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CONTENTS:

H. J. HANSEN, CRUSTACEA MALACOSTRACA. IV.

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WITH 4 PLATES AND A LIST OF STATIONS.

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VI. The Order *Cumacea.*

Introduction.

Before entering on the subject of the present paper I may refer to "Introductory Remarks" in "Crustacea Malacostraca I" published in 1908, because they contain various statements that need not be repeated here. In that chapter I explained the limits of the area investigated by the "Ingolf" and other Danish expeditions to our northern dependencies; the principal sources (apart from the "Ingolf") for the material examined were enumerated, and the principles followed as to "occurrence" and "distribution" were laid down. Zoologists wishing to get some information on these and allied topics may find them in the paper mentioned.

Our earlier knowledge of the Cumacea living at the coasts of Greenland in depths down to nearly a hundred fathoms was rather good, but as to the fauna of the deeper tracts of the adjacent seas it was very poor. In 1887 I recorded 16 species, deep-sea forms included, belonging to the fauna of West Greenland; in 1913 K. Stephensen enumerated only the same number for both sides of Greenland. From the coasts of Iceland only 2 species of Cumacea have been recorded (by G. O. Sars), and none from the Færoes; from the deeper tracts around Iceland and the areas north-west, west, and south-west of the Færoes (southwards to Lat. 60° N.) scarcely more than a single species was known. In the present paper 66 species are enumerated, and all, excepting 2 species from very deep water and not seen by me, have been secured by Danish expeditions; 24 species are described as new. The "Ingolf" has gathered 41 species; 18 species have been taken exclusively by that expedition, and 14 species are new to science. During the cruizes of the "Thor" Dr. Joh. Schmidt brought together a magnificent material; he captured no less than 33 species (species secured at places outside the "Ingolf" area not included); 16 of these species were taken exclusively by him, and 8 are new to science. Among the new species described on the following pages only 1 has been taken by two expeditions, viz. both by the "Ingolf" and the "Thor". Only 9 of the 66 species have not been met with either by the "Ingolf" or the "Thor"; 3 of them are new to science and have been gathered by the IInd Amdrup-Expedition (Mag. sc. Soren Jensen), while the 2 species not seen by me were captured by the "Valorous" (Rev. Canon A. M. Norman). Of course a number of the species taken by the "Ingolf" or the "Thor" have also been gathered by various other Danish expeditions or collectors.

A comparison with the fauna of Norway and Great Britain may be of some interest, as the Malacostraca in the seas of these countries have been more thoroughly investigated than in any other area of our globe. In his "Account" (1899—1900) G. O. Sars described 49 species from Norway, and of these 21 are known from the "Ingolf" area, but some among them will certainly be found there in the future. Of the Cumacea of Great Britain and Ireland no complete faunistic list exists, but in looking over Stebbing's work in "Das Tierreich" I found that the British fauna comprises 60 species, when "off Rockall" and the sea between Rockall and Ireland is included; of these species only 22 are known from the "Ingolf" area. According to the numbers given the seas around our northern dependencies have been proportionately rather well explored, though it is quite certain that many forms living in the warm area, and especially in depths from 500 to 600 fathoms, have not yet been discovered.

On the Literature.

On this topic very little need to be said. During the years 1899—1913 a series of very important papers have been published by G. O. Sars, W. T. Calman, T. R. R. Stebbing and C. Zimmer. In his book on the Cumacea in "Das Tierreich", 39. Lief., 1913, Stebbing has compiled and quoted the whole literature until 1912, and for this reason I have referred to his most useful book in the synonymical list at every species. Zoologists wishing to get further knowledge on synonymy than the generally rather few references in the present paper can easily find them in "Das Tierreich". Zimmer's original contribution to the knowledge of the northern fauna is of slight importance, but his paper on the Cumacea in "Deutsche Südpolar-Expedition 1901—1903" Bd. XIV, Zool., VI, p. 438—491 (published in 1913) contains a very interesting chapter; "Zirkumpolarität und Bipolarität" (p. 483—488), in which an outline of the classification of families and genera followed by me is given, together with the number of species of each genus in the five climatic zones of the oceans.

Results and Questions.

A. The Material.

A comparison of the Cumacea from the "Ingolf" area with the world's fauna of the same order may be of some interest. In 1913 Stebbing states to have enumerated 309 accepted and 23 doubtful species; of the latter category the great majority will certainly disappear as unrecognizable for ever or synonyms, and only a few species have been established since 1913. If we therefore put the total number of valid species hitherto established to 315, we must be near the truth. Compared with that number 66 species from the "Ingolf" area is perhaps somewhat more than might be expected.

The latest arrangement of families and their genera of the world's fauna is that published by Zimmer in 1913; it differs rather little from that adopted by Calman, and Calman's arrangement differs somewhat from that by Sars in 1899—1900. Zimmer accepted only 7 families, and it is very interesting that 6 of these are represented in the "Ingolf" area, while of the seventh family, the Ceratocumidæ, only a single species is known. Yet it may be added that the large family Bodotriidæ, which has very few species in the cold areas of the globe and numerous forms in tropical seas, is poorly represented in the "Ingolf" area, while the some-

what smaller family Leuconidæ, of which not a single species is tropical, has a very high number of species, viz. 22, in our area.

As to number of species in our area a comparison of the Cumacea with Isopoda and Tanaidacea is rather suggestive. Of the order Tanaidacea Sars described 28 species from Norway, while I (1913) enumerated from the "Ingolf" area 78 species, 52 of which were new to science; of Isopoda Sars has 84 species from Norway, while I (1916) counted from our area 164 species, 70 of which were new. Compared with these astonishing results the outcome as to Cumacea is proportionately moderate, viz. from Norway according to Sars 49 species, while I enumerate 66 species, 24 among them new. As a very large number of the Tanaidacea and many Isopoda are smaller and not more easy to detect in sifted bottom material than the Cumacea, and as the animals of all three orders have been searched after with the same care and interest in the same samples, it follows that the fauna in our area of the last-named order must be much less exceeding that of Norway (or Great Britain) than is the case with that of Tanaidacea and Isopoda in proportion to the Norwegian (or British) fauna of these orders. An explanation can partly be derived from some facts to be pointed out later on as to bathymetrical distribution.

B. The Classification.

The shape and morphological structure of the appendages is on the whole well known at least in one form and frequently in some species of most genera. Nevertheless, the value of a number of genera is rather questionable, and, what is more important, some of the families are not very well defined. G. O. Sars, the first author who divided the order into families, accepted in 1879 8, in 1899-1900 9 families; Calman established a new family on an aberrant form discovered at Ireland, but both the last-named author and C. Zimmer pointed out in various papers the difficulty or impossibility of maintaining a few of the older families, and the result is that 3 were cancelled, so that Zimmer in 1913 has 7 families; this arrangement is, I think, the best hitherto proposed. Stebbing divided in 1912 and in "Das Tierreich", 1913, the order into 26 families, but this radical splitting has already been criticized by Zimmer, and I cannot follow the highly meritorious English author in his classification. But his attempt has a peculiar interest, because it is a symptom or indirect indication of the difficulty every Zoologist will find in trying to circumscribe natural and well defined families in this order. In my opinion we must know at least twice, perhaps three times as many species as hitherto described — especially of the fauna living in from 100 to about 600 fathoms in tropical and subtropical seas — before we can hope to ameliorate the classification in points essential. And perhaps the task will prove itself partly insoluble, as seems to be the case in the suborder Amphipoda Gammarida.

In the present paper not the slightest attempt of reform as to families has been made. The large material contained certainly a good number of new species, but not one among them differed so much from a previously well-known species, that it became necessary or even possible to establish a new genus for its reception. And the types of the genera dealt with here were all well studied. The only thing I could make is in a few cases to lay more stress than generally made on some differences serviceable as specific characters; for inst. the shape, relative size and serration of the joints in third pair of maxillipeds in *Procampylaspis* and *Campylaspis* (and perhaps in several other genera) ought to be considered more carefully than generally believed.

C. Geographical and bathymetrical Distribution.

It is an interesting fact that in the cold deep-sea area, with depths from about 300 to 1309 fathoms and the temperature at the bottom below zero, only 9 species have been taken, and that not a single species among these is exclusively limited to that area. Among these species two, viz. *Leucon nasicus* G. O. S. and *L. Nathorsti* Ohlin, have in that area only been taken at Stat. 126, 293 fath., temp. — 0.5°, thus near the limit of the area. *L. Nathorstii* has also been found in Davis Strait, 318 fath., temp. 3.9°, while *L. tidus* was secured at six stations in Davis Strait, in depths from 88 to 1109 fath., and temperature from 1.6° to 3.9°, and besides in low water at Iceland, etc. *Leucon spinulosus* n. sp. has been taken south of Jan Mayen in 1003 fath., temp. — 1.0°, but besides at three deep stations in the warm area, in 582 to 1435 fath., temp. 3.3°—1.5°. *Campylaspis intermedia* n. sp. has been taken south of Jan Mayen, 371 fath., temp. — 0.4°, and besides in Davis Strait, 318 fath., temp. 3.9°. *Leptostylis villosa* G. O. S. has been gathered two times in the cold area, in 293 and 471 fath., temp. — 0.5° and — 0.6°, but besides in the warm area in Davis Strait, 318 fath., temp. 3.9°, in low water at Iceland, furthermore south and north of Iceland in depths between about 18 and 194 fath. *Leptostylis longimana* G. O. S. has been taken five times in the cold area 471—702 fath., temp. — 0.6°— — 0.9°, but is was also secured at two typical stations in the warm area (and at several places in the North Sea, south-east of our area). *Diastylis Rathkii* Kr. was taken in the cold area, 471 fath., temp. — 0.6°, and several times in the warm area down to 420 fath., and in lower water. *Diastylis spinulosa* Heller was gathered once in the cold area, 537 fath., temp. — 0.7°, but besides in Davis Strait in depths from 48 to about 200 fath. and the bottom temperature above zero. *Diastylis polaris* G. O. S. (= *D. stygia* G. O. S.) may be called a typical inhabitant of the cold area, and the "Ingolf" captured it at ten such stations in depths from 371 to 1309 fath., temp. — 0.4°— — 1.1°, but the same ship gathered also specimens in the warm area, in Davis Strait, 582 fath., temp. 3.3°, and Calman records it from many stations off America between Lat. 41½° N. and Lat. 37° 25′ N., depths generally from 1149 to 1769 fathoms. It is interesting that, while 8 species of Tanaidacea and 15 species of Isopoda are in my earlier "Ingolf"-papers recorded as only taken in the cold deep-sea area, not a single species of Cumacea is limited to that area.

We find also considerable differences as to bathymetrical distribution between Tanaidacea and Isopoda on one hand and the Cumacea on the other. At the deepest "Ingolf" station, Stat. 38, 1870 fath., temp. 1.3°, 9 species of Tanaidacea and 8 species of Isopoda were secured, but not a single specimen of Cumacea. At Stat. 78 (709 fath., temp. 3.5°) an enormous bottom material, especially sponges, was hauled up, and it contained 9 species of Tanaidacea and 22 species of Isopoda, but only 2 species of Cumacea. Stat. 24 (1190 fath., temp. 2.4°) yielded of Tanaidacea 12, of Isopoda 15, but of Cumacea only 6 species. The extremely rich Stat. 36 (1435 fath., temp. 1.5°) at which only a rather small quantity of bottom material was hauled up, yielded 11 species of Tanaidacea, 18 species of Isopoda living at the bottom (besides 2 bathypelagic species) and 9 species of Cumacea, thus a proportionately good number of the last-named order. From Stat. 25, 582 fath., temp. 3.3°, thus more moderate depth, I had 8 species of Tanaidacea, 16 species of Isopoda, and 11 species of Cumacea. But while all the stations now mentioned were the only places really rich as to Tanaidacea and Isopoda, only two among them, viz. Stat. 36 and Stat. 25, contained a good representation of Cumacea, and from the last-named station with its 582 fathoms the harvest was richer than from Stat.

36, 1435 fath. But three other places, which have rather moderate depths and yielded lower numbers of Tanaidacea and Isopoda than the deeper stations just enumerated, gave the richest harvest of Cumacea. The places in question are: "Ingolf" Stat. 32, 318 fath. (temp. 3.9°), with 12 species; the "Thor" at Lat. 61°07′ N., Long. 9°30′ W., 443 fath., with 13 species, and at Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath., with even 15 species, thus only a little less than one-fourth of the total number of species in the area.

As only rather few species of Cumacea are restricted to depths from a few and down to 50—60 fathoms, the majority live most frequently or always in considerable depths, while only 15 species (2 among them only taken by the "Valorous") have been found in depths from 1000 to 1870 fathoms, and only 10 of these are known exclusively from these depths; 8 of these 10 species are new to science.

Of Tanaidacea the "Thor" secured only a few species, of Isopoda scarcely $^2/_7$ of all species known from the area, but of Cumacea 33 species, half of the whole number known from our area, while the "Ingolf" had only somewhat more, viz. 41 species. The geographical and bathymetrical distribution of the species of Cumacea helps somewhat to understand that remarkable fact. Many of the "Ingolf" stations are in the cold area, which has a very poor fauna of this order. Furthermore stations with the depth exceeding 600 fathoms yielded, with a single exception, a comparatively considerably or much lower number of Cumacea than of Tanaidacea and Isopoda. The highest number of species was taken both by the "Ingolf" and the "Thor" at places with depths between 300 and 600 fathoms; finally the bottom of the two above-named places, where the "Thor" gathered the very high number of Cumacea, must be especially fit for animals of this order.

Family Bodotriidæ.

Of this rich family, which is widely distributed in warmer temperate and in tropical seas, only two genera have been found in the "Ingolf" area.

Cyclaspis G. O. Sars.

The single European species of this large genus occurs in the southern part of our area.

1. **Cyclaspis longicaudata** G. O. Sars.

1865. *Cyclaspis longicaudata* G. O. Sars, Forh. Vid. Selsk. i Christiania for 1864, p. 207.
1896. — — Bonnier, Ann. Univ. Lyon, T. XXVI, p. 534, Pl. XXVIII, fig. 2a—2v.
!1899. — — G. O. Sars, Account, III, p. 16, Pls. VII—VIII.
1913. — — Stebbing, Das Tierreich, 39. Lief., p. 30.

Bonnier has described and figured the sculpture on the carapace, but did not perceive that many of the so-called "cellules" have at the middle a more or less elevated granule. — A feature, which seems to have been overlooked by authors, is that in females and immature males (adult males are unknown to me) the distal part of the upper margin of the peduncle of the uropods has 3 or 4 saw-teeth.

Occurrence. Taken by the "Ingolf" at a single station in the warm area.

South of Iceland. Stat. 40: Lat. 62° 00′ N., Long. 21° 36′ W., 845 fath., temp. 3.3°. 2 immature females.

Besides, this species has been captured by the "Thor" at two places.

South-West of the Faroes. Lat. 61° 15′ N., Long. 9° 35′ W., 463—515 fath., 31 specimens.

Lat. 61° 7′ N., Long. 9° 30′ W., 443 fath., large number of specimens.

Distribution. G. O. Sars says that this fine species has been gathered at several places on the west coast of Norway, northwards to off the Lofoten Islands, and always in depths of more than 100 fathoms. By the "Thor" it has been secured in the northern part of the North Sea at Lat. 58° 32′ N., Long. 4° 18′ E., 148 fath. Calman records it from places west of Ireland, 112 to 454 fath., Norman from the North Atlantic at Lat. 50° 11′ N., Long. 37° 41′ W., 1450 fath., and from off the Spanish coast, Lat. 48° 6′ N., Long. 9° 18′ W., 530 fath. Bonnier described a specimen from the Bay of Biscay, 510 fath. Furthermore it has been taken in the Mediterranean near Capri in depths from 65 to 584 fath. (Lo Bianco, Calman), and East of Sardinia, 652 fath. (Stephensen). Finally it has been taken in the North-West Atlantic off the United States between Lat. 30° 54′ and 38° 22′ N. in depths from 1525 to 1825 fath. (Calman).

Bathycuma H. J. Hansen.

Only one species is known from the area.

2. **Bathycuma brevirostris** Norman.

1879. *Leucon brevirostris*, A. M. Norman, Ann. Mag. Nat. Hist. 5. ser. Vol. III, p. 71.

1896. *Vaunthompsonia cocca* Bonnier, Ann. Univ. Lyon. T. XXVI, p. 536, Pl. XXVIII, figs. 3a—3s.

1905 *Bathycuma brevirostris* Calman, Fisheries, Ireland, Sci. Invest. 1904, I, p. 18.

1913 " *brevirostre*, Stebbing, Das Tierreich, 39. Lief. p. 13.

My three specimens are all mutilated; thus only a single uropod is present. The serration at the median line of the carapace shows the difference pointed out by Bonnier between the female and the immature male, as in the female the posterior two-fifths of the median line have some, in my specimen 4, teeth, placed with irregular intervals, but these teeth are wanting in the young males.

Occurrence. Taken by the "Ingolf" at a single station in the warm area.

South of Iceland. Stat. 40: Lat. 62° 00′ N., Long. 21° 36′ W., 845 fath., temp. 3.3°: 1 immature male.

Besides, this species has been taken by the "Thor" at a single place.

South of Iceland. Lat. 62° 57′ N., Long. 19° 58′ W., 508 fath.; 1 adult female and 1 immature male.

Distribution. Norman's type was taken to the south of Rockall, Lat. 56° 26′ N., Long. 14° 28′ W., 109 fath. Calman records it from west of Ireland, 382 fath.; Bonnier from three places in the Bay of Biscay, with the depths from 13 to 908 fath. Finally it has been taken near Capri in depths from 504 to 584 fath. (Calman).

Family Leuconidæ.

As to geographical distribution this moderately large family is extremely different from the Bodotriidæ. While, as pointed out by Zimmer, the latter family has a greater number of forms in the tropical than in the northern or southern temperate seas, and only a couple of representatives, both deep-sea forms, within the "Ingolf" area, no member of the Leuconidæ has been found in the tropical seas, while a rather good number of forms inhabit the boreal-arctic and the subantarctic and antarctic seas. Three well-known genera are represented in the "Ingolf" area.

Leucon Kröyer.

Of this genus the "Ingolf" and the "Thor" together has secured a large number of forms, viz. all species taken in the area in question by earlier expeditions excepting *L. longirostris* G. O. Sars, furthermore all species captured according to Sars at Norway and according to Calman at Great Britain and Ireland, finally 5 new species. The result is that no less than 14 species (*L. longirostris* G. O. S. included) are known from our area, an astonishingly high number of this genus. A few species are found in rather low water or in moderate depths; several are mainly from depths between 200 and 600 fathoms, and some are real deep-sea forms.

The following arrangement, though partly somewhat artificial, may be of some use for the student of this somewhat difficult genus.

A. Species with an extremely long, freely projecting branchial siphon.

3. Leucon siphonatus Calm.

! 1905.	*Leucon siphonatus*	Calman,	Fisheries, Ireland, Sci. Invest. 1904, I, p. 19, Pl. I, figs. 2—4.
1906.	—	—	Calman, Mitth. Zool. Stat. Neapel, 17. Bd. 4. Heft, p. 416, Pl. 27, fig. 9.
1913.	—	—	Stebbing, Das Tierreich, 39. Lief. p. 64.

The single specimen is a female with marsupium, 3.7 mm. long. It agrees on the whole well with Calman's description and figures; especially the somewhat curved pseudorostrum with its very concave lower margin is most characteristic. On the anterior part of one of the sides of the carapace I have counted at least 16 teeth. More than the anterior half of the lower margin of the carapace is serrated, but most of the teeth are difficult to see because they are almost subparallel with the margin. Pseudorostrum has 5 teeth on the upper margin, but the single tooth anteriorly on the dorsal crest in Calman's Irish specimen does not exist in my specimen. The upper part of the anterior margin of third free thoracic segment has several fine teeth, but no armature could be perceived on any of the other segments. In the antennulæ the third joint of the peduncle is nearly as long, but only half as thick, as the second; it is nearly half as long again as the external flagellum. In second pair of legs the merus is very thick and short, the carpus very slender and elongated, almost twice as long as the merus and a little longer than the two distal joints combined.

Occurrence. Taken by the Ingolf at a single station.

West of Iceland. Stat. 8. Lat. 63° 50′ N., Long. 21° 10′ W., 136 fath., temp. 6.0°; 1 specimen.

Distribution. The type was secured West of Ireland in 382 fath. (Calman).

Besides gathered at several places near Capri in depths from 53 to 584 fath. (Calman).

4. **Leucon spinulosus** n. sp.

(Pl. I, figs. 1 a—1 d.)

Female (with marsupium). Carapace moderately oblong (fig. 1 a), with pseudorostrum not included about one-third as long again as deep, and about as long as the free segments combined; when the pseudorostrum is included the carapace is a little less than twice as long as deep. The serration on the dorsal edge is found only on its anterior third or fourth; as a rule 3 rather long teeth are seen in front, then comes an interruption, and behind it 2 to 5 small teeth; a few teeth are found on each side between the antennal notch and the frontal lobe, the latter has no lateral tooth (fig. 1 b). Pseudorostrum is rather long, somewhat less than half as long as the carapace, more than twice as long as deep at the base, and very moderately upturned, with the proximal part of the upper margin a little convex; about the proximal half of its upper side has 4 to 7 teeth, but these show much individual variation in size, being sometimes all long, sometimes rather or very small, or some large and others small. The lower margin of the pseudorostrum is oblique but not concave as in *L. siphonatus* Calm., with a couple of smaller teeth near the middle. The antennal notch is very distinct and varies in shape, generally with a small tooth on its upper margin; the front margin above the notch generally with 2 or 3 long teeth and above them frequently 2 small teeth. The lower margin of the carapace is serrated in nearly its whole length, and the anterior teeth are long and strong; in front the margin curves upwards to the antennal notch, below which a good-sized tooth is seen, while the tooth on the middle of the curvature is also large.

Second and third free segments each with the anterior margin down to the middle of the sides armed with irregular, somewhat small teeth; furthermore the upper front angle of first segment has a couple of teeth; the upper margin of fourth segment with 2 teeth; finally 2 teeth just above the coxa of third leg on the anterior margin of the segment, and a single tooth far downwards on the front margin of second segment; in immature specimens some or many of the teeth on the free segments are apparently wanting. Abdomen slender and decidedly longer than cephalothorax with pseudorostrum.

The branchial siphon is almost or fully as long as the free thoracic segments combined. The antennulæ (fig. 1 a) are well developed, second joint of the peduncle twice as thick as, and slightly longer than, third joint, which is as long as the outer flagellum, while the inner flagellum is about as long as first joint of the outer. (First pair of legs mutilated in my specimens). Second pair of legs (fig. 1 c) most characteristic; the carpus is slender and very long, three times as long as the thick merus and considerably longer than the two distal joints combined, the terminal joint is very slender, with some very long setæ at the end. — The uropods are rather long, somewhat longer than the two distal abdominal segments combined, the peduncle in the adults a little longer, in younger specimens (fig. 1 d) a little shorter, than first joint of the endopod, with only 2 spines on the inner margin; first joint of the endopod a little more than two and a half times as long as

second joint, with about 4 spines on the inner margin; second joint has a single long spine and about 5 minute spines on the inner margin, a long and thick spine and an extremely long seta on the end; exopod a little or somewhat shorter than the endopod, with very few setæ excepting some at or near the distal end.

Length of a female with marsupium from Stat. 24 3.8 mm., of an ovigerous female from Stat. 36 4.1 mm.

Remarks. This species is allied to *L. siphonatus* Calm., but differs in several particulars. Pseudorostrum is considerably longer and scarcely curved; the dorsal edge and the anterior margin of the carapace have more teeth; some of the thoracic segments have marginal teeth; in second thoracic legs the carpus is still more elongated than in *L. siphonatus*, while in the uropods the endopod is conspicuously longer than the exopod. — The rather mutilated adult female from the cold area differs from the specimens from the warm area only in having 5 instead of 2 or 3 small teeth on the dorsal edge of the carapace behind the interruption. — It may be noted that many of the teeth, f. instance on the lower margin of the carapace, are frequently difficult to count.

Occurrence. Taken by the "Ingolf" at three deep-sea stations in the warm and one station in the cold area.

Davis Strait: Stat. 25: Lat. 63°30′ N., Long. 54°25′ W., 582 fath., temp. 3.3°; 1 small specimen.
— — Stat. 24: Lat. 63°06′ N., Long. 56°00′ W., 1199 fath., temp. 2.4°; 5 specimens (1 adult ♀).
— — Stat. 36: Lat. 61°50′ N., Long. 56°21′ W., 1435 fath., temp. 1.5°; 2 specimens (1 adult ♀).
South of Jan Mayen: Stat. 117: Lat. 69°13′ N., Long. 8°23′ W., 1003 fath., temp. + 1.0°; 2 specimens (1 adult ♀).

B. Species with the branchial siphon reaching at most a little beyond pseudorostrum.

a. Endopod of the uropods longer than, or at least about as long as, the exopod.

5. Leucon tener n. sp.

(Pl. I, figs. 2a—2c.)

Female (with marsupium). Carapace oblong, half as long again as deep, and when pseudorostrum is included twice as long as deep, about as long as the free segments combined. The serration on the dorsal edge occupies only about its anterior third, and in this third even a long interruption is found, as two teeth are seen anteriorly, then comes a smooth part and behind it 3 or 4 teeth. Pseudorostrum is considerably upturned, long, nearly $^2/_5$ of the whole length of the carapace, with the narrow end obtuse and the upper margin slightly concave, while the lower margin is nearly straight and has two saw-teeth a little before the base of the antennulæ. The frontal lobe on each side with two teeth, one towards the dorsal edge, the other a little above the lower margin. The antennal notch is feebly developed, as the antero-lateral corner of the carapace is slightly produced, terminating in a small tooth, above which two minor teeth are seen; the lower margin

only about three teeth. The abdomen is somewhat slender, a little shorter than the cephalothorax with pseudorostrum.

The antennula, when stretched horizontally forwards, with the tip of the outer flagellum scarcely reaching below the apex of pseudorostrum, second joint of the peduncle is curved, thick, considerably thicker than third joint; the outer 3-jointed flagellum is very considerably longer than third joint of the peduncle, and its first joint is as long as its two distal joints combined, inner flagellum uncommonly long, even a little longer than first joint of the outer flagellum. First pair of legs (fig. 2 b) without teeth on the lower side of second joint; sixth joint scarcely longer than the fifth and much longer than the seventh. Second pair of legs with the carpus in the adult conspicuously, in an immature specimen slightly, longer than the two distal joints combined. Uropods (fig. 2 c) rather characteristic; the peduncle as long as the exopod, with about 4 spines on the inner margin; second joint of the exopod with 3 setæ along the outer margin, the usual long setæ on the distal part of the inner margin and on the end, and besides 3 well developed setæ on the upper surface, endopod somewhat longer than the exopod; its first joint two and a half times as long as the second, with 4 spines (in an immature specimen with 6 spines) at the inner margin, and the spine at its end is rather long and thick; second joint with two spines near the end, the second long and strong, and besides with an extremely long terminal spine.

Length of the female with marsupium 4.4 mm.

Remarks. This small species is instantly recognized by the long pseudorostrum, the very few dorsal saw-teeth on the carapace, two pairs of teeth on the frontal lobe, and the rami of the uropods. In the two first-named features it shows relationsship to *L. spiniventris* n. sp., but the latter is much larger and differs from *L. tener* in several sharply pronounced features.

Occurrence. The "Ingolf" has gathered this species at three rather deep stations in the warm area.

Davis Strait: Stat. 25: Lat. 63° 30′ N., Long. 54° 25′ W., 582 fath., temp. 3.3°; 1 adult female.

Denmark Strait: Stat. 97: Lat. 65° 28′ N., Long. 27° 39′ W., 450 fath., temp. 5.5°; 1 immature female.

South-West of Iceland: Stat. 78: Lat. 60° 37′ N., Long. 27° 52′ W., 799 fath., temp. 4.5°; 1 young specimen.

6. **Leucon longirostris** G. O. Sars.

!1871 *Leucon longirostris* G. O. Sars. Kgl. Sv. Vet.-Akad. Handl. Ny Följd. B. 9, No. 13, p. 42, Tafl. XV, fig. 75.

1879. — — Norman, Ann. Mag. Nat. Hist. 5 ser., Vol. III, p. 69.

!1906. — — Calman, Mitth. Zool. Stat. Neapel B. 17, p. 414, Pl. 27, figs. 1—8.

1913. — — Stebbing, Das Tierreich, 39. Lief., p. 70.

Occurrence. Of this characteristic species I have not seen any specimen, but it has been recorded by Norman (l. c.) from a deep-sea station at the entrance of Davis Strait: Lat. 59° 10′ N., Long. 50° 25′ W., 1740 fath.

Distribution. The type was taken off Portugal at Lat. 38°7′ N., Long. 9°18′ W., 550 fath. (G. O. Sars). Calman recorded it from a place off the Un. States: Lat. 40°16′50″ N., Long. 67°05′15″ W., 1290 fath., and from stations in the Mediterranean near Capri, 504 to 637 fath.

7. **Leucon spiniventris** n. sp.

(Pl. I, figs. 3a—3d).

Female (adult and subadult). Allied to *L. longirostris* G. O. S., but very distinct. Carapace with pseudorostrum about 4 times in total length; more than the posterior half of the dorsal crest is feebly curved, nearly horizontal, while its anterior part curves gradually considerably downwards and is armed with 2 triangular teeth very distant from one another, and the anterior somewhat behind the end of the frontal lobe; the anterior tooth is moderately large, the posterior one considerably larger; the lateral surface of the frontal lobe without any tooth. Pseudorostrum is a little more than 1/4 of the total length of the carapace, directed considerably upwards and tapering from near the base to the subacute end; its upper margin has the posterior half a little concave, while the lower margin has towards the base 2 distinct teeth and 1 rudimentary tooth. The antennal notch is regularly and somewhat flatly concave without any incision or tooth. The antero-lateral angle of the carapace is slightly produced and equipped with a strong tooth, behind which the lower margin has about 12 teeth. The pleural plate of the antepenultimate thoracic segment has its infero-posterior angle produced into a slender tooth turning downwards; the last thoracic segment has on the anterior half of its lower side two pairs of spiniform processes (fig. 3 c) directed downwards and forwards. The abdomen is rather robust and a little longer than the cephalothorax; its first segment has below a pair of procurved, spiniform teeth (fig. 3c).

The antennulæ are moderately long; second joint of the peduncle is very thick, third joint much more slender, though still robust. The outer flagellum 3-jointed; first joint almost as long as the third joint of the peduncle, and distinctly longer than second joint; the inner flagellum is a rather thick, subconical joint with the end obtuse, and it is somewhat shorter than first joint of the outer flagellum. Third maxillipeds without any conspicuous tooth on fourth or fifth joint. First thoracic legs without teeth on the lower side of second joint; the propodus is a little longer than the carpus and considerably longer than the terminal joint. Second legs with the distal joints very robust; carpus nearly as long as the two following joints combined. Fourth legs at least in the immature female (fig. 3e) with a spine directed forwards and somewhat upwards on the antero-interior side of second joint somewhat from its base. — The uropods (fig. 3d) are a little shorter than the two distal abdominal segments combined. The peduncle in the adult with about 7 spines on its inner margin. The endopod is as long as the peduncle; its proximal joint at least five times as long as the distal joint which terminates in a strong, somewhat curved spine longer than the joint; this distal joint has 4 or 5 spines on its inner margin, while the proximal joint has in the adult about 17 spines; among the 8 spines on its distal fourth 3 are long and strong, while 5 are rather short; in the immature specimen 14 or 15 spines were observed on the proximal joint. The exopod is considerably shorter than the endopod.

Length of a female with brood in the marsupium 7 mm.

Remarks. *L. spinirostris* is more allied to *L. longirostris* G. O. S. than to any other northern species, but it differs in several features. The dorsal edge has only 2 teeth, while *L. longirostris* has about 7; the pseudorostrum is proportionately somewhat shorter, the antennal notch without teeth; the last thoracic segment with two pairs of ventral processes, while only one pair are found in *L. longirostris*; first abdominal segment has a pair of ventral processes not found in any other species, finally the endopod of the uropods has its second joint very short, proportionately a good deal shorter than in *L. longirostris*.

Occurrence. Not taken by the "Ingolf", but by Dr. Joh. Schmidt in the middle of July 1903 at a single place.

South of Iceland. Lat. 62° 57' N., Long. 19° 58' W., 508 fath. 2 specimens.

8. **Leucon profundus** n. sp.

(Pl. 1. figs. 4a—4d).

Female (with marsupium). Carapace rather oblong, without pseudorostrum a little less than half as long again as deep, and slightly shorter than the free segments combined; when the pseudorostrum is included the carapace is a little less than twice as long as deep. The serration on the dorsal edge is well developed excepting a moderately short interruption somewhat before the posterior end. The frontal lobe has on each side a good-sized tooth a little above its lower margin. Pseudorostrum rather long, a little less than one-third as long as the carapace without pseudorostrum, somewhat upturned, half as long again as deep; the upper margin is slightly concave, the lower and the terminal margins constitute together a continuous rather convex line, and the terminal margin has about 6 somewhat small teeth. The antennal notch is subangular at the bottom and rather deep, as the antero-lateral corner of the carapace is considerably produced with its upper margin finely serrated; the lower margin of the carapace has only about 7 teeth. The abdomen is moderately robust about as in *L. Nasica* Kr., and somewhat longer than carapace with pseudorostrum.

The antennulae when stretched forwards (fig. 4b) with the peduncle long, reaching far beyond the end of pseudorostrum. Second joint of the peduncle is unusually slender, third joint longer than second and still considerably more slender; outer flagellum only half as long as third peduncular joint, with its first joint longer than the two other joints combined; inner flagellum very short. Third maxillipeds normal; fourth joint with 2 teeth, both on the distal part of its outer side, while the fifth joint has only a single tooth, situated distally on the outer margin. First pair of legs (fig. 4c) moderately robust; second joint on the distal half of the lower margin with a row of strong teeth; third joint with a tooth on the inner, and fourth joint with a tooth on the outer margin near the end; fifth joint conspicuously longer than the sixth, which is not fully twice as long as the seventh. Second pair of legs with the carpus rather long, somewhat longer than the propodus and dactylus combined. — Uropods moderately slender (fig. 4d); the peduncle a little longer than the exopod, with about ; long and 2 short spines along the distal half of the inner margin; second joint of the exopod with a few short setae along the outer margin, no setae on the upper side, while the end and the distal part of the inner margin have the usual long setae; endopod very considerably longer than the exopod, the first joint about two and a half times as long as second joint and slightly shorter than the exopod, with

several — in the subadult specimen figured 8 — spines of different length on the inner margin; second joint on the inner margin and the end with about 7 spines increasing in length from the first to the last, and the outer terminal spine is almost as long as the joint.

Length of an ovigerous female 7.3 mm.

Remarks. This fine species is easily recognizable in having the carapace somewhat low in proportion to its length, pseudorostrum rather long and longer than in the majority of forms, a conspicuous tooth near the lower margin of the frontal lobe, the two distal joints of the antennular peduncles long and the outer flagellum uncommonly short in proportion to the last joint of the peduncle, finally by the uropods with the long endopod and the relative length of its joints.

Occurrence. Taken by the "Ingolf" at two deep-sea stations in the warm area.

Davis Strait: Stat. 24: Lat. 63°06′ N., Long. 56°00′ W., 1199 fath., temp. 2.4°; 16 specimens.

— — Stat. 36: Lat. 61°50′ N., Long. 56°21′ W., 1435 fath., temp. 1.5°; 9 specimens.

(Most of the specimens from both stations not full-grown or mutilated).

9. **Leucon Nasica** Kröyer.

1841. *Cuma Nasica* Kröyer, Naturh. Tidsskr. B. III, p. 524, 532, Tab. VI, Fig. 31—33.

1846. *Leucon* — Kröyer, Naturh. Tidsskr. 2. R. B. II, p. 189, 209, Tab. II, Fig. 5, a—b.

1849. — — Kröyer, in Gaimard, Voy. en Scand., Crust. Pl. III, fig. 2, a—o.

!1900. — *nasicus* G. O. Sars, Account, III, p. 30, Pls. XXI—XXII.

1911. — *nasica* Stappers, Camp. arct. Duc D'Orléans, Crust. Malacost. p. 100, Pl. IV, fig. 1.

1913. — — Stebbing, Das Tierreich, 39. Lief. p. 66.

Occurrence. Taken by the "Ingolf" at a single place.

North-West Iceland: Dyre Fjord, 20 fath., mud; 13 specimens.

But this species has been secured at a good number of other localities within our area. Off West Greenland it has been captured at Proven (Lat. 72°23′ N.), 200—300 fath., and at Nivak (Lat. 68°36′ N.), 120 fath. (H. J. Hansen). The "Thor" gathered it south-west of Iceland: Lat. 63°46′ N., Long. 22°56′ W., 80 fath. (many hundreds of specimens), and south of Iceland: Lat. 63°18′ N., Long. 21°30′ W., 94 fath. Furthermore it has been taken at North-West Iceland by Mag. W. Lundbeck in Onundar Fjord, 11—12 fath., ooze with a few stones and some algæ (large number of specimens), and by Mag. R. Horring in Dyre Fjord, 10—12 fath.; off North Iceland by the "Thor" near Husa Vik, 42—53 fath.; at East Iceland by Mag. R. Horring in Faskruds Fjord, 50—20 fath., and by Dr. A. C. Johansen in Loons Vik, 40 fath., ooze and clay; finally south of Iceland by Dr. A. C. Johansen at Vestman-Islands, 68—70 fath., clay and ooze.

At East Greenland *L. Nasica* has been taken two times, viz. in Hekla Havn, Lat. 70°27′ N. (H. J. Hansen), and in Scoresby Sound, Lat. 70°43′ N., 37 fath. (Ohlin).

Distribution. This species has a very wide distribution. It inhabits the Kattegat, especially its eastern parts, and goes southwards into the northern half of the Sound and the northern part of Store Belt and Odense Fjord; in these southern localities it has been taken in 9 fath., and even in "7—9" fath.; in

Skagerak it has been found in depths from 70 and down to 350 fath. (Memert, H. J. Hansen). At Norway it is recorded along the whole coast from Christiania Fjord to Vadso in 30—100 fath. (G. O. Sars). It has been recorded from two places at West Spitzbergen, the most northern of the stations at Lat. 78° 27′ N., in 111 and 115 fath. (Ohlin); from the Murman Sea, 48 fath. (Stappers), from Matotschkin Strait, 10—15 and 30—50 fath. (Stuxberg); from the Kara Sea, 51 fath. (H. J. Hansen), and somewhat further eastwards at two places in 13 and 22 fath.; the most eastern locality being at Lat. 75° 00′ N., Long. 75° 20′ E. (Stuxberg). At Scotland it has been secured in some places on the western side; on the eastern side in Firth of Forth, 40 to 43 fath., and more southwards off Ahmouth and Sunderland, 59 and 45 fath. (various authors); furthermore at Lat. 57° 54′ N., Long. 7° 38′ W., 212 fath. (by the "Thor"), and at two places in the North Sea, the most southern locality being Lat. 56° 33′ N., Long. 1° 47′ E., 47 fath. (by the "Thor"). Lo Bianco's statement on its occurrence in the Mediterranean is of course wrong. On the Atlantic side of America it has been recorded from Gulf of St. Lawrence, 50—70 fath. (S. I. Smith) and from two places at Labrador, one among them with 80 fath. (Calman); finally on the Pacific side from two localities on the south coast of Alaska, one among them with 6—8 fath. (Calman).

10. **Leucon Nathorstii** Ohlin.

(Pl. 1, figs. 5a—5b.)

1901 *Leucon Nathorsti* Ohlin, Bih. till K. Sv. Vet. Akad. Handl. B. 26, IV, No. 12, p. 41, figs. 9a—9c.
1913 — *nathorsti* Stebbing, Das Tierreich, 39. Lief. p. 68.

Some additions, together with two figures, may be made to Ohlin's brief description. My numerous specimens are rather small; a female with marsupium from Jan Mayen measures only 4.5 mm in length, while Ohlin says 7 mm. Pseudorostrum is not quite as long as figured by Ohlin, and shaped about as in *L. fulvus* G. O. S. The frontal lobe has always a single and distinct, acute tooth on each side; I have inspected more than thirty specimens from Jan Mayen and every specimen from the other localities without finding any exception. When the antennuke are in a horizontal direction their peduncle terminates vertically below the end of pseudorostrum; the outer flagellum is as long as the terminal joint of the peduncle, and its first joint is considerably longer than the two other joints together. Third maxillipeds on the proximal two-thirds of the lower side of second joint with a longitudinal row of small, feeble teeth; fourth and fifth joints each with 2 spiniform teeth on the outer margin and 1 tooth distally on the lower side. First pair of legs (fig. 5 a) rather slender; second joint with only two spines very remote from one another on the lower side; fourth joint without any distal tooth on the outer margin; sixth joint a little shorter than fifth and much longer than seventh. Second legs with the terminal joint nearly as long as the carpus. Fig. 5b exhibits the left uropod of an adult female; it is seen that the endopod is conspicuously longer than the exopod, and its proximal joint a little more than twice as long as the distal; the number and relative length of the spines scarcely need any description.

Occurrence. Taken by the "Ingolf" at two stations.

Davis Strait: Stat. 32. Lat. 66° 35′ N., Long. 56° 38′ W., 318 fath., temp. 3.9°; 6 specimens.

North of Iceland: Stat. 126. Lat. 67° 19′ N., Long. 15° 52′ W., 293 fath., temp. + 0.5°; 5 specimens.

The IInd Amdrup-Expedition has secured this species at two places.

Jan Mayen, 50—60 fath., and 55 fath.; 46 specimens.

East Greenland: North of Steward Land (ab. Lat. 70°30′ N.), 158 fath., clay with stones; 1 specimen.

Distribution. Ohlin's specimens were taken at three stations at King Charles Island, Spitzbergen, viz. in Bremer Sound, 53—58 fath., temp. + 1.45°; at Lat. 78°50′ N., Long. 27°39′ E., 10 fath., temp. 0.2°, and at Lat. 78°50′ N., Long. 29°39′ E., 32—37 fath.; furthermore it is recorded from a place at East Spitzbergen, 45 fath., and from a locality north of Spitzbergen at Lat. 81°20′ N., 530 fath. (Zimmer, in 1908). Stappers recorded 3 specimens from two hauls taken near one another south of Novaya Zemlya, Lat. 70°20′ N., Long. 56°35′ E. and 56°34′ E., 48 fath.

11. **Leucon nasicoides** Lilljeb.

1855. *Leucon nasicoides* Lilljeborg, Öfv. K. Sv. Vet. Akad. Förhandl. B. 12, p. 122.
!1900. — — G. O. Sars, Account, III, p. 31, Pl. XXIII.
1911. — — Stappers, Camp. arct. Duc D'Orléans, Crust. Malacost. p. 102, Pl. IV, fig. 7.
1913. — — Stebbing, Das Tierreich, 39. Lief., p. 65.

Occurrence. Not taken by the "Ingolf", but captured by several other expeditions or collectors at various places within our area.

At West-Greenland it was known from Kekertak, Lat. 69°58′ N., 40 fath., and Godhavn, Lat. 69°14′N. (H. J. Hansen); by Traustedt it has been gathered at Holstensborg, Lat. 66°56′ N. It is not known from the northern, western or southern side of Iceland, but at East-Iceland it has been taken at four places, viz. in Bakke Fjord, 52—43 fath. ("Diana", by Dr. A. C. Johansen); Viid Fjord, 8—12 fath. (by Mag. R. Horring), Faskruds Fjord, 50—20 fath., blue clay (by Mag. R. Horring), and Breiddals Vik, 6 fath., mud and black sand, about 200 specimens (by Dr. A. C. Johansen). Off East Greenland it has been taken by the IInd Amdrup-Expedition at Cape Dalton, Lat. ca. 69°30′ N., 9—11 fath., 1 specimen, and it has been recorded from Hekla Havn, Lat. 70°27′ N., 10 fath. (H. J. Hansen), and from S. of Little Pendulum Island, Lat. 74°35′ N., Long. 18°23′ W., 9—12 fath. (Ohlin).

Distribution. *L. nasicoides* has been recorded from the southern part of Kattegat, 14½ to 20 fath., the Samso Belt, 7 and 11 fath., and the northern part of the Sound, 16 fath.; furthermore from Skager Rak, 110 and 125 fath. (H. J. Hansen). At Norway it has been found in several localities from Christianiafjord to Lofoten, 10 to 50 fath., and at Hammerfest (G. O. Sars). Stappers recorded a good number of specimens from two hauls taken near one another south of Novaya Zemlya, Lat. 70°20′ N., Long. 56°35′ and 56°34′ E., 48 fath. Off North America it has been recorded from the Gulf of St. Lawrence and from Eastport in the Bay of Fundy (S. I. Smith), finally from Lat. 45°29′ N., Long. 55°24′ W., 67 fath. (Calman). — Stebbing (l. c.) has among the localities "Spitzbergen", depth 1000 m.; his authority is certainly Zimmer in "Fauna arctica", but he has overlooked that the last-named author in his Cumacea from the German "Tiefsee-Expedition", 1908, p. 178, says that the specimens from Spitzbergen determined by him in 1900 as *L. nasicoides* in reality belong to *L. Nathorstii*.

b Endopod of the uropods distinctly or considerably shorter than the exopod.

12 **Leucon fulvus** G. O. Sars.

1864 *Leucon fulvus* G. O. Sars, Forh. Vid. Selsk. Christiania for 1864, p. 180.
1900 — G. O. Sars, Account, III, p. 32, Pl. XXIV.
1911 — — Stappers, Camp. arct. Duc D'Orléans, Crust. Malacost. p. 105, Pl. IV, fig. 8.
1913 — — Stebbing, Das Tierreich, 39. Lief. p. 66.

This species was, according to Sars and Stappers, known only from depths between 6 and 50 fathoms, thus a pronounced shallow-water form. The following list of localities shows nearly every desirable depth between 10 and 582 fathoms, and even that a couple of specimens from nearly 1200 fath. are referred to this species. I have spent a good deal of time in search for any reliable character, by which it would be possible to refer the specimens from more than 50 or 100 fathoms to another species, but without result. In the carapace, the antennulæ, the thoracic legs of first and second pairs, and the uropods some variation in minute particulars could be found, but no real difference indicating the possibility of dividing the form into two species. Only one feature may be noted, viz. that the 2 specimens from Stat. 35, 362 fath., 4 of the 5 specimens from Stat. 25, 582 fath., and the majority of, but not all, specimens from Stat. 32, 318 fath., have some or several saw-teeth on the dorsal edge of first and second free thoracic segments, while such teeth are absent in the 2 specimens from Stat. 28, 420 fath., the 2 specimens from Stat. 126, 293 fath., the 2 young males from Stat. 24, 1199 fath., and in specimens from all places with the depth less than 200 fath. The existence of such dorsal teeth on the anterior thoracic segments is consequently to be regarded as variation in specimens from considerable depth.

It may be mentioned that second joint of the exopod in the uropods is always at least rather long, but frequently not as long in proportion to first joint as shown by Sars. Stappers states that he has found 4 lanceolate appendages on the ischium of third pair of thoracic legs in the adult males, and that these appendages are shorter than in the other boreal or arctic forms examined by him; this observation agrees completely with males from Onundar Fjord examined by me, and it is mentioned here, because G. O. Sars in 1865 has another statement and in 1900 a third statement, both consequently wrong.

Occurrence. Taken by the "Ingolf" at 8 stations.

Davis Strait: Stat. 32: Lat. 66 35′ N., Long. 56 38′ W., 318 fath., temp. 3.9° ; 9 specimens.
— Stat. 31: Lat. 66 35′ N., Long. 55 54′ W., 88 fath., temp. 1.6° ; 4 specimens.
— — Stat. 35: Lat. 65 16′ N., Long. 55 05′ W., 362 fath., temp. 3.6° ; 2 specimens.
— — Stat. 28: Lat. 65 14′ N., Long. 55 42′ W., 420 fath., temp. 3.5° ; 2 specimens.
— — Stat. 25: Lat. 63 30′ N., Long. 54 25′ W., 582 fath., temp. 3.3° ; 5 specimens.
— — Stat. 24: Lat. 63 06′ N., Long. 56 00′ W., 1199 fath., temp. 2.4° ; 2 specimens (immature males).

North of Iceland: Stat. 128: Lat. 66 50′ N., Long. 20 02′ W., 194 fath., temp. 0.6° ; 24 specimens.
— Stat. 126: Lat. 67 10′ N., Long. 15 52′ W., 293 fath., temp. [illegible]° ; 0.5° ; 2 specimens.

The "Thor" gathered *L. fulvus* south-west of Iceland: Lat. 63°46′ N., Long. 22°56′ W., 80 fath. Furthermore it has been taken west of Iceland in Faxe Bugt off Kolla Fjord, 10 fath.; at North-West Iceland by the "Thor" and by Mag. W. Lundbeck in Onundar Fjord, 10 fath. and 11—12 fath.; at North Iceland in Skjalfandi, 21 fath. (by "Beskytteren"); finally recorded by G. O. Sars from the harbour of Reykjavik, South Iceland.

Distribution. At Norway it is recorded from the Lofoten islands, 6—12 fathoms, and from "several places of the Finmark coast, as far east as Vardo" (G. O. Sars). Furthermore it has been taken in Advent Bay, Spitzbergen (G. O. Sars), and Stappers recorded numerous specimens from two hauls taken near one another south of Novaya Zemlya, Lat. 70°20′ N., Long. 56°33′ and 56°34′ E., 48 fath. — Lo Bianco recorded it erroneously from the Mediterranean.

13. **Leucon acutirostris** G. O. Sars.

1865. *Leucon acutirostris* G. O. Sars, Forh. Vid. Selsk. Christiania for 1864, p. 181.
!1900. — — G. O. Sars, Account, III, p. 34, Pl. XXVI.
1911. — — Stappers, Camp. arct. Duc D'Orléans, Crust. Malac. p. 107, Pl. IV, fig. 10.
1913. — — Stebbing, Das Tierreich, 39. Lief. p. 73.

Occurrence. Taken by the "Ingolf" at 5 places:

Davis Strait: Stat. 32: Lat. 66°35′ N., Long. 56°38′ W., 318 fath., temp. 3.9°; 38 specimens.
— — Stat. 28: Lat. 65°14′ N., Long. 55°42′ W., 420 fath., temp. 3.5°; 19 specimens.
— — Stat. 27: Lat. 64°54′ N., Long. 55°10′ W., 393 fath., temp. 3.8°; 2 specimens.
— — Ameragdla (inner end of Ameralik Fjord), Lat. 64°12′ N.; 1 specimen.
— — Stat. 25: Lat. 63°30′ N., Long. 54°25′ W., 582 fath., temp. 3.3°; 26 specimens.

Distribution. Taken several times in eastern Kattegat southwards to off Kullen, 16 to 44 fath. (H. J. Hansen), and three times in Skager Rak, 70—125 fath. (Meinert). According to Sars it has been taken in many places along the Norwegian coast from the inner part of Christiania Fjord, 30—60 fath., to Vadso; besides Sars recorded it from 200 fath. in Christiania Fjord, and Norman from 150 to 300 fath. in Throndhjem Fjord. Finally Stappers recorded several specimens as taken south of Novaya Zemlya, in 48 fath., together with *L. nasicoides*, *L. Nathorstii*, *L. fulvus* and *L. pallidus*.

14. **Leucon pallidus** G. O. Sars.

1865. *Leucon pallidus* G. O. Sars, Forh. Vid. Selsk. Christiania for 1864, p. 182.
1873. — — G. O. Sars, Kgl. Sv. Vet.-Akad. Handl. Ny Följd. B. 11, no. 6, p. 9, Tafl. III, Fig. 10.
!1900. — — G. O. Sars, Account, III, p. 33, Pl. XXV.
1911. — — Stappers, Camp. arct. Duc D'Orléans, Crust. Malac. p. 106, Pl. IV, fig. 9.
1913. — — Stebbing, Das Tierreich, 39. Lief. p. 71.

Sars says in 1900: "Dorsal crest very fully developed, extending to the hind edge," but the crest has always a short part somewhat before the hind margin without serration, as shown in his fig. C and in his

[illegible] 1897). In female specimens from 10 and 6 fathoms the pseudorostrum is a little shorter and even obtuser than in specimens from deeper water, but the endopod of the uropods is normal; it may be added that in some of those specimens this endopod is scarcely as short in proportion to the exopod as in typical specimens.

Occurrence. — Taken by the "Ingolf" at 4 stations.

Davis Strait: Stat. 32: Lat. 66°35' N., Long. 56°38' W., 318 fath., temp. 3.9°; ab. 44 specimens, some among them males.

Stat. 25: Lat. 63°30' N., Long. 54°25' W., 582 fath., temp. 3.3°; 5 specimens.

West of Iceland: Stat. 8: Lat. 63°56' N., Long. 24°40' W., 136 fath., temp. 6.0°; 1 specimen.

Near Jan Mayen: Stat. 115: Lat. 70°50' N., Long. 8°29' W., 86 fath., temp. 0.1°; 1 specimen.

Furthermore it has been gathered by "Beskytteren" in two places at North Iceland, viz. in Skjalfandi, 10 fath., 2 specimens, and in Thorshofn, 6 fath., 2 specimens, at East Iceland it has been secured by the "Thor" in Hjerads Floi, 28–47 fath., 2 specimens, and by Dr. A. C. Johansen in Breiddals Vik, 10 fath., sand, 1 specimen.

Distribution. — *L. pallidus* is known from two localities in Skager Rak, 125 and 350 fath., (H. J. Hansen). At Norway it has been taken in Christiania Fjord, 50 to 230 fath., and in Hardanger Fjord, 150 to 400 fath. (Sars), in Throndhjem Fjord, 40 to 3·· fath. (Norman), and at Lofoten, 300 fath.; the "Thor" captured it south-west of Norway at Lat. 58°32' N., Long. 4°18' E., 149 fath. Furthermore it has been taken south of Spitzbergen at Lat. 76°5' N., Long. 13°5' E., 1400 fath., and at Lat. 76°19' N., Long. 18°1' E., 146 fath. (G. O. Sars). Stappers recorded many specimens as taken south of Novaya Zemlya, in 48 fath., together with *L. nasicoides*, *L. Nathorstii*, *L. fulvus* and *L. acutirostris*, and 2 specimens from the western part of the Kara Sea, at Lat. 71°26' N., Long. 56°29' E., captured in a vertical haul from the bottom, 200 met. to 150 met. — Calman recorded (1905) with a query a few immature and damaged specimens gathered west of Ireland in 382 fath.; his observation, that they possessed "on either side of the cephalic lobe, just above the end of the lateral fissure, a small, inconspicuous denticle, sometimes two", makes the determination rather uncertain.

15. **Leucon serratus** Norman.

(Pl. I, figs. 6a—6e).

1876. *Leucon serratus* Norman, Proc. Royal Soc. Vol. XXV, p. 212 (nomen nudum).
1879. — — Norman, Ann. Mag. Nat. Hist. Ser. 5, Vol. III, p. 70.
1913. — — Stebbing, Das Tierreich, 39. Lief. p. 72.

Female (and immature Male). In general aspect intermediate between *L. fulvus* and *L. acutirostris*. In the ovigerous female the length of the carapace without pseudorostrum is in proportion to the free segments combined as 62:54; the length of the carapace in proportion to the depth is as 49:36. The dorsal edge serrated excepting on a short part considerably before the posterior end (in Norman's type the serration is not interrupted). Frontal lobe without any lateral spine. Pseudorostrum feebly upturned, of very moderate length, with its terminal portion somewhat deep, as its terminal margin is rather long, subvertical or somewhat

feebly oblique, with 6 or 7 teeth. Antero-lateral corner of the carapace much produced, so that the antennal notch is deep and the terminal tooth on the corner long and strong; the lower margin of the notch with a couple of minute teeth. The lower margin of the carapace in my adult female with about 10 teeth. The abdomen is moderately slender, about as long as cephalothorax without pseudorostrum.

The antennulæ are very short (figs. 6a—6b), in horizontal position their end is vertically below the apex of pseudorostrum; second joint of their peduncle is very thick and distinctly longer than third joint, which is rather robust and a little longer than the outer flagellum; the inner flagellum is short. Third maxillipeds (fig. 6c) with a row of small teeth on somewhat less than the proximal half of lower side of second joint; fourth joint, the merus, seen from below with 3 strong, acute teeth at the terminal margin, and one large, acute tooth distally on the outer margin; carpus with two slender teeth on the outer margin and one tooth on the lower side at the end. First pair of legs cannot be fully described, because only a single leg was moderately preserved, while the other five legs in the 3 specimens had lost their distal half; in an immature male the second joint has a longitudinal row of 6 very strong, oblong teeth on the distal part of the lower side, while in the adult female (fig. 6d) only 3 real and rather feeble teeth are found; in the last-named specimen the distal half of the leg was uncommonly slender and its dactylus as long as the propodus, but somewhat shorter than the carpus. Second pair of legs with the dactylus as long as the carpus. — The uropods (fig. 6e) have the peduncle slightly shorter than the exopod, with about 4 spines along the inner margin; the exopod has 3 shorter setæ on the proximal part of the outer margin of second joint, while the end and the distal part of the inner margin possess the usual long setæ; the endopod is much shorter than the exopod; its first joint, which is nearly half as long again as the second, has 5 or 6 spines at the inner margin and one long spine at its end; second joint with 4 spines on the inner margin and 2 terminal spines, the outer as long as, or somewhat shorter than, the joint.

Length of an ovigerous female 4.9 mm.

Remarks. Norman established his *L. serratus* on a single female specimen measuring 6 mm. in length, thus somewhat larger than the single adult female examined by me. His description was published as early as in 1879, without figures, and though seemingly good has its defects. Thus the relative dimensions of the carapace stated by him had scarcely been measured with a micrometer and are therefore not accurate, as I do not think the depth of the carapace is "subequal" to its length in any species of *Leucon*. Furthermore his expression on the carapace: "antero-lateral corner produced forwards and outwards in wing-like form" is certainly somewhat unfortunate. In order to remove these and other difficulties as to the determination of my specimens I wrote to my able and always very helpful friend Dr. W. T. Calman, asking him to examine Norman's type preserved in the British Museum (Natural History) as to certain points, and I enclosed calkings of my figures for comparison. He answered the questions and added sketches of the carapace, of first leg and of an uropod. He says that "the antero-lateral angle of the carapace is not conspicuously everted", and "there is no tooth on the side of the frontal lobe", an important character. His sketch of the carapace shows that the dorsal edge of the type is somewhat more convex towards the middle, so that the carapace is distinctly shorter in proportion to length than in my adult female, though without pseudorostrum decidedly more than one-fourth as long again as deep; furthermore he figures only 4 teeth on the lower margin of the carapace,

and penultimate by a little shorter than in my specimen, but I do not think that these differences are of specific value. Of the third maxillipeds he says "I can see four teeth on the merus and, I think, three on the carpus". This statement is very important, as the number of teeth agrees completely with my description, and both the joints mentioned have a higher number of such teeth than in any other species of *Leucon* described in the present paper, and are, besides, unusually robust. He observed 7 strong teeth on second joint of first leg, but as I found 6 in an immature male the difference is of no importance; in my adult specimen the first leg has a curiously week aspect, was perhaps not quite normal, and therefore the low number of 3 teeth on the lower side of second joint is not improbably a casual anomaly. Calman's sketch of the uropods shows the same difference as to length between exopod and endopod, furthermore that second joint of the endopod is even slightly longer in proportion to first joint than in my fig. 6e; a difference as to spines on the inner margin of first joint of the exopod is easily explained by the supposition that one spine or perhaps two spines near the middle of the margin are lost in Norman's type. His specimen was secured rather near the two places where my specimens were captured, and judging from the similarity in important characters I think that my determination is correct.

Occurrence. Taken by the "Ingolf" at two deep-sea stations in the warm area.

Davis Strait Stat. 24: Lat. 63 06′ N., Long. 56 00′ W., 1199 fath., temp. 2.4°; 1 ovig. female.

" " Stat. 36: Lat. 61 50′ N., Long. 56 21′ W., 1435 fath., temp. 1.5°; 2 immature males.

The type, the only specimen hitherto recorded, was gathered by the "Valorous" at the entrance of Davis Strait, Lat. 59 10′ N., Long. 50 25′ W., 1750 fath. (Norman).

16. **Leucon robustus** n. sp.

(Pl. I, figs. 7a—7d).

Female (with the marsupium half developed). Rather similar to *L. serratus*, but showing some sharp differences. Carapace about as deep in proportion to length as in *L. serratus*, but the anterior half of the dorsal line is less convex; the serration on the dorsal edge is strongly developed, with the usual interruption considerably before the posterior end. The frontal lobe has a longitudinal row of 3 conspicuous teeth a little above its lower margin. Pseudorostrum feebly upturned, moderately long, tapering to the acute end (fig. 7a), with the lower margin a little convex and a few teeth near the end (fig. 7b). The antennal notch is deep, angular at the bottom, with 2 or 3 minute teeth on its upper and 5 teeth on its lower margin; the antero-lateral corner therefore considerably produced; the lower margin of the carapace with about 9 teeth. The free thoracic segments combined as long as carapace without pseudorostrum. Abdomen moderately slender, as long as the whole cephalothorax.

The antennulæ (fig. 7b) are long; the peduncle is slender in proportion to length, reaching beyond the end of pseudorostrum, with third joint somewhat shorter and considerably more slender than the second; the three-jointed outer flagellum is slightly shorter than third pedunculer joint; inner flagellum very short. Third maxillipeds with a single spine on the proximal part of the lower side of second joint, merus with one well developed and another minute spine at the outer margin; carpus with 2 well-sized distal spines, one inside and the other on the outer margin. First pair of legs (fig. 7c) robust; second joint with 3 strong teeth

on the lower side near the outer margin; merus with a distal tooth on the outer margin; carpus conspicuously longer than propodus and twice as long as dactylus. Second pair of legs with carpus somewhat elongated, distinctly longer than the two distal joints combined. — Uropods (fig. 7 d) somewhat similar to those in *L. serratus*; the peduncle is a little shorter than the exopod, with about 6 spines along the inner margin; the exopod is somewhat slender, with the normal setæ along the inner margin and on the end, and a few short setæ on the outer margin of second joint near its base; the endopod is considerably shorter than the exopod, its first joint nearly more than two and a half times as long as the second, with about 8 spines along the inner margin, and some of them long; second joint with 4 spines along the inner margin, and 2 long spines on the end, the outer somewhat longer than the inner and as long as the joint.

Length of the largest specimen, a female with the marsupium half developed, 6.1 mm.

Remarks. *L. robustus* agrees with *L. nasicoides* and differs from all other northern or European forms in having 3 pairs of teeth on the frontal lobe, but the arrangement of these teeth is sharply different in the two species. The uropods afford a good character in having the distal joint of the endopod rather short.

Occurrence. Taken by the "Ingolf" at a single station in the warm area.

Davis Strait: Stat. 36: Lat. 61°50′ N., Long. 56°21′ W., 1435 fath., temp. 1.5°; 2 immature females.

Eudorella Norman.

This genus is richly represented in our area, but excepting a single species the other forms are difficult. On the following pages I have recorded 6 species, viz. *E. emarginata* Kr. and 5 species allied to *E. truncatula* Bate and *E. hirsuta* G. O. Sars, but apparently not belonging to any of these forms; 4 of the 5 species are established as new. Especially the forms with only 2 or 3 saw-teeth above the antennal notch in the female are very difficult, because, as already pointed out by Calman, there is some individual variation in the armature of the anterior margin of the carapace and in other particulars generally used as specific characters. Though my material is good, adult and subadult females ought to be collected at a much higher number of stations within the "Ingolf" area and farther south before the individual variation and the limitation of some of the species can be finally and satisfactorily decided. Meanwhile the following descriptions with figures may serve as help for a future investigator. It may only be added that there is probably a somewhat high number of species of *Eudorella*, as the allied genus *Leucon* really has numerous northern species, and in the latter genus they can as a rule be separated with certainty, while in *Eudorella* the characters are generally more difficult to discover and point out, so that at the present time the personal judgment must in some cases be applied more than desirable by the limitation of species.

17. **Eudorella emarginata** Kröyer.

1846. *Leucon emarginatus* Kröyer, Naturh. Tidsskr. 2. Række B. II, p. 181, 209, 211, Tab. II, Figs. 3, a—h.
1849. — — Kröyer, in Gaimard, Voy. en Scand., Crust. Pl. V a, fig. 2, a—s.
!1900. *Eudorella emarginata* G. O. Sars, Account, III, p. 36, Pl. XXVII—XXVIII.
1913. — — Stebbing, Das Tierreich, 39. Lief. p. 75.

Occurrence. Taken by the Ingolf at 5 places.

Davis Strait: Stat. 28: Lat. 65° 14′ N., Long. 55° 42′ W., 420 fath., temp. 3.5°; about 15 specimens.

West Greenland: Ameragdla (inner end of Ameralik Fjord), Lat. 64° 12′ N.; 9 specimens.

North-West Iceland: Dyre Fjord, 20 fath., 12 specimens.

East Iceland: Seydis Fjord; 2 specimens.

Between Iceland and the Færoes: Stat. 4: Lat. 64° 07′ N., Long. 11° 12′ W., 237 fath., temp. 2.5°; 1 specimen.

Furthermore *E. emarginata* has been gathered by several expeditions or zoologists at a large number of places within the "Ingolf" area. It has been recorded from five places at West Greenland, viz. Umanak Fjord, Lat. ab. 71° N., 410 fath.; Claushavn, Lat. 69° 05′ N., 280 fath., and Nivak, Lat. 68° 36′ N., 120 fath. (H. J. Hansen); in Nordre Stromfjord, Lat. 67° 40′ N., Long. 52° 38′ W., 202—191 fath., temp. —1.5° (K. Stephensen); finally Julianehaab, Lat. 60° 43′ N., 30 fath. (H. J. Hansen). — South-west of Iceland, at Lat. 63° 46′ N., Long. 22° 56′ W., 80 fath., an enormous number was secured by the "Thor". Furthermore it has been gathered at Iceland by the "Thor", Mag. R. Horring, Mag. W. Lundbeck, Dr. A. C. Johansen and others in many of the Fjords, thus on the western side of Iceland in Kefla Vik, 15—16 fath., Faxe Bugt, 9½ and 25 fath., Dyre Fjord, 10—12¼ fath., and Onundar Fjord, 11—12 fath.; on the northern side off Husa Vik, 42 and 48—53 fath., on the eastern side in Mid Fjord, 5 fath., Bakke Fjord, 20—28 fath., Faskruds Fjord, 50—120 fath., and Loons Vik, 40 fath.; on the southern side at Vestman-Islands, 68—70 fath. At the Færoes it has been taken at Thorshavn (Lieut. Jensen). — Finally the IInd Amdrup-Expedition gathered it at East Greenland in Hurry Inlet, Lat. 70° 50′ N., 10 fath.

Distribution. *E. emarginata* has a wide distribution outside our area. It is common in parts of southern Kattegat, penetrates far in the northern half of Store Belt and the Sound, and is common in the eastern parts of Kattegat, the depths recorded are from 7 to about 30 fath.; furthermore it has been gathered several times in Skager Rak, 70 to ab. 220 fath. (Meinert and H. J. Hansen). It occurs "rather plentifully along the whole Norwegian coast, from the Christiania Fjord to Vadso, in depths varying from 30 to 150 fathoms" (G. O. Sars). At Spitzbergen it has been taken four times, both on the western, the eastern and the north-western side, going northwards to Lat. 79° 58′ N.; the depths were from ab. 10 to 231 fath., and the temperature at the bottom from 2.8° down to 0.2° (Ohlin). Stappers records it from places at the southern coast of Novaya Zemlya, 32 and 48 fath.; Stuxberg from Matotschkin Schar, 30—50 fath., three places in the Kara Sea, 32 and 90 fath., and from three places more easterly in the Sibirian Ocean, 16 to 26 fath., the most eastern of these localities being Lat. 75° 40′ N., Long. 78° 40′ E.

Furthermore it has been recorded by various authors from various places in the North Sea, excepting its south-western part, and the "Thor" gathered it at some places in its northern half; the depths vary from about 19 to 212 fath. It has been recorded from the Hebrides (Norman), Firth of Clyde (Th. Scott), and in the Irish Sea off Ireland at Lat. 53° 48′ N., 30—32 fath. (Calman). Finally it has been recorded from several places at the Atlantic coast of North America, viz. Labrador, 7 fath. (Calman); Gulf of St. Lawrence, 30 fath. (S. I. Smith); at places off Nova Scotia, 52 to 70 fath. (Smith, Calman); off Cape Cod, 16 fath., and off Marthas Vineyard, about Lat. 41½° N., 30 fath. (Calman).

18. **Eudorella hispida** G. O. Sars.

(Pl. I, figs. 8 a—8 c).

1871. *Eudorella hispida* G. O. Sars, Öfv. Kgl. Sv. Vet.-Akad. Förhandl. B. XXVIII, No. 1, p. 80.

!1871. — — G. O. Sars, Kgl. Sv. Vet.-Akad. Handl. Ny Följd, B. 9, No. 13, p. 49, Tafl. XVIII, Fig. 95—97.

1912. — — Calman, Proc. U. S. Nat. Mus. Vol. 41, p. 621.

1913. — — Stebbing, Das Tierreich, 39. Lief. p. 79.

Sars established this species on a single immature female, $5^1/_2$ mm long, taken in a depth of only 30—35 fath. From a few stations I have several specimens, among them two females with marsupium, and in some essential points they show so much similarity to Sars' representation of *E. hispida* that they are referred to this species, though they differ in a few particulars of probably slight importance and — excepting one specimen — have been taken in rather considerable depths.

The carapace and all segments of the body have a number of thin hairs, but not nearly as many as drawn by Sars in his fig. 95. The anterior part of the lower margin of the carapace is nearly straight (figs. 8 a and 8 b), with small saw-teeth, but the angle between this line and the front margin is distinctly larger than shown by Sars (his fig. 96). The antero-inferior tooth is straight, nearly horizontal, long or very long. The front margin between this large tooth and the next tooth is rather long, scarcely or slightly concave and without vestige of any tooth. The antennal notch is in females deeper and more triangular than figured by Sars, with a small denticle on the lower and two denticles on the upper margin; in the immature male this notch is scarcely developed, and the front margin between the upturned tooth at the upper end and the downwards curved tooth farther below is feebly concave without serration. The abdomen is long and robust as figured by Sars.

The antennulæ (fig. 8 a) are somewhat robust, with many setæ; terminal joint of the peduncle almost as long as the outer flagellum, in which first joint is proportionately very long, more than three times as long as the second. First pair of legs moderately slender; propodus considerably longer than carpus and slightly more than twice as long as the dactylus. Second pair of legs are robust; carpus is very distinctly longer than merus and about as long as the two distal joints combined. — The uropods (fig. 8 c) are robust and very characteristic, agreeing with Sars' fig. 97; the peduncle is as long as the endopod, with a good number of spines at the inner margin; first joint of the endopod is very long, in adult specimens between five and six times as long as second joint, and it has numerous, in the specimen drawn 15, spines along the inner margin; second joint has 3 small spines on the inner margin and terminates in a very robust spine slightly shorter than the joint, and besides its end has a moderately long, thick seta; the exopod, which reaches slightly or somewhat beyond the end of first joint of the endopod, has numerous strong setæ not only along the inner margin but about five on the dorsal surface, and some shorter setæ on the outer margin.

Length of the adult female 7.2 mm.

Remarks. The robust animal with hairs on the whole body, the long, horizontal tooth from the antero-lateral angle of the carapace, the characteristic uropods with numerous spines and setæ and the very

[illegible] the endopod agrees so much with Sars' figures, that I do not entertain any doubt as to the determination. Besides Sars had only an immature specimen, and the differences between this and my [illegible] seem to be of no specific value whatever, but only accidental or perhaps local variation. Calman [illegible] mentions difficulties in referring individual specimens to *E. hispida* or to *E. truncatula* Bate.

E. gracilis G. O. Sars established on a single adult female from the cold deep-sea area at Spitzbergen, is so closely allied to *E. hirsuta*, that a direct comparison of specimens of both forms is very desirable. The only differences of real value discovered by me on his figures are found in the uropods; according to Sars' figure of *E. gracilis* the second joint of their endopod is proportionately considerably longer, while first joint has a considerably lower number of spines, and the exopod only a single seta on its upper side.

Occurrence. Taken by the "Ingolf" at three stations in the warm area.

Davis Strait. Stat. 32: Lat. 66° 35′ N., Long. 56° 38′ W., 318 fath., temp. 3.9 ; 2 specimens.

— — Stat. 28: Lat. 65° 14′ N., Long. 55° 42′ W., 420 fath., temp. 3.5 ; 6½ specimens.

— — Stat. 25: Lat. 63° 30′ N., Long. 54° 25′ W., 582 fath., temp. 3.3 ; 1 specimen.

Besides a single specimen has been secured by Prof. D. Bergendal at Jakobshavn, West Greenland (Lat. 69° 13′ N.).

Distribution. Recorded from a number of places at the Atlantic coast of North America from Nova Scotia southwards to Marthas Vineyard (about Lat. 41° 15′ N.), in depths from 1 to 4, 5, and 16 to 70 fath. (Sars, Smith, Calman).

19. **Eudorella arctica** n. sp.

(Pl. I, figs. 9a—9d).

Female. An ovigerous female and an immature specimen are to hand, and agree with one another in nearly all features of any importance. The species is closely allied to *E. truncatula*, but an important difference in the uropods renders a reference to the latter form impossible.

The immature specimen has a number of outstanding hairs on the surface of cephalothorax and abdomen, while they have nearly disappeared in the adult. On the carapace the antennal notch is somewhat long but rather shallow; in the immature specimen (fig. 9 a) one small and one large tooth are found above and two small teeth below the notch, while in the adult that serration is still more rudimentary. The antero-lateral tooth is long, robust and horizontal in the small specimen, but feebly developed in the adult.

First pair of legs (fig. 9 b) as in *E. truncatula*, as the propodus is considerably longer than the carpus and nearly more than twice as long as the terminal joint. In second pair of legs (fig. 9 c) the merus is somewhat thickened and nearly as long as the carpus; the terminal joint is moderately broad. — In the uropods (fig. 9 d) the peduncle is a little longer than the endopod, with several — in the adult about 7 — spines at the inner margin, the exopod reaches to or, in the small specimen, even beyond the end of the endopod, and has about 4 long setæ on the upper side, 4 setæ on the outer margin and the usual setæ on the end and on the inner margin. First joint of the endopod nearly three times as long as second joint, with about 7 spines on the inner margin, while the second joint has 2 spines on the inner margin, a rather long, very thick spine and an extremely long seta on the end.

Length of the ovigerous female 5.1 mm.

Remarks. The striking difference in the length of the rami of the uropods between *E. truncatula* and *E. arctica* makes it necessary to establish the latter species.

Occurrence. Not taken by the "Ingolf", but by the IInd Amdrup-Expedition at a single place.

East Greenland: Cape Dalton, ab. Lat. 69°30′ N., 9—11 fath., July 20, 1900; 2 specimens.

20. **Eudorella parvula** n. sp.

(Pl. I, fig. 10a; Pl. II, figs. 1a—1f.)

Female (and subadult Male). Closely allied to *E. truncatula*, but much smaller and showing a few minor differences. Carapace nearly as in *E. truncatula*; the antennal notch in the females (figs. 1a—1c) somewhat short but rather deep and without teeth on the margins; below the notch the margin has 2 teeth of which at least the lower tooth is somewhat large; the margin of the interruption below these is in the females scarcely ever concave or straight, but has an angular protuberance which varies much in size and most frequently is low. The lower margin of the carapace is anteriorly curved much upwards, so that the tooth limiting the interruption is directed a little upwards and in reality situated on the front margin, while the next tooth is placed between the anterior and the lower margin, and these two teeth are uncommonly large. The front margin of the subadult male differs as usual materially from that in the female and is shown in fig. 1 f, but a description is scarcely needed.

In the antennulæ (fig. 1 a) the outer flagellum is not inconsiderably longer than the terminal joint of the peduncle. First pair of legs (fig. 1 d) afford a character between this species and *E. truncatula*, as the propodus is at most one-fourth as long again as, and frequently only a little or slightly longer than, the carpus, and distinctly less than twice as long as the dactylus, while in *E. truncatula* it is more elongated, being one-third as long again as the carpus and at least twice as long as the dactylus. Second pair of legs (fig. 1 e) nearly as in *E. truncatula*, though less robust; merus and carpus similar in length. — Uropods (fig. 10 a) in the female with a lower number of spines than in *E. truncatula*; the peduncle a little shorter than the endopod, with about 4 spines along the inner margin; first joint of the endopod not quite three times as long as the second, with 5 or 6 spines on the margin, while second joint has only a single spine or two spines on the inner margin, a long and very thick terminal spine and an exceedingly long terminal seta; the exopod has a couple of setæ on the upper surface. In the subadult male the first joint of the endopod has 8 spines.

Length of the adult females 3.4—3.7 mm.

Remarks. Whether this species can be maintained as valid or may better be considered only as a variety of *E. truncatula* must be decided by a future investigator possessing a very large material from numerous localities. I am apt to consider it as a valid species, as I have a large material exclusively from rather deep stations in the Davis Strait, while not a single specimen of the much larger form *E. truncatula* has been found in any part of the "Ingolf" area. And the animals of *E. parvula* are very uniform as to size and features.

According to Sars *E. truncatula* goes to the Lofoten Islands, and he did not find it at Finmark. As Norman records it from East Finmark, his specimens ought to be carefully re-examined; besides I doubt

whether the specimen mentioned by him as taken in 1443 fathoms at Lat. 55° 11′ N., Long. 11° 31′ W., or that recorded by Sars from Ellesmere Land belong to this species. Calman records a single specimen of *E. concinna* from 120 fath. at Iceland, and I have noted it from 70 and 125 fath. in Skager Rak, but otherwise *E. concinna* is only known from lesser depths or from shallow water.

Occurrence. *E. parvula* has been taken by the "Ingolf" at three rather deep stations.

Davis Strait. Stat. 32. Lat. 66° 35′ N., Long. 56° 38′ W., 318 fath., temp. 3.9°. 21 specimens.
Stat. 28. Lat. 65° 14′ N., Long. 55° 42′ W., 420 fath., temp. 3.5°. 9 specimens.
— — Stat. 25. Lat. 63° 30′ N., Long. 54° 25′ W., 582 fath., temp. 3.3°. numerous specimens.

Besides a single specimen was secured many years ago by Admiral Wandel near the "Ingolf" stations named, viz. at Lat. 65° 36′ N., Long. 56° 34′ W., 349 fath., temp. 3.2°.

21. **Eudorella intermedia** n. sp.

(Pl. II. figs. 2 a—2 d.)

Immature Female. Body with very few hairs, excepting as usual a number above the antennulæ on the carapace. Front part of the carapace completely similar to that in *E. truncatula* as to antennal notch, teeth below this notch, etc., excepting in one very important feature, viz. that the front margin from the notch upwards scarcely to the upper margin of the base of the antennulæ has a number of somewhat small saw-teeth (fig. 2 a). Antennulæ as to shape as in *E. truncatula*, but with more setæ; thus the last joint of the peduncle has 6 or 7 thick setæ on the upper margin and 6 setæ on the outer side. First pair of legs (fig. 2 b) robust; propodus rather short, slightly or scarcely longer than the carpus, and distinctly less than twice as long as the dactylus. Second pair of legs (fig. 2 c) nearly as in *E. truncatula*; merus slightly longer than the carpus and nearly as long as the two distal joints combined, which are moderately broad. — Uropods (fig. 2 d) somewhat robust, the peduncle as long as the endopod, with about 5 small spines on the inner margin; first joint of the endopod nearly more than three times as long as the second, with about 7 spines on the inner margin, while second joint has 3 spines on the inner margin, besides the long and thick spine and a very long seta on the end; exopod somewhat shorter than the endopod, with the setæ on the inner margin and the end strongly developed, and about 3 setæ on the upper surface.

Length of the largest immature specimen 5.3 mm.

Remarks. This species is as to the front margin of the carapace intermediate between *E. truncatula* Bate and *E. hirsuta* G. O. Sars, the saw-teeth above the notch occupy less than two-thirds of the anterior margin, and besides they are far from easy to observe, when the antennulæ are not removed. First pair of legs differ materially from those in *E. truncatula*, while second pair and the uropods are nearly as in that species; second pair differ from those in *E. hirsuta* by the short propodus.

Occurrence. Taken by the "Ingolf" at a single deep station in the warm area.

Davis Strait. Stat. 24. Lat. 63° 06′ N., Long. 56° 00′ W., 1109 fath., temp. 2.4°. 2 ♀ ♀ specimens.

22. **Eudorella æquiremis** n. sp.

(Pl. II, figs. 3 a—3 d.)

Female (adult and subadult). Body with a moderate number of fine hairs. Carapace (fig. 3 a) anteriorly almost as in *E. intermedia*; the antennal notch normal, and just below it, between it and the somewhat short unarmed part one tooth or less frequently two teeth; the margin above the notch is serrated inconspicuously more than half of its length, with a few of the upper teeth somewhat large, but the majority rather small and not always easily seen; the lower margin of the carapace is anteriorly curved a good deal upwards.

The antennulæ normal (fig. 3 a). First pair of legs (fig. 3 b) with the propodus a little longer than, or only about as long as, the carpus and less than twice as long as the terminal joint. Second pair of legs (fig. 3 c) differ from those in *E. intermedia* in having the carpus conspicuously longer and much thinner than the merus, and carpus is as long as, or slightly shorter than, the two distal joints combined; terminal joint rather narrow. — Uropods (fig. 3 d) as long as the two distal segments combined; peduncle about as long as the rami, with 4 spines on the inner margin; exopod with 2 or 3 setæ on the upper side and none on the outer margin; the endopod, which does not overreach the exopod, has its first joint two and a half times as long as the second, with 5 spines on the inner margin; second joint has on the inner margin 3 spines, on the end the thick, rather long spine and a very long seta.

Length of an adult female 4.5 mm.

Remarks. *E. æquiremis* is instantly distinguished from all other northern species excepting *E. arctica* in having the endopod of the uropods not longer than the exopod; from *E. arctica* and the other forms excepting *E. intermedia* and *E. hirsuta* G. O. S. it is separated in having the major part of the front margin of the carapace above the notch serrated, but the serration extends less upwards than in *E. hirsuta*.

Occurrence. Taken by the "Ingolf" at a single deep station in the warm area.

Davis Strait: Stat. 36: Lat. 61°50′ N., Long. 56°21′ W., 1435 fath., temp. 1.5°; 7 specimens, among them 2 females with marsupium, 1 subadult female and 2 young males.

Eudorellopsis G. O. Sars.

Of this genus 2 species are observed in our area; both were previously known from West Greenland. It may be possible that the North American species *E. biplicata* Calman can in the future be discovered at West Greenland or Iceland.

23. **Eudorellopsis deformis** Kröyer.

1846. *Leucon deformis* Kröyer, Naturh. Tidsskr. Ny Række, B. II, p. 194 and 209, Tab. II, Fig. 4.
1849. — — Kröyer, in Gaimard, Voy. en Scand., Crust. Pl. V a, fig. 3, a—h.
1871. *Eudorella* — G. O. Sars, Kgl. Sv. Vet.-Akad. Handl. Ny Följd, B. 9, No. 13, p. 42, Tafl. XIX—XX, Fig. 101—118.
!1900. *Eudorellopsis deformis* G. O. Sars, Account, III, Pls. XXXI—XXXII.
1913. — — Stebbing, Das Tierreich, 39. Lief. p. 82.

Occurrence. Not taken by the "Ingolf", but gathered by other investigators at many places in a good deal of the area.

It has been recorded from two localities at West Greenland, viz. Godhavn, Lat. 69° 14′ N., 8—10 fath., and Godthaab, Lat. 64° 11′ N., 12 fath. (H. J. Hansen). At Iceland it has been taken many times by the Thor. Dr. A. C. Johansen, Mag. B. Saemundsen, Mag. R. Horring and the ship "Beskytteren", in a good number of the fjords on all sides of the island. Thus at the western coast it has been found at Reykjavik, 20—30 fath. (G. O. Sars), and in Faxe Bugt near Kolla Fjord, 9½ fath.; on the northern side in Nord Fjord at Skagestrands Bugt, 5—6 fath., in Skjalfándi, 10 fath., Thistils Fjord, 5 fath., Thorshöfn, 6 fath., and Myre Bugt, 33 fath., on the east side of Iceland in Mid Fjord, 8½ fath., Bakke Fjord, 8—10 fath., Vopna Fjord, numerous specimens in stomachs of *Gadus æglefinus*, Hjerads Floi, 15—25 fath., several hundreds, and in Seydis Fjord, 6 fath., south of Iceland it was gathered off Eyafjälla Jökul, 10, 17 and 23 fath. At the Faroes it has been taken in Bordo Vik, 7—10 fath., and in Trangisvaag Fjord, 12—16 fath. — It is not known from East Greenland or Jan Mayen.

Distribution. This species is common at Denmark in Lille Belt and Store Belt, not found in the Sound, but taken several times in various parts of Kattegat; the depths vary from 4 to 15 fath. (Meinert, H. J. Hansen). It is unknown from Skager Rak, and at Norway it has only been taken three times at the west coast between Lat. 58½° and 59½° N., in "comparatively shallow water" (G. O. Sars). In the North Sea it has been found at Heligoland (Ehrenbaum) and at various places more northwards, thus off Horns Rev, Northumberland, Firth of Forth, Aberdeen, Fair Isle (various authors); furthermore is it known from Clyde (Th. Scott) and at the north-eastern coast of Ireland, 3—5 fath. (Calman). Finally taken at some places near the east coast of North America from off Nova Scotia at Lat. 45° 04′ N. southwards to Long Island, in depths from 8 to 57 fath. (Sars, Smith, Calman).

24. **Eudorellopsis integra** Smith.

1870 *Eudorella integra* S. I. Smith, Trans. Connect. Acad. Vol. V, p. 116.

'1887. *Eudorellopsis integra* H. J. Hansen, Vidensk. Medd. Naturh. Forening i Kjobenhavn for 1887, p. 201, Tab. VII, Fig. 3—3 c.

1913 — — Stebbing, Das Tierreich, 39. Lief. p. 83.

Occurrence. Taken by the "Ingolf" at four localities at West Greenland.

Davis Strait. Stat. 32: Lat. 66° 35′ N., Long. 56° 38′ W., 318 fath., temp. 3.0°; 3 specimens.

— — Stat. 28. Lat. 65° 14′ N., Long. 55° 42′ W., 420 fath., temp. 3.5°; 1 specimen.

Ameragdla (inner end of Ameralik Fjord), Lat. 64° 12′ N.; many specimens.

Ameralik Fjord (in the estuary), Lat. 64° 03′ N., 5—70 fath., 1 male.

Previously this species had been recorded from four places at the more northern part of West Greenland viz. Lille Karajak Fjord, Lat. 70° 20′ N., (Vanhöffen); Kekertak, Lat. 59° 58′ N., 35—40 fath.; Claushavn, Lat. 69° 05′ N., 15—20 fath. and 280 fath.; Lat. 68° 9′ N., Long. 56° 32′ W., 50 fath. (H. J. Hansen). — It has not been found in any other part of the "Ingolf" area.

Distribution. S. I. Smith recorded this species from off Halifax, Nova Scotia, depths from 42 to 110 fath., and Gulf of St. Lawrence, 70 fath. Calman (1912) enumerates several localities near the east coast of North America from Battle Harbour, Labrador, southwards to the Gulf of Maine at Lat. 42° 44′ N., depths from 42 to 110 fath.; besides he records it from two localities in the Bering Sea, between about Lat. 57° and 57½° N., Long. 164°25′—164°27′ W., 29 and 36 fath.

Family Nannastacidæ.

This family is richly represented in the "Ingolf" area, as no less than 4 of the 7 genera hitherto established have been found.

Cumella G. O. Sars.

The forms belonging to this genus differ much from each other in general aspect, as in some species the legs and uropods are rather short and stout, but long and very slender in other forms. Furthermore the sexual differences as to armature of the carapace, shape of some of the joints in the thoracic legs and sometimes in the eyes are uncommonly pronounced. In the "Ingolf" area 2 new species have been discovered, and I follow Calman in referring *Campylaspis carinata* H. J. H. to *Cumella*, so that 3 species are mentioned here.

25. **Cumella tarda** n. sp.

(Pl. II, figs. 4 a—4 g.)

Adult Male. In general aspect similar to the male of *C. pygmæa* G. O. S.[1], but it is somewhat larger and several appendages are longer and more slender. As in that species the dorsal line of the carapace is nearly straight and completely without teeth, but the antero-lateral corner is broadly rounded, without angle or teeth, and the most anterior part of the carapace is less deep than in *C. pygmæa*, as its lower margin is more ascending. Pseudorostrum (figs. 4 a—4 b) is distinctly upturned, short, but yet longer than in *C. pygmæa*; its front margin is, seen from the side, somewhat oblique, with about four teeth on its lower half. The eye is not quite as large as in *C. pygmæa* and differs materially in having 4 pairs of ocelli, while *C. pygmæa* has 3 pairs and besides in the median a single very large ocellus not found in *C. tarda*; the dark pigment between the ocelli is more or less developed. The free thoracic segments and the abdomen nearly as in *C. pygmæa*.

The antennulæ (fig. 4 c) have the peduncle slender, considerably longer and much more slender than in *C. pygmæa*; its third joint is a little shorter than the second and distinctly longer than the upper flagellum. (The flagellum of the antennæ lost). Second maxillipeds (fig. 4 d) mainly as in *C. pygmæa*, though more slender. Third maxillipeds (fig. 4 e) with third to sixth joint much thinner than in *C. pygmæa*; as in that species the merus has a tooth on the outer side. First pair of legs (fig. 4 f) differ much from those in *C. pygmæa* as fig-

[1] I refer to Sars' representation of this species in 1879, as he there gives a much higher number of figures of the male than in his "Account", 1900.

...ridge. Second joint has no crista on the outer side, fourth joint, the merus, is proportionately slender, somewhat curved and more than twice as long as the ischium, carpus and propodus together about as long as second joint, while in *C. pygmæa* they are considerably shorter than that joint. Second pair of legs with the 5 distal joints combined longer than in *C. pygmæa* shorter than second joint, carpus distinctly longer than dactylus, and both very slender and rather elongated. Uropods (fig. 4 g) elongated and slender, peduncle about as long as sixth, fifth and half of fourth abdominal segment combined, with about 11 spines on the inner margin; exopod half as long as the peduncle and somewhat, but not much, shorter than the endopod, which has a small apical spine and 12 spines on the inner margin, the most distal of these spines much longer and thicker than the others.

Length 3.3 mm.

Remarks. As seen in the description, the male *C. tarda* differs in a good number of features from the other northern species, *C. pygmæa*, of which I have seen males taken at Shetland by A. M. Norman. My specimens of *C. tarda* are all mutilated, so that a couple of less important particulars could not be described. The female can probably be recognized by the number of ocelli and in having antennuke, third maxillipeds, first and second pairs of thoracic legs more slender than in *C. pygmæa*, finally by the relative length of the joints in these appendages.

Occurrence. Not taken by the "Ingolf", but by the IInd Amdrup-Expedition about at the following place.

South-West of the Faroes: Lat. 60° 24′ N., Long. 11° 21′ W., pelagic haul, Sept. 25, 1900, 8 p. m., 10 specimens.

26. **Cumella egregia** n. sp.

(Pl. II, figs. 5 a—5 d.)

Adult Male. Carapace rather deep, about half as long again as deep; the dorsal edge considerably convex with about 13 spiniform processes not very regularly distributed and the majority somewhat long, the first longer than the others. Pseudorostrum (figs. 5 a—5 b) moderately short and considerably upturned; in the single adult specimen the left siphon is a moderately short cone with the end acute, while the right siphon protrudes as a long, membranous tube a good deal more than half as long as the carapace; the ocular lobe has no visual elements and is in the adult specimen as long as pseudorostrum, but it is easily perceived that its terminal part is lost; in a small specimen the ocular lobe is much longer than pseudorostrum, protruding as a process with the end acute (and in my figures of the adult this shape is rendered). The anterior margin of the carapace is somewhat concave, the antero-lateral corner rounded with an oblong, strong tooth, and from this tooth to the postero-lateral angle of the carapace runs a row of numerous outstanding teeth, and as this row is curved less downwards than the lower margin, it touches this margin towards both ends, while its median part is somewhat removed from it. The free thoracic segments are together only half as long as the carapace including pseudorostrum, second to fifth segment each anteriorly with a transverse row of small teeth above and down the sides, but on third and fourth segments the teeth near the dorsal line are rather long, and fourth segment has about four teeth on the dorsal edge. Abdomen slightly longer than the

carapace, rather slender, and all segments excepting the sixth adorned with a median dorsal row of long, curved teeth (figs. 5 a and 5 c), a median ventral row of short teeth, and on each side far below the middle a longitudinal row of curved teeth shorter than those on the dorsal edge; sixth segment with a few teeth.

The antennulæ (fig. 5 a) slender; first joint of the peduncle much longer than second, which is somewhat longer than the third; outer flagellum about as long as second peduncular joint, while the inner flagellum is minute. The antennæ without setæ on the distal joints of the peduncle; the distal part of flagellum lost. Third maxillipeds with a strong tooth on the merus. The thoracic legs slender and somewhat long (fig. 5 a); in first pair the propodus is slightly shorter than the carpus and twice as long as the dactylus; in second pair the carpus is as long as the dactylus; in fourth pair the second joint has several fine teeth on its outer margin. — The uropods are very long and slender; the peduncle, which is as long as the two posterior segments together and about twice as long as the endopod, is adorned with three rows of teeth (fig. 5 d), viz. two with short teeth on the outer side and a row with longer teeth on the upper side rather near the inner margin; the endopod has on the inner margin 3 short, setiform spines on the proximal half and on the distal half 3 real spines, and between the two distal spines some three saw-teeth, while the end has a long, thick spine; the exopod is a little shorter than the endopod, with a single spine on the inner margin and an apical spine.

Length 4 mm.

Remarks. This species is easily recognized by the beautiful rows of teeth on the abdominal segments and the uropods. Besides the type I have the cephalothorax of a much smaller male which I refer to this species, though it differs in having seemingly only 3 or perhaps 4 dorsal processes on the carapace, while the teeth on the free thoracic segments are with few exceptions either lost or scarcely discernible; antennulæ, maxillipeds and thoracic legs similar to those in the type.

Occurrence. Taken by the "Ingolf" at a deep station in the warm area.

Davis Strait: Stat. 36: Lat. 61°50′ N., Long. 56°21′ W., 1435 fath., temp. 1.5°; $1^1/_2$ specimens.

27. **Cumella carinata** H. J. H.

!1887. *Campylaspis carinata* H. J. Hansen, Vidensk. Medd. Naturh. Forening i Kjobenhavn for 1887, p. 207, Tab. VII, Fig. 4—4 a.

1905. *Cumellopsis* — Calman, Fisheries, Ireland, Sci. Invest. 1904, I. (1905), p. 28.

1912. *Cumella*(?) — Calman, Proc. U. S. Nat. Mus., Vol. 41, p. 426.

When I established the present species I had only a single specimen not belonging to our Museum, and therefore could not well dissect the mouth-parts, etc., of its left half. In 1905 Calman published notes on the mouth-parts and thoracic legs as results of an examination of a single specimen, and he was liable to refer it with some doubt to his new genus *Cumellopsis*. But in 1912 he returns to the subject, as he has obtained more material, and he is now of the opinion that the curious animal is more related to *Cumella*, in reality does not differ from that genus in any character justifying the establishment of a new genus. And according to his observations we may also safely omit the query still used by him.

Occurrence. Not taken by the "Ingolf", but by the IInd Amdrup-Expedition, Aug. 21, 1900. East Greenland, Hurry Inlet, Lat. 70°50′ N., 10 fath., 1 juvenile specimen with the last pair of legs not yet visible.

The type was taken off West Greenland at Disko in Nordfjord, Lat. 69°57′ N., 25 fath., clay; it belonged to the Riksmuseum, Stockholm.

Distribution. Calman records three localities for this species, viz. the coast of Labrador, Lat. 56°48½′ N., Long. 52°34′ W., 80 fath., and Lat. 45°29′ N., Long. 55°24′ W., 67 fath. In 1909 Sars recorded a specimen taken by the IInd "Fram"-Expedition at Ellesmere Land (ab. Lat. 79°30′ N., Long. 106° W.), "outside the Forvisnings Valley, 2—20 fath.".

Cumellopsis Calman.

Only a single species, the type for the genus, has been found within our area.

28 **Cumellopsis Helgæ** Calm

(Pl. II, figs. 6 a—6 d.)

[1] 1905	*Cumellopsis Helgae*	Calman, Fisheries, Ireland, Sci. Invest. I. (1905), p. 28, Pl. II, figs. 20—34.
1906.	— —	Calman, Mitth. Zool. Stat. Neapel, 17. B., p. 418—419.
1913	— *helgae*	Stebbing, Das Tierreich, 39. Lief. p. 178.

A fine material of adult females is to hand. The carapace has on the whole more depressions and ridges than mentioned or figured by Calman, but as this adornment shows a little individual variation and the integument is rather thin and flexible, easily damaged, the value of smaller depressions and shorter keels is probably of rather little systematic importance. Some points may yet be mentioned. The long lateral depression is generally rather deep, but somewhat before the posterior end of the carapace it either nearly ceases or is interrupted by a short, transverse ridge, which cuts off its long anterior deep part from the much shorter posterior, more shallow portion. The ridge limiting that long depression below is sometimes rounded, sometimes sharp. Seen from above, the "slight median keel posteriorly" is distinct, but an area midway between the pseudorostrum and the first free segment has three longitudinal rounded ridges posteriorly close together, and the lateral pair, which are more distinct than the feeble median ridge, radiate forwards and somewhat outwards; the depressions between these rounded ridges are more or less pronounced, and the interval between each of the outer ridges, which ceases somewhat behind the base of pseudorostrum, and the longitudinal ridge limiting above the long above-mentioned lateral depression is somewhat excavated, forming an oblong, oblique depression. — In the immature males the dorsal ridges and depressions are less developed than in adult females, though still discernible. Adult males are unknown; in the 6 males to hand the terminal setæ on the exopods of third and fourth pairs of legs are extremely short, consequently seemingly undeveloped, and the antennæ could not be made out without dissection, which was not undertaken.

Figs. 6 a—6 c represent left third maxilliped, first leg and second leg of an adult female. By comparison with Calman's figures of the same appendages of an immature male it is seen that they are more slender

as might be expected; besides the carpus of third maxillipeds has distally on the outer side 3 teeth, and the end of second joint of first leg 2 teeth not found on Calman's figures.

Length of ovigerous females 5.5—5.7 mm.

Occurrence. Taken by the "Ingolf" at a single station.

South-West of Iceland: Stat. 81: Lat. 61°44′ N., Long. 27°00′ W., 485 fath., temp. 6.1°; 1 immature male.

Besides the "Thor" captured this form at 3 places.

South of Iceland: Lat. 63°15′ N., Long. 22°23′ W., 114—172 fath.; 1 immature male.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 17 specimens, most of them adult females.

— — — Lat. 61°7′ N., Long. 9°30′ W., 443 fath.; 5 adult females.

Distribution. Hitherto known only from a single locality west of Ireland, viz. 77 miles W.N.W. of Achill Head, co. Mayo, 382 fathoms.

Procampylaspis Bonnier.

This interesting genus is easily separated from all other genera by the curious shape and armature of the terminal joint of second pair of maxillipeds. It may be remarked that first pair of legs are long, considerably longer than second pair, while in *Campylaspis* first pair are at most slightly longer and generally shorter than second pair. Only 4 species are recorded by Stebbing (1913), 2 among them from the southern hemisphere. In the "Ingolf" area 2 new species have been discovered, and it may be possible that a third species, *P. armata* Bonnier, also can be found[1].

29. **Procampylaspis bituberculata** n. sp.

(Pl. II, figs. 7 a—7 m.)

Subadult Female. Carapace, seen from above (fig. 7 b), almost half as long again as broad, somewhat oblong-ovate and rather narrowed forwards; considerably behind the middle a pair of proportionately large, broad and somewhat low, conical protuberances, each with a small spine on the top. Seen from the left side (fig. 7 a), the dorsal line shows the shape of left protuberance; pseudorostrum is turned sharply and considerably upwards, and its anterior margin is straight, yet directed from above a little backwards, without any notch, and the corner between this line and the lower margin is a very obtuse angle. The ocular lobe is narrow with the sides parallel, not half as long as pseudorostrum and without eyes. The free thoracic segments in the main as in *P. armata*; first segment dorsally at the middle produced as a small, bifid lamina with its two teeth curved distinctly forwards, second segment with similar, but nearly vertical teeth; fourth and fifth segments each with a pair of teeth somewhat from the median line. First abdominal segment with a pair of dorsal granules; otherwise granulation on the abdominal segments is indistinct or wanting.

[1] Of *P. armata* Bonn., first gathered in the Bay of Biscay, later in the Mediterranean and west of Ireland, 2 females and 1 male have been taken by the "Thor" in 1905 at Lat. 61°14′ N., Long. 1°19′ E., 85 fath. thus north-east of Shetland.

Second pair of maxillipeds (figs. 7 c—7 d) somewhat similar to that in *P. armata*, but the interesting terminal joint shows some differences. As in that species this joint has two proximal teeth and three more slender subuniform processes, but the two teeth are considerably broader, oblong-triangular, and the proximal tooth is shorter than in *P. armata*, while the distal tooth has a secondary small tooth on its distal margin; the first of the processes is longer than the proximal tooth and marked off by a suture, the second process is short, considerably curved, and a seta originates at its base, the terminal process is rather curved and only somewhat longer than the first. Third pair of maxillipeds (fig. 7 e) in the main as in *P. armata*, differ especially in having no teeth on the inner or outer margin of second to fifth joint excepting a tooth on the outer margin of the carpus; the merus has on the outer margin somewhat from the end a kind of tubular process (*t*) which might be taken as the basal part of a broken seta, but the aspect of its wall is different, and on the same spot I have found a similar tube in the male of the next species. First pair of legs (Fig. 7 f) nearly as in *P. armata*, the carpus is almost as long as the merus. Second pair of legs (figs. 7 g and 7 h) with merus, carpus and propodus somewhat robust; carpus not half as long again as merus, and at the end of its inner margin with a conical process (fig. 7 h) directed vertically inwards; dactylus not quite twice as long as the carpus. — Uropods (fig. 7 i) of moderate length; the peduncle about as long as the two posterior abdominal segments combined, somewhat less than twice as long as the endopod, which has 3 spines on its inner margin (the terminal spines on both rami lost).

Length of the specimen with the marsupium half developed 5.5 mm.

Adult Male. Carapace from above (fig. 7 l) very oblong-ovate, about three-fourths as long again as broad, considerably behind the middle a pair of small spines somewhat removed from one another, but the protuberances bearing in the female these spines have almost disappeared in the male. Seen from the side (fig. 7 k), the carapace is a good deal lower than in the female; pseudorostrum is turned considerably upwards, but its front margin is angular at the middle, as its upper half is subvertical, its lower half directed not only downwards but besides a little forwards. The ocular lobe is linear, much longer than in the female, though shorter than in the male *P. armata*. On the right side of the carapace the specimen to hand has three outstanding teeth on the posterior part of the lower margin. First and second free segment each with the dorsal median bifid lamella as in the female; the three posterior segments each with some dorsal small teeth and granules, and besides the lateral margins of all segments are irregularly adorned with a few teeth or sometimes only a single tooth. The granulation on the dorsal side of the abdominal segments very fine. — The uropods (fig. 7 m) longer than in the female; the peduncle which is only a little longer than the two posterior abdominal segments together and considerably less than twice as long as the endopod, has on the inner edge a good number of thin setæ, short and rather close together on the proximal half, and then gradually more distant and increasing strongly in length; the endopod has 8 spines on the inner margin and a long apical spine.

Length 5.7 mm.

Remarks. This species is allied and rather similar to *P. armata*, but is instantly distinguished in having a pair of spines somewhat from one another on the upper side of the carapace rather behind its middle, and in the female each of these spines is placed on the top of a large, broad, conical protuberance, which is rudimentary in the male. Third maxillipeds have no teeth on the inner margin of second to fifth

joint, while several teeth are found in *P. armata*; the conical process on the inner margin of the carpus of second legs is found in both sexes, but does not exist in *P. armata* or *P. macronyx*.

Occurrence. Not taken by the "Ingolf" but by the "Thor" in May 1904 at a single place.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 1 male and 1 female.

30. **Procampylaspis macronyx** n. sp.

(Pl. II, figs. 8 a—8 g.)

Adult Male. Carapace from above nearly as on *P. bituberculata*, excepting that no vestige of any dorsal spine or protuberances is found. Seen from the side, the carapace is not so low as in the preceding species, as the dorsal line is somewhat convex. Pseudorostrum is, seen from the side (fig. 8 a), peculiarly shaped, as its upper margin is considerably convex, the anterior margin concave and somewhat oblique, because the upper part of pseudorostrum is produced considerably forwards. Seen from above no ocular lobe could be observed between the lamellæ of pseudorostrum, and this lobe seems to be wanting. The two anterior free segments each with two submedian teeth, but these are smaller and scarcely originating from a lamella as in *P. bituberculata*; the segments otherwise nearly as in that species, but the number of teeth and granules is somewhat higher. The abdominal segments with some or a few teeth on the sides and very finely granulated above; first segment or besides the second with very few dorsal teeth.

Second pair of maxillipeds (figs. 8 b and 8 c) with the terminal joint most peculiarly developed. This joint has the same number of teeth and processes as in *P. armata* and *P. bituberculata*, but they differ exceedingly as to shape and size; the proximal tooth is triangular, of moderate size and much smaller than in the forms named; second tooth is rudimentary; the proximal process is more slender than in the two other species (in the mutilated "Ingolf" specimen this process is longer than in the type); second process is thin and close to the terminal process, which is somewhat curved and exceedingly elongated, nearly three times as long as the distance from its base to the origin of the joint. Third pair of maxillipeds (fig. 8 d) nearly as in *P. bituberculata*; there is no tooth on the outer side of the carpus, but the tubular process (*t*) on the merus is present. First pair of legs (fig. 8 e) in the main as in the preceding form, but the carpus is distinctly shorter than the merus. Second pair of legs (fig. 8 f) with the merus thick and not half as long as the somewhat slender carpus, which is only a little shorter than the dactylus and without any process at the end of the inner margin. — Uropods (fig. 8 g) considerably longer than in the male *P. bituberculata*; the peduncle is very long, almost as long as the three posterior abdominal segments together and more than two and a half times as long as the endopod, on the inner margin with about 15 pubescent setæ increasing much in length towards the end; the endopod which is a good deal longer than the exopod, has 5 or 6 spines on the inner margin and a very long apical spine.

Length of the type 6 mm., of the "Ingolf" specimen 7.5 mm.

Remarks. The male *P. macronyx* is easily separated from all other species hitherto known by the extremely elongated terminal process on the dactylus of second maxillipeds, and as the armature of the dactylus in other forms does not show sexual difference, the elongated process is in all probability also found

the female which may be recognized by this feature. The male of *P. macronyx* differs besides from the same sex of the other European species by the convex upper margin of pseudorostrum, no dorsal spines on the cephalon and the very long peduncles of the uropods.

Occurrence. Taken by the "Ingolf" at a single station.

West of Iceland. Stat. 10. Lat. 64° 24′ N., Long. 28° 50′ W., 788 fath., temp. 3.5°; 1 mutilated male.

Besides it has been gathered by the "Thor" in 1904 at the following locality.

South-West of the Faroes: Lat. 61° 15′ N., Long. 9° 35′ W., 463—515 fath.; 1 male (type).

Campylaspis G. O. Sars.

Of this large genus about 24 species have been described in the literature, and representatives are known from nearly every sea. In the "Ingolf" area 10 species have been captured, but 5 among them are new, which indirectly indicates that even the European fauna of this genus is still somewhat imperfectly known[1].

Among the cephalothoric appendages especially second and third pairs of maxillipeds and first and second pairs of legs are generally recognized as affording specific characters. According to my experience third maxillipeds differ more from species to species than any of the three other pairs, and ought therefore always to be carefully figured; especially merus, carpus and propodus show excellent characters. It may be mentioned here that the merus shows a gradual development from a normal shape, f. inst. in *C. intermedia* (Pl. III, figs. 6 e—6 f) to that found in *C. verrucosa* (fig. 8 a), from this again to the allied deep-sea form *C. globosa* (figs. 9 c—9 d) from the Davis Strait, where the shape of the merus is rather curious, while in the closely allied antarctic species *C. frigida* H. J. H. (in Res. Voy. Belgica, 1908) the merus has been developed in the most extraordinary way in the same direction, so that its shape in *C. globosa* is intermediate between those in *C. verrucosa* and in *C. frigida*; all these 3 (or 4) species are allied and somewhat similar in aspect, and we have here an interesting connection between a boreal form, a deep-sea form from a sea with its coasts subarctic or arctic and a real antarctic species — but no bipolarity of a species.

Finally it may be mentioned that the colour of the species in some forms does not agree well with Sars' statements; variation or difference is mentioned later on at *C. rubicunda*, *C. undata* and *C. horrida*.

31. **Campylaspis rubicunda** Liljeb.

(Pl. III, fig. 1 a.)

1855 *Cuma rubicunda* Lilljeborg, Öfv. K. Sv. Vet.-Akad. Förh. Bd. 12, p. 121.

1873 *Campylaspis* G. O. Sars, Kgl. Sv. Vet.-Akad. Handl. Ny Följd, Bd. 11, no. 6, p. 10, Tav. IV, Fig. 14—16.

Campylaspis undata G. O. S. and *C. costata* G. O. S. have not been found in the "Ingolf" area, but as both have been captured by the "Thor" north-east of Shetland at Lat. 61°14′ N., Long. 1°19′ E., 85 fath., and the last-named form besides north-east of the Hebrides at Lat. 58°20′ N., Long. 9°00′ W., 186 fath., it may be possible that they can be found west or south-west of the Faroe

1887. *Campylaspis rubicunda* H. J. Hansen, Vid. Meddel. Naturh. Foren. i Kjobenhavn for 1887, p. 207 (and 209).

!1900. — — G. O. Sars, Account, III, p. 84, Pls. LVI—LVII.

1913. — — Stebbing, Das Tierreich, 39. Lief. p. 190.

In 1887 (l. c.) I stated that the eye or the ocelli in this species had not been mentioned in the literature, and that I found two ocelli. In his Account Sars says: "Eye distinct, semicircular and somewhat prominent", which is misleading. It is not the eye but the ocular lobe which is "semicircular and somewhat prominent"; on each side of this lobe I have constantly found an ocellus, but it was impossible to find any dorsal ocellus between the lateral pair, while on the end of the lobe one finds with difficulty two oblong, semivertical ocelli lying close together in the median line. Therefore Sars' figures O and O x on Pl. LXI present a curious difficulty, as his fig. O, the lobe seen from the left side, has two ocelli respectively on the side and at the end, consequently only two pairs, but his fig. O x, exhibiting the lobe from above, has an apical pair, a lateral pair and a single, large, dorsal ocellus at the base. In my specimens from various localities such a median dorsal ocellus does not exist.

Sars points out that the dactylus of second pair of maxillipeds has "four strong spines increasing in length from before backwards". This is a very fine character which I can verify, as I found the four spines increasing backwards in length both in a specimen from Norway and in one of the anomalously coloured females from Lat. 63°46′ N. (fig. 1 a). So high a number of spines has not been found by Sars in any other species from Norway, nor by me in any species from the "Ingolf" area excepting *C. serratipes* n. sp., but in this species the second spine is much shorter than the third or the proximal spine.

The "Ingolf" specimen and the male from Lat. 63°15′ N. have the red colour of the body well preserved and no dark dots. But the 6 speximens of both sexes from Lat. 63°46′ N. are at least now only light reddish, and they have a large number of dark-brown, mostly very oblong dots spread partly irregularly on the body; these dots are sometimes so numerous on certain parts of the carapace that they are nearly confluent. It may be added that I found the joints in third maxillipeds and in first and second legs of one of these dotted females agreeing well as to shape and marginal teeth with Sars' figures.

Occurrence. Taken by the "Ingolf" at a single station.

North of Iceland: Stat. 128: Lat. 66°50′ N., Long. 20°02′ W., 194 fath., temp. 0.6°; 1 specimen.

C. rubicunda has been recorded from three places at northern West-Greenland, viz. Olrik Bay, Lat. ca. 77° N., 15—20 fath. (Ortmann); Kekertak, Lat. 69°58′ N., 60—70 fath. (H. J. Hansen), and off Holstensborg, Lat. 66°59′ N., Long. 55°27′ W., 57 fath. (Norman). The "Thor" has secured it at the following two localities.

South-West of Iceland: Lat. 63°46′ N., Long. 22°56′ W., 80 fath.; 3 males, 3 females.

South of Iceland: Lat. 63°15′ N., Long. 22°23′ W., 114—172 fath.; 1 male.

Distribution. Recorded from the northern part of the Sound and the entrance to Odense Fjord (Meinert), a few places in Kattegat, 13 to 30 fath., and three places in Skager Rak, 85, 100 and 350 fath. (H. J. Hansen). At Norway it has been taken at several places from Christiania Fjord to Vadso, generally in 30 to 100 fath. (Sars, etc.). Sars records a single very large specimen gathered by the Swedish Spitzbergen-

Exped. (1876) at Lat. 75 45 N., 1050 fath.[1]; a good number of specimens was taken south of Novaya Zemlya at Lat. 70 28 N., Long. 56 34 and 56 35 E., 48 fath. (Stappers). The "Thor" gathered it at a station north-east of Shetland, Lat. 61 14 N., Long. 1 10 E., 85 fath.; it has been recorded from the North Sea west of Jutland, 82 Fv. (H. J. Hansen), from two localities on the east coast of North England, 39 and 25 fath. (Norman and Brady), and from Scotland in Firth of Forth, Firth of Clyde, Moray Firth and Loch Fyne (Th. Scott). Finally it is known from places at the Atlantic coast of the Un. States, viz. in the Gulf of Maine, 35 fath. (Calman), in Casco Bay in the stomach of *Pseudopleuronectes americanus*, and off Cape Ann, Mass., 35 fath. (S. I. Smith), further south from Marthas Vineyard, 36 fath. (Calman).

32. **Campylaspis alba** n. sp.

(Pl. III, figs. 2 a—2 l).

Adult Female. Carapace strongly vaulted, proportionately short and deep; seen from above (fig. 2 a) and with pseudorostrum included scarcely half as long again as broad; seen from the side (fig. 2 c) only somewhat less than half as long again as deep. Pseudorostrum forms an obtuse angle with the dorsal line and is not even quite horizontal; seen from above (fig. 2 a) it is acutely triangular, seen from the side (fig. 2 c) the lower margin is strongly ascending, and only a vestige of an antennal notch is discoverable. The ocular lobe (fig. 2 b) is a small triangle occupying scarcely the basal fourth between the pseudorostral lamellæ, and it has no visual elements. The whole surface of the carapace is smooth, shining and looks as polished. The dorsal part of the three anterior free segments nearly or totally overlapped by the carapace; the two anterior segments with somewhat protruding dorsal lamellæ. Abdomen slender and very conspicuously shorter than the carapace.

Second pair of maxillipeds (fig. 2 d) robust; carpus (fig. 2 e) with a triangular tooth on the inner part of the terminal margin; dactylus with three long and strong spines subequal in length, and just before them a very robust seta considerably longer than the spines; the propodus has a somewhat small, oblong tooth at the distal inner angle, and the spine from the end is much longer than the spines on the dactylus and distinctly bent somewhat from the end. Third maxillipeds (fig. 2 f) broad, and in this respect nearly as in *C. rubicunda* or *C. glabra* G. O. S.; ischium produced on the inner side with a strong tooth on the end; merus broad, nearly as broad as second joint, about two-thirds as long again as broad, with the lateral margins subparallel and the inner margin without teeth, but a large, oblong tooth is found on the distal end at the outer margin; carpus scarcely two-fifths as long as merus and a little longer than broad, with 5 strong teeth on the inner margin and a single tooth on the outer; propodus with 3 teeth on the inner margin. First pair of legs (fig. 2 g) with the distal half rather slender; ischium with a tooth on the end, merus with a small tooth at the end of the outer margin, and otherwise all joints are unarmed. Second pair of legs (fig. 2 h) with the carpus slender and very long, slightly longer than the daectylus, which is thin and regularly tapering to the end. —

[1] It is extremely surprising that this species can live in that great depth. The specimen, a large but immature male, is according to G. O. S.'s representation uncommonly robust, especially the uropods (his fig. 10) are extremely thick. I think the determination is correct, but may suppose that the young male had been captured while swimming or adhering to some floating [illegible] unfortunately the exact locality is not stated, so that it is impossible to judge of its distance from lesser depths.

Uropods (fig. 2 i) slender and very long; the peduncle is fully as long as the three posterior abdominal segments combined, almost two and a half times as long as the endopod, with about 4 thin spines on the distal part of the inner margin; the endopod with 10 spines on the inner margin, a very long terminal spine, and all spines pectinate on both margins; the exopod is very little shorter than the endopod.

Length of females with marsupium 4.3—4.7 mm.

Male. The carapace differs in the usual way from that of the female; its anterior part seen from above is shown in fig. 2 k; the antennal notch is distinct, but its margin only very moderately concave; the shining, polished surface is characteristic. Uropods (fig. 2 l) still longer than in the female; the peduncle varies from being a little more to a little less as long as half of the third abdominal segment and the three posterior segments combined, not fully two and a half times as long as the endopod, with about 12 setiform spines along the inner margin; the endopod nearly as in the female, with about 12 thin spines on the inner margin, not counting the very long terminal spine; the exopod somewhat shorter than the endopod.

Length 5.1 mm.

Remarks. Many years ago I had determined this species as *C. nitens* Bonnier, established on an immature male scarcely 5 mm. long, but a closer examination revealed such differences in three of the appendages that my form must be considered a different species. Bonnier says that the inner margin of third to sixth joint of third maxillipeds is "regulièrement denticulé", and this statement agrees with his fig. 4 m (Pl. 28), but in my animals the large fourth joint has no vestige of such serration, third joint only the terminal tooth, and furthermore instead of the big tooth on the distal outer angle of the merus his figure seems to exhibit three small teeth on the outer margin. Though in other species of *Campylaspis* I have found some individual variation as to serration on the limbs, the differences in this respect between Bonnier's description and my animals are far too great to be considered as due to variation. His figure of second pair of legs has the carpus considerably shorter and thicker than in my animals, and he describes and figures the dactylus as "élargi", while in my specimens it is slender. Finally his description and figure of the uropods differ very much from my animals; according to Bonnier the inner margin of the peduncle is finely serrated, but such serration is not found either in the male or the female; furthermore he figures 5 or 6 spines on the inner margin of the endopod, while my specimens have a much higher number. Besides some further differences between *C. nitens* Bonn. and *C. alba* can be found by a comparison of the figures. While *C. nitens* Bonn. must be another species than my animals, I am convinced that the immature females taken west of Ireland and referred by Calman with a query to Bonnier's form in reality belong to *C. alba*, as his notes, pointing out differences between his specimens and *C. nitens*, show agreement with my form. — *C. pulchella* G. O. Sars is also similar in general aspect to *C. alba*, but differs sharply in the spinulation of the uropods, while second and third pairs of maxillipeds in *C. pulchella* are unknown.

Occurrence. Not taken by the "Ingolf" but by the "Thor" at two localities.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 10 females, 1 male.

— — — Lat. 61°07′ N., Long. 9°30′ W., 443 fath.; 24 specimens, ♀ and ♂.

Distribution. According to the "Remarks" gathered west of Ireland, 312 fath. (Calman).

33. Campylaspis laticarpa n. sp.

(Pl. III, figs. 3 a—3 l.)

Adult Female. In general aspect somewhat similar to *C. rubicunda*, but considerably larger. The carapace seen from above (fig. 3 a) and pseudorostrum included is a little more than half as long again as broad, and about ovate, but a good deal of the posterior margin is very feebly convex, and the anterior third of the lateral margin to the middle of the frontal lobe is a little more convex than in *C. rubicunda*, while the front angle of pseudorostrum is less acute. The ocular lobe (fig. 3 b) occupies more than half of the length of pseudorostrum, it is oblong, broader beyond the middle than at the base, anteriorly rather broadly rounded, and a pair of lateral ocelli are sometimes but not always perceptible. Seen from the side (fig. 3 c) the carapace with pseudorostrum is twice as long as deep; pseudorostrum is moderately short, nearly horizontal, the antennal notch is small but very distinct, triangular, and the angle below it a little protruding. About on the anterior half of the dorsal surface and somewhat downwards on the sides the carapace has a number of irregularly distributed, very small and low, rounded protuberances, which sometimes are rather distinct, sometimes very feebly developed; besides the middle part of the dorsal median line is sometimes, but not always, distinctly impressed. The carapace covers nearly totally the three anterior free segments, and the dorsal part of each of the two anterior segments protrudes a little, but has no distinct lamella. The abdomen is moderately robust and as long as the carapace.

Second pair of maxillipeds (fig. 3 d) moderately strong; carpus with a broad, acute protuberance on the inner side before the end; propodus (fig. 3 e) with the inner distal angle produced as a triangular, acute protuberance, and the distal half of the inner margin nearly straight with numerous short spines, while the spine on the outer terminal angle is not very long but extremely robust, with the usual bend beyond the middle and its distal part with some spines on the inner margin; dactylus with 3 spines, the first a little shorter than the third and considerably overreaching the second. Third pair of maxillipeds (fig. 3 f) are very characteristic; merus is large, long and broad, a little less than twice as long as broad, distally with the outer part much produced but its end obtuse; carpus is very large, two-thirds as long as, and not much narrower than, the merus, propodus proportionately small, oblong; all joints without marginal teeth. First pair of legs (fig. 3 g) normal, ischium with a tooth on the inner angle; merus thicker but not longer than the carpus, and both joints without marginal teeth. Second pair of legs (fig. 3 h) of very moderate length, as carpus and dactylus are somewhat short, and equally long. — Uropods (fig. 3 i) only moderately long; peduncle a little longer than the two posterior abdominal segments together and considerably more than twice as long as the endopod, with the inner margin finely serrated; endopod with 3 spines on the inner margin and 3 terminal spines, the median very long, the outer very short; exopod somewhat shorter than the endopod.

Length 7 mm.

Male. Carapace (fig. 3 k) differs in the normal way from that of the female, and has similar rudimentary tubercles on the surface; the antennal notch is moderately and evenly concave, deeper and especially broader than in the female, but an angle below it is not developed. The median dorsal lamella on first and second free segment is distinct but short. — Uropods (fig. 3 l) more slender and distally longer than in the female;

peduncle about as long as the two posterior abdominal segments and half of fourth segment combined, slightly more than twice as long as the endopod, with most of the outer margin extremely finely serrated, while the inner margin has about 12 robust setæ increasing in length from the first to the last; endopod with 10 spines on the inner and 2 on the terminal margin; exopod a good deal shorter than the endopod.

Length 7.5 mm.

Remarks. *C. laticarpa* is separated especially by having the carpus of third maxillipeds longer and very much broader than in any other northern species of *Campylaspis*; the size and shape of merus and carpus can easily be seen without dissection, and the absence of marginal teeth in this pair of appendages is, besides, a good specific character. On the colour little can be said; the animals are now whitish, often with numerous extremely small, dark-brown dots; in some specimens larger and partly confluent brownish red dots are found on the peduncles of the uropods.

Occurrence. Not taken by the "Ingolf" but by the "Thor" in May 1904 at two places.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 38 specimens, ♀ and ♂.

— — — Lat. 61°07′ N., Long. 9°30′ W., 443 fath.; 2 specimens.

34. **Campylaspis undata** G. O. Sars.

(Pl. III, fig. 4 a).

1865. *Campylaspis undata* G. O. Sars, Forh. Vidensk. Selsk. Christiania for 1864, p. 205.

!1900. — — G. O. Sars, Account, III, p. 88, Pl. LXI.

1913. — — Stebbing, Das Tierreich, 39. Lief. p. 195.

A comparison between my female specimens and Sars' representation gave the following results. The carapace agrees with his figure excepting that the pseudorostrum seen from the side looks a little more produced and has its front margin distinctly as a whole more oblique; between the upper longitudinal ridge and the lower one there is anteriorly nearly below the large sublateral protuberance a more or less conspicuous, very rounded, subvertical ridge not figured by Sars in the female *C. undata*, but in the male, and besides in *C. horrida* and *C. verrucosa*; furthermore there is sometimes a feeble and short piece of longitudinal keel rather far behind between the two very long lateral keels. In second pair of maxillipeds the distal inner corner of the carpus is somewhat produced in a triangular tooth; the propodus has near the end of the inner margin a very conspicuous, oblong tooth, thus the two teeth mentioned are considerably more developed than in Sars' fig. mp^2, but there is complete agreement between his figure and the maxilliped examined by me in the spines on the dactylus and the terminal spine on the propodus. Third pair of maxillipeds (fig. 4 a) differ in some particulars from Sars' fig. mp^3; the ischium has 2 teeth (not a single tooth) on the inner end; merus differs considerably in shape, as in my specimens the inner margin is distinctly concave, the outer margin feebly angular near the middle and sooner convex than concave, while in Sars' figure both margins are curved in the way opposite, but I think that this figure is incorrect; as to marginal serration the differences between Sars' figure and the features observed by me are of no importance (in maxillipeds of three specimens I found also a little variation as to marginal teeth). First pair of legs differ only from Sars in having

a tooth on the outer margin of the carpus second pair of legs in having a few teeth on the proximal part of the outer margin of the carpus On the inner margin of the endopod of the uropods Sars figures only 3 spines I found the same number in a single specimen, but otherwise 4 or 5 spines — As to the colour it ought to be noted that both body and appendages are adorned with numerous or innumerable dark-brown or reddish-brown dots generally separate or sometimes confluent, and on the carapace these dots are especially found on the ridges and protuberances, which therefore are very conspicuous in opposition to the more or less excavated areas, where the dots are proportionately moderately few in number.

In spite of the differences pointed out I believe that my specimens belong to *C. undata* G. O. S.

Occurrence Not taken by the "Ingolf" but by the "Thor" at two places, together with the two preceding and some of the following species of this genus.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 7 specimens.

— — — Lat. 61°07′ N., Long. 9°30′ W., 443 fath.; 1 specimen.

Distribution. Hitherto only recorded with certainty from off the Lofoten Islands, 100—200 fath (G. O. Sars). The "Thor" gathered a specimen between Shetland and the Færoes at Lat. 61°35′ N., Long. 4°30′ W., 212 fath. Lo Bianco's statement on its occurrence in the Mediterranean ought to be considered as doubtful.

35. **Campylaspis rostrata** Calm.

(Pl. III, figs. 5 a—5 c).

This species, which was established on a single immature female, has been well figured and described by Calman. The form is instantly separated from all other northern species by the long and most peculiarly shaped psendorostrum. As Calman did not examine the two posterior pairs of maxillipeds in his specimen, they are figured and briefly mentioned here. Second pair of maxillipeds (figs. 5 a and 5 b) robust; carpus without any tooth on the inner side; dactylus with 3 spines, the first and the third strong and subequal in length, while the second is quite short; propodus produced considerably at the end of the inner side, but the tooth is short and blunt, while the spine on the distal end is robust, only a little overreaching the distal spine of dactylus and with a sharp bend a little before the end. Third maxillipeds with the distal half somewhat slender (fig. 5 c); ischium extremely produced forwards on the inner side and terminating as a triangle without any tooth; merus only half as broad as the middle part of second joint, its inner margin nearly straight with a couple of teeth, and at the end of the outer margin a thick, nearly blunt tooth; carpus with some 3 teeth on the outer margin, and propodus with a single strong tooth on the proximal part of the inner margin.

Occurrence Not taken by the "Ingolf", but by the "Thor" at a single locality.

South-West of the Færoes: Lat. 61°07′ N., Long. 9°30′ W., 443 fath.; 1 subadult and 1 very young specimen.

Distribution The type was gathered west of southern Ireland, 312 fath. Besides specimens have been taken by "Travailleur" and "Talisman" at Lat. 35°24′45″ N., Long. 10°19′7″ W., 640 fath., and Lat. 2[illegible]8′ N., Long. 18°29′ W., 561 fath. (Calman).

36. **Campylaspis intermedia** n. sp.

(Pl. III, figs. 6 a—6 i).

Female (with the marsupium scarcely half-developed). In general aspect nearly intermediate between *C. costata* G. O. S. and *C. verrucosa* G. O. S. Carapace seen from above (fig. 6 a) rather oblong, as the proportion between breadth and length is about as 3 to 5; a good deal of the lateral margins feebly divergent from in front backwards, but anteriorly these margins rather suddenly converge strongly to near the end of pseudorostrum, which is broadly rounded. The ocular lobe about as long as the pseudorostrum in front of the lobe. Seen from the side (fig. 6 b) the carapace is of moderate depth, scarcely half as deep as long including pseudorostrum, which is somewhat produced and a little upturned; the antero-inferior margin is rather oblique, the antennal notch well developed, and the angle below it a little protruding. The sides of the carapace show as in *C. costata* two longitudinal, long ridges separated by a deep depression, which considerably behind the front end is partly interrupted by a low, broad protuberance; besides between the posterior third of these ridges a third ridge, which has its anterior end united with the long lower ridge, but this species differs from *C. costata* in having several rounded, moderately low tubercles on the upper and about three tubercles on the intermediate ridge. Seen from above, the carapace (fig. 6 a) has in more than its posterior half a longitudinal, a little curved row of about five tubercles on each half not far from the median line, and just behind the outer end of the suture separating the pseudorostrum a large tubercle is very conspicuous; besides some small tubercles are observed on the anterior half. The tubercles, excepting the anterior sublateral pair, are on the whole low and rounded. The two anterior free segments are overlapped by the carapace; they have dorsally no really lamellar expansion. — Abdomen moderately robust, as usual conspicuously shorter than the carapace; the three anterior segments each with a pair of obtuse tubercles.

Second pair of maxillipeds (figs. 6 c—6 d) somewhat slender; carpus with a triangular tooth on the distal inner angle; dactylus with 3 spines, the first strong and rather long but shorter than the third, while the second is very small; propodus with the inner angle somewhat produced, acute, while its terminal spine scarcely overreaches the third spine of the dactylus. Third pair of maxillipeds (fig. 6 e) with the distal half slender; second joint serrated on the distal part of its inner margin; ischium with two teeth at the inner end; merus (fig. 6 f) conspicuously less than half as broad as long, its inner margin distinctly concave with several fine teeth, the outer margin a little convex with a large tooth towards the end and a couple of much more proximal, minute teeth; carpus with some teeth on the outer margin. First pair of legs (fig. 6 g) with the distal half slender; second joint serrated on the distal part of the inner margin; the following joints without teeth, and merus a little longer but slightly thicker than carpus. Second pair of legs (fig. 6 h) without marginal teeth; carpus of middle length and slightly shorter than dactylus. — Uropods (fig. 6 i) somewhat slender; the peduncle as long as the two posterior abdominal segments together, slightly more than twice as long as the endopod, with low saw-teeth on the inner margin; the endopod with 5 spines on the inner margin, a very long spine and a quite short one on the end; exopod about as long as, or slightly shorter than, the endopod.

Length 5.5 mm. (An immature male from Stat. 116 is 5.8 mm.)

Remarks. *C. intermedia* is distinguished from *C. sulcata* by the tubercles on the sides, from *C.*

[illegible] by the tubercles on the carapace being less numerous and especially much lower, [illegible] it is also sharply separated by the shape of the merus in third maxillipeds

Occurrence. Taken by the "Ingolf" at two stations.

Davis Strait. Stat. 32. Lat. 66° 35′ N., Long. 56° 38′ W., 318 fath., temp. 3.9°; 11 specimens.

South of Jan Mayen. Stat. 116. Lat. 70°05′ N., Long. 8° 26′ W., 371 fath., temp. + 0.4°; 2 specimens.

37. **Campylaspis horrida** G. O. Sars.

(Pl. III, fig. 7 a).

1870 *Campylaspis horrida* G. O. Sars, Forh. Vidensk. Selsk. Christiania for 1869, p. 162.
1894 — Norman, Ann. Mag. Nat. Hist. ser. 6, Vol. XIII, p. 278, Pl. XII, figs. 6—7.
1900 G. O. Sars, Account, III, p. 89, Pl. LXII.
1913. Stebbing, Das Tierreich, 39. Lief. p. 196.

The species is characterized by the rather produced pseudorostrum and especially by the high, conical tubercles on the carapace. It agrees on the whole with Sars' figures, but some remarks must be made. The carapace of the female has always posteriorly between the submarginal and the subdorsal keels a short keel with two to five tubercles visible from the side, while the right figure of Sars shows only a single tubercle. — In the two posterior pairs of maxillipeds I found some differences from Sars' figures. Second maxillipeds agree excepting in two points, viz. that the carpus has an oblong tooth on the distal inner angle, and propodus a rather large, oblong one on the inner side near the end. Third maxillipeds differ in having the ischium shorter and without distinct teeth, but the latter point is certainly on insignificant variation; a more important difference is found in the shape of the merus (fig. 7 a) which is conspicuously more narrow than figured by Sars, with its inner margin somewhat concave. — The uropods show very considerable variation as to length, thickness and serration of the peduncles, breadth of the endopod and its number of spines. Sars says that their peduncle is "coarsely serrated on both edges" and the endopod "armed with only 4 spinules", according to his figure 3 on the inner margin, 1 long terminal spine, while the small outer terminal spine is not counted; in his figure of the adult female the peduncle is scarcely as long as the two posterior abdominal segments combined, while his fig."urs" shows the saw-teeth on the inner margin to be rather high and distinctly higher than those on the outer margin. In a few specimens with vestiges of marsupial lamellæ the peduncle is even a little shorter than the two posterior segments together, robust, with the serration on both margins as in Sars' figure, while the endopod is somewhat broad, as drawn by Sars, with 3 or 4 spines on the inner margin and the 2 terminal spines. In two females with the marsupium fully developed the peduncles are proportionately more slender and considerably longer, even in one female somewhat longer than the two posterior segments combined, and the serration on both margins is conspicuously more feeble, on the outer margin nearly indistinct, the endopod more narrow, with 3 spines on the inner margin. Some females with the marsupium rudimentary are intermediate between those described, though generally more similar to the adults, but the number of spines on the inner margin of the endopod varies from 3 to 5. The peculiarities described show that length and serration of the peduncles, slenderness and [illegible] of the endopods ought to be applied with caution as specific characters in this genus.

In most of my females the ridges and tubercles of the carapace are adorned with small dark dots, and some similar dots are also frequently found on the abdomen, the uropods, etc.

Occurrence. Not taken by the "Ingolf", but by the "Thor" at four localities.

South of Iceland: Lat. 63°15′ N., Long. 22°23′ W., 114—172 fath.; 2 females.

— - — Lat. 63°05′ N., Long. 20°07′ W., 290 fath.; 2 females.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 2 females.

— — — Lat. 61°07′ N., Long. 9°30′ W., 443 fath.; 5 females.

Distribution. At several places at the west coast of Norway from Hardanger Fjord to Lofoten, 100—300 fath. (G. O. Sars). The "Thor" captured it south-west of Norway at Lat. 58°32′ N., Long. 4°18′ E., 149 fath. Calman referred with some uncertainty a broken specimen from Lat. 39°59½′ N., Long. 70°30¾′ W., 428 fath., to this species; he refers also with some doubt a specimen from Sagami Bay, Japan, to *C. horrida*, but his remarks on its size and especially the more slender distal joints in some appendages make it rather certain that it must be a different species, which he also suggests as a possibility. Lo Bianco's statement on its occurrence in the Mediterranean may possibly be correct, but it is not very probable.

38. **Campylaspis verrucosa** G. O. Sars.

(Pl. III, fig. 8 a).

1866.	*Campylaspis verrucosa*	G. O. Sars,	Nyt Mag. for Naturv. Vol. XV, p. 105.
1894.	—	—	Norman, Ann. Mag. Nat. Hist. 6. ser., Vol. XIII, p. 278, Pl. XII, fig. 7.
!1900.	—	—	G. O. Sars, Account, III, p. 90, Pl. LXIII.
1913.	—	—	Stebbing, Das Tierreich, 39. Lief, p. 198.

Only a few remarks on some appendages shall be made for comparison with Sars' figures. I found in second pair of maxillipeds a well developed, triangular tooth on the distal inner angle of the carpus, a somewhat slender tooth on the distal inner angle of the propodus, only a slight difference in the length of first and third spine of the dactylus, both these spines longer than figured by Sars, and between them the second, very small, but distinct spine. In third maxillipeds I found more important difference in the size and shape of the merus; fig. 8 a shows this joint larger than figured by Sars in proportion to carpus, only a little narrower than the distal part of second joint, and somewhat expanded inwards, as its inner margin has the proximal two-thirds somewhat convex, and then it is suddenly angularly bent; some differences in the teeth on the merus and the two following joints may be observed by comparison between fig. 8 a and Sars' fig. *mp*³. In first pair of legs I found on the outer margin of the merus some small teeth and a long subterminal tooth; otherwise his figures of this leg and of second leg agree with my preparation. The expansion of the merus of third maxillipeds is a good character and besides of special interest (see "Remarks" at the next species).

Occurrence. Not taken by the "Ingolf" but by the "Thor" at four localities.

South of Iceland: Lat. 63°18′ N., Long. 21°30′ W., 95 fath.; 1 specimen.

— - — Lat. 63°15′ N., Long. 22°23′ W., 114—172 fath.; 15 specimens.

South-West of the Faroes. Lat. 61° 15' N., Long. 9° 35' W., 463—515 fath., many specimens.
— — Lat. 61° 07' N., Long. 9° 30' W., 443 fath.; large number of specimens.

Distribution: Found along the whole south and west coast of Norway, as far north as the Lofoten Islands (11° 00' to 100 fath. (G. O. Sars). Sars and Norman, however, had in 1872 and 1894 recorded it as taken in two Fjords in 100—300 fath. Taken three times in Skager Rak in depths from 280 to 350 fath. (H. J. Hansen). six times west of Ireland, 120 to 454 fath. (Calman), and several times in the Mediterranean near Capri, 100—637 fath. (Calman). — *C. verrucosa* var. *antarctica* Calm. from Lat. 66° 2' S., Long. 89° 38' E., 385 m. will in all probability in the future be recognized as a separate, valid species, and Stebbing has already in Das 'Tierreich' 30. Lief. p. 199 established it as *C. antarctica* Calm.

39. **Campylaspis globosa** n. sp.

(Pl. III, figs. 9 a—9 g; Pl. IV, figs. 1 a—1 b).

Adult Female. The carapace somewhat similar to that in *C. verrucosa*, but seen from above (fig. 1 a) proportionately broader with the major part of the lateral margins more convex, conspicuously less than half as long again as broad, seen from the side (fig. 1 b) twice as long as deep, with pseudorostrum somewhat produced and a little upturned; the antennal notch rather deep, the corner below it angular, and the margin above it somewhat convex and rather oblique. Both above and on the sides the carapace is adorned with tubercles, all rounded and differing much in size, the majority arranged into four pairs of longitudinal but somewhat curved or partly irregular rows; the lateral impression is anteriorly bent considerably upwards, and its middle part is deep. Dorsal erect lamellæ on the two anterior free segments could not be detected. Abdomen considerably shorter than the carapace; on the two anterior segments dorsal tubercles are feebly developed, on third segment scarcely perceptible.

Second pair of maxillipeds (fig. 9 a and 9 b) rather similar to those in *C. verrucosa*, but the tooth on the inner angle of both carpus and propodus is small; first and third spine on the dactylus long, while second spine is very short and thin; the spine on the end of propodus somewhat overreaches the spines on the dactylus. Third pair of maxillipeds (fig. 9 c) somewhat slender; second and third joints without teeth; merus extremely characteristic (fig. 9 d), as it is expanded considerably on the inner side in a low triangle, the proximal half of its inner margin is nearly straight and directed not only forwards but considerably inwards, while the distal half of the margin forms an angle with the proximal half, is directed considerably outwards and besides somewhat concave; the merus is about half as long again as broad, with a rather small tooth at the base of the distal, strong seta; carpus normally shaped, rather oblong, with about two teeth on the outer margin. First pair of legs (fig. 9 e) slender; second joint tapers considerably from the middle to the end; ischium with a tooth on the inner margin; merus very slender, considerably longer but slightly broader than carpus, and both these joints without teeth. Second pair of legs (fig. 9 f) with carpus elongated and very slender, somewhat shorter than the very long and thin dactylus. — Uropods (fig. 9 g) moderately strong, the peduncle scarcely as long as the two posterior abdominal segments together and distinctly less than twice as long as the endopod, with more than half of the inner margin somewhat coarsely serrated,

and the major proximal part of the outer margin finely serrated; endopod with 3 spines on the serrated inner margin, one long and one short apical spine.

Length 5.6 mm.

Remarks. This species is intermediate between *C. verrucosa* G. O. S. and *C. frigida* H. J. H., though nearer to the latter form, which was collected by the "Belgica" at Lat. 70°48′ S., Long. 91°54′ W. The curious expansion of the merus is still more developed in *C. frigida*, in which that joint is as broad as long; as to the shape of merus *C. globosa* is intermediate between *C. verrucosa* and *C. frigida*, and the relationship between these three species from most different localities has been mentioned above on p. 36.

Occurrence. Taken by the "Ingolf" at a very deep station in the warm area.

Davis Strait: Stat. 36: Lat. 61°50′ N., Long. 56°21′ W., 1435 fath., temp. 1.5°; 1 adult female.

40. **Campylaspis serratipes** n. sp.

(Pl. IV, figs. 2 a—2 h).

Subadult Female (and immature Male). Carapace seen from above (fig. 2 a) nearly regularly oblong-oval, excepting at the front end which is cut off transversely, and it is considerably less than twice as long as broad; seen from the side (fig. 2 b) the carapace is highly vaulted, very deep, with the pseudorostrum included considerably less than twice as long as deep, about as deep as broad. Pseudorostrum short and a little upturned; the antennal notch moderately or somewhat feebly developed, and the upper part of the oblique margin below the notch with some saw-teeth. The ocular lobe broader than long, nearly half as long as pseudorostrum. The dorsal side of the carapace with a pair of longitudinal rows of tubercles; the rows are posteriorly nearer the median line than anteriorly, and each row consists of 5 or 4 rather small, more or less conical or rounded tubercles; behind the pseudorostrum a broad but proportionately somewhat low tubercle is placed more laterally; finally the upper part of each side has one just discernible small tubercle and sometimes a vestige of a second or even a third tubercle. The dorsal part of the two anterior free segments frequently completely concealed by the carapace, when visible it is observed, that each segment has a high transverse keel, which is not really lamellar. Abdomen as usual conspicuously shorter than the carapace; the segments without dorsal tubercles.

Second pair of maxillipeds (figs. 2 c and 2 d) peculiarly armed; carpus with an extremely long, spiniform process on the distal inner angle and before it an acute tooth; propodus with an uncommonly long, spiniform process on the inner margin before the end, and the outer terminal spine is rather long; dactylus with 4 spines, the first long, about as long as the third and considerably longer than the second, while the fourth is only about half as long as and much thinner than the third. Third pair of maxillipeds (fig. 2 e) with second joint uncommonly short, much shorter than the five following joints combined; ischium with two teeth on the inner margin; merus normally shaped, somewhat less than twice as long as broad, with two strong teeth on the inner margin and some three teeth on the outer; carpus oblong and scarcely longer than the breadth of merus, with three strong teeth on the inner and four on the outer margin; propodus rather long, with three very strong teeth on the proximal part of the inner margin and a smaller tooth on the outer mar-

First pair of legs (fig. 2 f) moderately slender; ischium with two teeth on the inner side; merus a little more than twice as long as broad with a tooth at the end of each margin, carpus distinctly shorter and more narrow than merus, with four teeth on the inner and three on the outer margin. Second pair of legs (fig. 2 g) with [illegible] teeth; carpus somewhat long and moderately slender, dactylus very long, even slightly longer than carpus and propodus together. — Uropods (fig. 2 h) vary as to length; the peduncle is from a little more to conspicuously less than the two posterior abdominal segments combined, and its length in proportion to the long endopod varies from being $^{7}/_{4}$ to scarcely $^{6}/_{4}$, the inner margin of the peduncle is coarsely serrated, and some or several of the teeth are elongated, nearly spiniform, a little curved and directed much backwards, while the outer margin is partly finely serrated or smooth; the endopod is long, with the inner margin serrated nearly as the peduncle and armed with 3 spines, the distal one at the end near the very long terminal spine, while the outer terminal spine is very small. The exopod is somewhat shorter than the endopod.

Length of females with the marsupium half developed 3—3.6 mm.

Remarks. *C. serratipes* is in general aspect somewhat similar to *C. affinis*, but it is considerably smaller and its appendages differ in many particulars; especially the armature of the two distal joints of second maxillipeds and the serration on third to sixth joint of third maxillipeds and third to fifth joint of first legs differ much in the two species; further differences are found in the uropods, especially in the number of spines on the inner margin of the endopod. The name *serratipes* has been chosen, because the marginal serration in some pairs of appendages is more developed than in any other northern species. — Sometimes a proportionately somewhat low number of small dark dots may be seen on carapace and abdomen.

Occurrence. Taken by the "Ingolf" at two stations in the warm area.

West of Iceland: Stat. 90: Lat. 64°45′ N., Long. 29°06′ W., 568 fath., temp. 4.4°; 1 specimen.

South-West of Iceland: Stat. 78: Lat. 60°37′ N., Long. 27°52′ W., 799 fath., temp. 4.5°; 12 specimens.

Family Pseudocumatidæ.

This small family comprises only two marine genera with some few species, but it has arrived at much richer development in the Caspian Sea. Only one of the marine genera has been found in the "Ingolf" area, but as the other genus, *Pseudocuma* G. O. S., goes northwards to Lofoten, Fair Isle and Scotland, it may possibly occur at the Færoes.

Petalosarsia Stebbing.

Only a single species is known.

41. **Petalosarsia declivis** G. O. Sars.

1865 *Petalopus declivis* G. O. Sars, Forh. Vidensk. Selsk. Christiania for 1864, p. 197.

1900 *Petalosarsia* G. O. Sars, Account, III, p. 77, Pl. LIV.

1901 Stappers Camp. Duc d'Orléans, Crust. Malac. p. 121, Pl. VI, figs. 11—12.

Sars says that the inner edge of the endopod of the uropods is "minutely serrate and densely hairy throughout", which agrees well with his fig. *urs.*, but is not quite correct. The hairs constitute a dense clothing on the inner side of the endopod, and the saw-teeth are arranged in a straight line a little above the clothing, and directed not only inwards and backwards but besides a little upwards; when the abdomen is seen vertically from above the saw-teeth originate slightly inside the margin and are seemingly minute, but when the endopod is turned a little so that one sees it from above and a little from the outer side, the saw-teeth, only about 12 in number, are perceived to be rather strong, and the distal teeth even produced in a slender triangle. — Sars has no figure or description of the male uropod, but Stappers has filled up that small gap; the endopod has on the distal part of the inner margin 9 somewhat small, ciliated spines but no hairs, while the hairs are well developed on the major proximal part of the inner margin; Stappers' fig. 12 agrees completely with the uropods of a male taken by the "Thor", excepting that I find the hairs on the inner margin much longer than drawn by Stappers, longer than the diameter of the joint.

Occurrence. Taken by the "Ingolf" at two stations.

Davis Strait: Stat. 31: Lat. 66°35′ N., Long. 55°54′ W., 88 fath., temp. 1.6°: 3 specimens.

West of Iceland: Stat. 86: Lat. 65°03′6″ N., Long. 23°47′6″ W., 76 fath.; 1 specimen.

Furthermore it has been gathered at North-East Iceland in Myre Bugt, Lat. 66°11′ N., Long. 15°04′W., 33 fath., 2 specimens, by "Beskytteren"; the "Thor" secured it at two localities, viz. East Iceland: Hjerads Floi, 15—25 fath., 3 specimens; and south-west of Iceland: Lat. 63°46′ N., Long. 22°56′ W., 79 fath., 10 specimens.

Distribution. At Norway gathered off Lofoten, 50—60 fath., and at Finmark near Hasvig and Vadsø 20—40 fath. (G. O. Sars). Furthermore taken at the southern end of Spitzbergen, Lat. 76°19′ N., Long. 18°1′ E., 142 fath. (G. O. Sars), at Cape Flora, Franz Joseph Land, 10 fath. (Th. Scott), and south of Novaya Zemlya, Lat. 70°20′ N., Long. 56°34′ and 56°35′ E., 48 fath. (Stappers). In the North Sea at Lat. 56°21′ N., Long. 5°32′ E. (Ehrenbaum), at two places in North-East England, 37 to 57 fath. (Norman and Brady), and in Firth of Forth (Th. Scott). Walker recorded it from the Irish Sea, 33 fath. Finally it has been taken off Newfoundland, 89 fath., and off Marthas Vineyard, 39 fath. (Calman).

Family Lampropidæ.

This family comprises hitherto only a moderate number of species (nearly 30), but as to generic types it is rather well represented in the "Ingolf" area, as 4 among the 8 genera referred by Zimmer to the family are to be mentioned on the following pages.

Lamprops G. O. Sars.

Only a single species is hitherto known from our area.

42. **Lamprops fuscata** G. O. Sars

1864 *Lamprops fuscata* G. O. Sars, Forh. Vidensk. Selsk. Christiania for 1864, p. 192.
1885 G. O. Sars, Account, III, p. 20, Pl. XI.
1913 Stebbing, Das Tierreich, 39. Lief. p. 154.

Occurrence. Not taken by the "Ingolf". But it has been collected at four localities in West Greenland all situated between Lat. 69° 14′ N. and 68° 36′ N. Three of these places have already been recorded by Lütken in 1887, viz. Breddal, Disko, 5 fath., Godhavn, 8—10 fath., and Nivak, 5—15 fath. The fourth locality is Kronprindsens Eyland, where Mag. sc. Kruuse took a sample of bottom material, in which 2 females were found.

Distribution. At Norway common from Lofoten to Vadsö, shallow water (G. O. Sars). At Novaya Zemlya it was taken in the western outlet of Matotschkin Schar, 8—10 fath. (Stuxberg); at Franz Joseph Land especially in West Bay, 2—10 fath. (Th. Scott); finally off Newfoundland, 67 fath. (Calman). — A few adult females taken at two localities in Alaska have "provisionally" been associated with *L. fuscata* by Calman (1912), but some of the differences from the normal form pointed out by him are in my opinion not unimportant, and I suppose that the specimens from Alaska belong to a separate species.

Hemilamprops G. O. Sars.

Of this genus 6 species have been established, and 3 among them are found in our area.

43. **Hemilamprops assimilis** G. O. Sars.

1883 *Hemilamprops assimilis* G. O. Sars, Forh. Vidensk. Selsk. Christiania for 1882, no. 18, p. 55, Tab. 1, Fig. 23—24.
1899 G. O. Sars, Account, III, p. 23, Pl. XV.
1913 Stebbing, Das Tierreich, 39. Lief., p. 56.

Occurrence. Not taken by the "Ingolf", but by the "Thor" at a single station.

South-West of the Faeroes: Lat. 61° 15′ N., Long. 9° 35′ W., 403—515 fath.; 3 specimens.

Distribution. First taken at Vardo in East Finmark, 30—50 fath., later besides at two places in West Finmark, 60—200 fath. (G. O. Sars). When Walker (teste Calman) recorded it from the Irish Sea off Co. Cork, I venture to suppose that the determination was not correct.

44. **Hemilamprops uniplicata** G. O. Sars.

1872 *Lamprops uniplicata* G. O. Sars, Forh. Vidensk. Selsk. Christiania for 1871, p. 270.
1899 *Hemilamprops uniplicata* G. O. Sars, Account, III, p. 24, Pls. XVI—XVII.
1913 Stebbing, Das Tierreich, 39. Lief. p. 58.

Occurrence. Not taken by the "Ingolf", but by the "Thor" at a single station.

South-West of the Faroes: Lat. 61° 07′ N., Long. 9° 30′ W., 443 fath.; 10 specimens (mutilated).

Distribution. West coast of Norway at five places, from Hardanger Fjord to Lofoten, 60– 150 fath.; rather far from Norway at Lat. 63°10′ N., 417 fath., temp. ÷ 1.0°, and at Lat. 66°41′ N., 350 fath., temp. ÷ 0.9° (G. O. Sars). Besides west of Ireland, 199 fath. (Calman). — Calman states that the species "is recorded, with an indication of doubt, from E. Loch Tarbest (L. Fyne) by Brook and Scott"; its occurrence in that Loch may be possible, but is not very probable.

45. **Hemilamprops cristata** G. O. Sars.

1870. *Lamprops cristata* G. O. Sars, Forh. Vidensk. Selsk. Christiania for 1869, p. 157.
!1900. *Hemilamprops cristata* G. O. Sars, Account, III, p. 25, Pl. XVIII.
1913. — — Stebbing, Das Tierreich, 39. Lief., p. 57.

As Calman points out differences between the telson in most of his specimens and Sars' account, it may be stated, that I have examined the telson in many females and found it to agree with Sars' figure both in shape and in length and number of spines, excepting that sometimes four pairs of lateral spines were found. Calman suspects that *H. Normani* Bonnier will prove to be a synonym to *H. cristata*; it may be possible, but seems to me rather improbable. — It may be mentioned that the Epicarid *Cumocchus insignis* H. J. H. was found in the marsupium of three females from Lat. 61°07′, Long. 9°30′ W.,

Occurrence. Taken by the "Ingolf" at a single station.

Davis Strait: Stat. 25: Lat. 63°30′ N., Long. 54°25′ W., 582 fath., temp. 3.3°; 2 specimens.

Besides taken by the "Thor" at 4 localities in our area.

South of Iceland: Lat. 63°15′ N., Long. 22°23′ W., 114—172 fath.; 4 specimens.
— - — Lat. 62°10′ N., Long. 19°36′ W., 1010—1142 fath.; 6 specimens.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 12 specimens.
— — — Lat. 61°07′ N., Long. 9°30′ W., 443 fath.; 84 specimens.

Distribution. Taken four times in Skager Rak between Jutland and Norway, 226—350 fath. (H. J. Hansen); the "Thor" captured it south-west of Norway at Lat. 58°32′ N., Long. 4°18′ E., 148 fath. At the west coast of Norway in several places from Hardanger Fjord to Lofoten "in depths of more than 100 fathoms" (G. O. Sars), yet in 1886 Sars stated to have gathered it at Husö in 80—100 fath. The "Thor" secured it north-east of Shetland, Lat. 61°14′ N., Long. 1°19′ E., 85 fath.; Norman recorded it from south of Rockall, Lat. 56°07′ N., Long. 14°19′ W., 630 fath., and Calman from five stations west of Ireland, 199—382 fath. But when Sars (1900) writes: "British Isles (Robertson)", it can only be founded on a single locality; according to Norman it was in 1860 published by Robertson that this species had been taken in the Firth of Clyde.

Platytyphlops Stebbing.

Of this very interesting genus only 2 species are known, one from each hemisphere. The northern species has been discovered in the "Ingolf" area.

46. Platytyphlops orbicularis Calm.

[illegible] *Platy[illegible]* Calman, Fisheries, Ireland, Sci. Invest., 1904, I, p. 43, Pl. V, figs. 77—81.
[illegible] *P[illegible]* Calman, Proc. U. S. Nat. Mus., vol. 41, p. 631, figs. 29—39.
[illegible] *P[illegible]* Stebbing, Das Tierreich, 39 Lief., p. 158.

Occurrence. Not taken by the "Ingolf", but by the "Thor" at a single station
South West of the Færoes: Lat. 61° 7' N., Long. 9° 30' W., 443 fath., 12 specimens, all mutilated, most of them fragments.

Distribution. The species was established on a specimen gathered west of Ireland: 77 miles W. N. W. of Achill Head, co. Mayo, 382 fath. (Calman). Later it has been recorded from 4 stations situated off the east coast of America, from Lat. 39° 54½' N., Long. 70° 20' W. to Lat. 39° 42' N., Long. 71° 32' W., depths 335—555 fath. (Calman).

Platysympus Stebbing.

Of this fine genus only 2 species are known. One among them, *P. typicus* G. O. Sars, has been taken at the west coast of Norway in some localities from Lofoten to Hardanger Fjord, besides west of Ireland and in the Mediterranean, consequently it might be possible to find it in the southern part of the "Ingolf" area. It has, however, not been discovered there, but I was somewhat surprised in seeing that a couple of specimens of *Platysympus* taken south of Iceland belong to a new species.

47. Platysympus tricarinatus n. sp.
(Pl. IV, figs. 3 a—3 c).

Immature Specimens (Male and Female). Carapace (fig. 3 a) seems to be proportionately a little broader than in *P. typicus* G. O. S., and with the lateral margins less converging forwards, but as it is cracked in both specimens some uncertainty as to the outline remains. But a valid difference between it and that in the last-named species is that its surface is adorned with three obtuse but distinct keels, one in the median line, and one about halfway between the median keel and the lateral margin; these sublateral keels cease anteriorly near the end of the fissure separating the pseudorostrum; the surface is a little hollowed along the lateral margins. First free segment differs extremely from that in *P. typicus*; it is scarcely half as broad as the carapace, with each antero-lateral corner produced, curved somewhat forwards and acute, while about the posterior half is strongly narrowed, less than half as broad as the anterior part, and the lateral margins of the segment are therefore very concave. Second free segment without distinct keels.

Antennulæ, the three pairs of maxillipeds and second pair of legs differ only in a few minute particulars from Sars' figures of *P. typicus*; the other cephalothoracic appendages are mutilated. — Uropods (fig. 3 b) nearly as in *P. typicus*; peduncle slightly shorter than the two posterior abdominal segments together and conspicuously longer than the endopod; both peduncle and endopod as in *P. typicus*, but the exopod differs in reaching distinctly beyond the end of second joint of the endopod, while in the other species it does not

reach that end. Telson with the proximal part of the lateral margins more convex, while these margins are about at their middle more concave than in *P. typicus*, according to Sars' figure; the end with 3 spines, but a smaller spine is in both specimens observed on one of the coarsely serrated lateral margins near the end.

Length of the young male 5.6 mm, of the female with the marsupium rudimentary 5.7 mm.

Remarks. By the three keels on the carapace and above all by the curious shape of the narrow first free thoracic segment this species differs strongly from *P. typicus*.

Occurrence. Not taken by the "Ingolf", but by the "Thor" at a single station.

South of Iceland: Lat. 62°57′ N., Long. 19°58′ W., 508 fath.; 2 immature, mutilated specimens.

Family Diastylidæ.

This large family, which is distributed all over the world, is especially represented in the arctic-subarctic and boreal regions by a large number of species; from the "Ingolf" area 19 species are dealt with in the present paper. But some questions as to the limitation of its genera are difficult; certain features frequently used are of slight value as generic characters. For instance, rudimentary exopods in third and fourth pairs of legs in the female are found in *Leptostylis* and wanting in *Diastyloides*, while in *Diastylis* they are wanting in most species, but according to Calman (1912) distinct in some forms. Whether third and fourth free thoracic segments are fused or separated is another feature used as generic character, but it has scarcely been observed that every transition between complete fusion of these segments without vestige of dorsal suture and movable articulation of these segments against one another can be pointed out; a few facts may be mentioned. Sars says that in *Diastylopsis resima* Kr. (referred here to *Brachydiastylis* Stebb.) these two segments "are very firmly connected", but "a well-marked suture may in reality be proved to exist between them"; in *Makrocylindrus spiniventris* n. sp., the suture is distinct on the sides but its transverse part on the dorsal surface is wanting. In the female of the gigantic *Diastylis Goodsiri* Bell these segments are seemingly both dorsally and on the sides well separated, but a closer inspection shows that the furrow between them is firmly chitinized, so that they are immovably coalesced. In *Diastylis polaris* G. O. S. and *Diastylis longicaudata* Bonnier there is a narrow but real, movable articulation between the two segments, especially on the dorsal side; *D. scorpioides* Lep. is intermediate between *D. Goodsiri* and *D. polaris*; in *Diastyloides serrata* G. O. S. and *Leptostylis grandis* n. sp. the articulation is well developed.

Taking these and other difficulties into consideration, I decided as to the genera to follow a middle way between Stebbing and Zimmer. The genus *Adiastylis* Stebb. is not adopted, but *Brachydiastylis* Stebb. is maintained, especially because a new species allied to *B. resima* Kr. shows some of the peculiarities found in that Kröyerian species developed to a still higher degree, so that these two species constitute a natural group. Finally it may be stated here that for reasons to be given later on a new species is referred to *Makrocylindrus* Stebb., though it differs from the diagnosis of this genus in a special feature of the telson. — Five genera are represented in the material.

Diastylis Say

The collection contains 9 species, one among them new, but an additional species not seen by me was secured by the "Valorous" near Davis Strait, and must of course be included.

48. Diastylis Rathkii Kr.

1841 *Cuma Rathkii* Kroyer, Naturh. Tidsskr. B. III, p. 513, 531, Tab. V, VI, Fig. 17—30.
1846 — — Kroyer, Naturh., Tidsskr., Ny Række, B. II, p. 144, 207, Tab. I, Fig. 4 and 6.
— — *angulata* Kroyer, Naturh. Tidsskr., Ny Række, B. II, p. 156, 206, Tab. I, Fig. 2, Tab. II, Fig. 1, a—i [5].
1849 — *Rathkii* Kroyer, in Gaimard, Voy. en Scand., Crust. Pl. V, fig. 1, a—u.
— — — *angulata* Kroyer, in Gaimard, Voy. en Scand., Crust. Pl. V, fig. 2 a—x [5].
1900 *Diastylis Rathkei* G. O. Sars, Account, III, p. 44, Pls. XXXIII—XXXIV.
— — — *Rathkei* var. G. O. Sars, Account, III, p. 107, Pls. LXX—LXXII.
1913. — *rathkii* Stebbing, Das Tierreich, 39. Lief., p. 98 (with the enormous synonymy).

It may be mentioned that in the marsupium of females from West Greenland specimens have been found of *Sphaeronella decorata* H. J. H., a parasitic Copepod of the family Choniostomatidæ.

Occurrence. Taken by the "Ingolf" at 7 stations.

Davis Strait: Stat. 32: Lat. 66°35′ N., Long. 56°38′ W., 318 fath., temp. 3.9°; 8 specimens.
— — Stat. 35: Lat. 65°16′ N., Long. 55°05′ W., 362 fath., temp. 3.6°; 11 specimens.
Stat. 28: Lat. 65°14′ N., Long. 55°42′ W., 420 fath., temp. 3.5°; numerous specimens.
— — Stat. 27: Lat. 64°54′ N., Long. 55°10′ W., 393 fath., temp. 3.0°; 6 specimens.
Stat. 25: Lat. 63°30′ N., Long. 54°25′ W., 582 fath., temp. 3.3°; several specimens.
South-East of Iceland: Stat. 4: Lat. 64°07′ N., Long. 11°12′ W., 237 fath., temp. 2.5°; 1 specimen.
North-West of the Faeroes: Stat. 138: Lat. 63°26′ N., Long. 7°56′ W., 471 fath., temp. ? 0.6°; 7 specimens.

This species is common at West Greenland; already in 1888 I enumerated 17 localities — most of them near the coast and 5 among them more distant from land in Baffin Bay or Davis Strait — between Lat. 72° 41′ N. and 60° N.; the depths were most frequently from ab. 10 to 50 fath., but six among them from 215 to 410 fath. Later it has been found at two places on the same coast not recorded in the literature, viz. at Egedesminde by Prof. Bergendal, and at Holstensborg (Lat. 66°56′ N.) by Mag. Traustedt; Stephensen records it from Northern Strömfjord, ab. Lat. 67°42′ N., 30 fath. and 4—11 fath., and from Brede Fjord, ab. Lat. 61° N., 2½—5 and 5—8 fath. Ohlin and Ortmann recorded it from two places very far northwards in West Greenland, viz. Barden Bay, ab. Lat. 77°30′ N., 20—25 fath., and Murchison Sound, ab. Lat. 77°39′ N., 25 fath.

The "Thor" gathered this species south-west of Iceland: Lat. 63°46′ N., Long. 22°56′ W., 80 fath.; [illegible] Iceland it has been taken by Dr. A. C. Johansen in Loons Vik, 40 fath. — Norman records it from [illegible] at the Faroes: Lat. 60°31′ N., Long. 9°18′ W., 220 fath. — At East Greenland it has been

captured six times; the IInd Amdrup-Expedition gathered it at ab. Lat. 74°28′ N., Long. 15°36′ W., 110 fath., and in Hurry Inlet, Lat. 70°50′ N., 50 fath. Ohlin recorded it from Lat. 70°43′ N., Long. 22°29′ W., Scoresby Sound, 37 fath.; Lat. 72°28′ N., Long 21°48′ W., 95 fath., and Lat. 74°52′ N., Long. 17°16′ W., 186 fath. Finally taken by the Duc d'Orléans near Lat. 75°58′ N., Long. 14°08′ W., 159 fath.

Distribution. Found in some parts of Kattegat, common in both Belts and also going through the Sound to the Baltic, where it has been taken in the Bay of Kiel, off Bornholm and eastwards to Gotland (various authors); it occurs generally in the deeper tracts of the named areas, is rare in 7—8 fath., though yet found in $3^1/_2$ fath. In Skager Rak it was secured several times in 35 to 110 fath., but also taken in ab. 220 and 350 fath. (H. J. Hansen). It occurs along the whole coast of Norway, generally in 10 to 30 fath: (G. O. Sars), was taken between Greenland and Spitzbergen at Lat. 81°00′ N., Long. 1°00′ E., 540 fath. (G. O. Sars), and a few times at western and northern Spitzbergen, northwards to Lat. 81°20′ N., in depths from 80 to 531 fath. (Sars, Ohlin, Zimmer). Furthermore it was recorded from Franz Joseph Land (Heller, Th. Scott), from places in the Barents Sea, 60 and 120 fath. (Hoek, Stuxberg), from places at the west and south coasts of Novaya Zemlya, Matotschkin Schar and Jugor Schar in depths from 4—10 fath. and down to 30—70 fath. (Stuxberg, Stappers); from several places in the Kara Sea in depths from 3 to 60 fath. (Stuxberg, H. J. Hansen), besides in the Sibirian Ocean at Long. 78°40′ E., 26 fath., at Long. 80°58′ E., 5 fath., and at several places between Cape Tchélyuskine and Long. 173°24′ W., near Bering Strait, 3 to 12 fath. (Stuxberg).

G. O. Sars recorded this species from two stations in the cold deep sea area west of Norway, viz. Lat. 69°46′ N., Long. 16°15′ E., 649 fath., temp. ÷ 0.7°, and Lat. 62°44′ N., Long. 1°48′ E., 412 fath., temp. ÷ 1.0°. It is common in the North Sea southwards to the Belgian coast; has been found at places on the eastern and western coast of Scotland and England and at the south coast of Devon and Cornwall (various authors), but is unknown from the west side of Ireland (Calman). It has been taken at Port Kennedy (Bate, as *D. borcalis*), at five places at the east coast of Baffin Land between Lat. 73°43′ N. and Lat. 71°42′ N. in 5—10 and down to 10—28 fath., and at Lat. 66°33′ N., 6 fath. (Ohlin); in places at Labrador in depths from 7 to 50 fath.; at some stations off Halifax and the east coast of America southwards to Lat. 41°11$^1/_2$′ N., 20 to 499 fath. (S. I. Smith; Calman); finally at Point Franklin on the east side of Bering Strait (Murdoch), and at a number of places at Alaska and the Aleutian Islands southwards to Sitka, in depths from 5—7 and down to 15—20 fath. (Calman).

The distribution of this species is very interesting. It is really circumpolar and goes southwards to the southern coast of Cornwall; it is generally found in depths from 10 to 50 fath., but has been taken in 3 fath., and several times in depths from 300 to 649 fath. Furthermore it seems rather independent both of salinity and temperature, because it goes far eastward in the Baltic and has been captured not only in 300 to 582 fath. at stations belonging to the warm area, but also by Sars and the "Ingolf" in 412, 471 and 649 fath. at stations belonging to the cold deep-sea area[1]. Extremely few, if any, other species of Malaco-

[1] Here a special point may be mentioned Ohlin imputes me to have committed an error in 1888 in saying that *D. Rathkii* had been recorded by Norman from the entrance of Davis Strait, 1750 fath., but I said that *D. Rathkii* had been taken at West Greenland in every depth down to 410 fath., the greatest depth where dredging had been undertaken, excepting that by Norman in 1750 fath. Consequently I did not include 1750 fath. as a locality for this species.

... wide geographical distribution together with so great independence of depth, temperature and salinity of water.

49. **Diastylis lucifera** Kr.

1841 *Cuma lucifera* Kroyer, Naturh. Tidsskr. B. III, p. 527, 531, Tab. VI, Fig. 34—35.
1848 — — Kroyer, Naturh. Tidsskr. Ny R, B. II, p. 171, 207.
1850 — — Kroyer, in Gaimard, Voy. en Scand., Crust. Pl. III, fig. 3, a—k.
1903 *Diastylis* — G. O. Sars, Account, III, p. 49, Pl. XXXVIII.
1913 — *lucifera* Stebbing, Das Tierreich, 39. Lief. p. 101.

Occurrence. Taken by the "Ingolf" at 4 stations.

Davis Strait Stat. 31 Lat. 66° 35′ N., Long. 55° 54′ W., 88 fath., temp. 1.6°, 1 specimen.
— — Stat. 32 Lat. 66° 35′ N., Long. 56° 38′ W., 318 fath., temp. 3.9°; 18 specimens.
— — Stat. 35 Lat. 65° 16′ N., Long. 55°05′ W., 362 fath., temp. 3.6°; 14 specimens.
— — Stat. 28 Lat. 65° 14′ N., Long. 55° 42′ W., 420 fath., temp. 3.5°, 11 specimens.

Distribution. Distributed in the major part of Kattegat, entering the northern half of the Sound and going through Store Belt into Langelands Belt; the depths generally 12 to 30 fath., a single time only 8 fath., furthermore frequently captured in Skager Rak in depths from 35 to 350 fath. (Meinert, H. J. Hansen). It is rather common along the whole coast of Norway, from the innermost part of Christiania Fjord to Vadso, in 20 to 50 fath. (G. O. Sars). It is rather common in the major part of the North Sea, in the eastern part southwards at least to Lat. 55° (Ehrenbaum), while in its western tracts it has been taken near Aberdeen, in Firth of Forth (Th. Scott) and at some places at Northumberland and Durham, 25 to 59 fath. (Norman and Brady); Norman records it from a place near Plymouth. Calman records it from off Newfoundland, 200 fath., and from the Gulf of Maine, 54 fath.; S. I. Smith possessed it from the Bay of Fundy, 60 and 77 fath., Whiteaves from the Gulf of St. Lawrence.

50. **Diastylis hastata** n. sp.

(Pl. IV, figs. 4 a—4 e).

Adult Female (and immature Male). Cephalothorax, not including pseudorostrum, rather oblong both from above and from the side, nearly as slender as *D. Rathkii*. Carapace moderately vaulted above, and two-thirds of its dorsal margin somewhat sloping, especially anteriorly; major anterior part of the dorsal surface with a good number of irregularly distributed small or rather small spinules, and several such spines are also found on the anterior part of the sides; ocular lobe with a few minute denticles; the whole lower margin adorned with a close row of teeth which are long on the anterior part and also found on the posterior part of the pseudorostral projection, while on about the posterior two-thirds of the margin the teeth are conspicuously shorter but not more slender, and towards the hind margin they are subquadratic. Pseudorostrum extremely long, only somewhat or even a little shorter than the carapace from the front end of the ocular lobe to the posterior margin, considerably upturned, tapering regularly to the subacute end, with the upper margin, seen from the side, very feebly convex, while half of the lower margin has a small number of remote,

minute saw-teeth, and the posterior part of this margin is, as already mentioned, armed with strong and closely set teeth rapidly increasing in length to below the insertion of the antennulæ. Free thoracic segments rather considerably shorter than the carapace; last segment with two pairs of sublateral denticles, and sometimes also a pair of denticles on fourth segment; postero-lateral angle of last segment scarcely produced. Abdomen somewhat slender; the two anterior segments each with a pair of sublateral denticles, and sometimes also a pair of denticles on fourth segment; fifth segment long, almost twice as long as the sixth, with about four pairs of sublateral denticles on its posterior third; sixth segment with a pair of sublateral denticles near the posterior margin.

Antennulæ (fig. 4 a) very long, as the peduncle is almost as long as pseudorostrum; its first joint seen from below about as long as the second, with a somewhat long tooth below and a similar tooth on the inner side at the end; third joint somewhat shorter than the second; upper flagellum considerably shorter than third peduncular joint, 3-jointed; lower flagellum shorter than first joint of the other flagellum, 3-jointed. Antennæ with a thin and moderately long, plumose seta on the end of the terminal joint; mandibles as in *Diastylis* sens. Sars. Third pair of maxillipeds normal; second joint a little broader and proportionately shorter than in *D. Rathkii*, and armed with several teeth along the distal part of its inner margin; ischium with a tooth on the inner margin, and merus with a tooth below; the long proximal joint of the exopod without teeth. First pair of legs (fig. 4 b) moderately long, stretched forwards reaching scarcely to the end of the antennular peduncles; second joint with about 7 strong teeth on the distal half of the inner margin and the same number of teeth below near the outer margin; propodus a little shorter than the carpus and much longer than the dactylus; the long proximal joint of the exopod with a number of teeth on the middle part of its outer margin. Second pair of legs (fig. 4 c) a little more than half as long as first pair; second joint with a few teeth on the inner margin and some teeth on the lower side; ischium with a somewhat small tooth on the inner corner; carpus about twice a long as the dactylus; the long proximal joint of the exopod with fine teeth on half of the outer margin. Third and fourth pairs of legs without exopods; fourth pair (fig. 4 d) with the carpus about twice as long as the two distal joints together. — Uropods somewhat long; peduncle in the adults almost as long as the two posterior abdominal segments together, with 6 or 7 spines on the inner margin; in subadult specimens without marsupium or with its plates small the peduncle is somewhat shorter (fig. 4 e) than the two abdominal segments together and with 6 marginal spines; rami long, as the exopod is only somewhat shorter than the peduncle and somewhat or rather little longer than the endopod, which is slender, 3-jointed, its first joint as long as the two distal joints combined, with 6 or 5 marginal spines in the adult, 5 or 4 such spines in subadult specimens; second joint longer than the third and with 2, or in the adult 3, marginal spines. Telson not much shorter than the peduncle of the uropods; its slender part is conspicuously longer than the thickened proximal portion, with 5 pairs of lateral spines; the terminal spines are longer and thicker than the lateral ones.

Length of the females with marsupium 6 mm.

Remarks. This interesting species is a typical *Diastylis*, excepting in having the pseudorostrum extremely long, even proportionately longer than in any other species of the order.

Occurrence. Gathered by the "Ingolf" at two deep stations in the warm area.

Davis Strait Stat. 24: Lat. 63° 06′ N., Long. 56° 00′ W., 1109 fath., temp. 2.4°; numerous specimens.
— — Stat. 36: Lat. 61° 50′ N., Long. 56° 21′ W., 1435 fath., temp. 1.5°; 4 specimens.

51. **Diastylis Goodsiri** Bell.

1853. *Diastylis Goodsiri* Bell, Belcher's Last of the Arctic Voy. Vol. II, p. 403, Pl. XXXIV, figs. 2, 2 a—q.
1880. *Diastylis Goodsiri* H. J. Hansen, Dijmphna-Togtets zool.-bot. Udbytte, p. 241, Tab. XXII, Fig. 5—5 n, Tab. XXIII, Fig. 1—1 e.
1880. — — G. O. Sars, Account, III, p. 54, Pl. XLI.
1901. — *goodsiri* Stebbing, Das Tierreich, 30. Lief. p. 99.

Occurrence. Taken by the "Ingolf" at 3 stations.

Davis Strait Stat. 32: Lat. 66° 35′ N., Long. 56° 38′ W., 318 fath., temp. 3.9°, 3 specimens.
— — Stat. 35: Lat. 65° 16′ N., Long. 55° 05′ W., 362 fath., temp. 3.6°; 4 specimens.
South of Jan Mayen: Stat. 115: Lat. 70° 50′ N., Long. 8° 29′ W., 86 fath., temp. 0.1°; 12 specimens.

Ortmann and Ohlin recorded it from two localities in the most northern West Greenland, viz. Foulke Fjord (Lat. 78° 18′ N.) 15—20 fath., and Murchison Sound (ab. Lat. 77° 30′ N.) 50 fath.

Furthermore it is known from two places in Davis Strait, viz. Lat. 66° 45′ N., Long. 56° 30′ W., ab. 200 fath. (K. Stephensen), and Lat. 65° 35′ N., Long. 54° 50′ W., 80 fath. (H. J. Hansen); besides taken in Bredefjord, West Greenland, at Lat. 60° 45′ N., 133—148 fath., and ab. 6 miles further south in Skovfjord, 34½—48 fath. (K. Stephensen).

At Iceland this species has been gathered a few times; on the north-western side it was taken by the "Thor" in Onundar Fjord, 12—0 fath.; on the northern side by Admiral Wandel in Skagestrands Bugt, 110 fath., temp. 2.9°, and by the "Thor" off Husavik, 43 and 48—53 fath.; at the east coast by the "Thor" in Rode Fjord, 74 fath. — The IInd Amdrup-Expedition collected it at Jan Mayen, ca. 55 fath., and at two places off East Greenland, viz. in Hurry Inlet, Lat. 70° 50′ N., 7—0 fath., 2 large females, and at ab. Lat. 74° 28′ N., Long. 15° 36′ W., 110 fath., 1 large female. Ohlin recorded it from four places at East Greenland between Lat. 70° 43′ N., and Lat. 74° 10′ N., depths 13—21 to 106 fath.

Distribution. Taken at the north-western side of Norway, in Fjords near Tromso at ab. Lat. 69½° N., further north in Porsanger Fjord, and at the east coast in Varanger Fjord at Vadso, ab. 60 fath. (G. O. Sars). It is recorded from several places off Spitsbergen or in its Fjords or Sounds, 34—125 fath. (G. O. Sars, Ohlin, Zimmer); furthermore from Barents Sea, 148 fath., temp. + 1.4° (G. O. Sars), and from 8 other places in the same sea, 40 to 198 fath. (Hoek). Stuxberg recorded it from Matotschkin Schar, 5—15 and 30—70 fath.; in the Kara Sea it is common, taken in 16 to 40 fath. (Stuxberg, H. J. Hansen), and it has been found in the Sibirian Polar Sea eastwards to Lat. 76° 52′ N., Long. 116° 0′ E., 20 to 40—50 fath. (Stuxberg). Calman records it from five stations situated somewhat south-east of Cape Sable, Nova Scotia (at ab. Lat. 43°) northwards to Lat. 47° 40′, Long. 47° 35½′ W., in depths from 70 to 218 fath.; Ohlin possessed it from the west side of Davis Strait at Lat. 66° 33′, 6 fath., and from three places at the east coast of Baffin Land between Lat. 71° 57′ N. to Lat. 72° 38′ N., 5—20 to 10—28 fath. The type specimens were taken in Wellington Strait at Lat. 75° N., Long. 95° W.

52. **Diastylis polaris** G. O. Sars.

1872. *Diastylis polaris* G. O. Sars, Öfv. Kgl. Sv. Vet.-Akad. Förh. Årg. 38, p. 797.
1872. — *stygia* G. O. Sars, l. c. p. 798.
1873. — *polaris* G. O. Sars, Kgl. Sv. Vet.-Akad. Handl. Ny Följd, Bd. 11, no. 6, p. 4, Tafl. I, Fig. 1—3.
1873. — *stygia* G. O. Sars, l. c. p. 6, Tafl. II, Fig. 4—7.
1887. — — G. O. Sars, Challenger Rep. Vol. XIX, II, p. 44, Pls. VI—VIII.
1901. — *polaris* Ohlin, Bihang K. Sv. Vet.-Akad. Handl. Bd. 26, IV, no. 12, p. 50.
1913. — *stygius* and *polaris*, Stebbing, Das Tierreich, 39. Lief. p. 100.

More than a year before Ohlin cancelled *D. stygia* as a synonym to *D. polaris* I had arrived at the same result while determining the "Ingolf" material, viz. the specimens from Stat. 25 in the warm area and from the stations in the cold area. I found that two or three oblique rugæ were always more or less developed on the carapace, which is a character for *D. polaris*, while in females without marsupium and in immature males (adult males are unknown) each of the three anterior free thoracic segments has in the median ventral line a more or less developed denticle, and many, but not all, specimens have an erect, fine, spiniform denticle above on the last thoracic segment, but both these features are according to Sars (in 1872) characters for *D. stygia*. From Stat. 36 (1435 fath., in the warm area) three young specimens with the last pair of legs still wanting were put aside for future study; these specimens are proportionately large, the largest measuring 8 mm. in length, while specimens without last pair of legs from the cold area or from 582 fath. in the warm area are only about 5.8 mm long. When in 1919 the present paper was worked out, the material was again examined; I found that the young specimens from Stat. 36 have no vestige of oblique rugæ on the carapace and agree on the whole well with Sars' first description of *D. stygia*, excepting in possessing not a single spine but two spines in the median dorsal line of last thoracic segment, the first spine larger than the second, and Sars describes two such spines in his "Challenger" specimens. According to Sars first pair of legs are shorter in *D. stygia* than in *D. polaris*, and in the three specimens without rugæ the carpus of these legs is rather far from reaching the end of pseudorostrum — but in young specimens from the cold area with rugæ but still without last pair of legs, first legs show the same feature, because they are proportionately shorter in such young than in subadult or adult specimens. — The result is that I must consider absence of rugæ in the young specimens from Stat. 36 as mere variation, that *D. polaris* and *D. stygia* are the same species, which shows some variation, partly individual, partly according to localities. If *D. stygia* shall be kept as a separate form, the only character hitherto observed seems to be the absence of rugæ on the carapace — and of the "Ingolf" material only the specimens from Stat. 36 have no rugæ.

It may be mentioned that the Epicarid *Cumocchus insignis* H. J. H. was found in the marsupium of specimens from the "Ingolf" Stat. 113 and 138.

Occurrence. Taken by the "Ingolf" at 12 stations.

Davis Strait: Stat. 25: Lat. 63° 30′ N., Long. 54° 25′ W., 582 fath., temp. 3.3°; 16 specimens, the major part mutilated and young.

Davis Strait: Stat. 6: Lat. 61° 50′ N., Long. 56° 21′ W., 1435 fath., temp. 1.5° C.; 3 very young specimens.

North of Iceland: Stat. 124: Lat. 67° 40′ N., Long. 15° 40′ W., 495 fath., temp. −0.6° C., 1 specimen.

East of North Iceland: Stat. 102: Lat. 66° 23′ N., Long. 10° 26′ W., 750 fath., temp. +0.9° C., 5 specimens.

" " Stat. 104: Lat. 66° 23′ N., Long. 7° 25′ W., 957 fath., temp. +1.1° C.; 4 specimens.

North-East of Iceland: Stat. 120: Lat. 67° 29′ N., Long. 11° 32′ W., 885 fath., temp. +1.0° C.; 9 specimens.

" Stat. 119: Lat. 67° 53′ N., Long. 10° 19′ W., 1010 fath., temp. +1.0° C., 5 specimens.

South of Jan Mayen: Stat. 118: Lat. 68° 27′ N., Long. 8° 20′ W., 1060 fath., temp. +1.0° C.; 1 specimen.

" " " Stat. 117: Lat. 69° 13′ N., Long. 8° 23′ W., 1003 fath., temp. +1.0° C.; 10 specimens.

" " " Stat. 113: Lat. 69° 31′ N., Long. 7° 06′ W., 1309 fath., temp. +1.0° C.; ab. 30 specimens.

" " " Stat. 116: Lat. 70° 05′ N., Long. 8° 26′ W., 371 fath., temp. +0.4° C.; 1 specimen.

North of the Færoes: Stat. 130: Lat. 63° 36′ N., Long. 7° 30′ W., 702 fath., temp. +0.6° C.; 6 specimens.

Finally captured by the "Lightning" south-west of the Færoes: Lat. 60° 31′ N., Long. 9° 18′ W., 220 fath. (A. M. Norman, and determined by him as *D. polaris*). Sars recorded *D. polaris* from two places within the "Ingolf" area, viz. East of Iceland: Lat. 65° 53′ N., Long. 7° 18′ W., 1163 fath., temp. +1.1° C., and between Iceland and Jan Mayen: Lat. 69° 2′ N., Long. 11° 26′ W., 1004 fath., temp. +1.1° C.

Distribution. Sars' type of *D. polaris* was taken west of North Spitzbergen: Lat. 80° N., Long. 4° 5′ E., 950 fath., his type of *D. stygia* was taken between Spitzbergen and Greenland at Lat. 78° N., Long. 2° 27′ W., and the depth was stated to be 2600 fath., but Ohlin says that this is an exaggeration, as the greatest depth measured by modern and exact methods in the so-called "Swedish depth" is 3200 m., or ab. 1700 Danish fathoms. Besides the two above-named stations Sars recorded *D. polaris* from four and *D. stygia* from three stations, all situated in the cold area west of Norway and further north to west of Spitzbergen, between Lat. 69° 17′ N., and Lat. 77° 58′ N., 350 to 1333 fath. Ohlin recorded it from three places west and south-west of Spitzbergen with great depths, down to 1434 fath., temp. +1.3° to +1.4° C. Sars mentioned *D. stygia* from Lat. 41° 14′ N., Long. 65° 45′ W., off Nova Scotia, 1340 fath.; Calman records what he considers as *D. stygia* from twelve places off the east coast of the U.S. States between Lat. 41° 28½′ N. and Lat. 37° 25′ N., depths from 1149 to 181 fath. (a station with 146 fath. is with good reason suspected by Calman as an error.)

Norman referred with some uncertainty a couple of immature specimens from Lat. 48° 50′ N., Long. 11° 9′ W., 711 fath., to *D. stygia*, but one or two of features observed by him makes the determination somewhat questionable.

53. **Diastylis scorpioides** Lepechin.

1780. *Oniscus scorpioides* Lepechin, Acta Acad. Sc. Imp. Petropol., 1778, vol. I, p. 148, Tab. 8, fig. 2. [teste Stebbing].

1841. *Cuma Edwardsii* Kröyer, Naturh. Tidsskr. B. III, p. 504, 531, Tab. V, Fig. 1—16.

1846. — — Kröyer, Naturh. Tidsskr. Ny Række, B. II, p. 128, 207, Tab. I, Fig. 1, 1*, 3, 5, 9—14.

— — *brevirostris* Kröyer, l. c. p. 174, 208, Tab. II, Fig. 6 [♂].

1849. — *Edwardsii* Kröyer, in Gaimard; Voy. en Scand., Crust., Pl. IV, fig. 1, a—o.

— — *brevirostris* Kröyer, l. c. Pl. V A, fig. 1, a—t. [♂].

!1900. *Diastylis scorpioides* G. O. Sars, Account, III, p. 58, Pl. XLIV.

1911. — — Stappers, Camp. arct. Duc. d'Orléans, Crust. Malac. p. 112, Pl. IV, figs. 2—6, 11, 12.

1913. — — Stebbing, Das Tierreich, 39. Lief. p. 102.

Occurrence. Taken by the "Ingolf" at a single station.

Entrance of Brede Fjord, West Iceland: Stat. 86: Lat. 65°03′6 N., Long. 23°47′6 W., 76 fath., 1 specimen.

D. scorpioides is common at West Greenland. Ortmann recorded it from Barden Bay, 20—25 fath., and Robertson Bay, 5—15 fath., both places at ab. Lat. 77°30′ N., and besides from Granville Bay, ab. Lat. 77° N., 20—30 fath.; Ohlin mentioned it from Murchison Sound, ab. Lat. 77°30′ N., 50 fath.; Calman from Upernivik, Lat. 72°47′ N., 13 fath. In 1888 the present author enumerated it from ten localities at or off West Greenland between Lat. 71°10′ N., and Lat. 63°35′ N., depths from 8—10 to 200 fath.; in 1890 Prof. Bergendal secured it at two new localities, viz. Jakobshavn, Lat. 69°13′ N., 10 fath., and Egedesminde, Lat. 68°42′ N.; later K. Stephensen recorded it from Nordre Strømfjord, ab. Lat. 67°40′ N., depths from 4—11 and down to 27 fath., and from Bredefjord, ab. Lat. 60°45′ N., together with the more southern Skovfjord, depths from 5—8 and down to 120—153 fath.

On the northern side of Iceland this species has been taken by "Beskytteren" in Skjalfándi, 21 fath., and by the "Thor" off Husavik, 42—53 fath.; on the east side of Iceland, by Dr. A. C. Johansen in Bakke Fjord, 20—28 and 52—43 fath., and in Loons Vik, 40 fath.; by Mag. R. Horring in Faskruds Fjord, 50—20 fath.

The IInd Amdrup Expedition secured it at Jan Mayen, 50—60 and 55 fath., — at this island it has been taken by Prof. Nathorst in 7—11 and 12 fath. (Ohlin) — and in four places at East Greenland between Lat. 69°30′ N., and Lat. 74°17′ N., viz. Cape Dalton, 9—11 fath.; Turner Sound, 3 fath.; Hurry Inlet, 10 fath. and 7—0 fath., finally Cape Borlase Warren, 10 fath. It is on the whole common at northern East Greenland; in 1913 K. Stephensen puts together the statements published by Ohlin, H. J. Hansen and himself; he enumerates ten places between Lat. 70°27′ N. and Lat. 76°45′ N., and in most of these localities the depths were between 1 and 10 fath., the greatest depth 18—32 fath.

Distribution. Found at several places in North Norway, going southwards to Salten Fjord, ab. Lat. 67¼° N. (G. O. Sars).[1] Furthermore taken at some places on the east side of Spitzbergen, in 7—8

[1] In 1913 K. Stephensen wrote: »Helgoland (Ehrenbaum, 1895)«. Ehrenbaum has in his faunistic list (1897) not *D. scorpioides*, and it certainly does not live at Heligoland; an error must exist, but its origin may be difficult to trace.

[illegible] Zimmer, Ohlin), in the Murman Sea (Breitfuss), at a number of places on the west and east coast of Novaya Zemlya and in the straits to the Kara Sea, 4—6 and down to 30—70 fath. (Stuxberg, Stuxberg), in the Kara Sea and eastwards in the Sibirian Polar Sea to Long. 80½° E., 10 to 50 fath. (Stuxberg).

From Arctic America it is recorded by Sars, viz. from Jones Sound, Lat. 76° 29′ N., Long. 84° 04′ W., and from Smith Sound, Rice Strait. Ohlin possessed it from three places on the east coast of Baffin Land between Lat. 72° 38′ N. and Lat. 71° 57′ N., 5—10 and down to 10—28 fath. Calman records it from near Nain, Labrador, and from off Newfoundland, Lat. 47° 40′ N., 206 fath.

Thus *D. scorpioides* is an arctic species, which generally has been taken in shallow water, but sometimes occurs in 50 to 150 fath., and the greatest depth recorded is 206 fath.

54. **Diastylis spinulosa** Heller.

1875 *Diastylis spinulosus* Heller, Denkschr. Math. Nat. Classe Akad. Wissensch. in Wien, B. XXXV, p. 28, Taf. I, Fig. 5.

1885. — *nodosa* G. O. Sars, Norw. North.-Atl. Exp. Crust. I, p. 61, Pl. VII, figs. 1—4.

1900. — *spinulosa* G. O. Sars, Account, III, p. 55, Pl. XLII.

1901 — — Ohlin, Bihang K. Sv. Vet.-Akad. Handl. Bd. 26, IV, no. 12, p. 47, Pl. VI, figs. 10 a—d.

1904. — *spinulosus* Stebbing, Das Tierreich, 39. Lief., p. 94.

Occurrence. Taken by the "Ingolf" at two stations.

Davis Strait: Stat. 31: Lat. 66° 35′ N., Long. 55° 54′ W., 88 fath., temp. 1.6°, 1 specimen.

East of Iceland: Stat. 101: Lat. 66° 23′ N., Long. 12° 05′ W., 537 fath., temp. [illegible] 0.7°; 1 specimen.

It has been recorded from Murchison Sound, West Greenland, 50 fath. (Ohlin), and from four places off West Greenland in Baffin Bay and Davis Strait between Lat. 71° 10′ N. and Lat. 65° 11′ N. (H. J. Hansen, K. Stephensen). The IInd Amdrup-Expedition secured it two times at East Greenland, viz. north of Stewart Land, ab. Lat. 70° 30′ N., 158 fath., and at ab. Lat. 74° 28′ N., Long. 15° 36′ W., 110 fath.; Ohlin recorded it from Hurry Inlet, Scoresby Sound, Lat. 70° 43′ N., 37 fath.

Distribution. At Norway taken only in Porsanger Fjord and Varanger Fjord, thus the most northern and north-eastern Fjords, in about 100 fathoms. (G. O. Sars). Sars recorded it from a station somewhat north-east of Varanger, Lat. 70° 36′ N., Long. 32° 35′ E., 148 fath., temp. 1.9°; and from a more northern station, Lat. 73° 25′ N., Long. 31° 30′ E., 197 fath., temp. 2.2°. Ohlin recorded it from Lat. 73° 27′ N., Long. 21° 11′ E., 217 fath., temp. 2.67°. It has been taken seven times at both sides of Spitzbergen, northwards to Lat. 81° 14′ N., in depths from 5 to 231 fath. (Zimmer, Ohlin, G. O. Sars); furthermore five times in Barents Sea between Long. 22° 30′ E., and 45° 18′ E., 120 to 220 fath. (Hoek); between Franz Joseph Land and Novaya Zemlya (Heller) in Matotschkin Schar from 5—15 and down to 30—70 fath. (Stuxberg); in the Kara Sea from 32 to 60 fath. (Stuxberg, H. J. Hansen), and somewhat more eastwards in the Polar Sea to ab. Long. 120° E. in 22 to 36 fath. (Stuxberg). Finally it has been recorded by Ohlin from the east side of Baffin Land: Lat. 72° 38′ N., Long. 74° 20′ W., 10—28 fath. — When Lo Bianco records it from the Mediterranean, it must [illegible] (wrong) determination.

55. **Diastylis echinata** Bate.

1865. *Diastylis echinata* Bate, Ann. Mag. Nat. Hist. Ser. 3, Vol. XV, p. 81, Pl. I, fig. 1.
!1909. — — G. O. Sars, Account, III, p. 57, Pl. XLIII.
1913. — *echinatus* Stebbing, Das Tierreich, 39. Lief. p. 104.

It may be mentioned that the Epicarid *Cumoechus insignis* H. J. H. was found in the marsupium of two specimens from Lat. 61°07′ N., Long. 9°30′ W.

Occurrence. Taken by the "Ingolf" at two stations.

Davis Strait: Stat. 32: Lat. 66°35′ N., Long. 56°38′ W., 318 fath., temp. 3.9°; 3 specimens.
— — Stat. 25: Lat. 63°30′ N., Long. 54°25′ W., 582 fath., temp. 3.3°; 3 specimens.

Besides captured by the "Thor" at 3 places within the "Ingolf" area.

South of Iceland: Lat. 63°15′ N., Long. 22°23′ W., 114—172 fath.; 1 specimen.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 38 specimens.
— — — Lat. 61°07′ N., Long. 9°30′ W., 443 fath.; 19 specimens.

Distribution. Taken some few times in Skager Rak in depths from 110 to 350 fath. (Meinert, H. J. Hansen). At Norway distributed along the coast from Christiania Fjord to Hasvig in West Finmark, 100 to 417 fath. (G. O. Sars). Zimmer recorded it from north of Spitzbergen, Lat. 81°20′ N., Long. 20°30′ E., 531 fath., which is somewhat surprising. Sars recorded it from off Norway in the cold area at two stations, viz. Lat. 66°41′ N., Long. 6°59′ E., 350 fath., temp. ÷ 0.9°, and Lat. 63°10′ N., Long. 5°0′ E., 417 fath., temp. ÷ 1.0°; Bates' type was taken off Shetland, and Norman recorded it from a place south-east of the Færoes: Lat. 60°10′ N., Long. 5°59′ W., 550 fath.; Calman mentions it from a place west of Ireland, 199 fath.[1]

56. **Diastylis longicaudata** Bonnier.

(Pl. IV, fig. 5 a).

!1896. *Leptostylis longicaudata* Bonnier, Ann. l'Univers. Lyon, vol. XXVI, p. 557, Pl. XXX, fig. 2 a—o.
1913. *Adiastylis longicaudatus* Stebbing, Das Tierreich, 39. Lief., p. 115.

Bonnier established this species on an immature female a little less than 10 mm. long. Three specimens from a single locality I refer to this form, though they differ in some particulars from his description. The two largest specimens are females with the marsupium half developed and measuring 8.1 mm.

The carapace agrees in outline completely with Bonnier's figure, and it is, as described by him, studded with innumerable denticles which, for the rest, differ considerably in size; the anterior half of the lateral margin behind pseudorostrum is finely serrated with obtuse teeth, and this serration is partly indicated in Bonnier's figure. The shape of the thoracic segments and abdomen, the antennulæ, the third pair of maxillipeds with a thick spine on the lower side of merus, the small but very distinct, biarticulated exopods

[1] In »Fauna Arctica» Zimmer refers *D. spinosa* Norman (1869) as a synonym to *D. echinata*, which is wrong (*D. spinosa* is the male of *D. Rathkii*), but the result is, that in his list of distribution the reference to Norman in 1869 and to Metzger, Möbius and Ehrenbaum on the occurrence of *D. echinata* in the North Sea must be cancelled. That Zimmer's statement: »dänische Gewässer, 550 F. (Norman 1894)« is wrong is easily seen, as no such depth is to be found near Denmark, but he has designated Norman's locality, the Færoe Channel, as »dänische Gewässer«

on distal fourth part of legs agree perfectly with Bonnier. But the differences in various minor features ought to be pointed out.

1) Bonnier does not mention or figure any spine on the upper surface of the free thoracic segments, and he states that the abdominal segments are "inermes"; in my two largest specimens the last thoracic segment has a single median dorsal denticle, and some small denticles are perceived on the upper side of the three especially of the two anterior abdominal segments. 2) On the distal joints in first pair of legs Bonnier says "le dactylopodite, un peu plus long que le propodite", and this agrees with his fig. 2 *m*, but in the single leg preserved in my specimens the dactylus, measured by micrometer, is a little shorter than the propodus; it may be added that in Sars' Account the dactylus in the forms belonging to this family is never longer and most frequently distinctly or considerably shorter than the propodus, and therefore I suppose that Bonnier's statement is due to a casual variation or anomaly in his specimen. 3) In one of my specimens the telson has some minute teeth on the proximal third of the lateral margin, but in the other specimen such teeth are scarcely discernible, in Bonnier's figure the telson has no lateral teeth. 4) Finally the French author says that the peduncle of the uropods has 7 spines on the distal half of the inner margin, but in a specimen I found on that margin 13 or 14 small spines — some of spines are lost, but their places of insertion distinct; (the rami are unfortunately mutilated or lost in my specimens). — The differences pointed out between Bonnier's representation and my animals are scarcely of specific value, but only variation.

Occurrence. Not taken by the "Ingolf", but by the "Thor" at a single station.

South-West of the Færoes: Lat. 61° 15′ N., Long. 9° 35′ W., 463—515 fath.; 3 specimens.

Distribution. The type was taken in the Bay of Biscay: Lat. 44° 36′ N., Long. 4° 25′ W., 345 fath. (Bonnier).

57. **Diastylis armata** Norman.

1879. *Diastylis armata* Norman, Ann. Mag. Nat. Hist. Ser. 5, Vol. III, p. 64.

1913. — *armatus* Stebbing, Das Tierreich, 39. Lief. p. 95.

Of this evidently rather characteristic species only the type specimen is known.

Occurrence. The single specimen was taken by the "Valorous" at the entrance of Davis Strait, Lat. 59° 10′ N., Long. 50° 25′ W., 1750 fath. (Norman).

Makrocylindrus Stebbing.

This genus was established in 1912, and *M. fragilis* Stebb. — from off Cape Natal — may be considered the generic type. The only distinctive character between *Makrocylindrus* and some species of *Diastylis* is that the telson has no lateral spines on the narrow and rather short distal part, but only the normal two distal spines. From Stebbing's representation of *M. fragilis* Zimmer points out another and more important generic character, viz. the remarkable reduction of the basal fan of second maxillipeds in adult females, but it is not known, as Zimmer says, whether this reduction is found in females of the other forms referred by Stebbing to this genus.

Our knowledge of the 3 or 4 European species of *Makrocylindrus*, viz. *M. serricauda* Th. Scott, *M. dubius* Bonn., *M. Josephinæ* G. O. S. (and *M. crinaceus* G. O. S.), together with *Diastylis longicaudata* Bonn., *D. longipes* G. O. S., *D. costata* Bonn. and *D. armata* Norm. is insufficient. These animals, which all have the thick part of the telson long and cylindrical, the narrow part rather short with three pairs of lateral spines or without spines, are not common, their integument is fragile and consequently damaged, they are more or less spiniferous, and this armature shows some variation; adult females have not been dissected and adult males are unknown. Under these circumstances it is sometimes not possible to refer specimens with certainty to species already described, or in every case to establish an absolutely valid new species, and the reference of species to a genus as *Makrocylindrus* must be provisional, as its diagnosis ought to be revised.

The material from our area comprises one of the species referred by Stebbing to *Makrocylindrus*, and besides a few specimens of a species which may be considered as new; this new species differs materially from Stebbing's diagnosis of the genus in possessing 3 pairs of dorsal spines on the distal part of telson, but as it in the shape of the carapace, the uropods, etc. seems to be related to the South African *M. fragilis*, it is provisionally referred to the present genus.

58. **Makrocylindrus Josephinæ** G. O. Sars.

1871. *Diastylis Josephinæ* G. O. Sars, Öfv. Kgl. Sv. Vet.-Akad. Förh. Årg. 37, p. 77.

!1871. — — G. O. Sars, Kgl. Sv. Vet.-Akad. Handl. Ny Följd, Bd. 9, no. 13, p. 36, Tafl. XV, Fig. 72—74.

1905. — — Calman, Fisheries, Ireland, Sci. Invest., 1904, I, p. 44.

1913. *Makrocylindrus Josephinæ* Stebbing, Das Tierreich, 39. Lief. p. 120.

Of this species I have examined 3 specimens, one from the "Ingolf" area, the others from more southern localities. In two females without marsupium somewhat more than the proximal half of the thick part of telson is serrated on the sides, in a female with marsupium half developed the saw-teeth on the sides are very small; in all three specimens the narrow part of the telson is completely smooth, while about the proximal half of the thick part is serrated in the ventral median line. — Calman (l. c.) mentions variation according to age in uropods and telson; on the uropods I can say nothing, but his remarks on the telson may possibly indicate that he, as suggested by Stebbing, did not separate it from *M. serricauda* Th. Scott.

Occurrence. Not taken by the "Ingolf", but by the "Thor" at a single locality.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 1 specimen (imm. ♀).

Distribution. Norman (1879) recorded it from Lat. 67°7′ N., Long. 5° 21′ W., 500 fath., a station near the polar circle in the cold area, wherefore I suppose that there is a misprint in the latitude 67° instead of 60° N., and this would agree better with the other stations from the "Lightning"-Expedition. The same author recorded it from the sea in the triangle: the Færoes—Shetland—the Hebrides, 344 to 542 fath., and from a point far south-west of Ireland, 725 fath.; the "Thor" captured a specimen not far from the last-named place, 674—624 fath. (Stephensen). Calman records it from west of Ireland, 199 to 454 fath., in 1910 from three places in the southern part of the Bay of Biscay and from one place south-west of Lissabon, depths from 196 to 718 fath.; Sars' type was taken south-west of Lissabon at Lat. 38°10½′ N., Long. 9°25′ W., 750 fath.

10. **Makrocylindrus spiniventris** n. sp.

(Pl. IV, figs. 6 a—6 d).

Adult male. Female. — Seen from the side the carapace, not including the considerably produced pseudorostrum, is a little oblong-ovate; seen from above it is rather oblong-oval. The ocular lobe without a small eye; in one specimen with a single large spine, in another (fig. 6 a) with a pair of similar large spines directed upwards and much forwards. Behind the ocular lobe the carapace has a transverse, sattle-shaped depression very conspicuous especially from the side (fig. 6 b); just behind the ocular lobe there is a smaller, and close behind this a large and thick, procurved spine. The upper margin of pseudorostrum is anteriorly curved much downwards, so that the end is rather obtuse, and a little behind this end a pair of dorsal, large, procurved spines, and close behind these two minute denticles, are found. Pseudorostrum has besides on the side below the ocular lobe two or three large and thick spines, and below the sattled-shaped depression and somewhat more backwards the lateral surface has a good number of somewhat small to minute denticles irregularly dispersed, behind the base of the antennæ the lower margin has 4 long and robust teeth, and behind them a few minute teeth. — The free thoracic segments smooth; third and fourth segments completely fused without any suture between them above and half downwards the sides (fig. 6 c). The abdominal segments increase in length from the second to the fifth, which is about as long as the sixth. First segment has below in the median line 3 very long, spiniform teeth rather near each other at their base but diverging strongly, and somewhat behind them a rather small tooth directed much backwards (in the figure indicated as seen through the leg); the same segment has, besides, between the upper surface and the side 2 or 3 spines, the posterior one strong. Second segment with a pair of robust sublateral denticles; the following segments show individual variation, as in one specimen they have no denticle, while in another specimen of the same size third and fourth segments have a similar pair of sublateral denticles, and fifth segment 3 pairs of sublateral denticles, the posterior pair robust.

Antennulæ (fig. 6 b) long; in the peduncle first joint has a long, spiniform process below at the end; second joint, which reaches beyond pseudorostrum, is a little less than twice as long as first joint and more than twice as long as the third; the upper flagellum scarcely as long as second peduncular joint, 4-jointed, with the 3 proximal joints subequal; lower flagellum somewhat longer than first joint of the upper, 3-jointed, but first and third joint very short. First pair of legs broken at the end of second joint, which is very robust with several strong teeth on the lower side. The three posterior pairs of legs have a single tooth or a couple of teeth on the proximal part of the anterior or posterior margin of second joint; merus of third and fourth pairs of legs somewhat elongated, but not fully half as long again as the three distal joints together, and these pairs each with a tiny rudiment of an exopod terminating in a seta; this rudiment is so small that on fig. 6 d it was necessary to render it proportionately too large. — Uropods (fig. 6 d) somewhat short and slender; the peduncle reaches about to the anal doors of the telson and has 5—7 spines on its inner margin; first joint of the endopod scarcely two-fifths as long as the peduncle, with 7 spines on the distal half of its margin; second joint somewhat short with 3 marginal spines (third joint mutilated in my specimens); the exopod slightly longer than the two proximal joints together of the endopod. Telson (fig. 6 d, and *t*) very long,

a little longer than the two posterior abdominal segments combined, with slightly more than its proximal two-thirds cylindrical and no vestige of lateral teeth on this part; the distal part much narroved towards the end which terminates in two short spines, while on the dorsal side of the telson before its end 3 pairs of sublateral spines are inserted, and the posterior pair of these spines longer than the terminal pair.

Length of two females without marsupium 7—7.1 mm.

Remarks. *M. spiniventris* agrees with *Diastylopsis*(?) *dubia* Bonnier in having third and fourth thoracic segments completely fused, in general outline, etc., but it differs in having the transverse sattle-shaped depression on the carapace, in the spines on the anterior part of carapace with pseudorostrum, in the relative length of the joints in the antennular peduncle and the armature of its first joint, in the upper antennular flagellum, in the extreme reduction of the exopods on third and fourth pairs of legs, in the armature of first abdominal segment, in having no lateral serration on the proximal part of telson, while its terminal part has 3 pairs of dorsal spines, finally in the number of spines on the endopod of the uropods. — *M. spiniventris* agrees more with *Diastylis longipes* G. O. S. as figured and described by G. O. Sars and Bonnier, and in spite of several differences I should have considered my animals as younger specimens of the last named species, if both Sars and especially Bonnier had not most distinctly figured third and fourth thoracic segments as well separated respectively by a suture and an articulation across the dorsal side; it may, for the rest, be added that there is such differences between Sars' representation of the immature male and Bonnier's description and figures of the immature female of *D. longipes*, that it does not seem unthinkable that the two authors have examined animals of different species.

In the remarks on *Makrocylindrus* (p. 65) I have said why I refer the new form to this genus.

Occurrence. Not taken by the "Ingolf", but by the "Thor" at a single station.

South-West of the Færoes: Lat. 61°15′ N., Long. 9°35′ W., 463—515 fath.; 3 immature females.

Diastyloides G. O. Sars.

Of the two species hitherto known at least one and probably both live within the "Ingolf" area, but have not yet been found there, while a third, undescribed form has been gathered.

60. **Diastyloides scabra** n. sp.

(Pl. IV, fig. 7 a).

Adult Female. The single specimen is somewhat mutilated with a part of the carapace broken, but the species can easily be made recognizable. Carapace as to general outline, shape of pseudorostrum, and serration on a little more than half of the lower margin as in *D. biplicata* G. O. S., but it has no vestige of dorso-lateral keels or plicæ, and its surface is scabrous, covered with distinct sharp granules; almost the posterior half of the lower margin is not serrated but seen from below crenulated. Postero-lateral angles of last thoracic segment produced into an acute point. The two anterior abdominal segments each with a pair of sublateral denticles near the posterior margin. Abdomen slender; fifth segment long, nearly as long as second and third segments together, and twice as long as the sixth segment.

first joint of the flagellum 1-second joint with most of the teeth on the inner margin less developed than in *D. serrata*. Second pair of legs with a couple of small teeth at the end of the inner margin of second joint, but without the long process found in *D. serrata* and *D. biplicata*, ischium with a small, slender tooth at the distal inner angle; carpus slender and about as long as the distal joints together. — Uropods (fig. 7 a) slender, peduncle a little longer than the two posterior abdominal segments combined, with about 8 spines on the inner margin; endopod somewhat shorter than the peduncle, its first joint somewhat less than twice as long as the two distal joints combined, with 7 spines on the inner margin, second joint conspicuously longer than the third with 2 spines, third joint with the long terminal spine and a small spine near the end; the exopod reaches distinctly beyond the second joint of the endopod. Telson (fig. 7 a) as long as the exopod of the uropods; its thickened part is short, while more than its distal half is very slender, with 4 pairs of lateral spines rather distant from each other, the terminal spines lost in the specimen.

Length of the adult female 5.1 mm.

Remarks. — *D. scabra* is instantly separated from *D. biplicata* in having no plicæ on the carapace, from *D. serrata* in having the distal part of the telson much longer and more slender, and by the proportionately shorter exopod of the uropods. — It may be remarked that I have not examined the mandibles of the single specimen, but the antennæ agree with those in *Diastyloides serrata*; besides telson, uropods, shape of carapace show close relationship to *D. biplicata*.

Occurrence. — Not taken by the "Ingolf", but by the "Thor" at a single station.

South-West of the Færoes: Lat. 61 07′ N., Long. 9 30′ W., 443 fath.; 1 female with marsupium.

Brachydiastylis Stebbing.

This genus was established on a single species of *Diastylis* of somewhat aberrant aspect, *D. resima* Kr. Among the material to hand is the adult female of another species, which is allied to *B. resima*, but possesses in a still higher degree most of the peculiar features which separate the last-named form from the species of *Diastylis*. Consequently it may be justified to keep the two species in a separate genus which may be distinguished by the following diagnosis.

Pseudorostrum, which is long and somewhat or much upturned, has at least in the female several plumose setæ along the lower margin and anteriorly upwards on the sides and above behind the end. Antennæ-fluke with the two proximal joints of the peduncle thick and short; third joint elongated, with a row of plumose setæ; upper flagellum 4-jointed, the lower 3-jointed. In the female third and fourth segments are immovably coalesced, and there is a considerable distance between the insertion of second and third pairs of legs. Second pair of legs in the female unusually short, not half as long as the first pair, in the male[1] second legs are anomalous, with second joint much expanded, carpus elongated and much longer than in the female, propodus narrowed into a long lateral process from the end. Third and fourth pairs of legs extremely robust and "adapted for digging", with several very thick setæ on the short and broad carpus, third legs with a long, spiniform

[1] Only male known to *B. resima* is known, but most probably second legs are in the male of *B. nimia* n. sp. built as in

process on the anterior margin of second joint towards the end. Uropods with the exopod elongated, much or very much longer than the endopod, and terminating in an extremely long seta. — The other features as in *Diastylis*.

61. **Brachydiastylis resima** Kröyer.

1846. *Cuma resima* Kröyer, Naturh. Tidsskr. Ny Række, B. II, p. 165, 206, Tab. II, Fig. 2 a—b.
1849. — — Kröyer, in Gaimard, Voy. en Scand., Crust. Pl. III, fig. 1, a—p.
!1900. *Diastylopsis resima* G. O. Sars, Account, III, p. 65, Pl. XLVII
1913. *Brachydiastylis resimus* Stebbing, Das Tierreich, 39. Lief. p. 107.

It may be remarked that Sars has not mentioned or figured the long, spiniform process on the anterior margin of second joint of third legs in the female; the process has the same size and shape as in *B. nimia* (shown in fig. 8 f on Pl. IV). Besides on Sars' figures the inner terminal seta on the exopod of the uropods is far too short; it is in reality longer than the exopod.

Occurrence. Taken by the "Ingolf" at a single locality.

North-West Iceland: Dyre Fjord, 20 fath.; about 10 specimens.

According to Kröyer a couple of specimens were secured by Holböll at "the southern Greenland", most probably Godthaab, Lat. 64° 11′ N. In 1900 Prof. Bergendal gathered 2 specimens at Jacobshavn, West Greenland at Lat. 69° 13′ N. A large number of specimens have been secured by Mag. W. Lundbeck at the north-west side of Iceland in Onundar Fjord, 11—12 fath.; at the east coast of Iceland it has been taken three times, viz. in Bakke Fjord, 12—15 fath., and Breiddals Vik, 6 fath., by Dr. A. C. Johansen; in Faskruds Fjord, 50—20 fath., by Mag. R. Horring. At East Greenland it has been found in three localities, viz. by the Ryder Expedition in Hekla Havn, Lat. 70° 27′ N., and by the IInd Amdrup Expedition at Cape Dalton, ab. Lat. 69° 30′ N., 9—11 fath., and off Hurry Inlet, Lat. 70° 50′ N., 20 fath.

Distribution. Taken several times in the eastern part of Kattegat, 12 to 23 fath., and three times in Skager Rak off Skagen, 70 and 110 fath. (Meinert, H. J. Hansen, Björck). Found in several places at the coast of Norway to Varanger Fjord, generally in 6 to 20 fath. (G. O. Sars). Furthermore taken in Advent Bay, West Spitzbergen, at Lat. 78° 16′ N., 60 fath. (G. O. Sars), at the west coast of Novaya Zemlya near Lat. 73° N., 6—10 fath., in Matotschkin Schar, 4—6 fath., and in the Kara Sea, 10 fath. (Stuxberg). Taken off Fair Island, north-east of Scotland (Th. Scott). Ohlin records it from the east coast of Baffin Land, Lat. 72° 38′ N., 12—16 fath.; Calman had it from a station off Nova Scotia at Lat. 45° 04′ N., 57 fath.

62. **Brachydiastylis nimia** n. sp.

(Pl. IV, figs. 8 a—8 g).

Adult Female. Cephalothorax seen from above (fig. 8 a) rather oblong, not including pseudorostrum twice as long as broad, with the major part of each lateral margin from outside the ocular lobe to the posterior end of third segment very feebly convex, and the lateral margins diverge feebly from off the ocular lobe to near the end of third segment. Seen from the side (fig. 8 c) the carapace with pseudorostrum is a little more than twice as long as deep, and the upper margin of pseudorostrum occupies somewhat more

than one-third of the length; it has above behind the ocular lobe a few denticles (fig. 8 b) and below these at the middle of each side two or three denticles; the antero-lateral corner below the base of the antennulae is produced into a long, oblong-triangular, acute process, from this process the lower margin is serrated almost to the posterior end, and nearly the anterior half of the saw-teeth are somewhat long and strong, but from before the middle to near the posterior end of the margin they are gradually smaller. Pseudorostrum long, moderately upturned, with the upper margin slightly sinuate, the lower margin posteriorly a little concave; this lower margin has 4 or 5 rather long, plumose setae, while 3 or 4 partly still longer setae are situated close together on the side and above just behind the obtuse end. The free thoracic segments longer than carapace without pseudorostrum, a distinct suture is observed between third and fourth segments on the upper surface. Abdomen somewhat slender and of middle length; fifth segment slightly longer than the sixth.

Antennulae (figs. 8 b and 8 c) long; the peduncle reaches beyond the end of pseudorostrum; upper flagellum nearly as long as third peduncular joint; lower flagellum as long as first joint of the upper. First pair of legs of moderate length as in *B. resima*; second joint (fig. 8 d) on the inner side with one very long, spiniform process, two teeth and some minute denticles; exopod with half of the outer margin of the long proximal joint serrated. Second pair of legs (fig. 8 e) proportionately very short; second joint with two good-sized processes and a few minute denticles on the inner margin; carpus only a little longer than the propodus, which is as long as the dactylus. Third pair (fig. 8 f) very robust; second joint with a long, strong, acute, a little curved, spiniform process on the anterior margin near the end; merus more than twice as long as the broad, short carpus, which has 7 very thick setae on the convex posterior (upper) margin; propodus small with 1 similar seta. Fourth legs in the main as third pair, though somewhat shorter and still more robust, but without any process on second joint; fifth legs considerably smaller than the preceding pair, but rather similar in structure. — Uropods (figs. 8 a and 8 g) only a little shorter than the six abdominal segments together; peduncle slightly longer than the two posterior segments combined, without spines, but with a few hairs especially on the outer margin; exopod even somewhat longer than the peduncle, with the inner terminal seta thin and only a little shorter than exopod and peduncle together, while the outer terminal seta is considerably shorter; the exopod is about three and a half times a long as the endopod, which consequently looks nearly rudimentary, is 3-jointed, terminates in a rather long spine and has 2 spines on the inner margin. Telson about two-thirds as long as the peduncle of the uropods, with the part behind the anal valves conspicuously shorter than the proximal part; this narrow part terminates in two long, pubescent spines, but the lateral margins have no spines, only some 3 pairs of hairs, and the distal pair is somewhat long and robust towards the base.

Length of an ovigerous female 3.6 mm.

Remarks. *B. nimia*, though allied to *B. resima*, differs in the outline of the carapace and especially in shape and direction of pseudorostrum. Besides the uropods with their extremely long exopod and very short endopod are very interesting and afford an excellent character.

Occurrence. Not taken by the "Ingolf", but by the IInd Amdrup-Expedition in a single locality.

East Greenland. North of Stewart Land, ab. Lat. 70 30′ N., 158 fath. (29. VII. 1900); 2 ovigerous females.

Leptostylis G. O. Sars.

Of this characteristic genus 4 species have been gathered in the "Ingolf" area; 1 among them is new to science.

63. **Leptostylis longimana** G. O. Sars.

1865. *Diastylis longimana* G. O. Sars, Forh. Vid. Selsk. Christiania for 1864, p. 173.
!1900. *Leptostylis* — G. O. Sars, Account, III, p. 68, Pl. XLVIII.
1913. — *longimanus* Stebbing, Das Tierreich, 39. Lief. p. 127.

Sars says (in 1900) that the carapace is only clothed with scattered small hairs; I have found some individual difference as to the number of such hairs, which vary from being present in a moderately good number (from Stat. 27) to very few or perhaps nearly none. In the most hairy specimen the characteristic uropods are completely as in typical specimens from the North Sea. It may be remarked that in different genera of Cumacea (f. inst. *Eudorella* and *Diastylis*) a low or a somewhat higher number of hairs on carapace (or abdomen) does not as a rule afford a specific character; perhaps hairs are frequently broken at the base and lost.

Occurrence. Taken by the "Ingolf" at 7 stations.

Davis Strait: Stat. 27: Lat. 64°54′ N., Long. 55°10′ W., 393 fath., temp. 3.8°; 1 specimen.
Denmark Strait: Stat. 91: Lat. 64°44′ N., Long. 31°00′ W., 1236 fath., temp. 3.1°; 1 specimen.
East of Iceland: Stat. 105: Lat. 65°34′ N., Long. 7°31′ W., 762 fath., temp. ÷ 0.8°; 1 specimen.
— - — Stat. 102: Lat. 66°23′ N., Long. 10°26′ W., 750 fath., temp. ÷ 0.9°; 2 specimens.
— - — Stat. 103: Lat. 66°23′ N., Long. 8°52′ W., 579 fath., temp. ÷ 0.6°; 1 specimen.
North-West of the Færoes: Stat. 138: Lat. 63°26′ N., Long. 7°56′ W., 471 fath., temp. ÷0.6°; 1 specimen.
— — — Stat. 139: Lat. 63°36′ N., Long. 7°30′ W., 702 fath., temp. ÷ 0.6°; 4 specimens.

Distribution. Taken a single time in northern Kattegat, 30 fath., and several times in Skager Rak in depths from 70 to 350 fath. (Meinert, H. J. Hansen). At Norway taken at the south and west coast from near Christiania to Lofoten, "generally" in depths from 30 to 100 fath. (G. O. Sars). Calman records it from west of Ireland, 199 and 382 fath.; S. I. Smith wrote that "a single female, apparently of this species, was dredged in Casco Bay".

It may be remarked that the bathymetrical distribution of this species and its occurrence both in the warm and the cold deep-sea area is rather interesting, especially as it has also been taken both in Kattegat and at Norway in a depth of only 30 fathoms.

In a female with marsupium from the "Ingolf" Stat. 138 a probably new species of *Homoeoscelis* (a genus of parasitic Copepoda of the family Choniostomatidæ) is found in the branchial cavities.

64. **Leptostylis grandis** n. sp.

Pl. IV, fig. 9 a).

Subadult Male. Carapace rather deep and long, more than twice as long as the dorsal side of the free thoracic segments, with a small number of hairs; seen from the side the outline of the cephalothorax is nearly as in the female of *L. macrura* as figured by Sars, but seen from above it is narrower, more oblong-ovate; pseudorostrum is moderately protruding, with the dorsal line horizontal, and the margin below the base is somewhat concave, thus constituting a feeble antennal notch and set with several quadrangular teeth; below and behind this notch the anterior half of the lower margin of the carapace is closely serrated with triangular teeth. Postero-lateral corner of fifth free segment angular, but not produced. Abdomen moderately slender and very long, a little less than half as long again as cephalothorax, as the latter is 3.5 mm. long, while the abdomen with telson is 5 mm. long; fifth segment very long, much longer than the fourth and fully twice as long as the sixth.

The antennular peduncles consist of three thick joints, but the terminal joint has not obtained the brush of sensory filaments, the flagella in this transition-stage afford scarcely any character. First pair of legs mutilated; second joint below on the distal part with a row of about 8 teeth. Second pair of legs with second joint as long as merus and carpus together; carpus consequently rather elongated, as long as dactylus plus half of the propodus. — Uropods (fig. 9 a) long; peduncle somewhat shorter than the two posterior abdominal segments together, somewhat less than twice as long as the endopod and twice as long as the exopod, with 15—16 spines on the inner margin; first joint of the endopod a little shorter than the two other joints together, with 3—4 spines on the inner margin; second joint slightly longer than the third, with a single spine; the exopod reaches the middle of third joint of the endopod. Telson nearly twice as long as broad; its terminal spines shorter than usual, only half as long as the breadth of telson; besides 2 pairs of lateral spines on the most distal part of telson.

Length of the subadult male 8.5 mm.

Remarks. *L. grandis* is considerably larger than any other species of this genus from the northern hemisphere. In general outline, length of abdomen, existence of teeth on the lower side of second joint of first legs and in relative length of the joints in second legs it is closely allied to *L. macrura* G. O. S., but it differs in the relative length of the joints in the endopod of the uropods and in the number of spines on the telson.

Occurrence. Taken by the "Ingolf" at a single very deep station in the warm area.

Davis Strait. Stat. 36. Lat. 61° 50′ N., Long. 56° 21′ W., 1435 fath., temp. 1.5°; 1 subadult and 1 very young male.

65. **Leptostylis ampullacea** Lilljeb.

1855. *Cuma ampullacea* Lilljeborg, Öfv. K. Sv. Vet.-Akad. Förh. Tolfte Arg., f. 1855, p. 120.

1880. *Leptostylis ampullacea* G. O. Sars, Account, III, p. 70, Pl. L, fig. 1.

1901. *Leptostylis ampullaceus* Stebbing, Das Tierreich, 39. Lief., p. 124.

Occurrence. Taken by the "Ingolf" at a single station.

North of Iceland. Stat. 127. Lat. 66° 33′ N., Long. 20° 05′ W., 44 fath., temp. 5.6°; 1 specimen.

Dr. A. C. Johansen has gathered this species in two places at the east coast of Iceland, viz. in Bakke Fjord, 25—32 fath., and 43—52 fath., and in Breiddals Vik, 6 fath.; Dr. Th. Mortensen captured it at the Færoes 6 miles north-west of Kalso, 60 fath.

Distribution. Taken several times in eastern Kattegat and the northern part of the Sound, rare in south-west Kattegat and the northern part of Store Belt; depths generally 14—16, but varying from 8 to 30—35 fath. (Meinert, H. J. Hansen). According to G. O. Sars found along the whole coast of Norway from Christiania Fjord to Vadso, 30 to 100 fath.; Norman wrote that he captured it in Throndhjems Fjord, 250—300 fath., a depth which seems to be somewhat doubtful. Norman records if from off co. Durham, 40 fath.; finally it has been found in the Gulf of Maine, 52—90 fath. (S. I. Smith).

66. **Leptostylis villosa** G. O. Sars.

1869. *Leptostylis villosa* G. O. Sars, Nyt Mag. for Naturv. 16. B., p. 344.
!1900. — — G. O. Sars, Account, III, p. 71, Pl. L, fig. 2.
1913. — *villosus* Stebbing, Das Tierreich, 39. Lief. p. 125.

Probably *L. gracilis* Stapp. and *L. borealis* Stapp., established respectively on adult males and on immature females captured partly in the same localities at the south coast of Novaya Zemlya, are synonyms to *L. villosa* G. O. S. — Stappers established both species in 1908, and his full account is found in Camp. arct. Duc d'Orléans, Crust. Malac., 1911, p. 116 and 120, Pls. V—VI, figs. 1—10; Pl. VII. Unfortunately Stappers does not mention any serration on the lower margin of the carapace, and his figures show no trace of saw-teeth, which certainly is erroneous, and in the present case it is especially unfortunate, because *L. villosa*, as pointed out and figured by Sars, is distinguished in having nearly the whole lower margin of the carapace adorned with very peculiarly formed, lamellar teeth. According to my own observation *L. villosa* shows some individual variation in the relative length of the exopod of the uropods, which sometimes is not much longer than the two proximal joints together of the endopod, sometimes reaches the middle of third joint; Stappers' figures of the uropods in his two species agree rather well with these appendages in *L. villosa*. Sars says that the two anterior free thoracic segments exhibit a structure as in *L. ampullacea*, viz. "each having the anterior edge emarginated in the middle, and forming on each side of the emargination a slight appressed lappet." This peculiar structure is well developed in adult females of *L. villosa* (as figured by Sars), but in females with the marsupium half developed the lappets are very feebly developed, and in females without marsupium and in males lappets are indistinct or wanting — consequently the absence of lappets in Stappers' specimens does not afford a specific character.

Occurrence. Taken by the "Ingolf" at 4 stations.

Davis Strait: Stat. 32: Lat. 66°35′ N., Long. 56°38′ W., 318 fath., temp. 3.9°; 1 specimen.

North of Iceland: Stat. 128: Lat. 66°50′ N., Long. 20°02′ W., 194 fath., temp. 0.6°; 4 specimens.

— - — Stat. 126: Lat. 67°19′ N., Long. 15°52′ W., 293 fath., temp. ÷ 0.5°; 1 specimen.

North-West of the Færoes: Stat. 138: Lat. 63°26′ N., Long. 7°56′ W., 471 fath., temp. ÷ 0.6°; 2 specimens.

The "Thor" captured this species at 3 stations.

South-West of Iceland. Lat. 61°40' N., Long. 22° 56' W., 80 fath.; hundreds of specimens.
Lat. 61° 15' N., Long. 22° 23' W., 114—172 fath.; 1 specimen.
South of Iceland. Lat. 61° 42' N., Long. 17° 34' W., 18—40 fath., 1 specimen.

Mr. W. Lundbeck has secured specimens at the north-west side of Iceland in Onundar Fjord, 150—180 fath. Dr. A. C. Johansen gathered it in two places at Iceland, viz. at the south-east coast in Loons Vik (40 fath.) and near the south coast at Vestman Islands, 68—70 fath.

Distribution. Found in the eastern part of Kattegat and the northern part of the Sound, 12 to 30 fath. (Meinert, H. J. Hansen, W. Bjorck); the "Thor" captured it two times in Skager Rak, 100 and 133 fath. At Norway captured in several places from Christiania Fjord to Vadso "in depths below 60 fathoms" (G. O. Sars). The "Thor" gathered it in the middle western part of the North Sea at Lat. 56° 33' N., Long. 1° 47' E., 45 fath., and Th. Scott records it from the western side of Scotland in the Firth of Clyde.

VII. The Order *Nebaliacea*.

Of this very small but extremely interesting order a single species has been known from Greenland since 1780. The "Ingolf" captured another species described from Norway. More than these 2 species cannot be expected to live in our area.

The four main-papers both on genera and species and on morphological structure, etc. have been published by Claus in 1888, by G. O. Sars in 1887 and 1896, and by Joh. Thiele in 1904. A paper by Joh. Thiele: "Beobachtungen über die Phylogenie der Crustaceenbeine" (1905), may be named, because it deals at some length with the appendages in Nebaliacea, but its ideas have never been and will scarcely ever be accepted by Zoologists with real knowledge of Crustacea. — In 1904 W. T. Calman published a valuable paper on the classification of the Malacostraca, and in his excellent hand-book (1909) the Zoologist will find a good view on the organization and position in the system of the series Leptostraca with the single recent order, the Nebaliacea.

In the present paper the morphological structure of the appendages in this order is treated, as I cannot accept the statements published by Claus, Sars or Thiele; the general outline of an appendage and the old idea that in Crustacea the sympod (or protopod) of legs etc. typically consists of two joints, or besides some superficial observations on musculature, have been the basis of their interpretations. It may be added that the investigation is a section of earlier studies on the morphology of the appendages, etc., of Arthropoda to be completed and published in a not too remote future.

The idea, on which the study is based, is that one ought to examine the chitinized pieces in appendages of Crustacea (or Arthropoda) — quite as a Zoologist examines the ossified parts in legs of Vertebrates, or the movable and immovable bones in heads of Pisces and Reptiles for comparison with the elements in birds or mammals. And as to the mouth-parts my point of departure is that their lobes are processes on the inner side from the joints, consequently a chitinized piece on the free posterior or lower side of each lobe of mandibulæ, maxillæ, maxillipeds, must be connected with the chitinized outer part of the joint, to which each lobe belongs.

Some further points may be mentioned. The musculature in legs may sometimes be of importance for the study of homology of joints, but the disappearance of musculature from a joint cannot as a rule be used in morphological interpretation, because muscles are not found when a joint shall not be moved; by fusion of two joints in an appendage the movement between them ceases, and when a joint is much reduced, its chitinized part proportionately small, muscles to its movement are frequently not found. From detailed study of the musculature in the head of various families of Diptera I have learnt, that a moderately well developed morphological element is in one family completely without musculature, while in other families it has an active, not only a passive function, is consequently larger and equipped with muscles. The chitinized tubes or plates of an appendage are the most important elements in morphological investigation; the musculature is secondary.

As the order Nebaliacea generally and with good reason is considered as the lowest type among the Malacostraca, one may expect that the appendages show some primitive features rather well preserved. Consequently my old "theory", that in the antennæ, mouth-parts and legs of Crustacea the sympod consists originally of three joints, should find some support in this order, and we shall see how far it can be realized. But before entering the topic a few remarks on the performance of such investigation may be made. In order to study the chitinized elements of appendages, especially of mouth-parts of Crustacea (or Arthropoda), it is frequently necessary to have the musculature partly or totally removed. It can be made in different ways, but it is sometimes necessary to put the object in a convenient solution of caustic potash, then to remove the dissolved contents by cautious handling in water or glycerine, examine the animal or the appendage first under the simple microscope, because it is then possible by the aid of two knifes as broad as a well-sized needle to discover the limits between the membranous parts and the more firmly chitinized elements; when laid under the compound microscope the cover-glass must be hindered by a minute wooden wedge from pressing the appendage.

The order Nebaliacea comprises 4 valid genera; but of *Nebaliella* Thiele and *Nebaliopsis* G. O. S. I have only a single young specimen of each genus, and the following study is in the main made on *Nebalia bipes* from Greenland. As *Nebaliella* exhibits two primitive features in the antennæ, Thiele's representation and an observation of my own are referred to.

The *Antennulæ* (fig. 10 a) are described by Sars and Thiele as having the peduncle 4-jointed, which is correct, but what they name first joint consists of two different parts. The large proximal part of this so-called joint must be interpreted as a protuding portion of the head (*h*); it is on the outer side marked off from the skeleton behind it by a fine curved line, which neither in *Nebalia* nor in *Nebaliella* shows the slightest degree of movability, when one attempts to move it by two minute knifes; furthermore the right protruding portion is united on the lower side with the left portion without any suture, and the whole undivided lower wall is well chitinized; at the distal end of this solid part is seen a narrow transverse band (*1*), which is firmly chitinized and very movable, in reality the first joint of the antennula. The 3 following joints of the peduncle are well known.

The *Antennæ* (fig. 10 a) are described by authors as having the peduncle 3-jointed in *Nebalia* and *Paranebalia*, 4-jointed in the two other genera; it has been seen by Sars and Thiele that in *Nebalia* the third

joint is really consists of two joints completely fused, and that these two joints are well separated in *Nebaliella* and *Nebaliopsis*. It is now generally admitted that the Nebaliacea are more related to the Mysidacea than to any other order. Furthermore it is known that in Mysidacea and Isopoda Asellota the sympod of the antenna consists of 3 joints, and that the exopod is more or less developed, furthermore that beyond the proximal two joints of the endopod are very different in aspect from the flagellum, so that in the Asellota with the exopod or squama much reduced the peduncle of the antenna consists of 6 distinct joints. We shall now see that the same parts are found in *Nebalia*. What the authors considered to be the first joint consists of two well separated joints (fig. 10 a, *1* and *2*), the first being in *Nebalia* well chitinized on most of its outer side and separated from the second by a narrow membrane. Near the end of the lower margin of third joint in *Nebalia* is on the outer side an insignificant, low elevation, but in *Nebaliella antarctica* is found, as figured by Thiele (1904), an oblong protuberance, which in my young specimen is well marked off and certainly is the reduced squama; in several Asellota the squama is also quite small and of similar shape. At the end of third joint the fourth is represented by a transverse, movable, well chitinized plate (fig. 10 *a*, *4*), also in Mysidacea and Asellota this joint is short. Fifth and sixth joints are, as already said, fused in *Nebalia*, well separated in *Nebaliella* and *Nebaliopsis*.

The *Maxillula* (fig. 10 b) are rather easy to investigate. Each consists of a proximal broad part, the sympod, and an extremely long "palp", the endopod. The sympod consists of 3 joints; first (*1*) and third (*3*) joints each with a lobe on the inner side, while second joint (*2*) has none, completely as in Mysidacea, Isopoda, etc. The chitinized elements of joints and lobes are seen in fig. 10 b; the membranous skin between them has a greyish shading. An exopod is wanting in this order.

The *Maxilla* (fig. 10 c) consist of a sympod with a 2-jointed endopod and an unjointed exopod. The sympod consists in other orders of Malacostraca of 3 most frequently well separated joints, with a lobe, frequently bifid, from second and from third joint, but never any lobe from first joint. In *Nebalia* the plate of first joint (*1*) is united with that of second joint, as there is no distinct line between them; the lobe from second joint (l^2) has its chitine bipartite, while the lobe from third joint (l^3) is only bifid.

The thoracic Legs (fig. 10 d). Only sympod and endopod need to be mentioned. The sympod consists according to authors of 2 joints, but it is in reality 3-jointed. The first joint can be seen by a strong pocket-lens in a *Nebalia*, when the carapace is taken away and the epipods pushed aside; the joint is short, but its outer side is well chitinized and well marked off both from the following joint with the epipod and from the tergite of the segment; seen from behind this joint (fig. 10 d, *1*) is a transverse triangle. Second joint (*2*) has a kind of low lobe on the inner side, and this lobe is always distinctly cleft rather little behind the distal end. As to third joint (*3*) it is difficult to decide where it terminates and the endopod begins. In *Nebalia* one can as a rule count 5 joints in the endopod, the two or three most distal marked off by a line across the leg, while between the more proximal joints this line is distinct only towards the inner margin. But in a couple of cases I counted with certainty 6 joints (fig. 10 d); the sympod was then considerably shorter as in additional, more proximal transverse line is visible near the inner margin and situated opposite the insertion of the exopod. — In the penultimate legs of *Paranebalia* I found features very valuable for the understanding. Near the inner margin of the narrow endopod of the leg five very small, narrow and

quite short musles are distributed with long intervals; these musles are longitudinal though somewhat oblique; each of the more distal muscles is crossed at its distal end by a distinct line on the leg indicating an articulation, while the line is indistinct across the second and could not be seen across the proximal muscle, which is situated a little beyond the base of the exopod, though near the opposite margin of the limb. As five muscles are distinct, we have consequently 5 movable joints in the endopod. But the last joint is very long, and its short terminal part is marked off by a moderately distinct very obliquely transverse line also seen and figured by Thiele, and partly indicated by Sars in his figure of the last thoracic leg. When this terminal piece is considered to be a joint we have 6 joints in the endopod, thus the same number as seems sometimes to exist in *Nebalia*. Consequently in all 9 joints in a thoracic leg. In all other orders of Malocastraca first joint, præcoxa, has disappeared, is in the Decapoda most probably a part of the pleuron bearing the pleurobranchiæ; in Mysidacea the leg has 7 joints plus a terminal claw, and this claw is probably a modified joint, viz. the short terminal joint observed in *Paranebalia*, while in *Nebalia* it is considerably longer.

The natatory Legs (fig. 10 e), four pairs, have according to authors a 2-jointed sympod. But on the exoskeleton of a *Nebalia* cleaned in caustic potash it is not difficult to see, that between the tergite and the long distal joint of the sympod small chitinized plates are found, and these are very naturally interpreted as belonging to two joints. Fig. 10 e shows the tergite (*t*), the plates (*1* and *2*) and the proximal part of the long joint (*3*) of third leg from the outer side in natural position; the lettering may be sufficient for the understanding. This structure is similar to that found in abdominal legs of *Cirolana*, *Æga* and *Arcturus* as described and figured in my work on the "Ingolf" Isopoda.

Nebalia Leach.

Two species have been found in the "Ingolf" area.

1. **Nebalia bipes** O. Fabr.

(Pl. IV, figs. 10 a—10 e).

1780. *Cancer bipes* O. Fabricius, Fauna Groenlandica, p. 246, fig. 2.
1847. *Nebalia bipes* Kröyer, Naturh. Tidsskr. Ny Række, Bd. II, p. 436.
1849. — — Kröyer, in Gaimard, Voy. en Scand. Pl. XL, fig. 2.
!1896. — — G. O. Sars, Fauna Norvegiæ, Bd. I, p. 9, Tab. I, Fig. 1—3; Tab. II—III, Tab. IV, Fig. 1—8; Tab. V.
1904. — — Thiele, Die Leptostraken, in Wiss. Ergebn. Deut. Tiefsee-Exped. Bd. VIII.

Occurrence. Not taken by the "Ingolf", but gathered by many collectors.

It has been secured at many places along the coast of West Greenland. It is recorded from Saunders Isl., ab. Lat. 76½° N., 5—10 fath (Ortmann); Cape Dudley Digges, Lat. 76°09′ N., 17—25 fath. (Ohlin); Lille Karajak Fjord, Lat. 70½° N. (Vanhöffen); Sondre Strømfjord, ab. Lat. 67⅔° N., 5 to 30 fath. (Stephensen); Lat. 66°59′ N., Long. 55°27′ W., 57 fath. (Norman); Kvanefjord, ab. Lat. 61°55′ N., Bredefjord, Skovfjord, Julianehaab (Lat. 60°43′ N.), in depths from 3 to 5—8 fath. (Stephensen). The Museum possesses specimens secured by seven collectors from the following hitherto unrecorded places in West Green-

[illegible] Nuuk (Lat. [illegible]2' N., 10 fath.), Egedesminde, Holstensborg, Ikertok Fjord, 30 fath., Godthaab, [illegible] fath., and places near Frederikshaab, 5 to 15 fath.

At Iceland it has been taken on the north-west side in Isefjord, 4 fath., by "Diana", on the east side in Bakke Fjord, 52—4, and 12—15 fath., by Dr. A. C. Johansen, and in Faskruds Fjord, 20—50 fath., by Mag. R. Hørring, finally on the south-west side at Reykjavik, 6 fath., "Diana". — At the Faeroes it has been gathered in Klaksvig, 10—15 fath., by Dr. Th. Mortensen.

At East Greenland this form has been taken at nine places recorded by Buchholz, Ohlin and K. Stephensen, and the last-named author has put them together in his Conspectus (1913). The places are situated between Lat. 70°45' N. and 73°6' N., the depths generally from 1½ to ab. 10 fath., excepting a single statement by Buchholz: 150 fath., which most probably is erroneous. Finally Mag. Kruuse secured a specimen at a more southern locality in East Greenland, viz. Tasiusak, Lat. 65°37' N.

Distribution. The Copenhagen Museum possesses specimens from two places in Kattegat and from Hornbæk, in the northern end of the Sound. Not rare along the coast of Norway, from Christiania Fjord to Vadsø, generally in 10 to 30 fath. (G. O. Sars). Recorded from West Spitzbergen at Lat. 79°43' N., 13—15 fath. (Ohlin); from various places at the British Isles, f. inst. at Northumberland and Durham, and at the south coast of Devon and Cornwall (Norman); from places at the east coast of Baffin Land northwards to Lat. 71°57' N., 5—20 fath. (Ohlin); finally from Unalaska, 8—12 fath. (Thiele).

So far it is possible to walk with tolerable certainty. But according to the literature *N. bipes* shall have a much wider distribution. Specimens of *Nebalia* with the eyes well developed have been found at various places in the Mediterranean, at the French coast and at Madeira (*N. Geoffroyi* H. Milne-Edw.); at Cuba; in the Red Sea; at Ceylon; at Japan (*N. japanensis* Claus); at the Pribyloff Islands; at Chile (*N. chilensis* Claus); in the Strait of Magellan; finally at New Zealand (*N. longicornis* Thoms.). In 1904 Thiele (op. cit.) referred all these "forms" to a northern species, *N. bipes* O. Fabr., and a southern species, *N. longicornis* G. M. Thomson, and speaks of "subspecies". One gets the impression that our present knowledge is quite insufficient, that a monograph of *Nebalia* based on rich material from most seas must be worked out by an able Zoologist, who after a critical study of the animals and the specific characters points out the limitation of the species, and consequently their distribution.

2. **Nebalia typhlops** G. O. Sars.

1870 *Nebalia typhlops* G. O. Sars, Forh. Vid. Selsk. Christiania for 1869, p. 169.

1896 — — G. O. Sars, Fauna Norvegiæ, Bd. I, p. 31; Tab. I, Fig. 4; Tab. IV, Fig. 9—19.

Occurrence. Taken by the "Ingolf" at a single station.

Davis Strait: Stat. 32: Lat. 66°35' N., Long. 56°38' W., 318 fath., temp. 3.9; many specimens.

Distribution. At the west coast of Norway taken off Stavanger, in Throndhjems Fjord and at Lofoten 150—200 fath. (G. O. Sars). Recorded from west of Ireland, 120 and 199 fath. (Tattersall) and from the Mediterranean (G. Haller and Lo Bianco, test. Joh. Thiele).

EXPLANATION OF THE PLATES.

Plate I.

Fig. 1. *Leucon spinulosus* n. sp.

Fig. 1 a. Cephalothorax of a female with marsupium from the "Ingolf" Stat. 24, from the left side; × 30. Major part of the siphon omitted.

— 1 b. Anterior part of carapace of an ovigerous female from the "Ingolf" Stat. 36, from the left side; × 50.

— 1 c. Left second leg of an ovigerous female from the "Ingolf" Stat. 36, from below; × 41. Major part of second joint omitted.

— 1 d. Left uropod of an immature female from the "Ingolf" Stat. 24, from above; × 76.

Fig. 2. *Leucon tener* n. sp.

Fig. 2 a. Carapace of an ovigerous female, from the left side; × 45.

— 2 b. Distal part of left first leg of an immature female from the "Ingolf" Stat. 97, from below; × 52.

— 2 c. Left uropod of an ovigerous female, from above; × 52.

Fig. 3. *Leucon spiniventris* n. sp.

Fig. 3 a. Immature female, from the side; × 13. Distal half of abdomen omitted.

— 3 b. Anterior part of carapace with left antennula of the same female, from the side; × 25.

— 3 c. Three posterior thoracic segments and first abdominal segment of the same female in order to show the ventral and marginal processes, from the side; × 19.

— 3 d. Left uropod of a female with marsupium, from above; × 37.

Fig. 4. *Leucon profundus* n. sp.

Fig. 4 a. Cephalothorax of a female with marsupium from the "Ingolf" Stat. 24, from the side; × $^{35}/_{2}$.

— 4 b. Anterior part of carapace with left antennula of the same female; × 36.

— 4 c. Left first leg of a female with the marsupium half developed, from below; × 32. Exopod omitted.

— 4 d. Left uropod of a female from the "Ingolf" Stat. 36, from above; × 31.

Fig. 5. *Leucon Nathorstii* Ohlin.

Fig. 5 a. Left first leg of a female with marsupium from Jan Mayen, from below; × 40.

— 5 b. Left uropod of an adult female from Jan Mayen, from above; × 44.

Fig. 6. *Leucon serratus* Norman

Fig. 6a. Cephalothorax with left antennula of an ovigerous female, from the side; × 33.
— 6b. Left antennula of the same female, from the side; × 81.
— 6c. Left third maxilliped of an ovigerous female, from below; × 50.
— 6d. Distal part of left first leg of an ovigerous female, from below; × 40.
— 6e. Right uropod of an ovigerous female, from above; × 39.

Fig. 7. *Leucon robustus* n. sp.

Fig. 7a. Cephalothorax with left antennula of a female with the marsupium half developed, from the side; × 10.
— 7b. Anterior part of carapace with left antennula of the same specimen; × 39.
— 7c. Left first leg of an immature female, from below; × 39.
— 7d. Left uropod of the largest immature female, from above; × 35.

Fig. 8. *Eudorella hispida* G. O. Sars.

Fig. 8a. Front part of carapace with left antennula of an adult female, from the side; × 33.
— 8b. Front end of carapace of an immature female; × 49.
— 8c. Left uropod of an adult female from the "Ingolf" Stat. 32, from above; × 33.

Fig. 9. *Eudorella arctica* n. sp.

Fig. 9a. Front end of carapace of an immature female, from the side; × 80.
— 9b. Distal part of left first leg of an immature female, from below; × 27.
— 9c. Distal part of left second leg of an ovigerous female, from below; × 35.
— 9d. Right uropod of an ovigerous female, from above; × 40.

Fig. 10. *Eudorella parvula* n. sp.

Fig. 10a. Left uropod of an ovigerous female from the "Ingolf" Stat. 25, from above; × 59.

Plate II.

Fig. 1. *Eudorella parvula* n. sp. (continued).

Fig. 1a. Front part of carapace with left antennula of an adult female from the "Ingolf" Stat. 25, from the side; × 50.
— 1b. Front end of carapace of a female without marsupium from the same station; × 80.
— 1c. Front end of carapace of a female with marsupium from the same station; × 80.
— 1d. Distal part of first left leg of an ovigerous female from the same station, from below; × 42.
— 1e. Distal part of left second leg of the last-named female, from below; × 55.
— 1f. Front end of carapace of an immature male from the same station; × 90.

Fig. 2. *Eudorella intermedia* n. sp.

Fig. 2 a. Front part of carapace of an immature female, from the side; × 53.
— 2 b. Major part of first left leg of the same female, from below; × 29.
— 2 c. Major part of left second leg of another immature female, from below; × 29.
— 2 d. Left uropod of an immature female, from above; × 36.

Fig. 3. *Eudorella æquiremis* n. sp.

Fig. 3 a. Front part of carapace with left antennula of an adult female, from the side; × 44.
— 3 b. Major part of left first leg of an adult female, from below; × 33.
— 3 c. Major part of left second leg of an adult female, from below; × 44.
— 3 d. Left uropod of a subadult female, from above; × 45.

Fig. 4. *Cumella tarda* n. sp.

Fig. 4 a. Anterior part of carapace with eyes and the proximal portion of the branchial siphon of an adult male, from the side; × 54.
— 4 b. Eyes and pseudorostrum of an adult male, from above; × 54.
— 4 c. Left antennula of an adult male, from the outer side; × 48.
— 4 d. Left second maxilliped of an adult male, from below; × 43.
— 4 e. Left third maxilliped of an adult male, from below; × 43. Setæ on exopod omitted.
— 4 f. Left first leg, mutilated, of an adult male, from below; × 43.
— 4 g. Last abdominal segment with right uropod of an adult male, from above; × 41.

Fig. 5. *Cumella egregia* n. sp.

Fig. 5 a. Adult male, from the side; × 16.
— 5 b. Front part of carapace with left antennulæ and the proximal part of the branchial siphon of the same male; × 32 *o*. ocular lobe, the distal half of which is lost in the adult specimen, but has been added on the figure from the well preserved lobe in the small specimen.
— 5 c. Fourth and proximal part of fifth abdominal segment of the same adult male, from the side; × 50.
— 5 d Posterior part of abdomen with left uropod of the same male, from above; × 33.

Fig. 6. *Cumellopsis Helgæ* Calman.

Fig. 6 a. Left third maxilliped of a female with marsupium, from below; × 29.
— 6 b. Left first leg of the same female, from below; × 29. Setæ on exopod omitted.
— 6 c. Left second leg of the same female, from below; × 29. Setæ on exopod omitted.
— 6 d. Last abdominal segment with left uropod of an adult female, from above; × 29.

Fig. 7. *Procampylaspis bituberculata* n. sp.

Fig. 7 a. Cephalothorax of a subadult female, from the side. × 25½.
— 7 b. Cephalothorax of the same female, from above. × 11.
— 7 c. Left second maxilliped of the same female, from below; × 23.
— 7 d. Distal part of second maxilliped, from below; × 66.
— 7 e. Left third maxilliped of the same female, from below. × 23. *t.* tube (see the text).
— 7 f. Left first leg of the female, from below; × 23. Setæ on exopod omitted.
— 7 g. Left second leg of the female, from below; × 23.
— 7 h. Carpus and propodus of the leg exhibited in fig. 7 g, from below. × 41.
— 7 i. Last abdominal segment with right uropod of the female, from above; × 21.
— 7 k. Cephalothorax of the adult male, from the side; × 25½.
— 7 l. Cephalothorax of the same male, from above; × 11.
— 7 m. Last abdominal segment with right uropod of the male, from above; × 21.

Fig. 8. *Procampylaspis macronyx* n. sp.

Fig. 8 a. Anterior part of cephalothorax of an adult male, from the side; × 14.
— 8 b. Major part of left second maxilliped of the same male, from below; × 24.
— 8 c. Distal joints of second maxilliped exhibited in fig. 8 b, from below; × 45.
— 8 d. Left third maxilliped of the same male from below; × 24. *t.* tube.
— 8 e. Left first leg of the same male, from below; × 24.
— 8 f. Major part of left second leg of the same male, from below; × 24.
— 8 g. Sixth abdominal segment with left uropod of the same male, from above; × 24.

Plate III.

Fig. 1. *Campylaspis rubicunda* Lilljeb.

Fig. 1 a. Distal joints of left second maxilliped of a female from Lat. 63°46′ N., from below; × 91.

Fig. 2. *Campylaspis alba* n. sp.

Fig. 2 a. Cephalothorax of an adult female, from above; × 12.
— 2 b. Anterior part of the carapace of the same female, from above; × 24.
— 2 c. Cephalothorax of an adult female, from the side; × 12.
— 2 d. Left second maxilliped of an adult female, from below; × 31.
— 2 e. Distal joints of the same maxilliped, from below; × 77.
— 2 f. Left third maxilliped of an adult female, from below; × 32.
— 2 g. Left first thoracic leg of the same female, from below; × 32.
— 2 h. Left second thoracic leg of the same female, from below; × 32.
— 2 i. Posterior end of abdomen with left uropod of an adult female, from above. × 32.

Fig. 2 k. Anterior part of carapace of an adult male, from above; × 24.
— 2 l. Posterior part of abdomen with left uropod of an adult male, from above; × 23.

Fig. 3. *Campylaspis laticarpa* n. sp.

Fig. 3 a. Cephalothorax of an adult female, from above; × 8.
— 3 b. Anterior part of carapace of the same female, from above; × 19.
— 3 c. Cephalothorax of an adult female, from the side; × 8.
— 3 d. Left second maxilliped of an adult female, from below; × 32.
— 3 e. Distal joints of the same maxilliped, from below; × 80.
— 3 f. Left third maxilliped of an adult female, from below; × 22.
— 3 g. Left first thoracic leg of the same female, from below; × 22.
— 3 h. Left second thoracic leg of the same female, from below; × 22.
— 3 i. Posterior part of abdomen with left uropod of an adult female, from above; × 22.
— 3 k. Cephalothorax of an adult male, from above; × $^{15}/_{2}$.
— 3 l. Posterior part of abdomen with left uropod of an adult male, from above; × 22.

Fig. 4. *Campylaspis undata* G. O. Sars.

Fig. 4 a. End of second joint, ischium, merus and carpus of left third maxilliped of a female, from below; × 49.

Fig. 5. *Campylaspis rostrata* Calman.

Fig. 5 a. Left second maxilliped of a subadult female, from below; × 30.
— 5 b. Distal joints of the same maxilliped, from below; × 69.
— 5 c. Left third maxilliped of a subadult female, from below; × 30.

Fig. 6. *Campylaspis intermedia* n. sp.

Fig. 6 a. Cephalothorax of a subadult female, from above; × 12.
— 6 b. Cephalothorax of the same female, from the side; × 12.
— 6 c. Left second maxilliped of a subadult female, from below; × 28.
— 6 d. Distal joints of the same maxilliped, from below; × 82.
— 6 e. Left third maxilliped of the same female, from below; × 28.
— 6 f. End of second joint, ischium, merus and carpus of the same maxilliped, from below; × 60.
— 6 g. Left first leg of the same female, from below; × 28.
— 6 h. Left second leg of the same female, from below; × 28.
— 6 i. End of abdomen with right uropod of a subadult female, from above; × 28.

Fig. 7. *Campylaspis horrida* G. O. Sars.

Fig. 7 a. Merus of left third maxilliped of a female, from below; × 73. Setæ omitted.

Fig. 8. *Campylaspis verrucosa* G. O. Sars.

Fig. 8 a. Distal joint of left third maxilliped of a female, from below. × 53. Setæ omitted, excepting the basal part of the three thickest setæ.

Fig. 9. *Campylaspis globosa* n. sp.

Fig. 9 a. Left second maxilliped of the adult female, from below. × 25.
— 9 b. Distal joints of the same maxilliped, from below. × 70.
— 9 c. Left third maxilliped of the adult female, from below. × 25.
— 9 d. End of second joint and the three following joints of third maxilliped, from below. × 47.
— 9 e. Left first leg of the same female, from below; × 25.
— 9 f. Left second joint of the same female, from below; × 25.
— 9 g. End of abdomen with left uropod of the same female, from above; × 29.

Plate IV.

Fig. 1. *Campylaspis globosa* n. sp. (continued).

Fig. 1 a. Cephalothorax of an adult female, from above; × 11.
— 1 b. Cephalothorax of the same female, from the side; × 10.

Fig. 2. *Campylaspis serratipes* n. sp.

Fig. 2 a. Cephalothorax of a subadult female, from above, × 19.
— 2 b. Cephalothorax of a subadult female, from the side; × 19.
— 2 c. Left second maxilliped of a subadult female, from below, × 41.
— 2 d. Distal joints of the same maxilliped, from below; × 88.
— 2 e. Left third maxilliped of the last-named female, from below; × 41.
— 2 f. Left first thoracic leg of the same female, from below; × 41.
— 2 g. Left second thoracic leg of the same female, from below; × 41.
— 2 h. Right uropod of a subadult female, from above; × 41.

Fig. 3. *Platysympus tricarinatus* n. sp.

Fig. 3 a. Carapace and first thoracic segment of an immature female, from above, × 12.
— 3 b. Posterior part of abdomen with left uropod of an immature male, from above. × 32.
— 3 c. Distal part of telson of the last-named male, from above; × 84.

Fig. 4. *Diastylis hastata* n. sp.

Fig. 4. Cephalothorax and the three anterior abdominal segments of an adult female from the "Ingolf" Sta. 24, from the side. × 19.

Fig. 4 b. Left first thoracic leg of a subadult female from the same station, from below; × 34.

— 4 c. Left second thoracic leg of the last-named specimen, from below; × 34.

— 4 d. Left fourth thoracic leg of an adult female, from the outer side; × 34.

— 4 e. Posterior part of abdomen with left uropod of a female without marsupium (5 mm. long), from above; × 26.

Fig. 5. *Diastylis longicaudata* Bonnier.

Fig. 5 a. Posterior part of abdomen with peduncle of right uropod of a subadult female, from above; × 23.

Fig. 6. *Makrocylindrus spiniventris* n. sp.

Fig. 6 a. Anterior part of carapace of an immature female, from above; × 25.

— 6 b. Anterior part of carapace with left antennula and antenna of another immature female, from the side; × 25.

— 6 c. Three posterior thoracic and two anterior abdominal segments of the last-named specimen, from the side; × 25.

— 6 d. Posterior part of abdomen with right uropod of an immature female, from above; × 25. *t.* Distal part of telson more highly magnified, showing the dorsal spines.

Fig. 7. *Diastyloides scabra* n. sp.

Fig. 7 a. Posterior part of abdomen with right uropod of an adult female, from above; × 23.

Fig. 8. *Brachydiastylis nimia* n. sp.

Fig. 8 a. Adult female, from above; × $31/_2$.

— 8 b. Anterior part of carapace of the same female, from above; × 31.

— 8 c. Cephalothorax of another adult female, from the side; × 26.

— 8 d. Left first thoracic leg of an adult female, from below; × 45.

— 8 e. Left second thoracic leg of the same female, from below; × 45.

— 8 f. Left third thoracic leg of the same female, from the outer side; × 45.

— 8 g. Posterior part of abdomen with right uropod of the female shown in fig. 8 a, from above; × 31. Major part of the two terminal setæ on the exopod omitted.

Fig. 9. *Leptostylis grandis* n. sp.

Fig. 9 a. Posterior part of abdomen with left uropod of a subadult male, from above; × 22.

Fig. 10. *Nebalia bipes* O. Fabr.

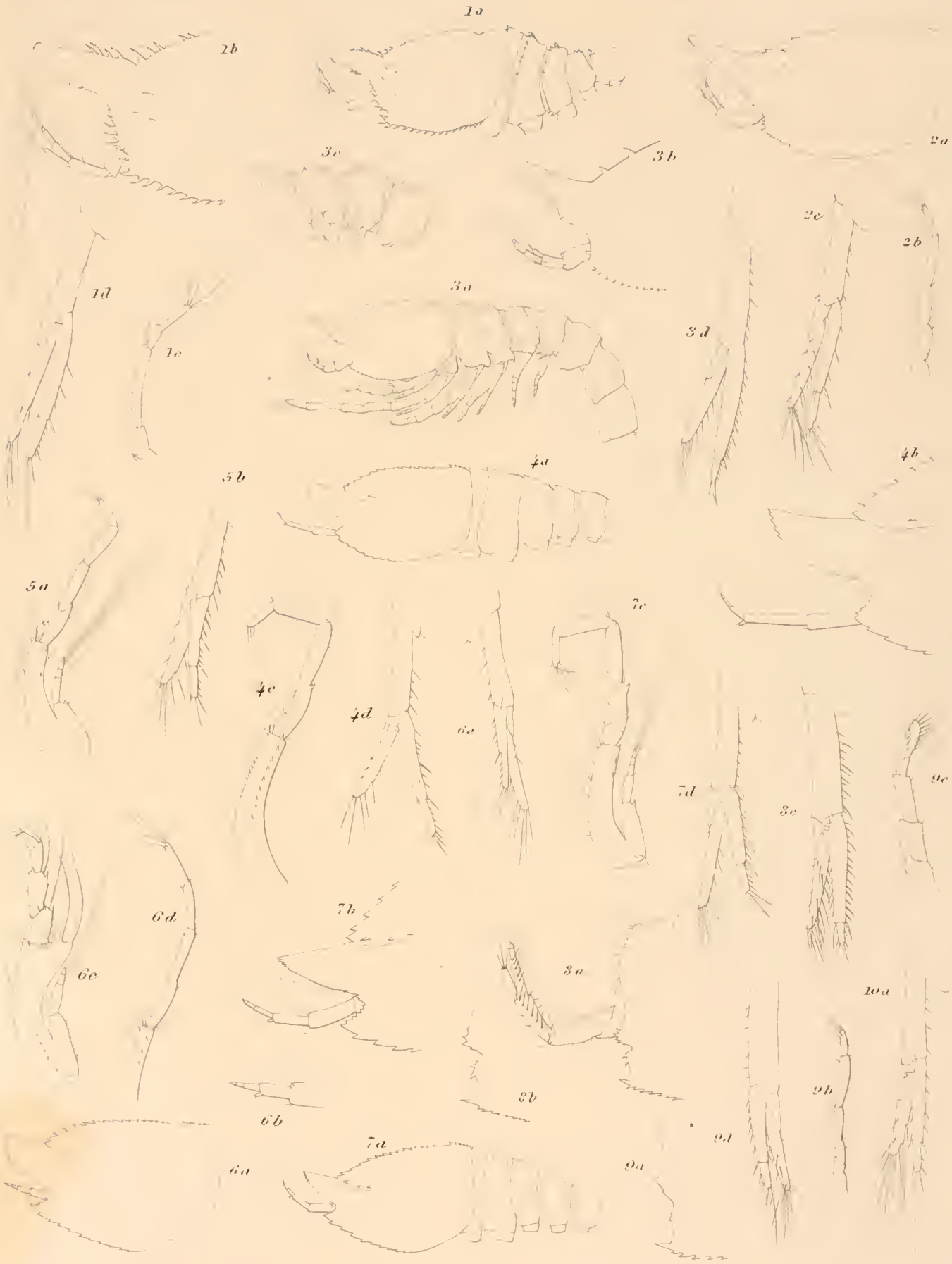
Fig. 10 a. Front end of the head with right eye, antennula and antenna of an adult female, from the right side; × 13. *h.* parts of the head. The ciphers at antennula and antenna indicate the number of the joints.

Fig. 10 b Left maxilla, from below, × 23. Distal part of endopod omitted. *1*. first joint, I^1 its lobe, *2*. second joint without lobe, *3* third joint with its lobe, I^3 *4* fourth joint. The membranous parts light greyish.

— 10 c Left maxilla, from below, × 23. *1* first joint, scarcely marked off from second joint, *2*; I^2. bipartite lobe of second joint, *3*. third joint, with its bifid lobe, I^3, *ex*. exopod.

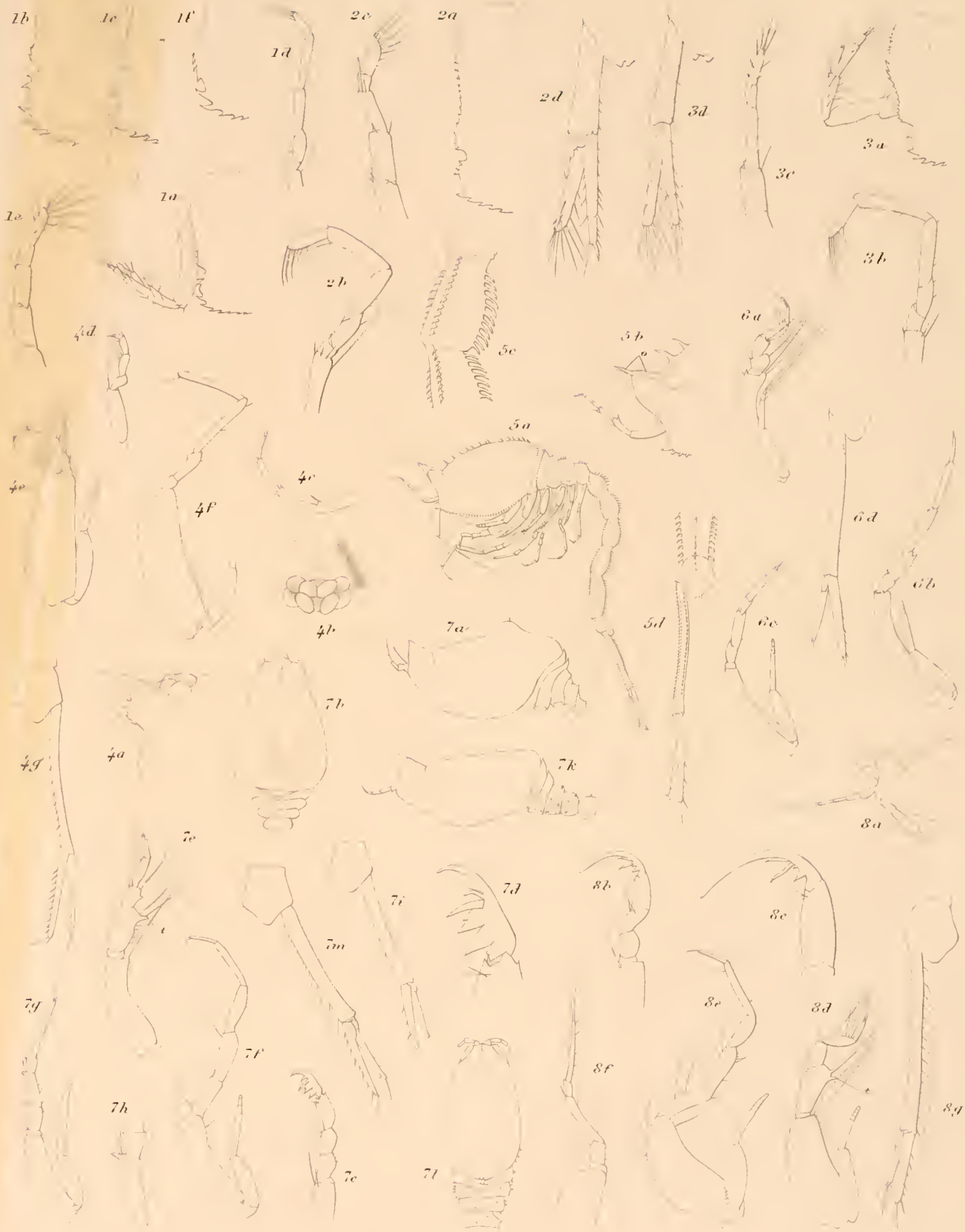
— 10 d Left third thoracic leg, from behind, × 17. Major part of the setae on the terminal joint end on the inner margin of the two preceding joints omitted. *1*. first joint, *2*. second joint, bearing the epipod, *3*. third joint, bearing the exopod.

— 10 e Proximal part of left third abdominal leg, from the outer side; × 11. *t*. tergite of the segment, *1* and *2* chitinized plates of first and second joints in the leg; *3*. proximal part of third joint. The membranous part light greyish.



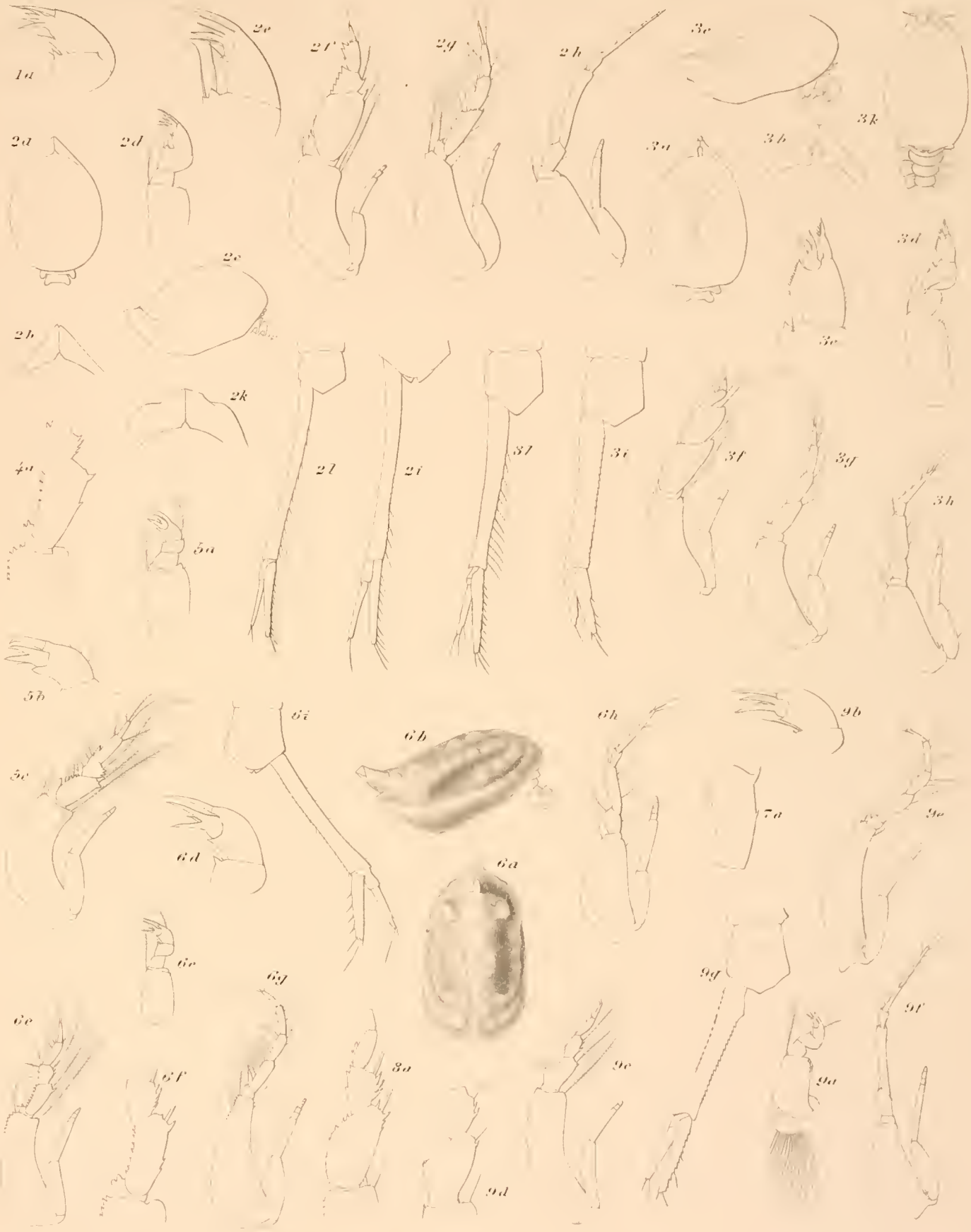
1 Leucon spinulosus n.sp. *2. L. tener n. sp.* *3. L. spiniventris n. sp.* *4. L. profundus n sp.*
5. L. Nathorsti Oldin. *6. L. serratus Norm* *7. L. robustus n sp.* *8. Eudorella hispida G.O.S.*
9 E arctica n.sp *10. E. parvula n.sp*

H.J. Hansen del *T.N. Möller sc*



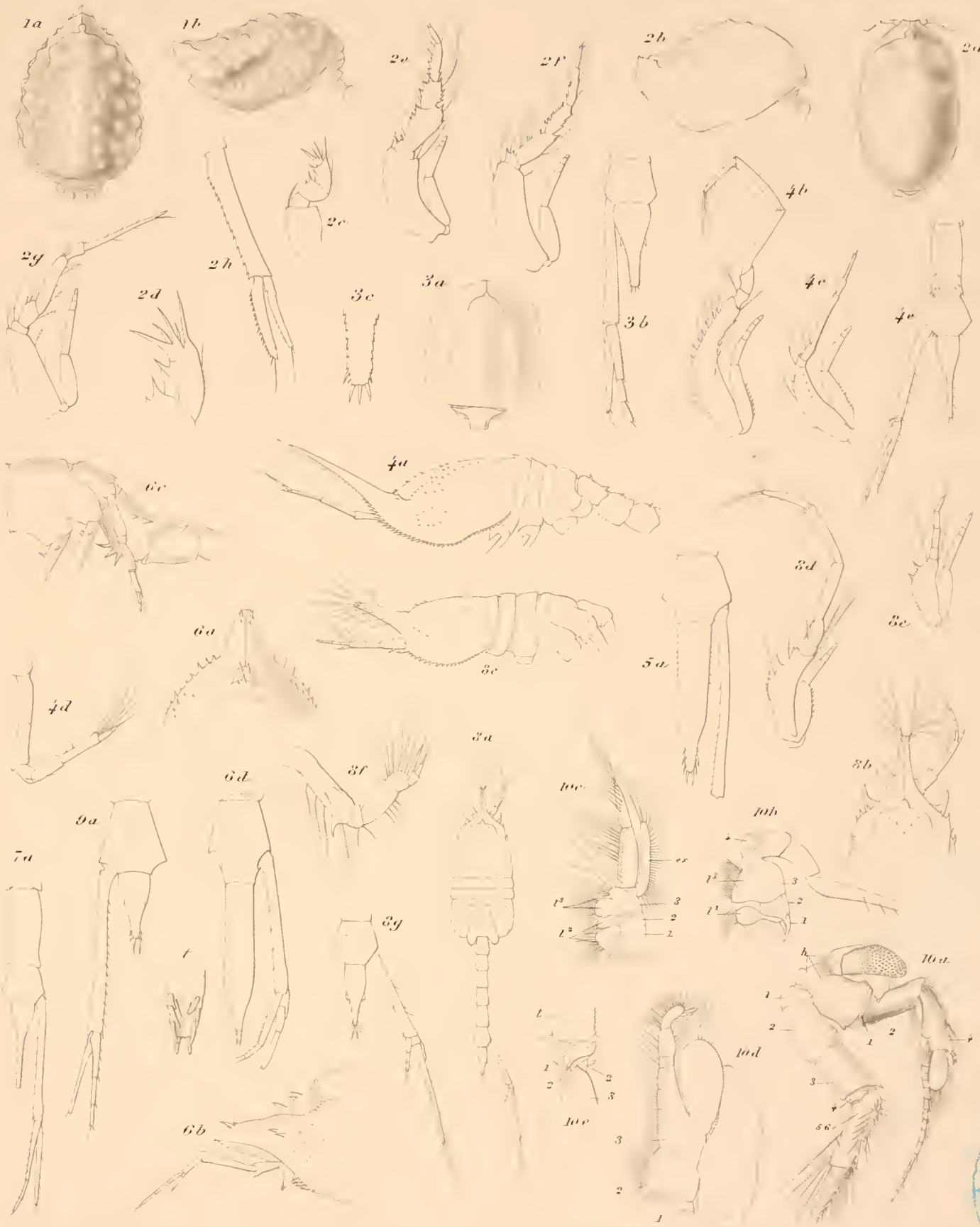
1 Eudorella parvula n. sp. 2 E. intermedia n. sp. 3 E. æquivemis n.sp. 4. Cumella tarda n. sp.
5 C. egregia n.sp. 6. Cumellopsis Helgæ Calm. 7. Procampylaspis bituberculata n. sp.
8 P. macronyx n. sp.

H.J. Hansen del. *T.N. Møller sc.*



1 Campylaspis rubicunda Lillj. b 2 C. alba n. sp. 3 C. laticarpa n. sp. 4 C. undata G.O.S.
5 C. rostrata Calm. 6 C. intermedia n. sp. 7 C. horrida G.O.S. 8 C. verrucosa G.O.S.
9 C. globosa n. sp.

H.J. Hansen del. T.N. Møller sc.



1. *Campylaspis globosa* n. sp. 2. *C. serratipes* n. sp. 3. *Platysympus tricarinatus* n. sp. 4. *Diastylis hastata* n. sp.
5. *D. longicaudata* Boeck. 6. *Makrocylindrus spinuventris* n. sp. 7. *Diastyloides scabra* n. sp.
8. *Brachydiastylis nimia* n. sp. 9. *Leptostylis grandis* n. sp. 10. *Nebalia bipes* O. Fabr.

H. J. Hansen del. T. N. Møller sc.

THE INGOLF-EXPEDITION

1895—1896.

THE LOCALITIES, DEPTHS, AND BOTTOMTEMPERATURES OF THE STATIONS

Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.	Station Nr.	Lat. N.	Long. W	Depth in Danish fathoms	Bottom-temp	Station Nr.	Lat. N	Long. W.	Depth in Danish fathoms	Bottom-temp.
1	62° 30′	8° 21′	132	7°2	24	63° 00′	56° 00′	1199	2°4	45	61° 32′	9° 43′	643	4°17
2	63° 04′	9° 22′	262	5°3	25	63° 30′	54° 25′	582	3°3	46	61° 32′	11° 36′	720	2°40
3	63° 35′	10° 24′	272	0°5		63° 51′	53° 03′	136		47	61° 32′	13° 40′	950	3°23
4	64° 07′	11° 12′	237	2°5	26	63° 57′	52° 41′	34	6°6	48	61° 32′	15° 11′	1150	3°17
5	64° 40′	12° 09′	155			64° 37′	54° 24′	109		49	62° 07′	15° 07′	1120	2°91
6	63° 43′	14° 34′	90	7°0	27	64° 54′	55° 10′	303	3°8	50	62° 43′	15° 07′	1020	3°13
7	63° 13′	15° 41′	600	4°5	28	65° 14′	55° 42′	420	3°5	51	64° 15′	14° 22′	68	7°32
8	63° 56′	24° 40′	136	6°0	29	65° 34′	54° 31′	68	0°2	52	63° 57′	13° 32′	420	7°87
9	64° 18′	27° 00′	295	5°8	30	66° 50′	54° 28′	22	1°05	53	63° 15′	15° 07′	795	3°08
10	64° 24′	28° 50′	788	3°5	31	66° 35′	55° 54′	88	1°6	54	63° 08′	15° 40′	691	3°9
11	64° 34′	31° 12′	1300	1°6	32	66° 35′	56° 38′	318	3°9	55	63° 33′	15° 02′	316	5°9
12	64° 38′	32° 37′	1040	0°3	33	67° 57′	55° 30′	35	0°8	56	64° 00′	15° 09′	68	7°57
13	64° 47′	34° 33′	622	3°0	34	65° 17′	54° 17′	55		57	63° 37′	13° 02′	350	3°4
14	64° 45′	35° 05′	170	4°4	35	65° 16′	55° 05′	302	3°6	58	64° 25′	12° 09′	211	0°8
15	66° 18′	25° 59′	330	—0°75	36	61° 50′	56° 21′	1435	1°5	59	65° 00′	11° 16′	310	—0°1
16	65° 43′	26° 58′	250	0°1	37	60° 17′	54° 05′	1715	1°4	60	65° 09′	12° 27′	124	0°9
17	62° 40′	26° 55′	745	3°4	38	59° 12′	51° 05′	1870	1°3	61	65° 03′	13° 06′	55	0°4
18	61° 44′	30° 29′	1135	3°0	39	62° 00′	22° 38′	865	2°9	62	63° 18′	19° 12′	72	7°92
19	60° 29′	34° 14′	1566	2°4	40	62° 00′	21° 36′	845	3°3	63	62° 40′	19° 05′	800	4°0
20	58° 20′	40° 48′	1095	1°5	41	61° 39′	17° 10′	1245	2°0	64	62° 00′	19° 00′	1041	3°1
21	58° 01′	44° 45′	1330	2°4	42	61° 41′	10° 17′	625	0°4	65	61° 33′	19° 00′	1089	3°0
22	58° 10′	48° 25′	1845	1°4	43	61° 42′	10° 11′	645	0°05	66	61° 33′	20° 43′	1128	3°3
23	60° 43′	56° 00′	Only the Plankton-Net used		44	61° 42′	9° 36′	545	4°8	67	61° 30′	22° 30′	975	3°0

Station Nr	Lat N	Long W	Depth in Danish fathoms	Bottom temp	Station Nr	Lat N	Long W	Depth in Danish fathoms	Bottom temp	Station Nr	Lat N	Long W	Depth in Danish fathoms	Bottom-temp
68	62° 00′	22° 00′	843	3°4	92	64° 44′	32° 52′	976	1°4	118	68° 27′	8° 20′	1060	—1°0
69	62° 00′	22° 00′	589	3°9	93	64° 24′	35° 14′	767	1°46	119	67° 53′	10° 19′	1010	1°0
70	63° 00′	22° 05′	134	7°0	94	64° 56′	36° 19′	204	4°1	120	67° 29′	11° 32′	885	1°0
1	63° 46′	22° 03′	46			65° 31′	30° 45′	213		121	66° 59′	13° 11′	529	—0°7
72	63° 12′	23° 04′	197	6°7	95	65° 14′	30° 39′	752	2°1	122	66° 42′	14° 44′	115	1°8
73	62° 58′	23° 28′	486	5°5	96	65° 24′	29° 00′	735	1°2	123	66° 52′	15° 40′	145	2°0
4	62° 17′	24° 30′	695	4°2	97	65° 28′	27° 39′	450	5°5	124	67° 40′	15° 40′	495	—0°6
	61° 57′	25° 45′	761		98	65° 38′	26° 27′	138	5°9	125	68° 08′	16° 02′	729	—0°8
	61° 28′	25° 06′	829		99	66° 13′	25° 53′	187	6°1	126	67° 19′	15° 52′	293	—0°5
75	61° 28′	26° 25′	780	4°3	100	66° 23′	14° 02′	59	0°4	127	66° 33′	20° 05′	44	5°6
76	60° 50′	26° 50′	806	4°1	101	66° 23′	12° 05′	537	—0°7	128	66° 50′	20° 02′	104	0°6
77	60° 10′	26° 50′	951	3°6	102	66° 23′	10° 20′	750	—0°9	129	66° 35′	23° 47′	117	6°5
78	60° 37′	27° 52′	799	4°5	103	66° 23′	8° 52′	579	—0°6	130	63° 00′	20° 40′	338	6°55
79	60° 52′	28° 58′	653	4°4	104	66° 23′	7° 25′	957	1°1	131	63° 00′	19° 00′	698	4°7
80	61° 02′	29° 32′	935	4°0	105	65° 34′	7° 31′	762	—0°8	132	63° 00′	17° 04′	747	4°6
81	61° 44′	27° 00′	485	6°1	106	65° 34′	8° 54′	447	—0°6	133	63° 14′	11° 24′	230	2°2
82	61° 55′	27° 28′	824	4°1		65° 29′	8° 40′	466		134	62° 34′	10° 26′	299	4°1
83	62° 25′	28° 30′	912	3°5	107	65° 33′	10° 28′	492	—0°3	135	62° 48′	9° 48′	270	0°4
	62° 36′	26° 01′	472		108	65° 30′	12° 00′	97	1°1	136	63° 01′	9° 11′	256	4°8
	62° 30′	25° 30′	401		109	65° 29′	13° 25′	38	1°5	137	63° 14′	8° 31′	297	—0°6
84	62° 58′	25° 21′	633	4°8	110	66° 44′	11° 33′	781	—0°8	138	63° 26′	7° 56′	471	—0°6
85	63° 21′	25° 21′	170		111	67° 14′	8° 48′	860	—0°9	139	63° 36′	7° 30′	702	—0°6
86	65° 03′	23° 47′	76		112	67° 57′	6° 44′	1267	1°1	140	63° 29′	6° 57′	780	0°0
87	65° 02′	23° 56′	110		113	69° 31′	7° 06′	1309	1°0	141	63° 22′	6° 58′	679	—0°6
88	64° 58′	24° 25′	76	6°9	114	70° 36′	7° 29′	773	—1°0	142	63° 07′	7° 05′	587	—0°6
89	64° 45′	27° 20′	310	8°4	115	70° 50′	8° 29′	86	0°1	143	62° 58′	7° 00′	388	—0°4
90	64° 45′	29° 06′	568	4°4	116	70° 05′	8° 26′	371	—0°4	144	62° 49′	7° 12′	276	1°6
91	64° 44′	31° 00′	1236	3°1	117	69° 13′	8° 23′	1003	—1°0					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