contained in the Collections of the U. S. National Museum).

— *striolatum*, Nilsson-Cantell, 1926, Antarktische und subantarktische Cirripeden.

— — — — — Тарасов, 1937, К ФАУНЕ УСТОИЩИХ РАКОВ (CIRRIPIEDIA THORACICA) СЕВЕРНОГО ЛЕДОВИТОГО ОКЕАНА. III.

Description: see BROCH, 1924, p. 11.

Material:

66°23' N., 10°26' W., 1412 m., ± 0.9° C., "Ingolf" St. 102.	1 small specimen.
66°23' N., 7°25' W., 1802 m., ± 1.1° C., "Ingolf" St. 104.	11 spec.
65°31' N., 7°31' W., 1435 m., ± 0.8° C., "Ingolf" St. 105.	2 spec.
69°31' N., 7°06' W., 2465 m., ± 1.0° C., "Ingolf" St. 113.	4 spec.
69°13' N., 8°23' W., 1889 m., ± 1.0° C., "Ingolf" St. 117.	1 spec.
68°27' N., 8°20' W., 1996 m., ± 1.0° C., "Ingolf" St. 118.	4 spec.
67°53' N., 10°19' W., 1902 m., ± 1.0° C., "Ingolf" St. 119.	10 spec.
67°29' N., 11°32' W., 1666 m., ± 1.0° C., "Ingolf" St. 120.	5 spec.
1410 m., "Thor" St. 50 (1903).	1 specimen.
63°16' N., 6°32' W., 1783 m., ± 0.11° C., "Michael Sars" St. 102 (1902).	3 specimens.

The adult specimens were thoroughly described by BROCH (1924), and in the same paper one somewhat smaller specimen was described. This specimen, however, was not sufficiently young to tell anything about the successive appearance of the capitulum plates. Some quite small specimens from "Ingolf" St. 104, 118, and 119 are of great interest in this respect.

At St. 118 a newly fixed pupa (fig. 2, a) was found seated on a shell fragment together with one medium-sized specimen. Calcareous plates had begun to develop within the pupa cover, and primordial valves were found apically on the scuta, terga, and carina. Besides these plates also the superior latera were well developed, and at the transition from the capitulum to the stalk a dorso-lateral and a lateral pair of stalk scales were found. This

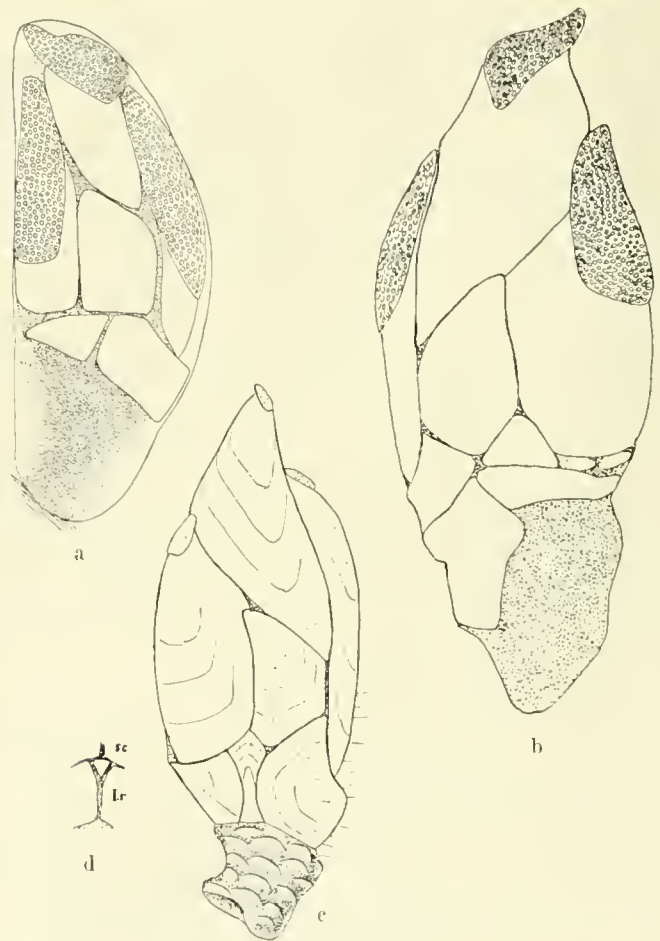


Fig. 2.

Scalpellum striolatum. a pupa from St. 118 (×40). b young specimen from St. 119 (×40). c somewhat older specimen from St. 104, and d rostrum of same specimen in ventral view (sc ventrolateral angle of scutum, l. r. latus rostrale) (c d ×8).

quite small stage thus fully agrees with the corresponding smallest stage of *Scalpellum stroemii* figured by BROCH (1912), and we can conclude that the development of the skeleton is parallel in both species. Attention is, however, called to the peculiar shape of the primordial tergum in *Scalpellum striolatum* with its remarkably peaked apex caused by the markedly concave dorsal margin.

A somewhat older specimen with a capitulum height of 3 mm (fig. 2, b) was found at St. 119. Here also a complete row of lower latera has developed on the capitulum and pushed the two primary pairs of stalk scales down below the transition zone from the capitulum to the stalk. In the lower row of the latera the carinal latera are the largest plates, although not much larger than the triangular inframedian plates. The rostral latera are small, almost of the same size as the rostrum; it must be emphasized that a rostrum is present in this young stage of *Scalpellum striolatum*.

During the following development the rostrum grows comparatively slowly, and after some time its growth ceases entirely. The growth of the lower latera, on the other hand, increases, and soon these plates attain their characteristic shape. At the same time the intensive growth of the rostral latera seemingly moves the small rostrum upwards towards the basi-ventral angles of the scuta. This development is easily observed in the specimens from St. 119, in which the height of the capitulum ranges from 1.8 to 5 mm. This series moreover shows that the two lowermost pairs of plates in the pupa (fig. 2, a) move downwards during the succeeding development of new stalk-scales, and that here as in *Scalpellum stroemii* they are the two basi-dorsal pairs of stalk-scales.

A specimen with a capitulum height of 7.7 mm was caught at St. 104 (fig. 2, c). Here the characteristic striation of the plates is indicated, and in the carina the sagittal, dorsal longitudinal furrow is rather distinct; moreover in the inframedian plate the fanshaped, secondary part above the mucro is already rather well developed. Even here a small, triangular rostrum is present, wedged in between the basi-ventral angles of the scuta and the upper ventral parts of the rostral latera; rostrum is cuneiform with its acute end pointing downwards towards the stalk (fig. 2, d).

During the following growth of the animal the rostrum atrophies at the same time as the ventro-scutal angles of the rostral latera grow out over it to meet along the sagittal ventral line, and in specimens with capitulum heights of some 10 mm the rostrum has completely vanished.

This development is of great importance to the question concerning the value of a more or less vestigial rostral plate in the systematics. In this connection it should also be noted that there is an upwards displacement of the rostrum in the investigated species, probably because the atrophy starts along the basi-lateral sides of the plate. This, however, may be casual, but it seems curious that there is no example showing that the rostrum disappears completely with growth, when it is placed between the basi-ventral margins of the rostral latera.

Scalpellum albatrossianum Pilsbry.

- Scalpellum tenuis*, Annandale, 1905, Malaysian Barnacles in the Indian Museum.
 non — — — Hoek, 1883, Report on the Cirripedia collected by H. M. S. "Challenger".
 — *albatrossianum*, Pilsbry, 1907, The Barnacles (Cirripedia) contained in the collections of the U.S. National Museum.
 — — — Annandale, 1908, Illustrations of the Zoology of the R. I. M. S. Investigator.
 — — — Annandale, 1913, The Indian Barnacles of the subgenus *Scalpellum*.
 — — — Annandale, 1916, Three Plates to illustrate the Scalpellidae of Indian Seas, with synonymy and notes.
 non — — — Nilsson-Cantell, 1925, Neue und wenig bekannte Cirripeden.

- Scalpellum albatrossianum*, Stubbings, 1936, Cirripedia, John Murray Exp.
 — — — Nilsson-Cantell, 1938, Cirripedes from the Indian Ocean.

Description: see PILSBRY, 1907, p. 54.

Material:

- 64°24' N., 28°50' W., 1484 m., 3.5° C. "Ingolf" St. 10. 10 specimens, capitulum mostly ab. 6 mm, the largest with 10 mm high capitulum.
 65°36' N., 56°24' W., 349 fathoms. WANDEL 1889. 1 small, pilose specimen.

The present species is very difficult to distinguish from small specimens of *Scalpellum striolatum*, the sculpturation of the capitulum plates of which is yet only feebly developed, and the secondary upper part of the inframedian latus is yet comparatively small, not having attained its greater, more broadly fanshaped form above the umbo. This plate is on an average a little more slender in the present species, but this is easily overlooked, if specimens of both species are not compared.

It is easy to suggest that *Scalpellum albatrossianum* represents an Atlantic group only of the same species as *Scalpellum striolatum*, the latter in this case representing an arctic modification. However, nothing has hitherto been stated concerning the structures of the animal itself in Atlantic *Scalpellum albatrossianum*, and I took the opportunity to dissect the largest specimen from "Ingolf" St. 10, though it was a little damaged.

Although the height of the capitulum was only 10 mm, the mantle cavity contained a great many ripe eggs, which shows that the species is mature already at this small size. The capitulum plates of the specimen are much more delicate than in specimens of *Scalpellum striolatum* of the same size.

Unfortunately, the cirri were also damaged, and only in cirrus I could the segments be counted: the branches have 8 and 11 segments respectively. The segments of the median part of the anterior branch are strongly swollen, whereas the posterior branch is rather slender. The anterior branch measures ab. $\frac{4}{5}$ of the length of the posterior. (BROCH in an outgrown specimen of *Scalpellum striolatum* found that the anterior branch measured $\frac{3}{5}$ of the posterior, and the numbers of segments were 9 and 12).

Abdominal appendages (fig. 3, a) are well developed, slender, and with 5 segments (in *Scalpellum striolatum* 9 segments), without setae barely as long as the protopodite of cirrus VI (in *Scalpellum striolatum* its two distal segments project above the protopodite of cirrus VI).

Penis lacking.

Labrum in shape almost agrees with that of *Scalpellum striolatum* (see BROCH, 1924, textfig. 14, d, e), but the palpus is a little longer and reaches to the middle of the side of the labrum.

Mandible (fig. 3, b) with three acute teeth. The lower angle is comparatively longer than in *Scalpellum striolatum*, but almost devoid of pectination.

First maxilla (fig. 3, c) with a distinct and comparatively broad notch at the side of which a bristle is seated. The armament above the notch almost entirely agrees with *Scalpellum striolatum*, but the number of spines below the notch is much lower, and among these lower spines that adjoining the notch is much larger and more powerful than the others.

All differences between the two species are small and may seem insignificant as specific criterion. However, taken together they give so different impressions that at present we must regard *Scalpellum albatrossianum* as a separate species.

As pointed out above the possibility however exists that we have before us representatives of two ecological or geographical races of one species. Looking at the size alone, this might no doubt

be explained as a result of differences in temperature. With our present knowledge it is, however, difficult to say whether the different degree in the sculpturation of the plates, or the morphological differences pointed out above, are due to differences of temperature.

The present material does not contain so young stages as those of the preceding species. Nevertheless, the smaller specimens show parallel stages in a retrograde development of the rostrum. In

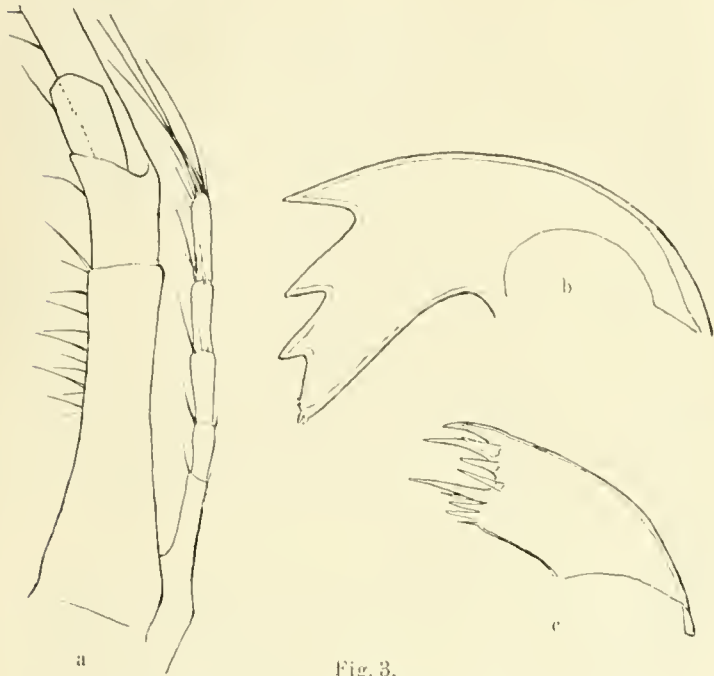


Fig. 3.

Scalpellum albatrossianum. a abdominal appendix and basal part of cirrus VI ($\times 40$). b mandible, and c first maxilla ($\times 80$).

Scalpellum albatrossianum the rostrum disappears already at a capitulum height of ab. 6.5 mm, whereas specimens with capitulum height of 6 mm yet show the rostra of comparatively the same size and position as those of *Scalpellum striolatum* with a capitulum height of 7.7 mm (see fig. 2, d).

A comparison of the data of the Atlantic specimens and the single specimen from the Indian Ocean described by ANNANDALE (1908, 1913, and 1916) is of interest here. The excellent drawing from 1908 leaves no doubt about the identity of his specimen. The capitulum height is 8.5 mm, i.e. it is a little smaller than PILSBRY's type (10.5 mm) and agrees with the medium-sized specimens from "Ingolf" St. 10.

The skeleton in all details agrees with the Atlantic *Scalpellum albatrossianum*. ANNANDALE (1913) states that the carinal umbo is subapical, whereas PILSBRY (1907) characterized it as apical. ANNANDALE's characterisation, however, depends on the narrow brim around (and under) the umbonal part at the apical end of the carina, a brim which may be observed in many species with "apical umbo", but which is generally concealed under the margins of the terga.

There are some small anatomical differences between ANNANDALE's description and the specimen from St. 10. According to ANNANDALE (1913) "the cirri . . . closely resemble those of *S. pacificum*, but the anterior ramus of the first cirrus is relatively broader" (under *Scalpellum pacificum* ANNANDALE (l.c.) says "The anterior ramus of the first cirrus flattened and expanded, especially in the 4th, 5th, and 6th segments. . . . ; posterior ramus slender, slightly longer than anterior ramus"). Cirrus I thus seems to be more flattened (with protruding median segments?) in Annandale's specimen. Although no direct statement is given as to the numbers of segments, a casual remark suggests 9 segments in the anterior branch.

There seems also to be a difference in the mandibles, but ANNANDALE's description is not quite clear. Under *Scalpellum pacificum* he writes "Mandible wide, with four subequal teeth of moderate size; the first widely separated from the others; the fourth (inner angle) pointed". Under *Scalpellum albatrossianum* he says "The . . . mouth parts closely resemble those of *S. pacificum*, but . . . the outer tooth of the mandible is relatively larger and the two inner teeth of the appendage lie closer together". In other words, there seems to be a wider interspace between first and second tooth, and the lower angle according to his description is comparatively more prolonged than in the Atlantic specimen examined (see fig. 3, b). Unfortunately, ANNANDALE has not given any drawings of these details. Moreover, our knowledge of the variations in these finer structural characters in the single species is far from sufficient. Future investigations must show, whether these small differences indicate racial differences, or whether they are only casual variations which may be found everywhere within the vast range of the species.

Scalpellum carinatum Hoek.

Description: see HOEK, 1883, p. 76.

Material:

62°25' N., 28°30' W., 1717 m, 3.5° C., "Ingolf" St. 83. 1 specimen.

With its capitulum height of 16 mm the specimen is larger than all previously known specimens of *Scalpellum carinatum*. The membranous interspace between the carina and the tergum better agrees with HOEK's (1883) description than with the drawing given by PILSBRY (1907), but the carinal latus is more in accordance with PILSBRY's figure and not quite so beaked as in HOEK's drawing, nor does its umbo jut out behind the carina as figured by HOEK. The capitulum is covered by a well developed, although thin, cuticle carrying a pelt of close-sitting, small hairs.

A comparison of the details given by HOEK (1883), PILSBRY (1907), and GRUVEL (1920) clearly indicates that also in *Scalpellum carinatum* there is a retrograde development of the rostrum like that stated in the two preceding species.

Group of *Scalpellum aurivillii*.

Scalpellum aurivillii Pilsbry.

Description: see PILSBRY, 1907, p. 61.

Material:

64°14' N., 55°55' W., 839 m, "Tjalfe" St. 408. 1 specimen.

The specimen has a capitulum height of 16 mm and agrees well with the description of PILSBRY (1907) which was based on a specimen with a capitulum height of 15.3 mm.

Scalpellum semisculptum Pilsbry.

Description: see PILSBRY, 1907, p. 62.

Material:

64°24' N., 28°50' W., 1481 m, 3.5° C., "Ingolf" St. 10. 1 specimen.

The specimen is smaller than PILSBRY's type (capitulum height 16 mm) with a capitulum of 10 mm only. It nevertheless agrees well with his description.

GRUVEL (1920) is of the opinion that the present species is identical with *Scalpellum mamillatum* Aurivillius. They are no doubt closely related, but the indistinct photographs reproduced by GRUVEL and his redescription are not convincing proofs, and until now nothing is known of the anatomical details of the animal. Since only a single specimen was available no dissection was made. It is interesting to note that PILSBRY and GRUVEL place the alleged synonymous species in different groups of the genus.

Scalpellum talismani Gruvel.

- Scalpellum talismani*, Gruvel, 1902, Cirrhipèdes.
 Gruvel, 1905, Monographie des Cirrhipèdes.
formosum, Pilsbry, 1907, The Barnacles (Cirrhipedia) contained in the Collections of the U.S. National Museum.
 non Hoek, 1907, The Cirrhipedia of the Siboga-Expedition. A. Pedunculata.
bellum, Pilsbry, 1908, On the classification of scalpelliform barnacles.
talismani, Gruvel, 1920, Cirrhipèdes provenant des campagnes scientifiques de S.A.S. le Prince de Monaco. (Remark on p. 23).

Description: see GRUVEL, 1905, p. 86, PILSBRY, 1907, p. 58.

Material:

58° 20' N., 10° 18' W., 3192 m., 1.5° C., "Ingolf" St. 20, 2 spec.

The larger specimen (fig. 4, a, b) is much larger than GRUVEL's type specimen (1902), which with its capitulum height of 18 mm equals the smaller specimen from St. 20 and having a capitulum height of 28 mm is much larger than the type of PILSBRY, the capitulum of which only measured 14 mm.—There are some small

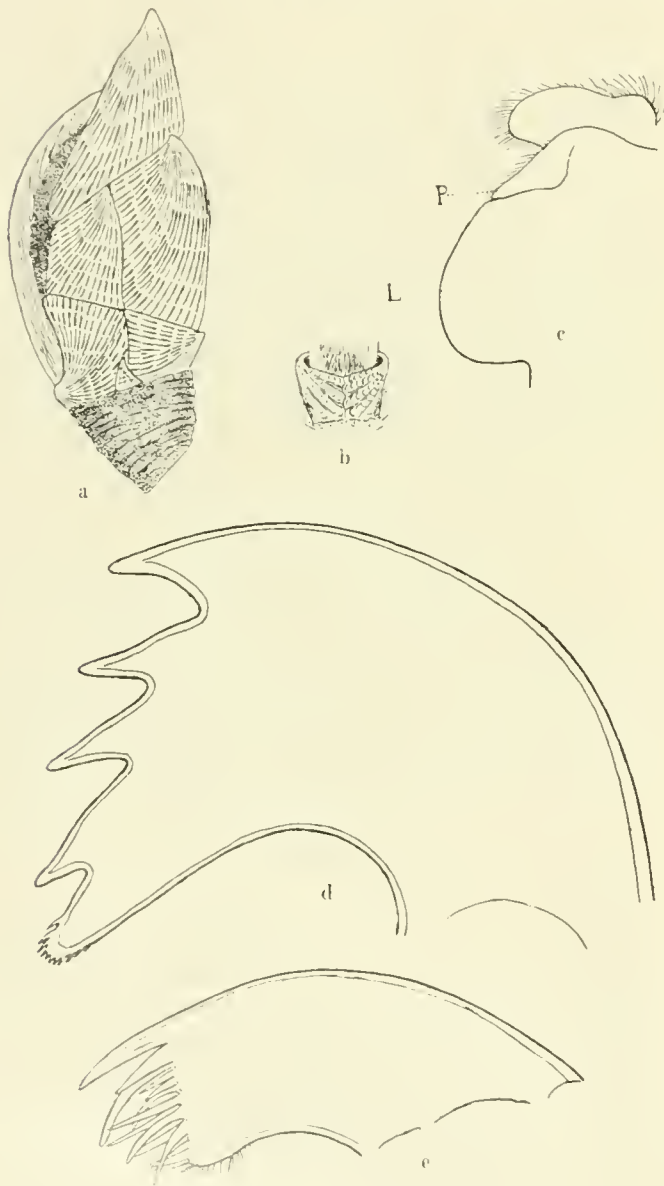


Fig. 1.

Scalpellum talismani, a specimen from St. 20, and b basal part of carina and carinal latera (dorsal view $\times 2$). c labrum (L) in side view with palpa (P) ($\times 15$). d mandible, and e first maxilla ($\times 60$).

discrepancies between the descriptions given by GRUVEL and PILSBRY and the present large specimen. None of these authors mentions a membranous interspace between the strongly and evenly arched carina and tergum-latus superius (fig. 4, a) probably because this interspace is also lacking in the smaller specimen from St. 20.

PILSBRY (1907) emphasizes that his specimen differs from *Scalpellum talismani* in size and in the shape of the latus infra-medium, the plate in GRUVEL's specimen being slightly smaller as compared with the height of the adjoining rostral and carinal latera. PILSBRY evidently did not pay sufficient attention to the difference in size of the two specimens. It is impossible to trace differences of taxonomic value in the drawings and descriptions given by GRUVEL (1902) and PILSBRY (1907). PILSBRY also mentions some detached valves of a much larger, macerated specimen from another locality, the identity of which, however, is questionable; only in exceptional cases is it possible to identify a recent *Scalpellum* on the basis of some detached plates.

PILSBRY mentions and figures a rudimentary rostrum which, in intact specimens, is completely covered by the upper parts of the rostral latera. GRUVEL found no rostrum in his somewhat larger specimen, but evidently did not dissect his single specimen. There was no rostrum in either of the two specimens from St. 20.—This feature, however, must be used with great caution in taxonomic respect as mentioned above under the group of *Scalpellum striolatum*. Probably, the rostrum also in *Scalpellum talismani* atrophies completely at a capitulum height between 14 mm (PILSBRY's specimen) and 18 mm (GRUVEL's specimen and the smaller specimen from St. 20).

Previous authors do not state anything about the anatomy.

The number of segments could not be stated with certainty in the posterior cirri; here the limits between the segments gradually fade away so that several of the basal segments are quite confluent. This is also to a certain degree the case in cirrus II and cirrus III, but a careful counting gave, in cirrus II, 22 and 27 segments, in cirrus III, 24 and 24 segments in the branches. The posterior cirri seem to have up to some 30 segments in their branches.

Cirrus I has 10 and 12 segments; these are swollen, but not protruding. The more basal segments of cirrus II also are slightly swollen. Here the distal segments are armed with 3, or in some segments 4 pairs of ventral bristles. In the median cirri III and IV the numbers of bristles generally rise to 5 or 4 pairs, and in the posterior cirri V and VI the segments again carry 3, or exceptionally 4 pairs of bristles.

Abdominal appendages and penis were not observed.

Labrum (fig. 4, c) is blunt and rounded, without inner teeth or spines.

Mandible (fig. 4, d) with four rather acute and almost equidistantly placed teeth above the slender and acute lower angle, which is finely pectinate.

First maxilla (fig. 4, e) with straight cutting edge. Below the upper spine one pair of powerful spines is placed above the row of lesser and more slender spines running to the lower angle, and the median spines of which are arranged in pairs.

Scalpellum phrygianum, n. sp.

Material:

64° 24' N., 28° 50' W., 1484 m., 3.5° C., "Ingolf" St. 10, 2 specimens, capitulum heights 10 and 14 mm.

63° 30' N., 54° 25' W., 1096 m., 3.3° C., "Ingolf" St. 25, 1 specimen (type).

Capitulum (fig. 5, a) with 13 plates, like the stalk covered by a delicate cuticle carrying a rather thick pelt of 1 to 1.5 mm long hairs. The height of the capitulum of the type specimen is 22 mm, the total height of the individual 29 mm.

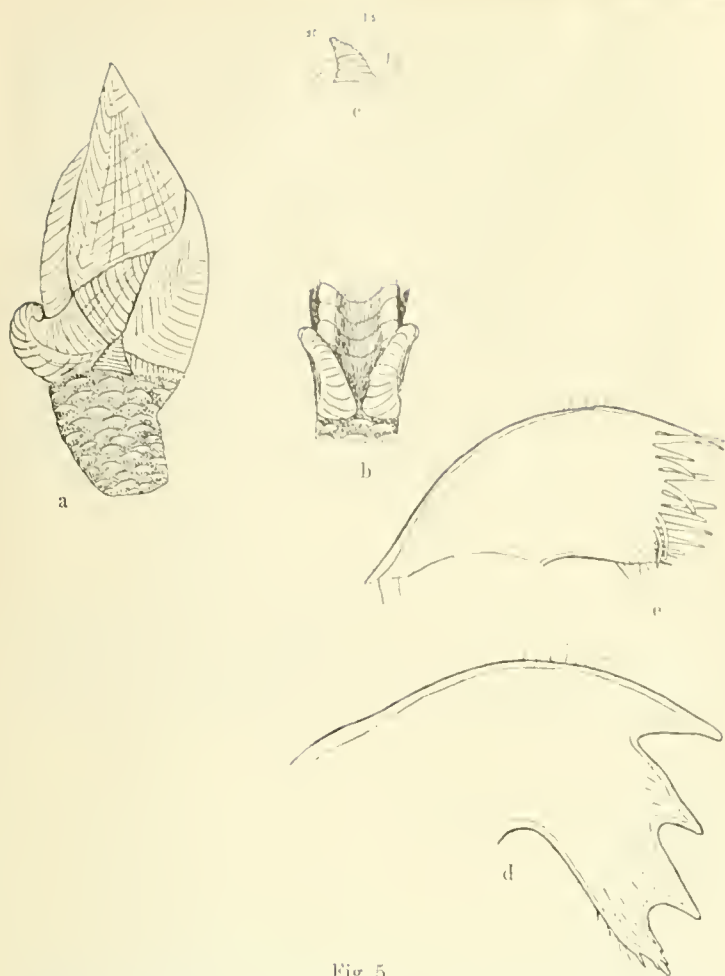


Fig. 5.

Scalpellum phrygianum. a type specimen, left side. b carinal latera and basal part of carina in dorsal view. c latus inframedium of right side (l.r. latus rostrale, sc scutum, l.s. latus superius, l.c. latus carinale) (a-c \times 2). - d mandible, and e first maxilla (\times 60).

Tergum almost triangular with acute apex, sculptured with slight, though distinct lines of growth and a few stripes radiating from the apex downwards towards the basal margin. Umbo apical. The ventral and dorsal margins of the tergum are almost quite straight, the dorsal with a slight indication of convexity; the basal margin is a little ∞ -shaped. The basi-carinal angle is rather acute.

Scutum is sharply beaked apically, with terminal umbo, and externally ornamented with five lines of growth. The basal margin towards the latus rostrale as well as the dorsal towards the latus superius are almost quite straight; the ventral margin is rather strongly and uniformly convex, whereas the upper part of the dorsal margin bordering the tergum is deeply concave so that the plate is beak-like tapering. Nevertheless, the scutal apex is not bent in over the tergum.

Carina with apical umbo, in lateral view a little convex with rather prominent ridges of growth. A deep and broad longitudinal furrow runs from the apex to basis flanked by narrow and rather clear-cut flanges (fig. 5, b).

Latus superius is triangular with its apical umbo wedged in between tergum and scutum and its basal margin adjoining the margin of the carinal latus from the inframedian plate to the carino-basal corner of tergum. The plate is adorned with prominent and conspicuous growth ridges parallel to its basal margin; it has also a few, less conspicuous, radiating stripes from the apex towards the basal margin.

Rostrum wanting.

Latus rostrale very low, trapezoidal, with feeble lines of growth.

Latus inframedium triangular, normally with a slightly incurved ventral margin so that the apical part is generally somewhat incurved over the basi-dorsal angle of the scutum. In the type specimen (fig. 5, a, c) the incurvation of the plate is somewhat stronger on the right side than on the left. The external side of the plate, especially in the basal part, is somewhat concave and throughout adorned with very conspicuous lines of growth parallel to the basis.

Latus carinale in lateral view strongly reminds of a Phrygian cap with its incurved apex seemingly resting against the basal part of the carina; in dorsal view (fig. 5, b) the upper part is bent slightly outwards, and because of their conspicuous growth ridges, the plates in this case recall the horns of a ram. The peculiar shape of the plate is furthermore conspicuous by its prominent growth lines combined with a rather conspicuous, strongly incurved diagonal rib from the apex to the basal angle, where the margins towards the latus superius and inframedius meet.

The stalk is richly furnished with scales which, however, are rather spaced.

The larger of the specimens from St. 10 was dissected.

The cirri showed the following numbers of segments in their branches:

Cirrus	I	II	III	IV	V	VI
	8-11 (12)	21-20	23-24	25-25	23-22	24-24

In cirrus I the segments are strongly swollen, but not protruding, and in cirrus II the segments of the anterior branch are a little swollen, whereas those of the posterior branch as well as those of the other cirri are tubular. The tubular segments are armed with 3 pairs of bristles along their ventral side.

Caudal appendages with four segments, without setae as long as the protopodite of cirrus VI. The terminal setae are as long as the appendage itself.

Labrum is a little protruding, almost like *Scalpellum scalpellum* (see BROCU, 1924, fig. 2, c and d, p. 16), rather broad, but without teeth on the inner side.

Mandibles (fig. 5, d) with three equidistant powerful teeth above the slender and not very prominent lower angle which ends in a spine and carries a few denticles.

First maxillae (fig. 5, e) with a straight cutting edge armoured with a single row of uniform and not especially powerful teeth.

It is rather difficult to say, in which group of the genus the species should be placed. It is a *Holoscaphellum*, and I was at first inclined to include it in the group of *Scalpellum portoricuum*. However, the conspicuous and nearly triangular or wedge-like latus superius together with the peculiarly shaped and strongly sculptured carinal latera deny this relationship, and the lower latera on the whole agree with the group of *Scalpellum velutinum*. Here, however, the inframedian latus according to PILSBRY (1907, p. 26) is wider than high. Nevertheless, the species seems to belong in the neighbourhood of *Scalpellum regium* Wyville Thomson.

Group of *Scalpellum gruveli*.

Scalpellum imperfectum Pilsbry.

Description: see PILSBRY, 1907, p. 75.

Material:

62° 40' N., 19° 05' W., 1506 m., 4.0 C., "Ingolf" St. 63, 1 specimen, capitulum height 22 mm.

The present specimen does not show quite so large interspaces between the calcareous plates as PILSBRY's type specimen. This, however, is quite in accordance with the larger size of PILSBRY's specimen (capitulum height 29 mm), it is older, and the interspaces between the calcareous parts of the plates increase with

the growth of the specimens. In yet older specimens moreover an atrophy of the marginal part of the plates generally seems to take place. This seems to be a general rule in the subgeneric group *Neoscalpellum*.

Scalpellum spp. indetermin.

In some places the "Ingolf" Expedition also collected detached plates which evidently should be referred to the genus *Scalpellum*: 62°00' N., 21°36' W., 1591 m, 3.3° C., "Ingolf" St. 40. 1 carina.

One large, strongly corroded carina. To a certain degree the plate recalls *Scalpellum albatrossianum*, but the thin lateral parts have been worn away, and an identification is therefore not possible.

63°30' N., 54°25' W., 1096 m, 3.3° C., "Ingolf" St. 25. 1 carina.

The plate is excellently preserved. In structure and shape it resembles the carina both of *Scalpellum portoricanum*, *longicarinatum*, and *phrygianum*, and it is not possible to determine the species exactly.

64°24' N., 28°50' W., 1484 m, 3.5° C., "Ingolf" St. 10. Several single plates.

One carina holds a place of its own, strongly reminding of *Scalpellum imperfectum* and its next related forms. All the other 10 carinae seem to be referable to the group of *Scalpellum portori-*

canum, but evidently they represent two different species or types: one with narrow and prominent flanges (8 specimens), and another type, which has the flanges along the furrow only feebly prominent against the flat, dorsal roof (2 specimens). It is not possible to determine them to species with certainty.

Among the plates also three scuta are found. Their outlines as well as a rather distinct diagonal line recall both *Scalpellum semisculptum*, *carinatum*, and *portoricanum*. Also here two types seem to be represented: one has a somewhat more pointed and a little incurved apical part. And finally one tergum was found in the sample. This tergum exhibits a distinct sculpturation like that found in *Scalpellum talismani* and *phrygianum*.

With our present knowledge we cannot determine the remains to species. Owing to the great number of species of recent *Scalpellum*, the finer structures of which are in many cases deficiently described, a reliable identification can only in exceptional cases be based on a single valve, and in such cases the ecological conditions should also be considered.

Scalpellum sp. (?)

63°06' N., 56°00' W., 2258 m, 2.4° C., "Ingolf" St. 21. 1 single pupa.

The pupa shows no traces of calcareous plates, also not of primordial valves, and it is only the finding place and its ecological conditions which induce me to place the specimen with a query in the genus *Scalpellum*.

Family Lepadidae

Genus *Lepas* Linné.

Lepas anatifera Lin.

Description: see BROCH, 1924, p. 46.

Material:

4 sea-miles E. of the northernmost Shetland Islands. The Danish expedition to East Greenland 1929. 3 clusters of quite small specimens; according to the label they were seated on a drifting bottle.

Family Balanidae.

Genus *Balanus* da Costa.

Balanus crenatus Brng.

Description: see BROCH, 1924, p. 78.

Material:

64°54' N., 55°10' W., 740 m, 3.8° C., "Ingolf" St. 27. 1 small spec.

The specimen is quite young, with the greatest carino-rostral diameter being only 4.5 mm, and with very narrow carino-laterals.

The specimen had been removed from its support, and no information of the nature of the latter is given. This is regrettable because of the great depth of the finding place, which with its 740 m is situated very far below the previously known lower limit of the habitat of the species (320 m).—It should be noted that specimens of *Scalpellum stroemii* and *Scalpellum hispidum* also occurred in the same haul.

Zoogeographical Remarks

The single find of *Lepas anatifera* does not add to our geographical knowledge of the species. The find of *Balanus crenatus* on the other hand, is astonishing, seemingly removing the lower limit of its range from some 320 m down to 740 m. However, it is a question, how much stress should be put on such single and evidently stray finds. Of course, they evidence that some larvae are able to survive a transplantation to extreme conditions and even subsist there for some time. But so long as only one or two stray specimens have been observed at such great depths, whereas a considerable, continuous population a normal range—has been stated at much shallower depths, such finds should be regarded as exceptions to the rule. In this case larvae may easily drift away

from their near by home along the Greenland coast and coastal banks, and sink to the bottom at deeper parts along the slope towards the great deeps of the Davis Strait. Some few are probably able to survive; probably the present record is an exception and, therefore, should not influence the presumed limits of the normal bathymetrical range of *Balanus crenatus* in northern waters.

Otherwise, we only have to deal with the genus *Scalpellum* which in the northern Atlantic in most cases normally has its range in somewhat deeper parts.

Different geographical types are represented in the collections, and it seems natural to start with the common species *Scalpellum scalpellum* living at shallow depths of our waters. This species is

strictly European, and its ecological conditions have recently been summed up in a paper by Broch (1953).

Scalpellum scalpellum is a common species in the Mediterranean, along the coasts of Spain and Portugal, and in the Bay of Biscay, although detailed data are wanting. Nor are there any particulars from Irish and British waters (see the chart, fig. 6), where the species, according to the literature, is most abundant. The northern limit of the species at present is at the Lofoten Islands.

collections fill several gaps in the picture framed by Broch (1921), but it does not alter the characteristics summed up in that paper. *Scalpellum stroemii* should certainly be characterized as a typical Atlantic, boreal species which already in the boreo-arctic border waters becomes rather seldom and disappears at the limit of the arctic region proper. On the other hand, there is as yet only one single find in water layers of more temperate character, viz. the record from a depth of 294 fathoms off Fernandina, Florida, men-



Fig. 6.

Scalpellum scalpellum. All localities are filled out, as the specimens of the collections come from earlier known finding places.

In 1924 I suggested that "Wahrscheinlich wird die Art an der Südküste von Island etwas häufiger vorkommen, als man nach den jetzigen Daten vermuten kann". A glance at fig. 6 shows that this suggestion is wrong. In spite of the rather intensive investigations carried out along the Icelandic coasts during the later decades, the species till now has not been found at the coasts and also not on the coastal banks of Iceland.

It thus seems evident that *Scalpellum scalpellum* in some way has been prevented from occupying the whole territory which seems to afford the ecological conditions required by the species. It has been able to traverse the Atlantic Stream from Scotland to the Faroes, but only one casual find may indicate that its outposts have spread along the Faroe-Iceland ridge and have reached the outskirts of the submarine Icelandic plateau. This, however, was already known in 1924, and since then nothing has changed the zoogeographical aspect of the species.

The group of *Scalpellum stroemii*, the three northern species of which systematically form a well defined set, exhibits interesting features also zoogeographically.

The central species, *Scalpellum stroemii*, is commonly distributed in the entire Atlantic-boreal region (fig. 7), but the species has not as yet been recorded from Pacific waters. The present

tioned by PULSBRY (1907). Elsewhere the species has also not been met with in "lusitanic" localities, and in American waters the southern limit of its continuous range seems to be just south of Cape Cod.

It is of importance in this connection to point to the chart (fig. 7), where the scarcity of finding places along the southern and eastern coasts of Greenland is very obvious, probably owing to the dominance of arctic water, whereas several finding places have been stated along the slopes of the fishing banks towards the deeper parts of the Davis Strait between some 63° and 69° Lat. N.

Bathymetrically *Scalpellum stroemii* has a wide range, from 10 to 1629 m ("Ingolf" St. 39). However, the majority of the localities are at depths from 100 to ab. 1000 m, and in the Norwegian North Atlantic most finds are above some 600 m, whereas in Davis Strait and off South- and West-Iceland the species seems to prefer depths greater than 500 m. On the New Foundland Banks the species, according to PULSBRY (1907), again seems to prefer depths from 100 to 500-600 m. This of course is correlated with the temperature, which also at the greater depths is generally positive. Scattered finds have been reported from localities with temperatures below 0° C., and the present collections have added one record ("Ingolf" St. 15, 621 m. : 0.75° C.). A comparison with the

chart (fig. 7), in which the single rings in several cases cover more finding places, makes it justified to maintain that the occurrence of specimens at temperatures below 0° C. is accidental.

The two other species of the group, *Scalpellum nymphocola* and *Scalpellum cornutum*, are typical eastern arctic species with remarkably limited ranges.

Scalpellum nymphocola towards the east passes beyond the limits of the chart (fig. 8). The easternmost locality, stated by TAPACOB (1937), is near the Tajmyr Peninsula. On the other hand, the westernmost localities of the continuous habitat are situated at the eastern coast of Greenland where the species, however, has been found only in a few places north of 70° Lat. N. One single specimen recorded by AURIVILLIUS (1894) under the name of *Scalpellum grönlandicum*, shows its occurrence in Baffin Bay at 400 m depth.—The bathymetrical range of *Scalpellum nymphocola* stretches from 76 m (near Tajmyr) to 1358 m (BROCH, 1924). Only quite exceptionally has the species been observed in localities with positive temperatures, viz. on the southern slopes in the Faroe Channel by "Triton" a little above 600 m depth (HOEK, 1883), and by "Valdivia" in 1111 and 1170 m depth (WELTNER, 1922); the position of these finds seems to suggest a larval transport from the cold area north of the Wyville Thomson ridge.

Scalpellum cornutum, zoogeographically in the main coincides with the preceding species (fig. 9). With only one remarkable exception are the finding places situated within the cold area. The easternmost finding place also here is reported near the western side of the Tajmyr Peninsula and thus beyond the limits of the chart. On the other hand the species up till now has not been found in Greenland and Icelandic waters, also not near Jan Mayen, but the two localities from the "Ingolf" Expedition show that the southern limit of the range of distribution probably follows the border of the cold area in the vicinity of the Faroe Isles.

A most astonishing find was made by the "Ingolf" at St. 2 north-east of the Faroe I., where one adult specimen was brought up from 493 m depth, although the temperature at the bottom was 5.3° C. This is the only known example of the species being able to stand temperatures above 0° C. The depth, on the other hand, is not unusual, the species having been met with in depths from 46 m (Kara-Sea, AURIVILLIUS, 1894) and down to 760 m in the Norwegian North Atlantic Sea (BROCH, 1924).

In this place also *Scalpellum hispidum* should be mentioned which seems to be an Atlantic-boreal species according to the scanty data known at present (fig. 10). BROCH (1924) doubts, whether the species should be characterized as a boreal species, or possibly an Atlantic visitor in northern waters. The new records of the "Ingolf" Expedition indicate that it inhabits the deeper parts of the boreal strata, and when we consider all known localities, it seems likely to characterize *Scalpellum hispidum* as a boreal species which in the somewhat deeper strata occurs together with *Scalpellum stroemii*, though it is much less numerous. Bathymetrically the finding places range from 150 to 1096 m. Along the Norwegian coast the species has been found in 150 to 400 m, to which the hitherto unrecorded specimens of STEENSTRUP add one locality in ab. 600 m depth; in the Davis Strait the localities are situated in depths from 652 to 1096 m.

Scalpellum striolatum is a typical eastern arctic species living in somewhat deeper strata (fig. 11). However, the easternmost localities were stated by TAPACOB (1937) at the northern entrance to the Kara Sea between Franz Joseph Land and the northernmost point of Novaja Zemlya; these localities are moreover the shallowest with depths of 425 m to 570 m. The chart, on the other hand, indicates a remarkable accumulation of finding places along the slopes towards the cold area between Jan Mayen and the Faroe Isles, where the species probably is comparatively common in depths from some 1000 m and downwards to 2485 m ("Ingolf" St. 113). There are no records at temperatures above

0° C. The westernmost localities of the species have been found at East Greenland at about 73° Lat. N. The species thus does not seem to have been able to penetrate into the deep basin of Baffin Bay.

It is interesting to compare our present geographical knowledge of the range of *Scalpellum striolatum* with that of *Scalpellum hamatum*, evidently also an eastern arctic species living in almost the same deep strata (see BROCH, 1924). The few finding places of *Scalpellum hamatum*, however, are situated along the opposite, eastern slope towards the great deep of the Norwegian North Atlantic Sea. This may of course be fortuitous, but it is strange that the species has completely escaped the attention of the investigators along the western slopes, though much more extensive investigations were carried out here.

The remaining 9 species of *Scalpellum* of the present Danish collections belong to a more temperate Atlantic intermediate bottom fauna. Our knowledge of the bathymetrical range of these species is very meagre. The following table gives the depths known at present from all finding places according to the literature (those from the Danish collections have been marked with an asterisk*; all depths are given in m):

<i>Scalpellum tritonis</i>	944 (HOEK). 913*
— <i>longicarinatum</i>	537; 805; 770 (PILSBRY). 1838*.
— <i>albatrossianum</i>	3742 (2045 fthms) (PILSBRY). 1484*; (?)638*. [Indian Ocean: 3687 (1997 fthms) (ANNANDALE)].
— <i>carinatum</i>	1830 (HOEK). 1427; 1716 (PILSBRY). 2028 (GRUVEL). 1717*.
— <i>aurivillii</i>	1211; 1429; 1440; 1550; 1800 (PILSBRY). 839*. [Subsp. <i>incertum</i> : 2906 (PILSBRY)].
— <i>semisculptum</i> .	512 (PILSBRY). 1484*. [<i>mumillatum</i> : 4020; 4261 (GRUVEL)].
— <i>talismani</i>	4255 (GRUVEL). 512 (PILSBRY). 3192*.
— <i>phrygianum</i> . .	1096*; 1484*.
— <i>imperfectum</i> . .	1429; 1559; 2250 (PILSBRY). 1506*.

These species evidently have their northern limits along the south slopes of the ridges which traverse the Davis Strait and the ridges between Greenland and Iceland as well as from Iceland to Scotland which constitute a barrier between the Arctic and the Atlantic deep sea. Evidently the temperate Atlantic deep sea species of *Scalpellum* extend their more or less scattered outposts into this border land.

Altogether, the records (fig. 12) clearly show tendency to assemble more numerous in two territories, viz. in the Davis Strait at the eastern side of the bottom of the deep cul-de-sac between 63° and 65° Lat. N., and along the eastern slope from the Iceland plateau towards the deep cul-de-sac penetrating from the south northwards into the Danmark Strait. Evidently, these two areas are favoured by the currents transporting young stages which by some cause or other have been delayed in settling and have drifted away from the main habitat of the species.

Apart from *Scalpellum phrygianum* here described as a new species, all the here mentioned species of the geographic group have also been found in Atlantic waters of lower latitudes, and in most cases in dominating numbers in the western parts, where the American survey ship "Albatross" had its main field of operation. This is probably also the cause, why there are on the whole only few records from south of the equator, where only few investigations of the bottom fauna have been carried out. Only one species, *Scalpellum carinatum*, in so far holds an exceptional place; the species was found by the Challenger Expedition (HOEK, 1883) near the Tristan-da-Cunha south of the equator.

Of the Atlantic species dealt with here only one, *Scalpellum albatrossianum*, also belongs to the Indian Ocean. The first record was given by ANNANDALE (1908), who identified one specimen from

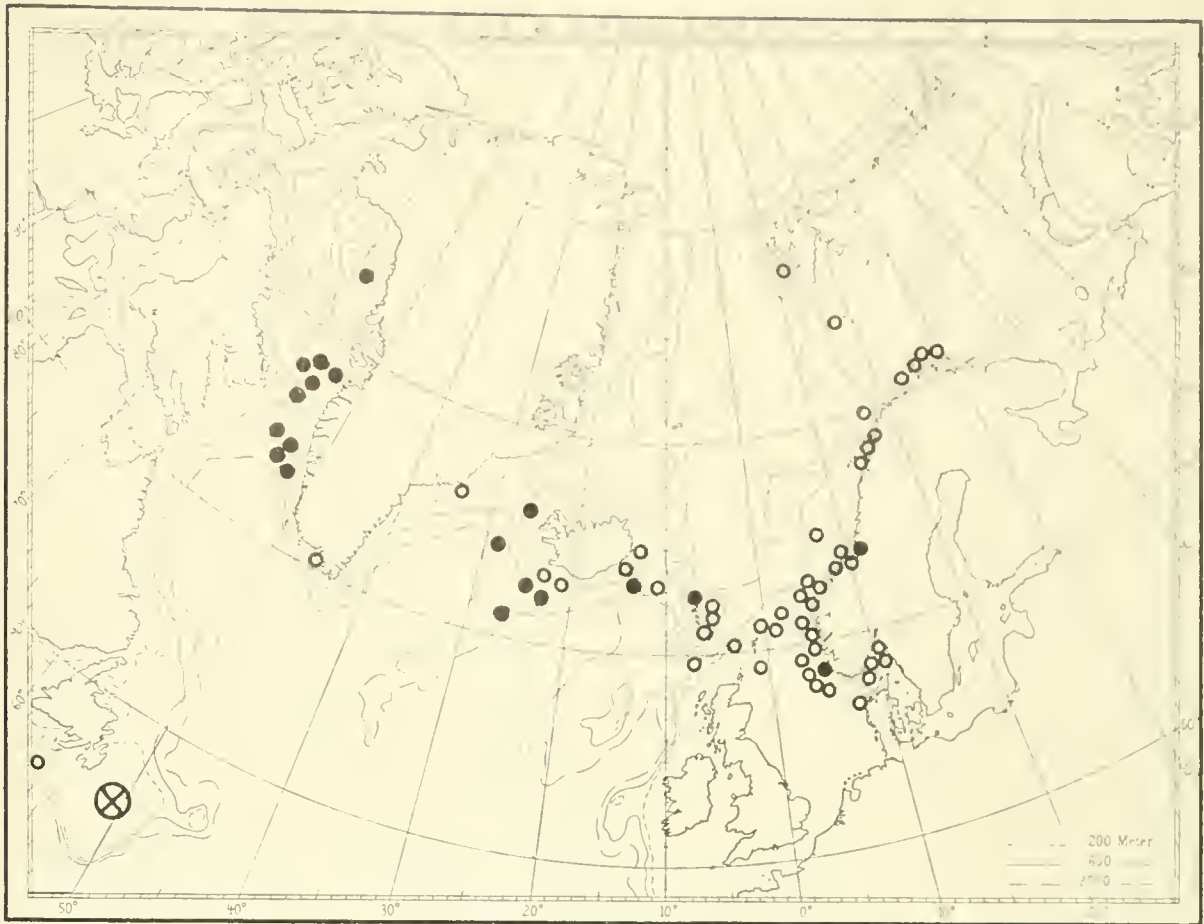


Fig. 7.

Scalpellum stroemii. Black figures localities of the Danish collections, open figures localities recorded in the literature (open ring with a cross, record without exact localities).

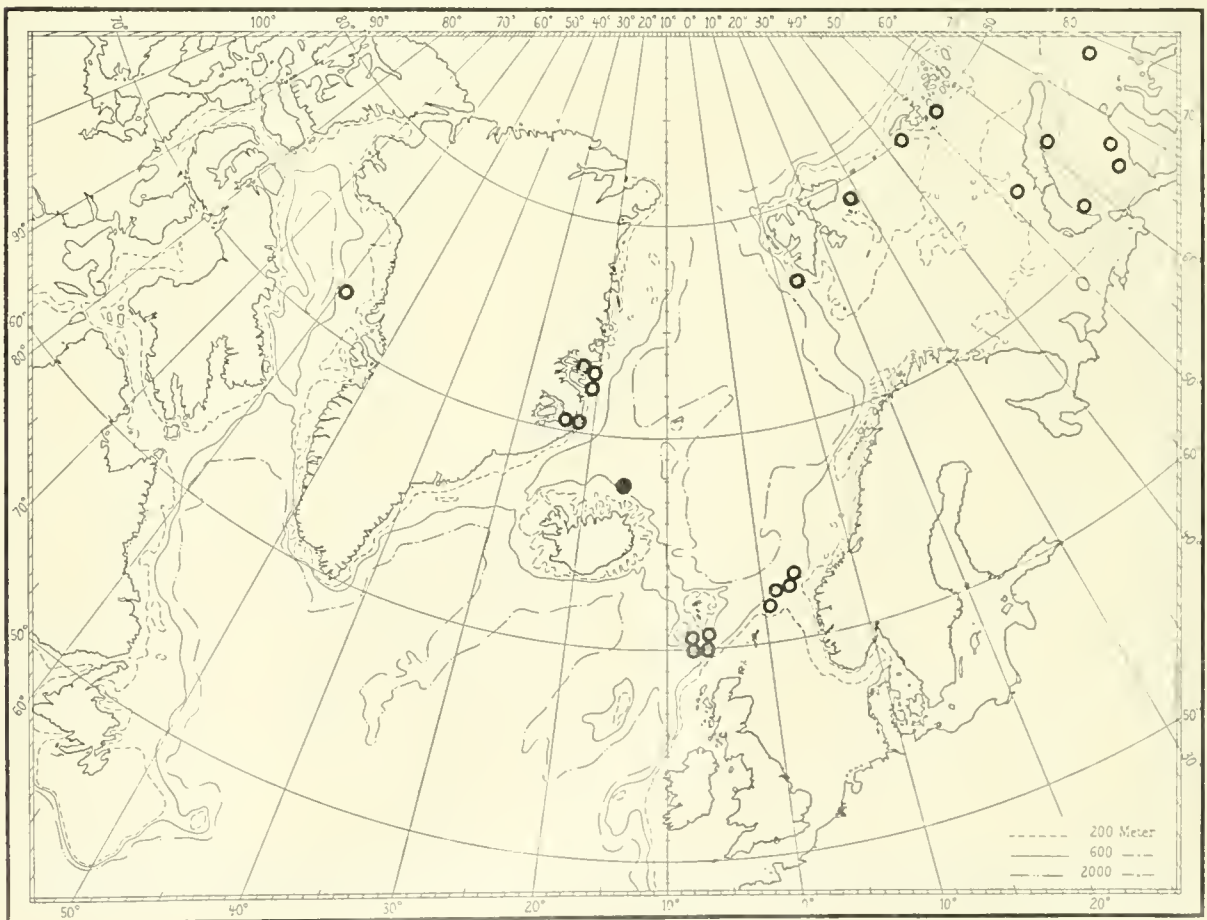


Fig. 8.

Scalpellum nymphocola.

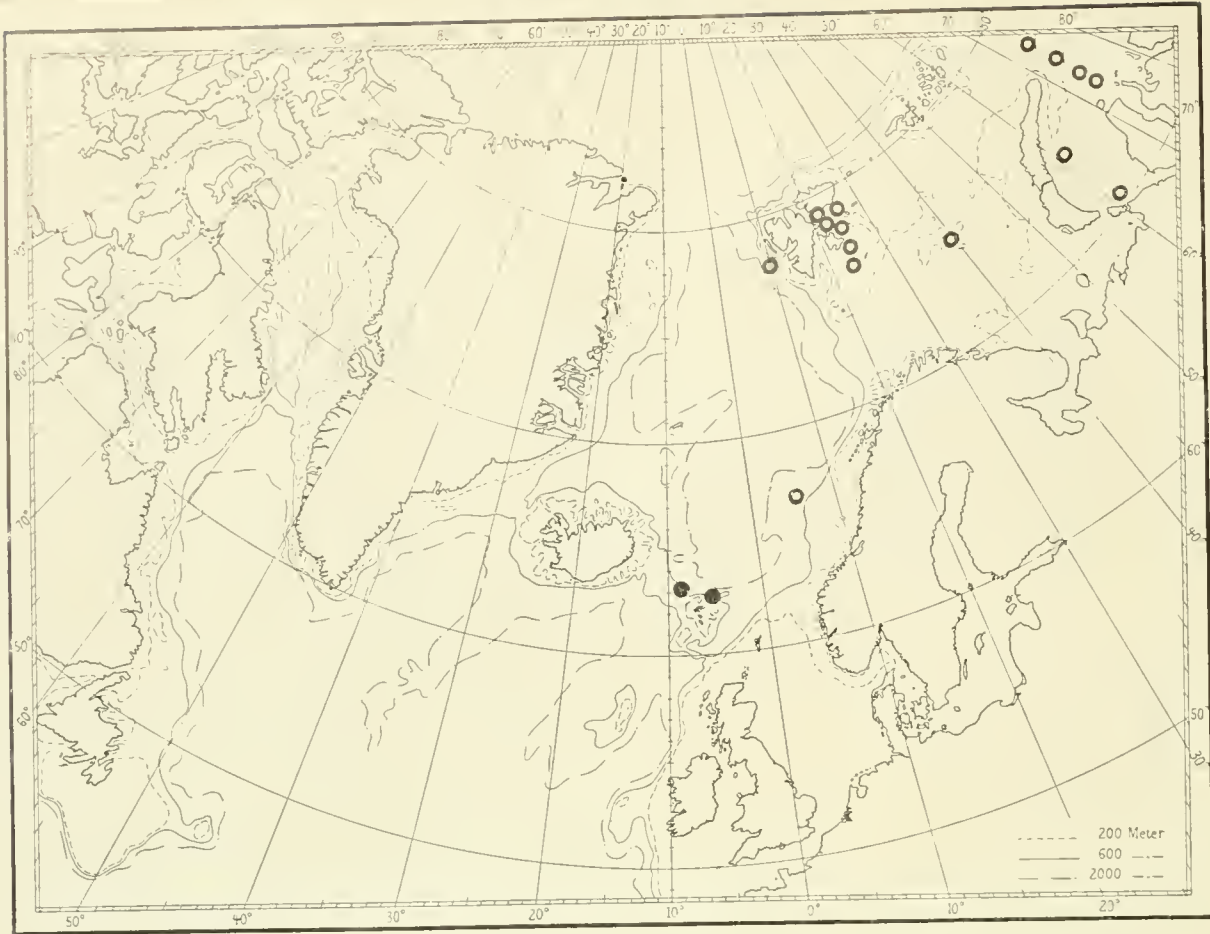


Fig. 9.
Scalpellum cornutum.

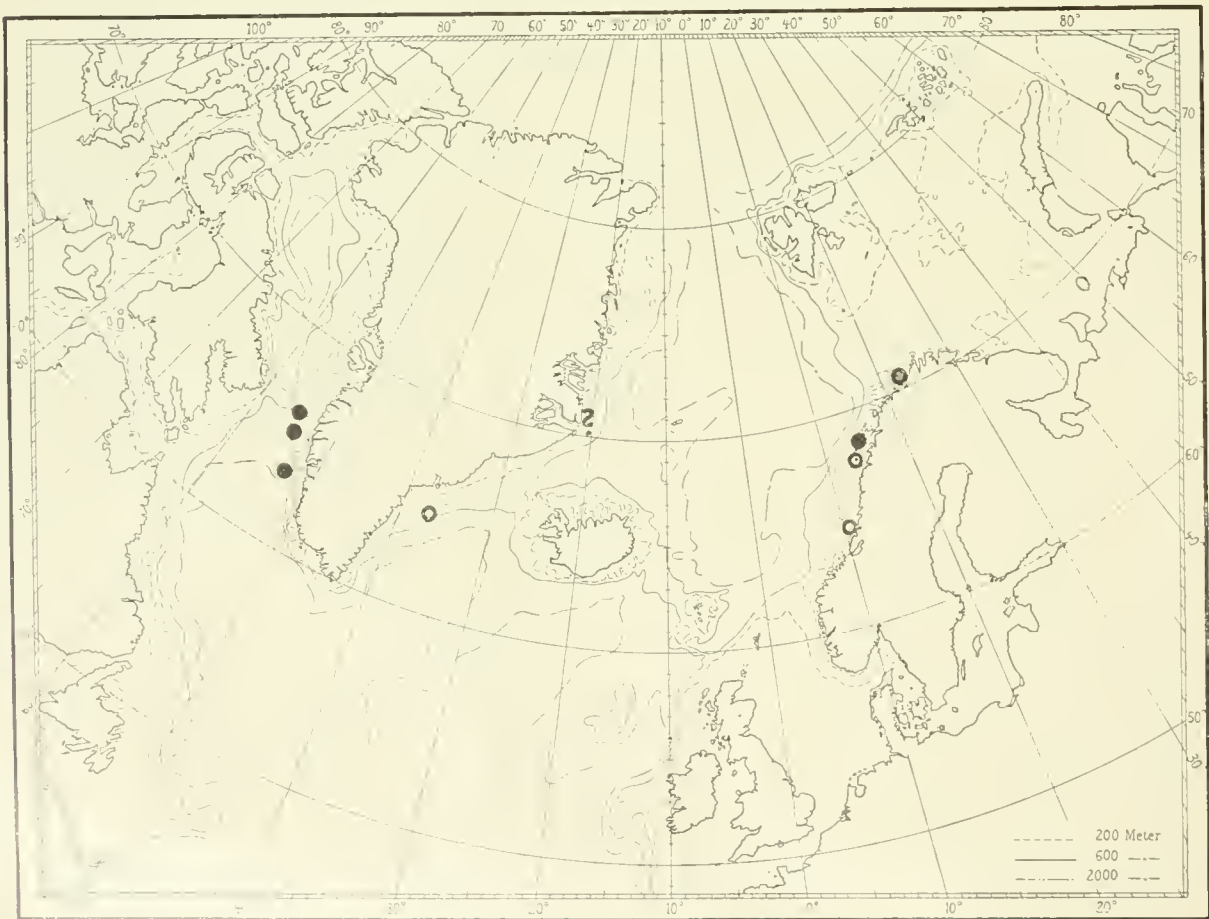
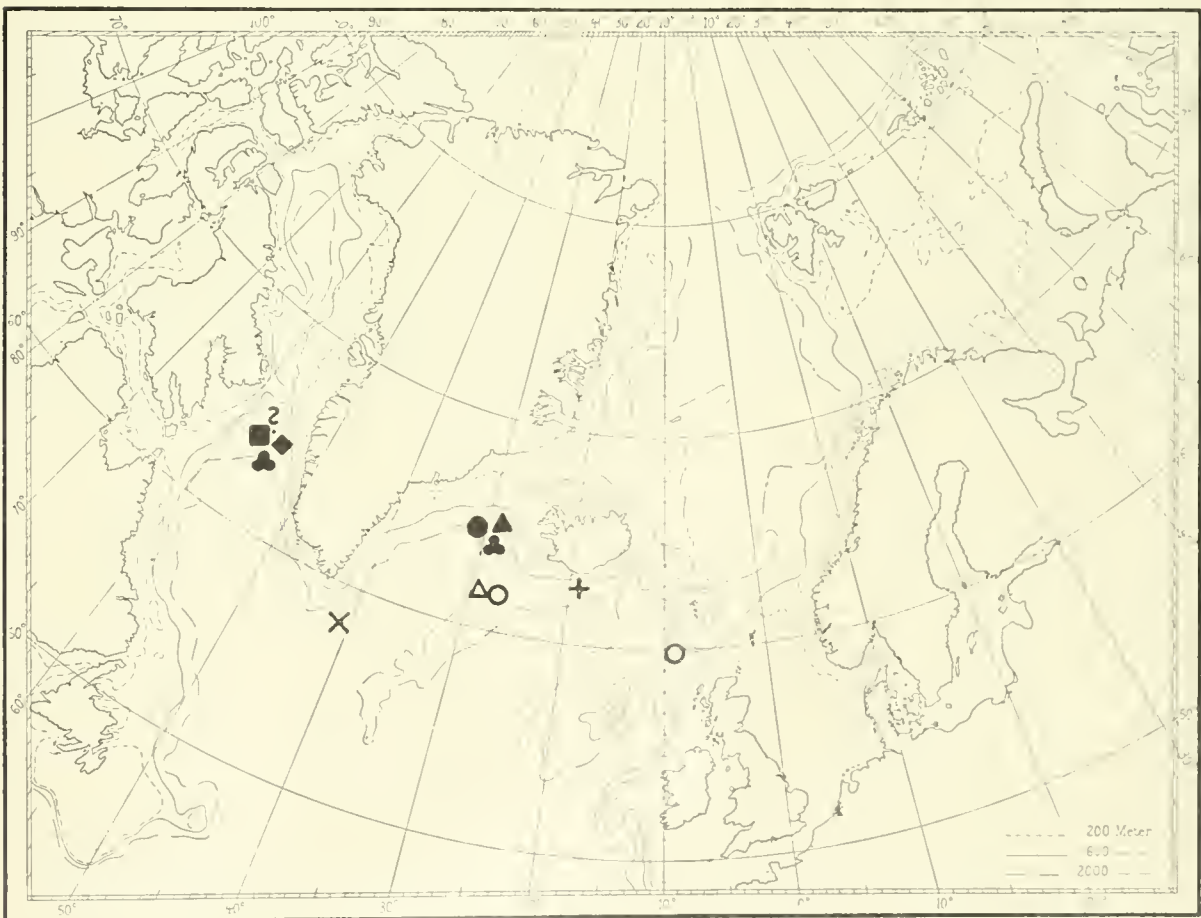


Fig. 10.
Scalpellum hispidum.



Fig. 11.
Scalpellum striolatum.



○ *tritonis* ● *langicarinatum* ▲(?) *albatrossianum* △ *corinatum* ■ *aurivittis*
◆ *semisculptum* × *talismani* ◆ *phrygianum* + *imperfectum*

Fig. 12.

Finding places of deeper living *Scalpellum* from temperate Atlantic waters represented in the Danish collections.

3687 m (1997 fathoms) as belonging to this species; later on no new finds have been reported from the Indian Ocean.—STUBBINGS (1936) after PILSBRY and ANNANDALE correctly gives the bathymetrical range “from 3687 to 3775 metres”, whereas NILSSON-CANTELL (1938) without adding any new locality in his general survey of species from the Indian Ocean, by a slip of the pen mentions a bathymetrical range from 760 to 2000 m.

[STUBBINGS (1936) also mentions *Scalpellum formosum* as a species found both in The Indian Ocean and the Atlantic Ocean. It evidently escaped his attention that the Indo-Pacific *Scalpellum formosum* Hoek (1883) is another species than the Atlantic *Scalpellum formosum* Pilsbry (1907). NILSSON-CANTELL (1938) correctly places HOEK's species in his list of “Species known from Indian Ocean, Malay Archipelago and Pacific Ocean”, and in an accompanying comment he clarifies the matter. On the other hand

NILSSON-CANTELL seems himself to have overlooked the remark of GRUVEL (1920) concerning the synonymy of PILSBRY's *Scalpellum formosum* and *Scalpellum talismani* (comp. p. 8)].

Finally, if we again look at all the charts of the distribution (figs. 6—12), one feature attracts the attention. Among the arctic cold-water sepecies of the genus only one, *Scalpellum nymphocola*, has been able to penetrate into the deep basin of Baffin Bay. Seemingly, there is no barrier for a species like e.g. *Scalpellum cornutum*. However, this species up till now has not been found in Greenland waters at all. It is beyond the scope of this paper to enter into a discussion of the probable reasons, but it should be emphasized again that, according to our present knowledge of the bottom fauna, all arctic *Scalpellum* except *Scalpellum nymphocola* are wanting in the deep sea basin of Baffin Bay.

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