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ZOOGEOGRAPHICAL  
INVESTIGATION OF CERTAIN FJORDS  
IN SOUTHERN GREENLAND

WITH SPECIAL REFERENCE TO

CRUSTACEA, PYCNOGONIDA AND ECHINODERMATA

INCLUDING A LIST OF ALCYONARIA AND PISCES

BY

K. STEPHENSEN

WITH 31 FIGURES

INVERTEBRATE  
ZOOLOGY  
Crustacea

SÆRTRYK AF MEDDELELSER OM GRØNLAND. LIII



KØBENHAVN  
BIANCO LUNOS BOGTRYKKERI

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THE present work is intended to furnish a survey of the zoogeographical conditions in certain fjords of Southern Greenland, based upon their fauna of Crustacea, Pycnogonida and Echinodermata.

The material was collected during the summer of 1912 with the aid of the motor boat "Rink", belonging to the Committee for Geological and Geographical Investigations in Greenland, under the supervision of the present writer. In the previous year (1911) Dr. V. NORDMANN had been sent out by the Committee to investigate the fauna of Northern Strømfjord (W. Greenland, abt. Lat.  $67\frac{1}{2}^{\circ}$  N.), this fjord being taken as the type of the Greenland fjords, where the temperature of the bottom water is negative, and all animal life consequently of arctic, or at least boreo-arctic character, without true Atlantic (boreal) deep sea species. My work on the Crustacea and Pycnogonida from this expedition is published in Medd. om Grønland vol. 51, 1913, p. 53—77.

In contrast to this, the "Tjalfe" expedition of 1908—09 had shown, that in some of the fjords of southern Greenland, south of the ridge running across Davis Straits at abt.  $66^{\circ}$  N. lat., there was free access for the bottom water of the Atlantic, save in cases where the mouth of the fjord itself was barred by a submarine ridge. As a result of these conditions, a remarkable phenomenon was here encountered, viz; that while the upper water layers were found to contain the usual arctic or boreo-arctic littoral fauna, search deeper down revealed the presence of Atlantic (boreal) deep sea forms.

As types of such "Atlantic" fjords were chosen: the Kvanefjord, near Frederikshaab (abt.  $62^{\circ}$  N.) and Bredefjord, between Julianehaab and Ivigtut (abt.  $61^{\circ}$  N.).

An extract from my instructions (the passages here quoted drawn up by the leader of the "Tjalfe" expedition, Museumsinspector Ad. S. Jensen) will give a good idea as to the nature of the task in question.

"In the course of the investigations made last year in Northern Strømfjord it was found, that the deeper water layers of this fjord were characterised by a remarkably low temperature, constantly below  $0^{\circ}$  C. And the dredgings carried out by Dr. NORDMANN furnished an excellent view of the fauna peculiar to a fjord of this character.

"The "Tjalfe" expedition of 1909 encountered, in certain fjords of western Greenland, entirely different conditions. Close to the surface, there was the same typical cold surface layer of the polar current, with minimal, negative temperature at abt. 50—100 metres depth; below this, however, from 300—500 metres, was a thick layer with temperature from 2° to 3,3° C., and fairly high salinity (over 34 ‰). We have thus, in these fjords, a water layer entirely similar in character to that which is found off the coast beneath the polar current, and which fills the whole of the deeper portions of Davis Strait. The reason of this doubtless lies in the fact that the mouths of these fjords are so deep as to permit direct inflow of the warm lower layer from the Davis Strait.

"It would thus be an interesting task for a zoologist to investigate the fauna of these fjords, the hydrographical conditions of which are so distinctly opposed to those found in most of the Greenland fjords, of which Northern Strømfjord may be taken as the type. There is little room for doubt that the deeper portions, with their high temperature and salinity, have a different fauna, and a comparison of this with the corresponding deep-water fauna of Northern Strømfjord should lead to interesting results, as regards the influence exerted by hydrographical conditions on the composition of the fauna. The deeper region of the Davis Strait has, it will be remembered, been investigated by several expeditions ("Fylla", "Ingolf" etc.); its ramifications, however, into certain fjords of southern Greenland, present a field hitherto entirely untouched, at least as regards the lower animal life; the "Tjalfe" expedition having been exclusively concerned with hydrographical conditions, and the distribution of the larger species of fish. Investigation of the shallower parts of the same fjords, covered as they are by polar water, will presumably reveal a fauna of the usual arctic type.

"Two fjords which would appear particularly suited to investigations of this nature are the Kvanefjord, south of Frederikshaab, and Bredefjord, north of Julianehaab. On account of the ice, Kvanefjord should be taken first, as the channel of Torsukatak, leading to Bredefjord, will hardly be navigable before the commencement of July.

"The work in Kvanefjord could probably be commenced in June, or possibly even earlier. The great depths, down to 500 metres, with the "warm" water, extend far in, almost to the base of the fjord; in 1909, a temperature of 3,07° C. was noted at 500 metres depth, four miles from the glacier there.

"Bredefjord is deepest in its western part, where in places as much as 700 m. of water may be found; the warm bottom water, however, extends throughout the whole of the fjord, and into the adjacent fjords of Tunugdliarfik and Skovfjord. This extended system of fjords should furnish more than sufficient work to occupy the months of July and August possibly also September."

The expedition consisted, besides the present writer, of a young

naturalist and ethnographer, stud. mag. K. BIRKET-SMITH, and Baadmand N. PETERSEN, of the Danish Navy. To the last-named in particular, a very large share of the credit for the good results obtained is due, as the experience of four previous expeditions rendered him familiar to a unique degree with the navigation of Greenland fjords, where ice and hidden reefs make investigations of this nature considerably more difficult than in most other parts of the world.

### **Bredefjord (Ikersuak) and adjacent fjords.**

(St. 29—156.)

The mouth of Bredefjord lies at  $60^{\circ}45'$  N., the fjord itself extending up some 30 miles inland, towards the north-east, and continuing, as the Sermilik, for about half that distance. Some 6 miles south of Bredefjord, and separated from it by a range of large islands, of which Tugtutok (Reindeer Island) is the largest, lies Skovfjord (Nardlunak). Skovfjord is almost as large as Bredefjord itself; its continuation landward is the Tunugdliarfik (the Eriksfjord of the Norsemen). The investigation of this system of fjords occupied the two months from 15. July to 15. September.

Bredefjord is on an average 2—3 miles across; the inner portion, however, is considerably broader, being divided up into a number of small branches running right up to the glaciers of the inland ice. The inner end of Sermilik has 5 branches, of which 3 with glaciers; a single glacier runs out into Tunugdliarfik.

The coasts of Bredefjord and Skovfjord with the interjacent islands are for the most part low, rising however, in places to considerable heights, as for instance at the north-east corner of Tugtutok, and the southern side of Sermilik (Ilimausak), which rise steeply from the water, as also in parts of the small branch fjords on the north side of Bredefjord.

The coast formation is thus suggestive of shallow water; in spite of this, however, considerable depths are found. At St. 130, for instance, the dredge was sent down with 800 metres of line out, without reaching bottom.

It is interesting to note the depths at the mouth of the fjord, these being such as to offer unhindered access to the Atlantic water. The following depths were noted midway out in the mouth of Bredefjord:  $> 550$  m. (St. 30);  $> 550$  m. (St. 34); 700 m. (St. 121).

At the mouth of Skovfjord, 400 m. was noted at St. 155, while St. 154 showed only 270 m. and St. 156, which lies, it is true, not far from a small island, 70—140 m. In the southern arm of Skovfjord (south of the island of Kangue) considerable depths are found off the perpendicular rock of Alangarssuak (St. 137, 280 m. St. 144, 250—300 m. St. 146, 305—310 m.); in the northern branch, however, between Tugtutok and Kangue, the depths are very slight (St. 145, 10—35 m.). With regard to Skovfjord as a whole, it was found, as will be seen from the following, that while the depth at the mouth is sufficient to permit a

certain, though not altogether free inflow of Atlantic water, the true deep-water fauna of the Atlantic does not penetrate into the fjord. (The deepest station — St. 155 — showed a temperature of only  $2,8^{\circ}$  at 400 m. while in Bredefjord, this figure is reached at a depth of only 200 m.).

### Kvanefjord.

(St. 1—28.)

The mouth of Kvanefjord (Kuanersok) is situated a little to the south of Frederikshaab, at abt.  $61^{\circ}55'$  N.; the fjord extending inland for some 25 miles in a north-easterly direction. It is from 3—4 miles across, and has four branches; one going almost due north, and forming the eastern boundary of the peninsula upon which Frederikshaab is built; at the base of this arm lies the rocky height of Istivigit (2035 ft.). The three remaining arms are situated right up at the base of the fjord; two end in glaciers, that of the third being extinct.

The mouth of the fjord is full of small islets, and a little farther in lies Kvanø, an island of some size. In contrast to Bredefjord, Kvanefjord is a water of the true fjord type, its sides being for the most part high and steep, resembling to a remarkable degree several of the fjords on the west coast of Norway.

The greatest depth noted was at St. 18, where the dredge was out with 700 metres of wire without reaching bottom.

There are two caplin stations, where the inhabitants of Frederikshaab and Kvanø move out at the beginning of June to fish for caplin (*Mallotus arcticus*), the fish being dried and preserved for winter use.

Despite the belt of islands which bar the mouth of the fjord, the warm Atlantic water is nevertheless found to penetrate in, so that there must be in places at least, very deep portions between the islets at the mouth. This is indicated both by the results of hydrographical investigations and by measurements of depth; at St. 27, for instance, in the island belt itself, the NANSEN-net was down to 300 m. without reaching bottom; St. 11 shows 290—320 m., St. 12 no less than 290—400 m.

The depth is thus sufficient to permit inflow of Atlantic water (*vide* hydrography St. 17, inner side of Kvanø; as already mentioned, the "Tjalfe" expedition records a temperature of  $3,07^{\circ}$  C. at a depth of 500 m. four miles from the glacier at the base of the fjord). And the figures moreover, do not differ very greatly from those at the mouth of Bredefjord. Evidently, however, the depth is yet not such as to allow free ingress to the true Atlantic fauna; at any rate, not a single true Atlantic form belonging to any of the groups here treated was found in the fjord.

The fjords investigated are waters of classic fame. Kvanefjord lies, as stated above, close to Frederikshaab, where the author of "Fauna

Groenlandica", OTTO FABRICIUS, was chaplain from 1768—74, and it may be taken for granted that a great number of the species mentioned by him were taken in Kvanefjord itself. It is interesting to note that two of the species brought home by the "Rink" expedition; viz.; *Coronula diadema* and *Pycnogonum littorale*, have not been recorded from Greenland throughout the 135 years which have elapsed since the publication of FABRICIUS' work in 1780.

Classic in another sense are the waters of the Bredefjord system; they formed the centre of the old Norse settlement of Østerbygd. Erik the Red himself lived on the coast of Tunugdliarfik (Eriksfjord).

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The implements used were: dredge (fine and coarse), plankton-net, (silk), NANSEN'S closing net, and ringtrawl. The method of operation was so contrived that hardly any layer of water from the bottom to surface could escape investigation, save for the greatest depths (> abt. 800—900 m.), which unfortunately were found to exceed considerably what had been expected. The motor boat was only equipped for work at a maximum depth of 500 m. and we had therefore only 550 metres of wire on board for the water bottle and reversing thermometer, so that we were unable to measure temperature and salinity at depths beyond this.

For the dredge, on the other hand, we had two lengths of wire, each 1000 metres, the one length, however, being left on shore in reserve, as there was not room for both on board, nor was it expected that the boat would be capable of hauling the dredge at depths of more than 500 m. In point of fact, however, as will be seen from the Report of the Expedition, we had frequently 900 metres of wire out; on one occasion even this did not suffice to reach bottom.

Save in a very few instances, the entire catch made at each haul was preserved, the specimens discarded being for the most part of large and easily recognisable species, the occurrence of which was always duly noted in the Journal. The hauls were also, as a rule, of uniform duration (20 min.), at any rate as regards the ringtrawl, so that the material may to a certain extent be used for quantitative determination.

A dredge made of stramin (the same material as that used for the bag of the ringtrawl) proved extremely useful in shallow water (up to about 35 m.). The catch made with this implement in the algae belt was enormous. On being drawn in, the whole content was emptied out into several buckets of water, algae leaves and stones removed, these being, however, carefully rinsed so that no animal forms should be thrown away with them; leaves of algae with animals attached (e. g. *Hydroidea*) we of course always preserved. The content of a bucket was then filtered through a plankton-net, to drain off the water, and the residue placed in glass jars and covered with spirit. In this manner, the whole yield of a dredge haul can be dealt with in the course of half an hour, without losing any portion of the material. This explains the

extraordinarily large quantities of certain *Amphipoda*, especially *Pontogeneia inermis* and *Paramphithoë bicuspis*, with other rare species from the weed belt.

The content of the ringtrawl was dealt with in a similar manner, except at St. 28, where we had not yet hit upon the method; the advantage thereby gained may readily be seen on comparing the results from this station with these of the other ringtrawl hauls.

From time to time, also, as opportunity offered, investigations were made in such fresh water as lay near to the actual field of work, though this formed no part of the plan laid down for the expedition. Very little is hitherto known as to the fresh-water fauna of Greenland, and the collections thus made also include one (two) new species, viz.; *Gammarus Zaddachi* and *Diaptomus castor*.

The present work includes the material of *Crustacea* and *Pycnogonida* (determined by the author), *Echinodermata* (determined by Dr. TH. MORTENSEN), *Alcyonaria* (determined by Prof., Dr. H. JUNGENSEN) and *Pisces* (determined by Museumsinspector AD. S. JENSEN). The two last-named groups, however, are not included in the geographical survey; the Alcyonaria, owing to the fact that the list did not come to hand until the present manuscript was almost completed, and Pisces, on account of the paucity of the material, from which no results of importance could be obtained. The expedition, it should be noted, was not equipped for the collection of fish. *Vermes* are at present being dealt with by Mag. sc. HJ. DITLEVSEN, and *Mollusca* by Museumsinspector AD. S. JENSEN; the results in both these cases will be published in the report of the "Ingolf" expedition. I hope, however, later on to give a list of the material from the "Rink" based on the manuscript of these two writers.

Two works dealing in part with results of the expedition have already been published; viz. a couple of papers by Dr. TH. MORTENSEN on the Echinodermata (*vide* the systematic portion), in addition to which, the voyage furnished opportunities of acquiring information in another field, quite apart from zoology, to wit, the study of old Norse ruins, new or little known, which forms the subject of a small work by the present writer (Medd. om Grønland, vol. 51, Nr. 3, 1913, p. 79—101). The fjords about Bredefjord belong, as already mentioned, to the old Norse colony of Østerbygd, Tunugdliarfik, or Eriksfjord, being the very place where Erik the Red and his fellow-settlers first took up land, and considerable remains of his building are still to be seen. A large amount of ethnographical material was collected here by stud. mag. K. BIRKET-SMITH, who has published a survey of the same in Medd. om Grønland, vol. 53, 1, 1915 ("Foreløbigt Bidrag til Kap Farvel-Distrikternes Kulturhistorie, paa Grundlag af en nyopdaget Ruingruppe i Julianehaabdistrikt"). Excavations were also made in some old Eskimo burial places, resulting in the finds of several crania and other skeletal

parts, since handed over to the Normal-anatomical Museum, which institution, as well as the Danish Collection and the Ethnographical Museum, has taken copies of the fairly large collection of photographs procured, representing Eskimo graves, old Norse ruins and adjacent grounds, and ethnographical subjects.

The expedition brought home in all 132 species of Crustacea, 8 (10) species of Pycnogonida, and 37 species of Echinodermata. With regard to the Copepoda, however, only character forms were determined (*vide infra*). These figures are far in advance of those from any other Greenland expedition working within a restricted area. The Danmark expedition to North-east Greenland procured only 80 species of Crustacea, 5 of Pycnogonida, and 26 of Echinodermata. Dr. NORDMANN'S expedition to Northern Strømfjord (W. Greenland. abt. 67° 45' N.) obtained 67 species of Crustacea, 3 of Pycnogonida, and 23 of Echinodermata. In other words, the present expedition has taken over one-fifth of Greenland's Crustacea (132 out of a total 585) one-fourth of its Pycnogonida (8 or 10 of a total 34) and two-fifths of its Echinodermata (37 of a total 88). These rich results are due to a combination of circumstances, among which should be reckoned the extensive fauna of the waters investigated, and the extremely favourable weather there encountered, with a consequent high proportion of working days. In addition, I have to thank my two companions for the zeal and energy which they devoted to the work.

Within the animal groups mentioned in the present work (excl. fish) the "Rink" material includes 4 species new to science, viz.:

- 72.<sup>1</sup> Halirages bispinosus,
- 90. Caprella Rinkii,
- 150. Pteraster hastatus,
- 182. Stenogorgia borealis,

with the following 13 species new for Greenland:

- 5b. Munida (Bamffica?, larva),
- 39. Scina borealis,
- ?43. Pseudalibrotus Nanseni,
- 78. Gammarus Zaddachi,
- 97. Eurycope producta,
- 102. Podon Leuckartii,
- 116. Diaptomus castor,
- 127. Scalpellum Stroemii,
- 142. Hathrometra Sarsii,
- 152. Poraniomorpha hispida,

<sup>1</sup> The figures denote number in the list of species following.

- 153. *Astrogonium Parelîi*.
- 177. *Psolus valvatus*,
- 181. *Primnoa resedaeformis*.

And the following hitherto unknown developmental stages of Decapoda:

- 3. *Hyas coarctatus*, 3. Zoea,
- 5. *Munida* (*Bamffica*?) larva,
- 8. *Nectocrangon* lar, young stage,
- 10. *Sabinea septemcarinata*, young stage,
- Spirontocaris* larva 1: *Sp. polaris*?
- — 2: *Sp. turgida*?
- — 3: *Sp. Fabricii*?
- — 4—5.,
- (*Fabricii*?) juv.,
- sp. juv.,
- 22. *Pasiphaë tarda*, larva in intermediate stage.

In a large number of cases, the locality of the find is of peculiar interest; most of the following species, for instance, have not hitherto been recorded from this part of Greenland.

#### Crustacea and Pycnogonida.

- 1. *Chionoecetes Phalangium*, not hitherto found S. of the ridge.
- 9. *Sabinea Sarsii*, not found S. of 65½° N.
- 19. *Spirontocaris microceros*, hitherto taken at 5 places only.
- 27. *Boreomysis arctica*, unexpectedly found to be of so frequent occurrence in the deeper parts of Bredefjord, that it must be classed as a character from.
- ?46. *Orchomenella pinguis*, found only in N. Strømfjord.
- ?47. *Tryphosa nanoides*, found only at Sukkertoppen and Upernivik.
- 50. *Amphilocheus manudens*, found in two places only.
- 51. *Metopa groenlandica* = *Stenothoë* (*Proboloides*) *clypeata*, hitherto from 3 places only.
- 52. — *longimana*, hitherto from 2 places only.
- 53. — *neglecta*, hitherto from 2 places only.
- 55. — *sinuata*, hitherto from Godthaab only.
- 62. *Paramphithoë Boeckii*, hitherto from 4 places only.
- 64. — *assimilis*, hitherto from 2 places only.
- 67. *Odius carinatus*, hitherto from 3 (4) places only.
- 74. *Calliopius Rathkei*, hitherto once only.
- 76. *Rhachotropis inflata*, not found S. of 68½° N.
- 80. *Ampelisca Eschrichtii*, not found S. of Godthaab.
- 81. — *macrocephala*, do.



82. *Haploops tubicola*, not found S. of 65° N.
85. *Neohela monstrosa*, not found S. of Umanakfjord.
87. *Dulichia tuberculata*, not found S. of 65½° N.
88. *Æginella spinosa*, only 65½° N. and 68° N.
91. *Calathura brachiata*, not found S. of the ridge.
93. *Æga ventrosa*, 2 places only.
94. *Ianira maculosa*, only 66½° N. and 72½° N.
98. *Phryxus abdominalis*, not hitherto found on Spiront. groenlandica.
99. *Bopyroides hippolytes*, not hitherto found on Spiront. Lilljeborgii.
120. *Euchaeta norvegica*, hitherto only from Lille Karajakfjord.
121. *Crypsidomus Terebellae*, not S. of Sukkertoppen.
- ?122. *Saccopsis Terebellidis*, only from Egedesminde.
123. *Herpyllobius arcticus*, only from Ritenbenk and Umanak.
127. *Philomedes brenda*, not S. of Holstensborg (ca. 67° N.).
132. Sylon *Hippolytes* was found to be of very frequent occurrence, but only on *Spirontocaris Fabricii*, where it has not hitherto been found.
131. *Coronula diadema* and
133. *Pycnogonum littorale* have not been recorded from Greenland since FABRICIUS' mention of them in *Fauna Groenlandica* 1780.
134. *Phoxichilidium femoratum*, hitherto only known from Greenland locality not stated.
136. *Nymphon grossipes*, not S. of 66½° N.

#### Echinodermata.

146. *Pedicellaster typicus*, hitherto only from 66½° N.
151. *Poraniomorpha tumida*, only Umanakfjord.
160. *Amphiura denticulata*, only 64—64½° N.
162. *Ophiacantha anomala*, only 64—65° N.
163. *Ophiolebes claviger*, hitherto only W. Greenland (no locality).
164. *Ophioscolex glacialis*, hitherto only 66½° and 71° N.
165. *Gorgonocephalus Lamarekii*, hitherto only 64½—65½° N.
169. *Eupyrgus scaber*, only Arsuk (61° N.).
171. *Laetmogone violacea*, only 63°17' N.

#### Alcyonaria.

180. *Eunephthya florida*, hitherto only from 2 places in E. Greenl.

#### Number of Greenland's Crustacea and Pycnogonida.

In the "Conspectus" of 1913, mention is made of 563 species of Crustacea and 34 Pycnogonida from Greenland, while in the same work, p. 423—424, 10 new species are noted. *Lepas anatifera*, however, should

not as a matter of fact be stated as new for Greenland, having then already been recorded from Egedesminde, W. Greenland, by H. J. HANSEN (Cladoc. u. Cirriped. d. Plankton-Exped., vol. 2, G. d. 1899, p. 15).

Another species mentioned in the Conspectus, viz.; *Ianthe Libbeyi* (Consp. Nr. 243, p. 298) should also be erased, this form being synonymous with *Ianira tricornis* (verbal communication from Dr. H. J. HANSEN).

A. R. MOLANDER has, in Arkiv f. Zoologi, vol. 9, Nr. 6, 1914, p. 1, Pl. 1, fig. 1, set up a new Greenland species, *Spirontocaris recurvirostris* n. sp., which is, however, as far as I can see, no other than *Sp. Gaimardi Belcheri* Bell (*vide* Nr. 13 of present work).

GUNNER ALM has, in Arkiv f. Zoologi, vol. 9, Nr. 5, 1914, recorded 4 new Ostracoda from Greenland (*vide* Nr. 124 of present work). With the 9 new species from the "Rink", the fauna of Greenland thus numbers at present 585 known Crustacea and 34 Pycnogonida. We have still, however, to reckon with the material from the "Ingolf" Expedition, now being treated, as regards the Isopoda, by Dr. H. J. HANSEN, and the Copepoda by Mag. sc. C. WITH, both of which groups will show a very considerable further increase.

With regard to the zoogeographical importance of the "Rink" material, the reader is referred to the special section of the present work.

## LIST OF THE SPECIES.

× indicates new for Greenland. ×× new to science.

### CRUSTACEA.

For literature of the species belonging to this group *vide* my work; Grønlands Krebsdyr og Pycnogonider (Conspectus Crustaceorum et Pycnogonidorum Groenlandiae; Medd. om Grøn., vol. 22, 1913) where all information as to distribution etc. will be found.

### MALACOSTRACA.

#### Decapoda.

##### 1. *Chionoecetes Phalangium* O. Fabr.

Conspectus p. 1.

Kvanefjord St. 5, 420 m., 1 spec.; St. 25, 115 m., 1 spec. — Bredefjord St. 70, 225—290 m., 1 spec. — Skovfjord St. 143, 65—90 m., 1 spec.

Not hitherto known from W. Greenland S. of 66°35' N.

2. *Hyas araneus* L.

Conspectus p. 2, 424.

Kvanefjord St. 13, 34—40 m., 1 spec., 75 mm., ♂.

Not hitherto known from W. Greenland S. of Godthaab (64°11' N.).

3. *Hyas coarctatus* Leach.

Conspectus p. 3, 424.

## A. The adult stage.

Kvanefjord St. 2, 17—19 m., 1 spec.; St. 4, 20,5—34 m., 8 spec.; St. 6, 37—45 m., 3 spec.; St. 9, 22—24 m., 4 spec.; St. 10, 19,5—54 (?) m., about 10 spec., and 12—14 m., among algae, 5 spec.; St. 13, 34—40 m., 5 spec.; St. 25, 115 m., 1 spec. — Bredefjord St. 32, 35—37 m., about 10 spec.; St. 36, 29—100 m., 2 spec.; St. 37, 20—30 m., about 10 spec.; St. 40, 170—180 m., 1 spec.; St. 46, 20—30 m., 5 spec.; St. 48, about 10 spec.; St. 78, 30—50 m., 5 spec.; St. 79, 30—50 m., several; St. 88, 40—70 m., about 10 spec.; St. 89, 16—17 m., 1 spec.; St. 92, 50—90 m., 1 spec.; St. 103, 90—100 m., 1 spec.; St. 134, 85—140 m., 1 spec. — Tunugdliarfik St. 141, 35—70 m., 1 spec.; St. 142, 14—18 m., 4 spec. — Skovfjord St. 145, 10—35 m., 1 spec.; St. 151, 58—60 m., 1 spec.; St. 152, 80—120 m., about 15 spec.; St. 156, 70—140 m., about 15 spec. — Julianehaab, the harbour, 8—10 m., among algae, 2 spec.

This species is thus of very common occurrence throughout the whole of the area investigated; it is, however, apparently not found up in the Sermilik of Bredefjord. It is particularly frequent from some few metres depth down to abt. 100 m.; some species have however, been taken lower down; (St. 25, 115 m.; St. 40, 170—180 m.; St. 103, 90—100 m.; St. 134, 85—140 m.; St. 152, 80—120 m.).

Most of the specimens are small, about (10—) 30 mm., only a very few being from 50—60—70 mm. One or two of the specimens were just changing or had recently changed their shell. (St. 13, 88).

This species has been previously found in W. Greenland from Julianehaab to Hareø (abt. 70°25' N.).

## B. The larva (Fig. 1).

Kvanefjord St. 19, surface, about 15 spec. (1. Zoea); St. 27, Nansen-net, 50—25 m., about 15 spec. (1. Zoea); St. 28, ring-trawl, 400 m. w., about 35 spec. (1. Zoea). — Bredefjord St. 31, ring-trawl, 700 m. w., 5 spec. (1. Zoea); St. 50, ringtrawl, 100 m. w., 2 spec. (1. Zoea); St. 59, ringtrawl, 300 m. w., 1 spec. (1. Zoea); St. 84, ringtrawl, 200 m. w., 2 spec. (1. Zoea); St. 86, ringtrawl, 100 m. w., about 10 spec. (1. Zoea); St. 94, Nansen-net, 25—10 m., 5 spec. (1. Zoea); St. 100, ringtrawl, 500 m. w., 1 spec. (1. Zoea); St. 102, ringtrawl, 400 m. w., 1 spec. (1. Zoea); St. 106, ringtrawl, 100 m. w., about

10 spec. (1. Zoea); St. 126, ringtrawl, 800 m. w., 1 spec. (3. Zoea). — Skovfjord, St. 147, surface, 1 spec. (3. Zoea).

The above list shows, that Zoea is found at several different places and in widely different depths.

There are only two stages represented in the material, viz.: one entirely without pleopoda, and one with fairly large, but entirely inarticulate do.



Fig. 1. *Hyas coarctatus*, 3. Zoea.

The youngest stage I have described in the "Tjalfe" expedition, p. 127, fig 33, but did not venture to determine it at the time, although I pointed out its resemblance to the Zoea of *Hyas araneus*. I have since, in "Northern Strømfjord 1913", p. 64, advanced reasons for ascribing the larva to *Hyas coarctatus*, only this form, and not *H. araneus*, having been found in Northern Strømfjord; the same applies to Bredefjord and adjacent waters, where, as my list shows, *Hyas coarctatus* is extremely common, whereas I did not find a single specimen of *Hyas araneus*. This seems to be more than sufficient proof of the correctness of my determination.

With regard to the Zoea stage, there is nothing to remark; reference may be made to my description in the "Tjalfe" expedition.

The older Zoea, of which I have taken but a single specimen at St. 126 and another at St. 147 (August 26. and September 5.) agrees entirely with the description given by WILLIAMSON of 3. Zoea stage of *Hyas araneus* in the Report on larval and later stages of certain Decapod Crustacea (Fishery board for Scotland, Sc. Invest. 1909, Nr. 1, 1911, p. 13, Pl. 1, fig. 1—2, Pl. 5, fig. 70—81, 83) and I have therefore considered it sufficient here to give detail figures of some of the limbs, referring for the rest to WILLIAMSON. The only point which needs be noted is that the 3. pair of maxillipedes, of which no trace was found in the 1. Zoea stage, now appears as a fairly large, cleft limb, this being, however, like the pereopoda, without articulation.

In view of this complete uniformity, we can only suppose that either the Zoea of the two species resemble each other to such a degree that it has been impossible hitherto to discover any real difference,

or that WILLIAMSON'S specimens belong to *Hyas coarctatus*. His determination, by the way, is not put forward with absolute certainty; but carefully stated thus: "this species is, I consider, *Hyas araneus*".

The *Megalopa* stage of the two species on the other hand exhibits certain differences, as will be seen by comparing WILLIAMSON l. c., p. 15, fig. 2, with W. BJÖRCK, *Biolog. faunistisch. Untersuch. Öresund* (Lunds Universitets Årsskrift, N. F., Afd. 2, vol. 9, Nr. 17), 1913, p. 22, text fig. 1—2.

#### 4. *Eupagurus pubescens* Kr.

Conspectus p. 6.

##### A. The adult stage.

Kvanefjord St. 4, 20,5—34 m., 1 spec. — Bredefjord St. 40, 170—180 m., 1 spec. — Skovfjord St. 156, 70—140 m., 2 spec.

B. The larva (G. O. SARS, *Decapodernes Forvandlinger* 2; *Archiv for Math. og Naturvid.*, Christiania, 1889, p. 154, Pl. 2, fig. 29).

Bredefjord St. 59, ringtrawl, 300 m. w., Zoea, 1 spec.; St. 66, 9—11 m., Zoea, 1 spec.

This species has been found in W. Greenland from Julianehaab to Umanak Fjord (abt. 71° N.).

#### × 5. *Munida Bamffica* Penn?

*Munida Bamffica* H. J. Hansen, *Crustacea Malacostraca*; The Danish "Ingolf" Exped., vol. 3, pt. 2, 1908, p. 32 (ubi lit. et syn.).

Bredefjord St. 31, ringtrawl, 700 m w., 2 spec. (Zoea).

Two specimens of a Zoea stage of this species were obtained at this station; they are very similar to, and probably identical with that described by Sars as 1. Zoea (*Decapodernes Forvandl.* 2, *Archiv f. Math. og Naturvid.*, Christiania, 1889, p. 178, Pl. 6, fig. 1—11. (*Munida rugosa*)).

Neither full-grown nor larval stages of this species have hitherto been found in true Greenland waters; the nearest locality at which it has been taken (full-grown) is W. of Iceland (H. J. HANSEN l. c., p. 32), while the larva was found by the "Tjalfe" expedition somewhere between Iceland and Greenland.

#### 5b. *Munida* sp. (*M. Bamffica*?). (Fig. 2).

Together with the two larvae of *Munida Bamffica* already mentioned, the "Rink" obtained two somewhat older *Munida* larvae, possibly belonging to the same species, both having teeth on the dorsal side of the 4—5 abdominal segment, such teeth not being found in the larva of *M. tenuimana* (*vide* my work on the "Tjalfe" expedition, p. 130, fig. 33—35). The length is 8 mm. Antennae and mxp. 1—2 have the same form as in the young larva of *M. tenuimana* ("Tjalfe" exped., fig. 35); in mxp. 3, however, the exopodite is quite small, as are also p1—p5.

Neither uropoda nor pleopoda are yet apparant, and the 6. abdominal segment is not separated from the telson. This latter is of the usual shape, having, however, on its posterior edge, 7 (not 5) pairs of spines, of which the 6. pair, reckoned from the centre, are far heavier than the others.

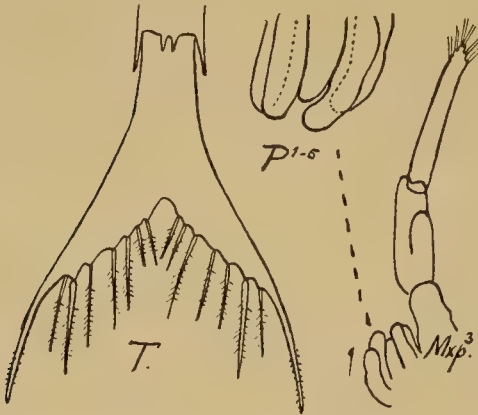


Fig. 2. Larva of *Munida* (*Bamffica*?).

6. *Munidopsis curvirostra* Whiteaves.  
Conspectus p. 10.

*Munidopsis curvirostra* Selbie,  
Fisheries, Ireland, Sci. Invest. 1914,  
pt. 1 (1914), p. 84, Pl. 13, fig. 14.  
Bredefjord St. 45, 430—450 m.,  
3 spec., one ♀ with ova.

Hitherto found in W. Greenland  
64°—65½° N.; and recently recorded by Selbie (f. c.) from 51°22' N.,  
12°41' W., 982 fms.

7. *Sclerocrangon boreas* Phipps.

Conspectus p. 12.

Bredefjord St. 32, 35—37 m., 6 spec., one with 2 *Piscicola*;  
St. 36, 29—100 m., 1 spec.; St. 37, 20—30 m., 1 spec.; St. 48, about  
10 spec.; St. 66, 9—11 m., 4 spec.; St. 89, 16—17 m., 1 spec.; St. 104,  
7—20 m., 8 spec. — Bredefjord Sermilik St. 110, 55—90 m., 2 spec.  
— Bredefjord St. 123, 5—10 m., 1 spec.; St. 127, 10—15 m., 1 spec. —  
Tunugdliarfik St. 142, 14—18 m., 3 spec.

This species, already known to be of very common occurrence  
along the whole coast of Greenland, was also frequently found in the  
area here investigated, from some few metres' depth to nearly 100 m.  
Many specimens had ova of *Piscicola*; a single one, from St. 32, having  
two grown *Piscicola*.

8. *Nectocrangon lar* Owen.

Conspectus p. 15.

A. The adult.

Kvanefjord St. 1, 84 m., 1 spec.; St. 2, 17—19 m., 1 spec. —  
Bredefjord St. 104, 7—20 m., 2 spec.; St. 123, 5—10 m., 2 spec.; St.  
127, 10—15 m., 4 spec.

B. The young stage? (Fig. 3).

Bredefjord St. 61, 12,5—13 m., 1 spec.; St. 65, ringtrawl,  
500 m. w., 1 spec.; St. 66, 9—11 m., 2 spec.; St. 89, 16—17 m., 2 spec.;  
St. 104, 7—20 m., 4 spec.

At the station above mentioned, we obtained some young stages  
of a Crangonid which I have not been able to determine with absolute

certainty. Unfortunately, the development of the Greenland Crangonidae is but little known (*vide* Conspectus, where all that is known will be found stated under the separate species).

The young stage here in question having p2 almost as long as p1, must be either *Nectocrangon* or *Sclerocrangon*. *Sclerocrangon ferox*,

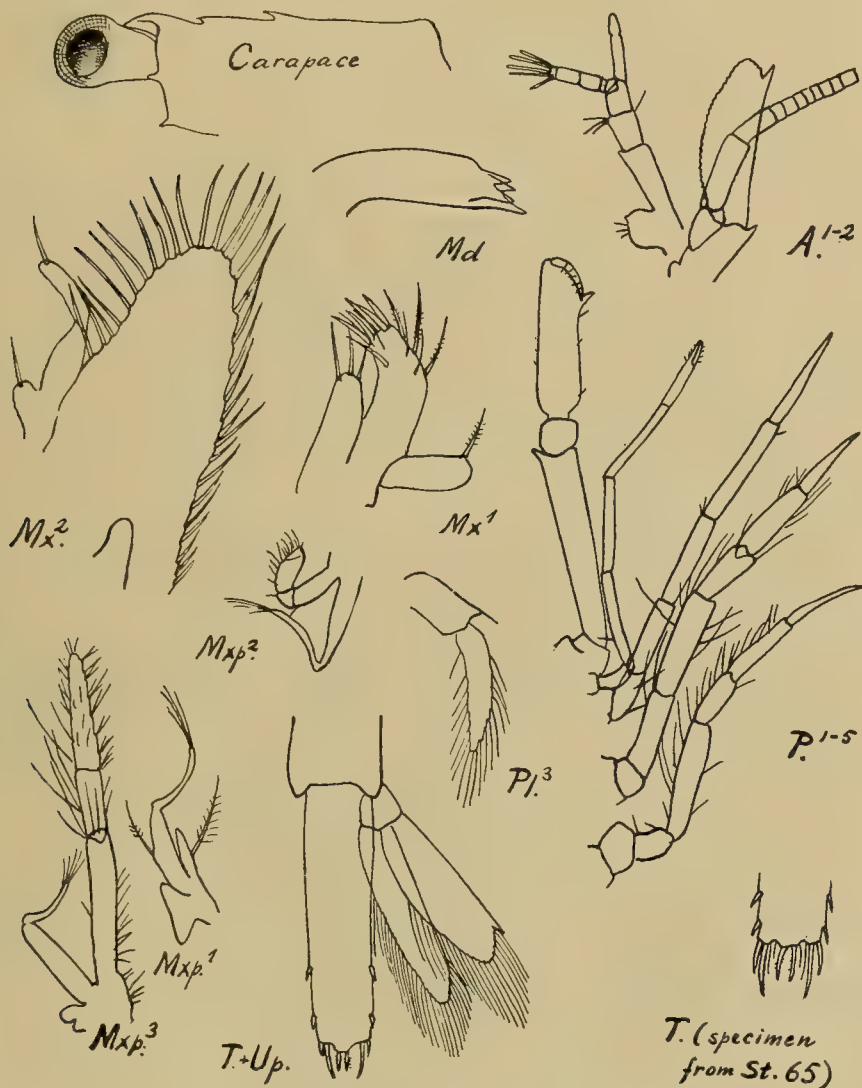


Fig. 3. *Nectocrangon* lar?, young stage.

as a deep sea form, may be disregarded, all the present specimens having been taken in shallow water (9—17 m.) with the exception of that from St. 65, which was brought up by the ringtrawl, with 500 m. wire out. There remain, then, *Sclerocrangon boreas* and *Nectocrangon*, both of which are found as grown specimens in the "Rink" material. *Sclerocrangon boreas*, however, is again excluded; Sars has described the young stage, or rather the young animal, as altogether resembling

the grown (Decapodernes Forvandl. 3, Archiv f. Math. og Naturvid., Christiania, vol. 14, 1890, p. 188, Pl. 6, fig. 29—31).

SARS writes (l. c., p. 181—82) that he has never, despite very careful search in Nordland and Finmarken, where *Sclerocrangon* is extremely common, succeeded in finding either larval or young stages, but only young specimens, altogether, or at any rate to a very high degree, resembling the fully grown, "all the characters of the developed animal being already well marked". We may therefore doubtless agree with SARS in presuming that *Sclerocrangon* has no developmental stages at all, but appears from the first in the same form as when fully grown.

In the case of young stages, of course, one should not attach too great systematic importance to such features as the shape of the carapace (here long and narrow) or peculiarities in the spinous armature; on the other hand, it is but natural that such characters should to a certain extent be taken into consideration. And in these respects, the present specimens agree entirely with the grown *Nectocrangon*, but not with *Sclerocrangon*. All things considered, therefore, I have but little doubt that the specimens in question are young stages of *Nectocrangon* lar, with regard to the development of which, however, absolutely nothing is known.

Length 11—12 mm.

The integument is comparatively soft, without sculpture; there are, however, two spines in the medio-dorsal line behind the rostrum, exactly as in grown *Nectocrangon* lar. There is also a spine beneath the eye, and at the anterior corner of the carapace. The shape of the telson is very characteristic, having almost parallel sides, with two spines on each, close to the end. At each of the posterior corners are two spines, of which the median is the longer. In most of the specimens, the posterior edge of the telson projects slightly in the centre, but is cut off sharply and armed with two spines; in some cases, (St. 61, 65, 66) two fine bristles are found on either side between this portion and the spines on the posterior corners. The telson thus differs from that of the grown *Nectocrangon*, which is almost the same shape as in the grown *Sclerocrangon*. I have nothing to remark concerning the appendages, but refer for these to my figures. The point of the flagellum in ant. 2 is lacking in all specimens. P2 is, as already mentioned, almost as long as p1.

True, the grown *Nectocrangon* has only been taken at one of the stations (St. 104) where the present young stage was found, while *Sclerocrangon boreas* was taken at St. 66, 89 and 104; the last-named species is, moreover, altogether of more frequent occurrence in the material than *Nectocrangon*; I have, however, for the reasons given above, no great doubt as to the correctness of my determination.

*Nectocrangon* lar is found in shallow water all round the coasts of Greenland. In addition to the area of distribution noted in the Con-



spectus, it has also been recorded from Japan (BALSS: Ostasiat. Decap., p. 2, 1914, p. 67).

9. *Sabinea Sarsii* S. I. Smith.

Conspectus p. 17.

Skovfjord St. 152, 80—120 m., 1 spec.

Hitherto found in W. Greenland only much farther north ( $65\frac{1}{2}$ — $66\frac{1}{2}$ ° N.).

10? *Sabinea septemcarinata* Sab. (Fig. 4).

Conspectus p. 18.

Bredefjord Sermilik St. 119, ringtrawl, 400 m. w., 2 spec. (young stage), 13 mm.

G. O. SARS has, in *Decapodernes Forvandlinger 3* (Archiv f. Math. og Naturvid., vol. 14, 1890), p. 168, Pl. 6, Pl. 7, fig. 1—13, described the larval stages of this species, but not the young stage, which is not known.

Integument fairly hard. Sculpture only slight. Rostrum rounded at the point, and with some small setae. The one specimen has 3 spines in the mediodorsal line, two of which are placed one close behind the other immediately in front of the posterior edge; the other specimen had 4 spines here, of which three close behind the rostrum. On either side of the carapace are three parallel lateral carinae, the lowest terminating anteriorly in a spine, while there is also a spine on the anterior corner of the carapace. There is a suggestion of a carina on the 3. abdominal segment; other sculpture than this I have been unable to discover. The sides of the telson are almost parallel, with 4 pairs of small lateral spines (the distal spines lacking on the right side). The posterior corners project slightly, and are armed each with 2 spines. The median portion of the posterior edge curves slightly outward, and is furnished with 4 pairs of ciliated setae.

On comparing my figure of the oldest larval stage with that given by SARS (Pl. 7, fig. 1—13) it will be seen that the likeness is on the whole striking enough, mine being, however, somewhat more "grown" in form. I therefore give here the most important characters only.

Ant. 2 has a flagellum almost as long as the whole animal, with distinct articulation in the proximal part. Of the pereopoda, only p1 has an exopodite. P2 is very small and has no chela. There are gills at the base of p1—p5.

The colour is still a faint red, despite three years' preservation in alcohol; 3 black pigment spots (dark red or reddish brown under the microscope) are visible on the squama, and two larger spots on the telson; no other pigment is present.

That my determination here is correct I consider absolutely beyond doubt. Of the Greenland Crangonidae, only *Pontophilus* and *Sabinea*

have a small p2; the p2 in this case, however, having no chela whatever, the specimens in question must be ascribed to *Sabinea*. Three species are, it is true, known from Greenland; *S. hystrix* is, however, so rare

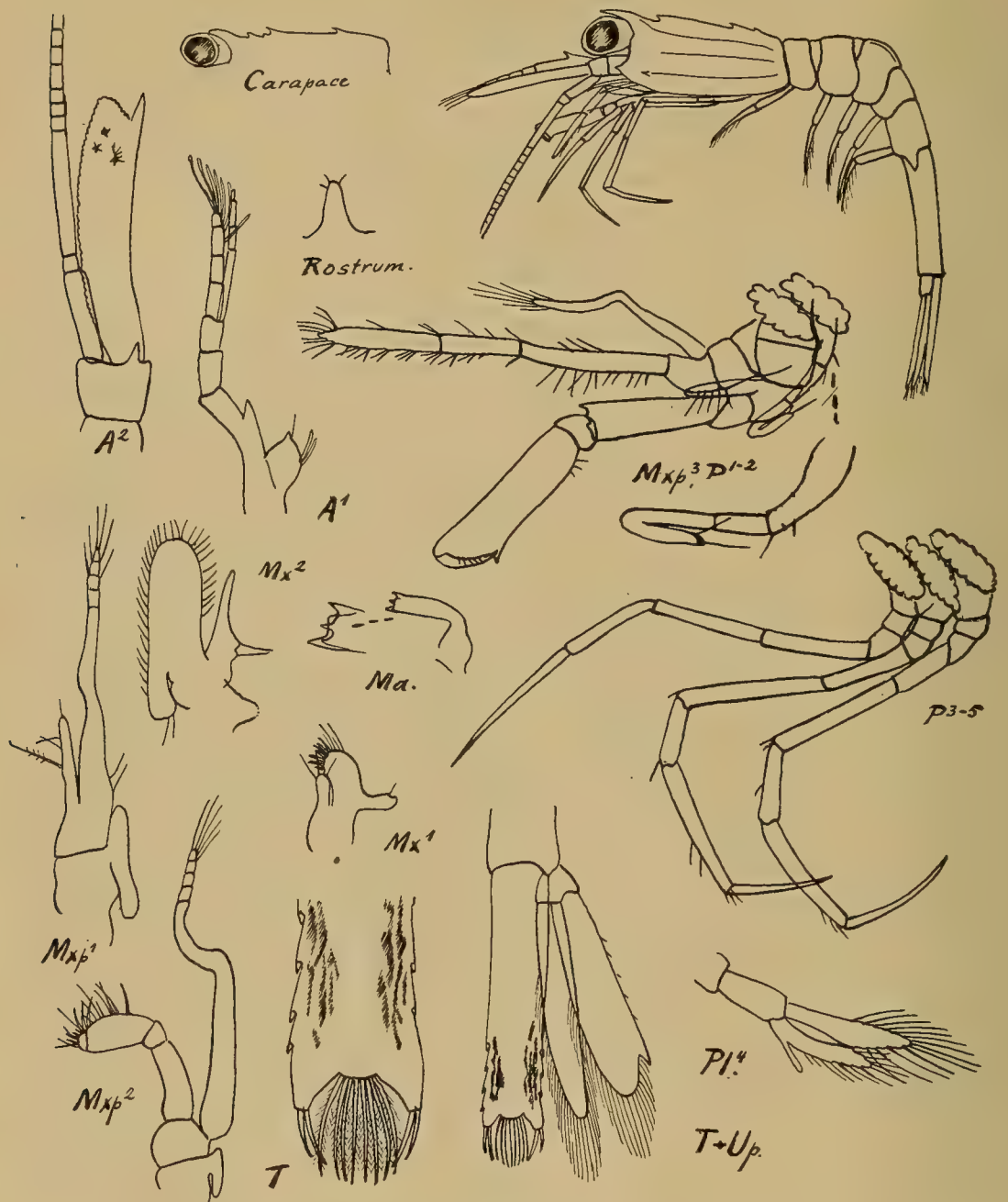


Fig. 4. *Sabinea septemcarinata?*, young stage.

that may be altogether disregarded. We have thus only *S. septemcarinata* and *S. Sarsii*. In *S. sept.*, the rostrum is rounded, in *S. Sarsii* pointed, while the telson is altogether different in the two species (*vide* SARS l. c., p. 180, Pl. 5, fig. 24—25). My specimens having a rounded

rostrum, and telson more resembling, though not altogether identical with that of *S. septemcarinata*, I consider it sufficiently certain that the specimens in question really are young stages of this species, and not of *S. Sarsii*. Moreover, the pigment spots on the telson agree entirely with those shown in Sars' figure of the older larva (l. c., Pl. 5, fig. 21) while the size (13 mm.) corresponds closely enough to the length of 11,5 mm. noted by Sars in the case of the older larva.

The species is not uncommon in East and West Greenland waters.

### 11. *Pontophilus norvegicus* M. Sars.

Conspectus p. 20.

Only the larva, not the adult, was taken (see G. O. Sars, Decap. Forvandl. 3; Archiv for Math. og Naturvid., Christiania, vol. 14, 1890, p. 160, Pl. 4).

Bredefjord St. 31, 700 m. w., 1 spec.; St. 47, 600 m. w., 1 spec.; St. 72, 400 m. w., 1 spec.; St. 73, 300 m. w., 1 spec.; St. 86, 100 m. w., 1 spec.; St. 100, 500 m. w., 1 spec. — Bredefjord Sermilik St. 118, 500 m. w., 1 spec. — Bredefjord St. 126, 800 m. w., 3 spec.; St. 132, 700 m. w., 1 spec.

Hitherto found in W. Greenland only at  $63\frac{1}{2}$ — $66\frac{3}{4}$ ° N.

### 12. *Spirontocaris Fabricii* Kr.

Conspectus p. 21.

Kvanefjord St. 4, 20,5—35 m., 3 spec., 1 with *Sylon Hippolytes*; St. 13, 34—40 m., 4 spec., 1 with *Sylon Hippolytes*. — Bredefjord St. 32, 35—37 m., about 10 spec., 1 with *Sylon Hippolytes*; St. 36, 29—100 m., 4 spec., 1 with *Sylon Hippolytes*; St. 48, 500 ccm., 11 with *Sylon Hippolytes*; St. 61, 12,5—13 m., 250 ccm., a few with ova, and 1 with *Sylon Hippolytes*; St. 62, 10—12 m., 6 spec., 1 with *Sylon Hippolytes*; St. 66, 9—11 m., 400 ccm., 1 with *Sylon Hippolytes* and 1 with *Bopyroides Hippolytes*; St. 79, 30—50 m., about 20 spec., one with *Sylon Hippolytes*; St. 88, 40—70 m., 1 spec.; St. 89, 16—17 m., 125 ccm., a few with ova, 1 with *Bopyroides Hippolytes*; St. 104, 7—20 m., 100 ccm.; St. 123, 5—10 m., about 35 spec. — Tunugdliarfik, St. 142, 14—18 m., about 50 spec., about 10 with ova and 3 with *Sylon Hippolytes*. — Skovfjord, 10—35 m., 2 spec., one with ova.

Numerically speaking, this is by far the most widely distributed of all *Spirontocaris* species in the area investigated. It is an endemic West Greenland species, found from the southern point of the mainland up to  $72\frac{1}{2}$ ° N.

It is interesting to note that so many of these specimens have *Sylon Hippolytes*, not only on account of the number, but also because this parasite had never before been found attached to this host.

For a larva and young stage ascribed to this species see p. 259, 266.

13. *Spirontocaris Gaimardii* M. Edw.

Conspectus p. 23.

Kvanefjord St. 4, 20,5—34 m., 1 spec. (*Sp. Gaimardii gibba* Kr.).

Strangely enough, only this one specimen was taken; the species is otherwise of very common occurrence in West Greenland.

Some months ago, I received a letter from Conservator C. DONS, of Tromsø (N. Norway), asking whether I did not consider *Sp. recurvirostris* Molander (Arkiv f. Zoologi, vol. 9, Nr. 6, 1914, p. 1, Pl. 1, fig. 1) to be merely a slightly differing form of *Sp. Gaimardii Belcheri* Bell. DONS himself had not material at his disposal for comparison. Unfortunately, I have not had time to go thoroughly into this question, but on examining some few specimens of *Sp. Gaimardii* from W. Greenland, where MOLANDER'S *Sp. recurvirostris* was originally taken, I cannot but consider that DONS' suggestion is correct.

14. *Spirontocaris spinus* Sow.

Conspectus p. 25.

Skovfjord St. 152, 80—120 m., 1 ♀ with ova.

15. *Spirontocaris Lilljeborgii* Danielssen.

Conspectus p. 27.

Kvanefjord St. 2, 17—19 m., 1 spec.; St. 4, 20,5—30 m., 1 spec.; St. 10, 19,5—54 (?) m., 1 spec. — Bredefjord St. 48, about 30 spec., several with ova, several with *Bopyroides Hippolytes*, 1 with *Phryxus abdominalis*; St. 76, 260—320 m., 1 spec.; St. 79, 30—50 m., 4 spec.; St. 87, 230 m., 1 spec.; St. 92, 50—90 m., 1 spec.; St. 127, 10—15 m., 3 spec. — Skovfjord St. 145, 10—15 m., 2 spec.; St. 155, 220 (240)—about 400 m., 1 spec.

This species is thus fairly widely distributed at the lesser depths, but has also been found at 230 m., 260—320 m. and 220 (240)—abt. 400 m. Strangely enough, the species has not hitherto been found in West Greenland south of abt.  $66\frac{1}{2}^{\circ}$  N.

16. *Spirontocaris turgida* Kr.

Conspectus p. 28.

Kvanefjord St. 4, 20,5—34 m., 8 spec.; St. 6, 45 m., 1 spec.; St. 9, 22—24 m., 1 ♀ with ova. — Bredefjord St. 32, 35—37 m., 3 spec., 1 ♀ with ova; St. 48, about 15 spec., several with ova; St. 61, 12,5—13 m., about 10 spec., 2 with ova; St. 62, 10—15 m., 5 spec., 2 ♀ with ova; St. 66, 9—11 m., abt. 15 spec., several with ova; St. 79, 30—50 m., 9 spec., 1 with ova; St. 89, 16—17 m., several spec.; St. 104, 7—20 m., 10 spec., 4 with ova; St. 123, 5—10 m., 12 spec., 1 with ova; ?St. 126, 800 m. w., 1 spec. juv.? — Tunugdliarfik St. 142, 14—18 m., 7 spec., 1 with ova. — Skovfjord St. 145, 10—35 m., 1 spec. with ova.

This species is thus very common at depths of from some few metres down to abt. 50 m. For larva se p. 256.

### 17. *Spirontocaris polaris* Sab.

Conspectus p. 30.

Kvanefjord St. 1, 84 m., 1 ♀ with ova; St. 4, 20,5—34 m., 4 spec.; St. 6, 37—45 m., 1 ♀ with ova; St. 9, 22—24 m., 2 spec., 1 with ova; St. 10, 19,5—54 (?) m., 1 spec.; St. 11, 290—320 m., 1 spec. with *Phryxus abdominalis*; St. 12, 290—400 m., 5 spec., 1 with ova. — Bredefjord St. 32, 35—37 m., 5 spec., 1 with ova; St. 40, 170—180 m., 3 spec., 1 with ova; St. 48, about 100 spec., several with *Bopyroides Hippolytes*; St. 61, 12,5—13 m., 10 spec.; St. 66, 9—11 m., 150 ccm., 6 with *Bopyroides Hippolytes*, several with ova; St. 79, 30—50 m., about 50 spec.; St. 89, 16—17 m., 15 spec.; St. 91, 110—180 m., 2 spec., 1 with ova; St. 97, 250—280 m., 1 spec.; St. 103, 90—100 m., 1 with ova; St. 104, 7—20 m., about 20 spec., 1 with *Bopyroides Hippolytes*; St. 109, 125—140 m., 2 spec., 1 with ova. — Bredefjord Sermilik St. 110, 55—90 m., 1 spec. — Bredefjord St. 123, 5—10 m., 3 spec. — Tunugdliarfik, several spec., several with ova. — Skovfjord St. 156, 70—140 m., 2 spec.

This species is thus common in shallow water and down to abt. 400 m., being most frequently found, however, from the surface to abt. 50 m.

Young and larval stages *vide infra* p. 254, 267.

### 18. *Spirontocaris groenlandica* Fabr.

Conspectus p. 34.

Bredefjord St. 32, 35—37 m., 2 spec.; St. 37, 20—30 m., 1 spec.; St. 48, about 10 spec.; St. 61, 12,5—13 m.; St. 66, 9—11 m. 8 spec.; St. 79, 30—50 m., 2 spec.; St. 89, 16—17 m., 2 spec., 1 young with larva of *Phryxus abdominalis*. — Skovfjord St. 156, 70—140 m., 1 spec.

This species, otherwise extraordinarily numerous in all Greenland waters, is thus, as regards the area here investigated, not nearly so common as might have been expected.

Besides the localities other than Greenland mentioned in the Conspectus, the species has also been taken at Awatscha (Japan?) (BALSS: *Ostasiat. Decap.*, 1914, p. 45).

For young form, *vide infra* p. 264.

### 19. *Spirontocaris microceros* Kr.

Conspectus p. 37.

Bredefjord St. 48, 1 spec.

The finding of this species is one of the most interesting results of the expedition; the specimen in question is somewhat defective, but the determination nevertheless certain.

When H. J. HANSEN drew up his list of the Malacostraca of W. Greenland, in 1887, it was only known from 4 places in all, viz.: Nanortalik, Ivigtut, Umanak and Prøven. In 1911, it was found by Dr. NORDMANN in Northern Strømfjord, abt. 67° N. (*vide* my work on this expedition, p. 65). The present find thus adds a new locality.

#### On the Developement of the Genus *Spirontocaris*.

Although the genus *Spirontocaris* is widely distributed throughout the northern seas, there are, strangely enough, but few writers who have studied its developement.

No species has been described from the egg to its full growth; G. O. SARS has, however, recently given a description of the postembryonal developement of an allied form, *Hippolyte varians* Leach (in *Archiv for Math. og Naturvid.*, Kristiania, vol. 32, Nr. 7, 1912, p. 1—25, with three double page plates).

I have been carefully through the literature on the subject, but have not been able to find anything beyond what is mentioned below.

*Spirontocaris* sp. Claus, Zur Kenntnis d. Malacostracen-larven; Würzburg Naturwiss. Zeitschr., vol. 2, 1861, p. 40, Pl. 3, fig. 8.

*Sp. polaris*, embryo, KRØYER, Monograf. Fremstill. Sl. Hippolyte; Kgl. Danske Vid. Selsk. Math.-Naturvidensk. Afh., 1842, p. 245, Pl. 6, fig. 120—32.

*Sp. Cranchii* and *Sp. pusiola*. SARS states in a footnote on p. 5 of his work above mentioned, on *Hippolyte varians*, that he has hatched out these species, but he does not describe their developement.

*Sp. sp.* Some developemental stages, including a young stage of *Sp. groenlandica*, I have myself described in *Danmark Exped. 1912*, p. 516—25, Pl. 39—43, and in the "Tjalfe" *Exped. 1912*, p. 126, fig. 32.

This then, is all I have been able to find. As, however, the material collected by myself includes much bearing upon this question, I have taken the opportunity to clear up various points in connection therewith.

As will be seen in the following pages, the quantity of material brought home by the present expedition is so large as to more than double our knowledge of the developement in this genus; this is due partly to the use of the ringtrawl, and partly that of the stramin dredge, both of which fished with an unusual degree of intensity.

The material includes young stages of 4 species, of which two not hitherto known, and larvae of 4 species, of which one only has previously been described, and this, moreover not with certainty. A fifth Decapod larva is also new, but as it presents strong points of difference, I have not ventured to regard it as altogether certainly belonging to this genus.

G. O. SARS, in his *Account of the postembryonal developement of Hippolyte varians* (*Archiv f. Math. og Naturvid.*, Kristiania, vol. 32, Nr. 7, 1912, p. 21—22), states that the older larvae of *Hippolyte* and

*Spirontocaris* may be distinguished by the fact that the first-named has only 5 pair of natatory rami (exopodites), viz.: on mxp. 1—3 and p1—2, whereas *Spirontocaris* has 7 pairs, the additional two being on p3—p4. This agrees entirely with my own results; I am unable to see, however, whence Sars has his knowledge of *Spirontocaris*, if not from the spec. of *Sp. Cranchii* and *Sp. pusiola* hatched by him (Sars l. c. on *Hippolyte* var.), as the only description of an older *Spirontocaris* larva which I have been able to find in extant literature is the larva described by CLAUS (l. c.); this lacks exopodites on p3—p4, and I am not certain that it really belongs to this genus.

Being unable to determine my larvae with certainty, I have numbered them for convenience of reference. I have, however, disregarded Nr. 5 in the following remarks concerning development, as I am not certain that it really belongs to this genus.

In point of habit, the larvae resemble that of *Hippolyte varians* described by Sars, but may be distinguished from this at a first glance by being more slender, and by the fact that none of them have any dentition on the anterior part of the lower edge of the carapace. There is generally a small protuberance behind the basis of the rostrum; the length of the rostrum does not generally exceed that of the eyes, and frequently falls short of this. All the larvae have a supra-ocular spine.

It is remarkable that the larvae of the different species come into the world at very different stages. Nr. 1, for instance (first free stage of *Sp. polaris*?), in which the 6. and 7. caudal segments are not yet separated, and the uropoda still within the integument, has nevertheless comparatively well-developed pleopoda and well articulated pereopoda of almost adult form but without exopodites at all. Larva Nr. 3 on the other hand, has in its youngest known stage the 6. and 7. caudal segments separate, and the uropoda free, while p3—p5 have no trace of articulation, and pleopoda are lacking.

This difference in the degree of development cannot be taken as proof that the larvae do not all belong to the same genus, and that some have consequently been incorrectly determined; it should rather be regarded as a secondary feature, due to the partially arctic conditions, possibly arising from the low salinity of the water nearest the surface. Arrested metamorphosis is, moreover, also known among not a few arctic forms, the Echinodermata especially, and one species of *Sclerocrangon*, *Sc. boreas*, has, as far as we know (*teste* Sars, *vide supra* p 246) no larval stage at all, while the other, *Sc. ferox*, has larval development, although arrested.

*Spirontocaris* has, it would seem, no real Zoea stage; Larva Nr. 1 should, it is true, from the shape of the telson, be a Zoea, but the pereopoda are here too well developed, and a true Zoea has, moreover, no pleopoda. Most of the larvae should be characterised as Mysis-stages.

In the young stages, the mandibles are of adult form, a distinct

cutting part having made its appearance, in addition to the molar part; mxp. 2 is curved, and is likewise almost of adult shape.

The following 5 *Spirontocaris* species are of common occurrence in the material: *Sp. Fabricii*, *Sp. Lilljeborgii*, *Sp. turgida*, *Sp. polaris* and *Sp. groenlandica*; the remaining species are represented only by some few specimens. We have therefore some justification for supposing that the larvae should be ascribed to these 5 species. Presuming larva Nr. 1 to be that of *Sp. polaris*, this species may be disregarded in seeking to determine the rest.

If Larva Nr. 2 be the same species as described in the Danmark Exped. then it is out of the question that it should belong to *Sp. Fabricii*, as this species is only found in W. Greenland. On the other hand, its frequency leads us to suppose that it might belong to *Sp. turgida*, the species next in order of frequency in the material.

Larva Nr. 3 should, from its high numerical position, probably be ascribed to *Sp. Fabricii* (*vide* p. 259).

Larva Nr. 4 would then, supposing the foregoing to be correct, belong either to *Sp. Lilljeborgii* or *Sp. groenlandica*. I readily admit however, that my conclusions as to determination of these larvae rest on a very slight foundation.

#### *Spirontocaris* larva Nr. 1.

(1. free stage of *Sp. polaris*?) (Fig. 5).

Bredefjord St. 35, ringtrawl, 400 m. w., 16/vii 1912, 1 spec., 8 mm.

At this station the "Rink" obtained a *Spirontocaris* larva which in the spines on 4. and 5. abdominal segment closely resembles the larva Nr. 2 described below; the present specimen, however, belongs to another species.

Young and old characters are here combined in a remarkable manner. The rostrum is quite short and thick, there is a supra-ocular spine, and one below the antennae, but not above the antennae. The peduncle of ant. 1 has three joints, with a spine on the under side of the first. The flagellum of ant. 2 is not articulated, a first segment is, however, indicated, and there is a suggestion of a second; the length of the flagellum cannot be given, as the point is lacking. The maxillipedes are of altogether larval type, and have large exopodites; p1—p5 however, are very close to the adult form, with distinct articulation, and, on p1—p2, large chelae; exopodites are altogether lacking; there are small gills, however, at the base. An even more adult character is the fact that 5. joint of p2 bears a slight trace of being divided into other (2) joints again. All 5 pairs of pleopoda are present, but appear to lack articulation. The telson is not separated from the 6th abdominal segment; it is of the usual larval form, and appears to have been furnished with 8(9?) pairs of bristles on its posterior edge (including the corner). Only portions of 7 pairs are remaining, but there would seem to have been two



pairs more at either corner. There are fine setae between the bristles. The uropoda may be seen through the telson, lying inside the integument.

Despite the resemblance to Larva Nr. 2 (the spines on 4.—5. abdominal segment) this is distinctly of another species. Its metamorphosis is far more arrested, is seen from the "adult" form of the pereopoda and the large pleopoda, as compared with the still undeveloped telson. If the supraocular spines are preserved until the adult stage is reached, then it should (*vide* p. 258) either belong to *Sp. polaris*,

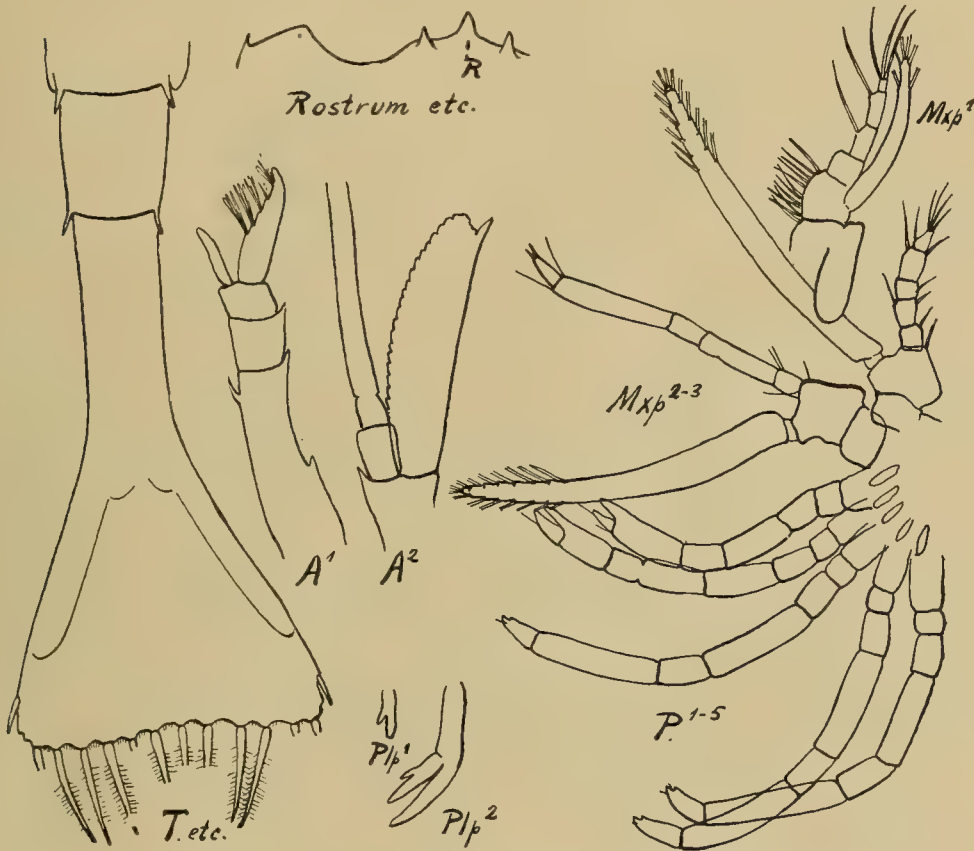


Fig. 5. *Spirontocaris polaris?*, the first freeliving stage.

to *Sp. groenlandica*, *Sp. turgida*, or *Sp. Lilljeborgii*. It shows a remarkable resemblance to the figure which KRØYER gives of the embryo of *Sp. polaris* (Monograf. Fremstill. Sl. Hippolytes nordiske Arter, Kgl. Danske Vid. Selsk. math.-naturvid. Afh., vol. 9, 1842, p 245 (37), Pl. 6, fig. 120—32).

Making allowance for the fact that KRØYER's figures and description are based upon embryos, where spines, etc. could hardly be expected to be developed, while the present larva was taken as a free living stage, the resemblance is in all other respects so great as to leave, in my opinion, but little doubt that the larva here in question actually is the first free stage of *Spirontocaris polaris*.

The time at which it taken, also (16. July) need not polar parts. the probability of this being the case, as *Spirontocaris polaris* has been taken with ova from St. 1 (21. June) to St. 142 (2. Sept.).

*Spirontocaris* larva Nr. 2 (Fig. 6—7). (*Sp. turgida?*)

1. stage. Kvanefjord St. 28, 400 m. w. (5/VIII), 10 spec. — Bredefjord St. 47, 600 m. w. (18/VII), 1 spec.

Intermediate stages. Kvanefjord St. 28, 400 m. w. (5/VII) about 25 spec. — Bredefjord St. 35, 400 m. w. (16/VII), 1 spec.; St. 73, 300 m. w. (25/VII), 2 spec.; St. 84, 200 m. w. (31/VII), 1 spec.; St. 89, 16—17 m. (31/VII), 1 spec.

Last stage. Kvanefjord St. 28, 400 m. w. (5/VII), about 50 spec. — Bredefjord St. 35, 400 m. w. (16/VII), 1 spec.; St. 50, 100 m. w. (20/VII), 1 spec.; St. 59, 300 m. w. (20/VII), 1 spec.; St. 61, 12,5—13 m. (22/VII), 5 spec.; St. 64, 600 m. w. (23/VII), 2 spec.; St. 66, 9—11 m. (23/VII), about 15 spec.; St. 89, 16—17 m., (31/VII) 1 spec.; St. 104, 7—20 m. (5/VIII), 4 spec.; St. 128, 700 m. w. (26/VIII), 3 spec.

In the Danmark Exped. 1912, p. 522—24, Pl. 43, and the "Tjalfe" Exped. 1912, p. 126—27, fig. 32, I have described a Mysis stage of a *Spirontocaris* larva, which I believe to have found again in my own collections. As will be seen from the foregoing list, it was found at a considerable number of stations, and in more than 3 different stages, none of which, however, entirely agrees with that I have previously described. That it is the same species, however, is fairly certain, *inter alia* on account of the spines on 4.—5. abdominal segment; the resemblance is also sufficiently evident when the two are compared. The stage previously described is, however, too large in proportion (abt. 10 mm.) and the spines on the telson there too long, the rostrum also, seen in profile view, being somewhat slenderer at the base.

I have drawn the youngest and the oldest stages; between these lie a number of intermediate forms, which are not easy to divide up into distinct stages.

Youngest stage (Fig. 6). Length 6,5 mm. Fore end of the carapace and the rostrum are of exactly the same shape as in my figure of these parts in the oldest stage. The rostrum is comparatively long, very pointed, with a small wart above the base. There is a spine above the eye and also over and under the base of 2. pair of antennae. In ant. 1, the 2. joint of the peduncle is not yet separated from the first; this joint has a spine on the under side of the distal end, just as in the later stages. In ant. 2, the length of the flagellum is equal to that of the squama; there is no articulation. The maxillipedes are of entirely larval character. P1—p2 have chelae and exopodites, but are altogether without articulation, as also p3—p5. Pleopode 1 is altogether lacking in some specimens; in others it appears in the form of a very small protuberance. Plp 2—5 are cleft but small, and without articulation.

nairs more soda, the inner ramus is short, and without bristles on the edge. The telson is slightly concave at the distal end, and is here twice as broad as at its base. The posterior edge is armed with 7 pairs of

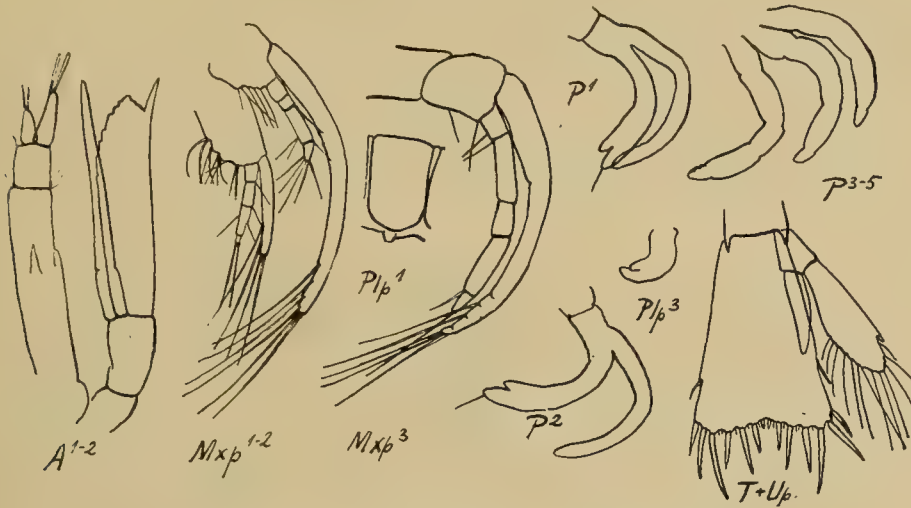


Fig. 6. Spirontocaris-larva Nr. 2, 1. stage.

spines in all (including the corners), the middle pair, however, being quite small, the third from the end being the longest. Between the bristles are fine setae. There is a small spine on either side a little in front of the corner.

Intermediate stages. The youngest and oldest stages are connected by a number of intermediate forms, which can, however, hardly be separated into distinct stages, as their characters appear partly to overlap. Some of them correspond more or less to my descriptions in the "Danmark" and "Tjalfe" Exped.; in all, however, the spines on the telson are smaller than there described.

Oldest stage (Fig. 7). Length 8 mm. (one specimen, however, from St. 64, measured 10—11 mm.). Antennae almost as in youngest stage, but peduncle of ant. 1 now with 3 joints, while in ant. 2, the peduncle is now  $1\frac{1}{2}$  times as long as the squama, and has developed two distinct articulations at its base. The maxillipeds are of almost the same shape as in the youngest stage. All pereopoda have now become articulated, and there is also an exopodite on p3. Gills at the base of p1—p5. The pleopoda are now larger, and the branches in articulate connection with the peduncle, natatory setae, however, are lacking, save for a single one at the point of the exopodite. The uropoda about the same length as the telson, and there are also bristles on the endopodite. The telson has almost parallel sides, its length is between 3 and 4 times its breadth; in most of the specimens it is somewhat broader than in the one shown in the figure. There are 6 pair of bristles on the posterior edge (including corners) and two spines on either side.

This larva can hardly be determined with certainty. The youngest stage is somewhat older than the 3. stage of *Hippolyte* varians described by Sars (l. c. *supra*), p. 11, Pl. 4, fig. 1—7. If we presume, as I consider must certainly be the case, that the supra-ocular spine is retained until the adult stage is reached, we have then to choose between the following species: *Sp. polaris*, *Sp. microceros*, *Sp. groenlandica*, *Sp. turgida*, *Sp. spinus* and *Sp. Lilljeborgii*. Of these, *Sp. spinus* and *Sp. microceros* may be excluded, on account of their rarity in the waters in question. There is, also, the more reason to consider the pre-

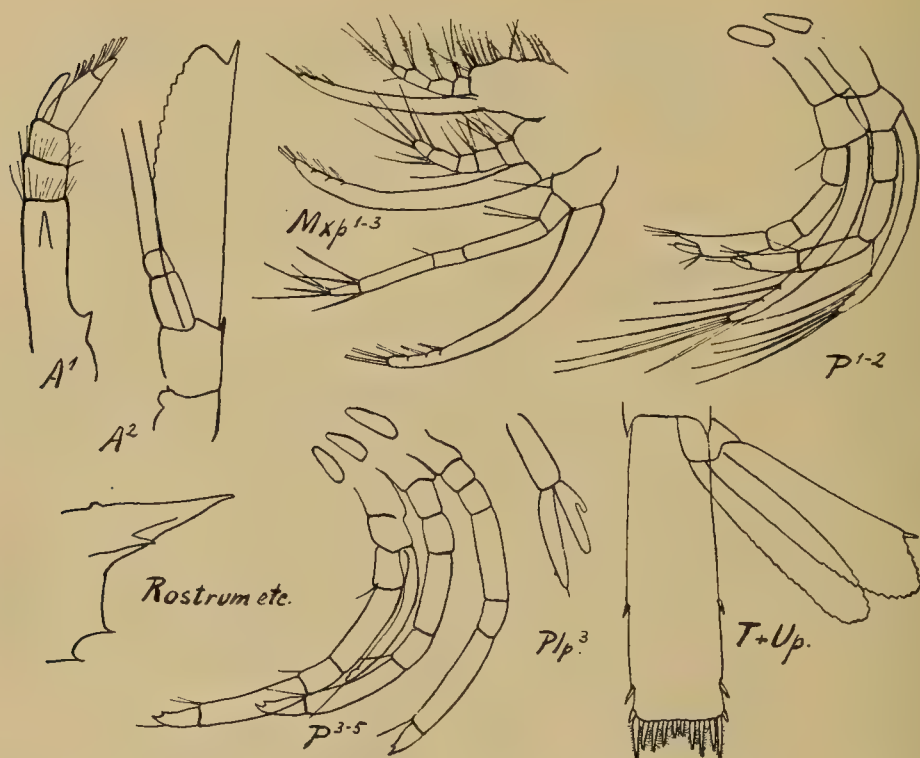


Fig. 7. *Spirontocaris*-larva Nr. 2, last stage.

sent specimen as belonging to one of the remaining species, since these are (with the exception of *Sp. Gaimardii*, *Sp. spinus* and *Sp. Lilljeborgii*, which may probably be disregarded) the only species of *Spirontocaris* taken by the Danmark expedition in the waters then investigated. That it does not belong to *Sp. Gaimardii* I consider certain, as the adult of this species was only taken by the "Rink" at a single place (in Kvane-fjord) and there represented by only a single specimen, whereas the larva in question was of common occurrence in Bredefjord.

*Sp. polaris* may probably also be excluded (*vide supra* p. 254); the larva must therefore be either *Sp. groenlandica*, *Sp. turgida*, or *Sp. Lilljeborgii*, and, as already mentioned (p. 254) it seems reasonable to suppose that it is in fact the larva of *Sp. turgida*. The material also

includes many females of this species taken with ova from 25. June (St. 9) to 5. Sept. (St. 145).

*Spirontocaris* larva Nr. 3. (*Sp. Fabricii?*)

1. stage. Kvanefjord St. 28, 400 m. w. (5/vii), 1 spec. — Bredefjord St. 50, 100 m. w. (20/vii), 4 spec. — (?St. 59, 300 m. w. (22/vii), 1 spec.).

Intermediate stage. Kvanefjord St. 28, 400 m. w. (5/vii), 1 spec. — Bredefjord St. 50, 100 m. w. (20/vii), 7 spec.; St. 59, 300 m. w. (22/vii), 3 spec.; St. 86, 100 m. w. (31/vii), 1 spec.; St. 106, 100 m. w. (7/viii), 4 spec.

Last stage. Bredefjord St. 59, 300 m. w. (22/vii), 1 spec.; St. 128, 700 m. w. (26/viii), 1 spec.; St. 131, 800 m. w. (28/viii), 1 spec.

All these evidently belong to one and the same species. The two oldest stages have a spine below (in front of) the anus, this spine, however, I have not been able to discover in the youngest stage. The oldest stage is that described and drawn in greatest detail; in the case of the others, I have only mentioned and shown the features in which they differ from the oldest stage.

Youngest stage (Fig. 8). 5—6 mm. In ant. 1, the endopodite is very small, the peduncle still consists of but two joints, and has no spine on the underside. In ant. 2 the flagellum is half as long as the squama, terminating in a point with spines. Mxp. 1—3 are as in the next stage, as also p1—p2, the exopodite, however, lacks natatory setae; this stage must therefore probably be described as an old Zoea. P3—p4 are cleft without articulation, p5, on the other hand, lacks the exopodite. The pleopoda are apparent as a very slight bulge on the ventral side. In the uropoda, there is still no articulate connection between the branches and the peduncle, the outer ramus has a few, the inner

ramus only two, pennate bristles. The telson is fairly broad, with a spine on either side. The posterior edge is slightly convex, and armed with 7 pairs of spines, of very characteristic lengths. Counting from the centre we find Nr. 1 very small, Nr. 2 abt. 3 times as long, and Nr. 3 twice as long as Nr. 2; Nr. 2 slightly longer than Nr. 2, Nr. 5 a little longer than Nr. 3, and Nr. 6 again a little longer. The tip of Nr. 7 is lacking, so that its length cannot be seen; it would seem, however, to have been about the same length as Nr. 6.

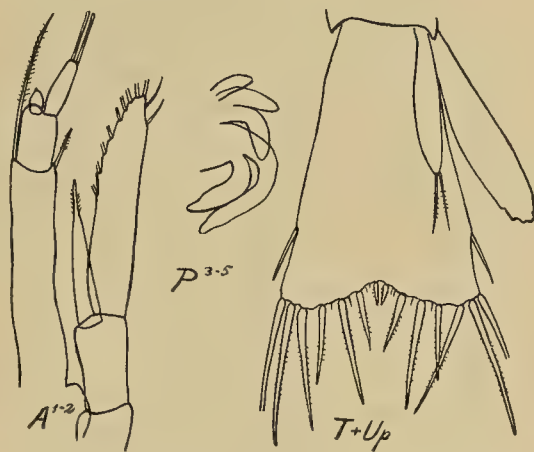


Fig. 8. *Spirontocaris*-larva Nr. 3, 1. stage.

The telson is fairly broad, with a spine on either side. The posterior edge is slightly convex, and armed with 7 pairs of spines, of very characteristic lengths. Counting from the centre we find Nr. 1 very small, Nr. 2 abt. 3 times as long, and Nr. 3 twice as long as Nr. 2; Nr. 2 slightly longer than Nr. 2, Nr. 5 a little longer than Nr. 3, and Nr. 6 again a little longer. The tip of Nr. 7 is lacking, so that its length cannot be seen; it would seem, however, to have been about the same length as Nr. 6.

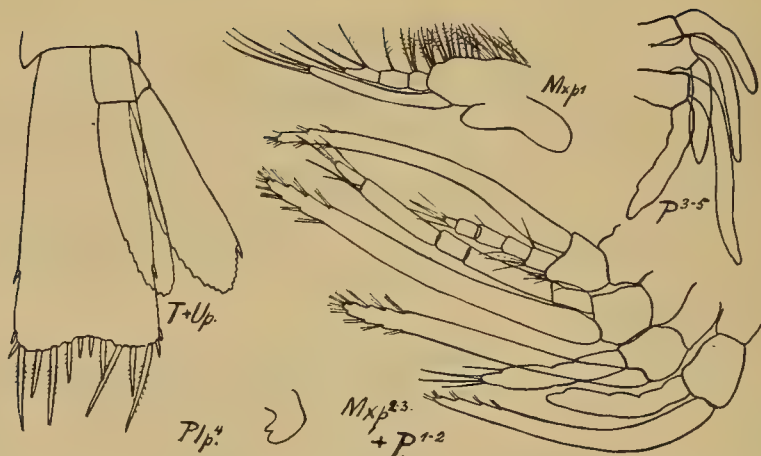


Fig. 9. Spirontocaris-larva Nr. 3, intermediate stage,

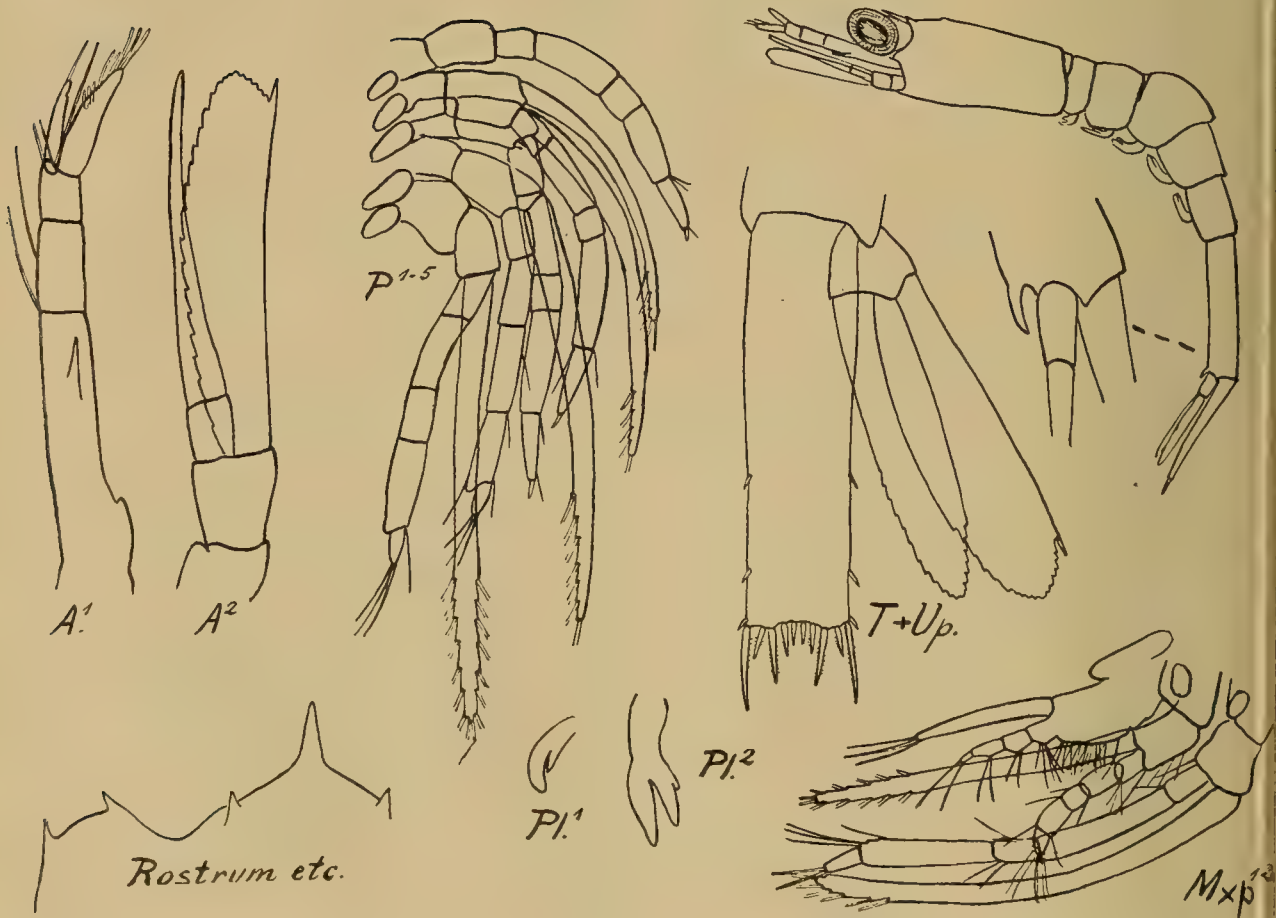


Fig. 10. Spirontocaris-larva Nr. 3, last stage.

Intermediate stage (Fig. 9). 7—8 mm. The flagellum in ant. 2 only half as long as the squama. Mxp. 1—3 about the same as in the oldest stage. In p1—p2 there are now natatory setae on the exopodite. P3—p5 have grown, and the branches are now in articulate connection with the peduncle. There are small cleft, but inarticulate, pleopoda (pl1, however, is not yet present). The uropoda have now the usual setose arrangement. The telson has grown narrower, and spines 6 and 7 on the posterior edge are now quite small.

Oldest stage (Fig. 10). 8—9 mm. The rostrum is pointed, flat, and not very long; there is a spine above the eye and over and under the base of the antennae. There are no dorsal spines on the abdomen, as in several of the other larvae described (Nos. 1 and 2); the 6. abdominal segment, however, has a spine in front of the anus. The sides of the telson are almost parallel, which suggests that the larva must be an old one; on the posterior edge (including corners) there are 6 spines, and two pairs of spines on either side of the telson. The antennae are not particularly slender, and the flagellum in ant. 2 is only of the same length as the squama; only the first segment is separated off from the remainder. As in the intermediate stage, there is a spine on the under side of the first joint in the peduncle of ant. 1. With regard to the maxillipedes there is nothing to remark; p1—p5 however, have become articulated, and p1—p2 show some suggestion of chelae. There are natatory setae also on the exopodite of p3—p4. Plp1 is now apparent, and is cleft, but none of the pleopoda are articulated.

All stages of this larva are very slender in shape, and are characterised by the exopodite on p1—p4; the two oldest stages also by the spine beneath the anus.

This being the larva of most frequent occurrence in the material, there is reason to believe that it belongs to *Spirontocaris Fabricii*, this species being that of most common occurrence in the area investigated.

*Spirontocaris* larva Nr. 4 (Fig. 11).

Kvanefjord St. 28, 400 m. w. (5/vii), 3 spec. — Bredefjord St. 30, Nansen-net, 250—200 m. (15/vii), 1 spec.; St. 35, 400 m. w. (16/vii), 2 spec.; St. 50, 100 m. w. (20/vii), 2 spec.; St. 59, 300 m. w. (22/vii), about 20 spec.

Length 9—11 mm. This larva is a Mysis stage, there being exopodites on p1—p3. The rostrum is thin, slightly longer than the eye (in the one of the specimens from St. 50, which is somewhat defective, the rostrum is only half as long as the eye). There are spines above the eye, and over and under the base of the antennae. No spines on the abdomen. The telson is triangular, with three pairs of spines on the posterior edge (corners included) and the spine on the side in front of the corner.

The antennae are slender, and the flagellum in ant. 2 shows incipient articulation (5 joints). With regard to md., mx. 1—2 and mxp. 1—3 nothing to remark save that the endopodite in mxp. 2 is slightly

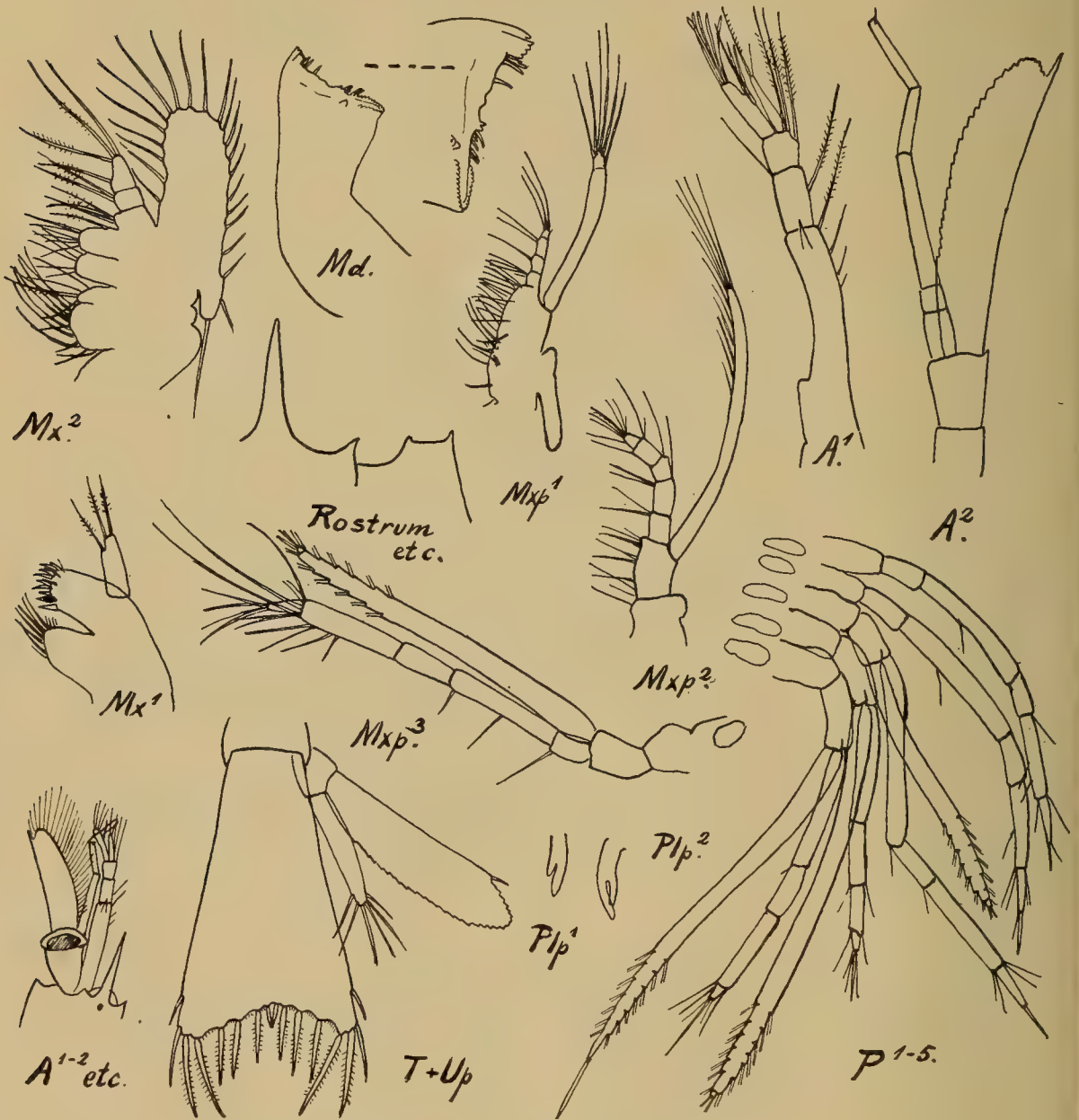


Fig. 11. *Spirontocaris*-larva Nr. 4.

curved, and thus approaches the adult form. P1—2 are of the same shape as mxp. 3; the 3. and 4. joints, however, appear to be hardly separated as yet. In some few specimens there may be a faint suggestion of a chela in p1, as also some slight variation in the articulation of the flagellum in ant. 2. In p3—5, the 7. joint is longer than in p1—p2;



the 3. and 4. joint are as yet not separated by articulation. The pleopoda are cleft, but not articulated. In the uropoda, the inner ramus is very short, and has abt. 6 bristles at its point. In some few specimens there may be a pair of spines over the base of the rostrum.

*Spirontocaris* (?) larva Nr. 5 (Fig. 12).

Bredefjord St. 64, 600 m. w. (23/VII), 1 spec., 9 m.

A highly characteristic larva was taken at this station. It is a young Mysis stage, there being exopodites in p1—p3, and it is easily distin-

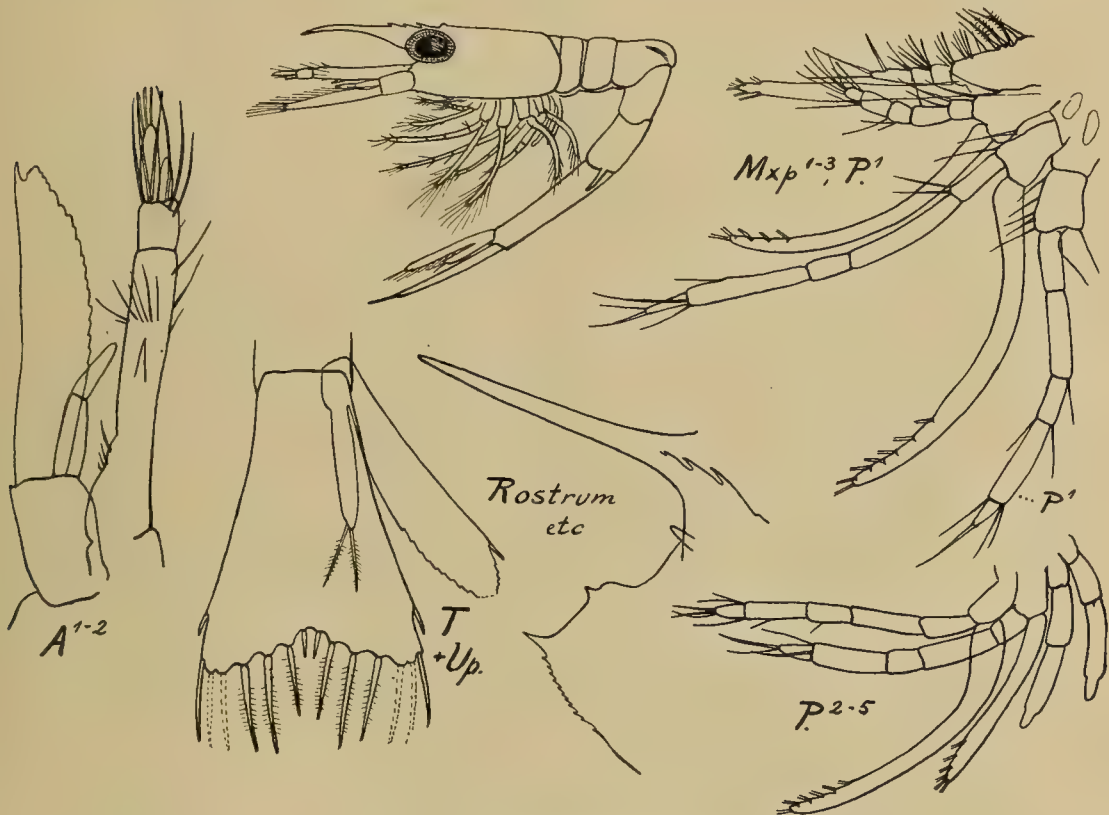


Fig. 12. *Spirontocaris*(?)-larva Nr. 5.

guised by the following characters: Rostrum very long, only slightly shorter than the carapace, pointed, with three teeth above the base; the eye is very large and somewhat flattened; there is a spine above the eye, and above and below the 2. ant.; the anterior portion of the lower edge is armed with abt. 10 teeth. The abdomen very long and thin, with a marked break, which cannot, apparently, be straightened out, at the 3. abdominal segment, which is drawn out into something resembling a carina at the hinder end. There is also a spine on either side of the 5. abdominal segment.

With regard to ant. 1, there is nothing to remark, save that this is very slender; the 1. joint of the peduncle has a spine on its lower side; the 2. joint is not yet separated from the first. In ant. 2, the fla-

gellum consists of 2 joints. Mxp. 1—3 have the usual larval character, with 2 exopodites, and p1—p3 are almost alike, without any indication of a chela on p1—2. No trace of pleopoda. The telson is triangular, and was doubtless armed on its posterior edge with 7 pairs of spines, the middle pair quite small. In the uropoda, the exopodite and endopodite are not separated from the peduncle by articulation; the endopodite has two bristles at its point, while the exopodite is furnished with the usual setose arrangement.

I am unable to determine this larva, which, as shown above, differs very considerably from the *Spirontocaris* larvæ hitherto described; on purely negative grounds, however, it may with some degree of certainty be considered as belonging to the genus *Spirontocaris*.

All Greenland genera of *Macrura* are known in their larval stage (*Bythocaris* and *Sclerocrangon* have no larval development); with the exception of *Nectocrangon*, *Glyphocrangon* and *Hymenodora*. Of these, *Glyphocrangon* is so rare as to be out of the question here, while *Hymenodora* has practically speaking only been found in E. Greenland waters, and is not known from W. Greenland. (I have not been able to consult MONTICELLI and LO BIANCO'S work on the development of *Gennadas elegans*, in *Monitore Zool. Ital.*, vol. 11, suppl., Roma 1900). There remains then, only *Nectocrangon* lar, and I cannot but admit a certain degree of probability that the larva in question may belong to this species; with its long rostrum and generally slender shape, it resembles several of the *Crangonid* larvae described by SARS; this is, however, of course but a very slight foundation for conclusion. Far more important is the fact that none of SARS' *Crangonid* larvae, not even the oldest stage, have any exopodite on p3, a point which weighs heavily against the probability of the present specimen being a *Crangonid*. We may therefore, with a very fair degree of certainty, refer it to the genus *Spirontocaris*.

*Spirontocaris groenlandica* juv. (Fig. 13).



Fig. 13. *Spirontocaris groenlandica* juv. Rostrum etc., telson and base of p1—p2.

Bredefjord St. 48 (19/vii), 5 spec.; St. 61, 12,5—13 m. (22/vi), 3 spec.; St. 66, 9—11 m. (23/vii) about 10 spec.; St. 89, 16—17 m. (31/vii), 5 spec.

In the Danmark Exped. (p. 516, Pl. 39) I described the young stage of *Spirontocaris groenlandica* (?); as a matter of fact, in view of the elongated lateral parts of the abdominal segments, there can be no doubt that this determination was correct.

As will be seen from the above, my own collections now include a

number of specimens (the adult *Sp. groenlandica* was taken at all the above mentioned stations, besides others). And my new material being better than that from the Danmark Exped., some further observations may be added. The rostrum is short and heavy. The lateral edges of the telson have, not one but two pairs of small spines; each

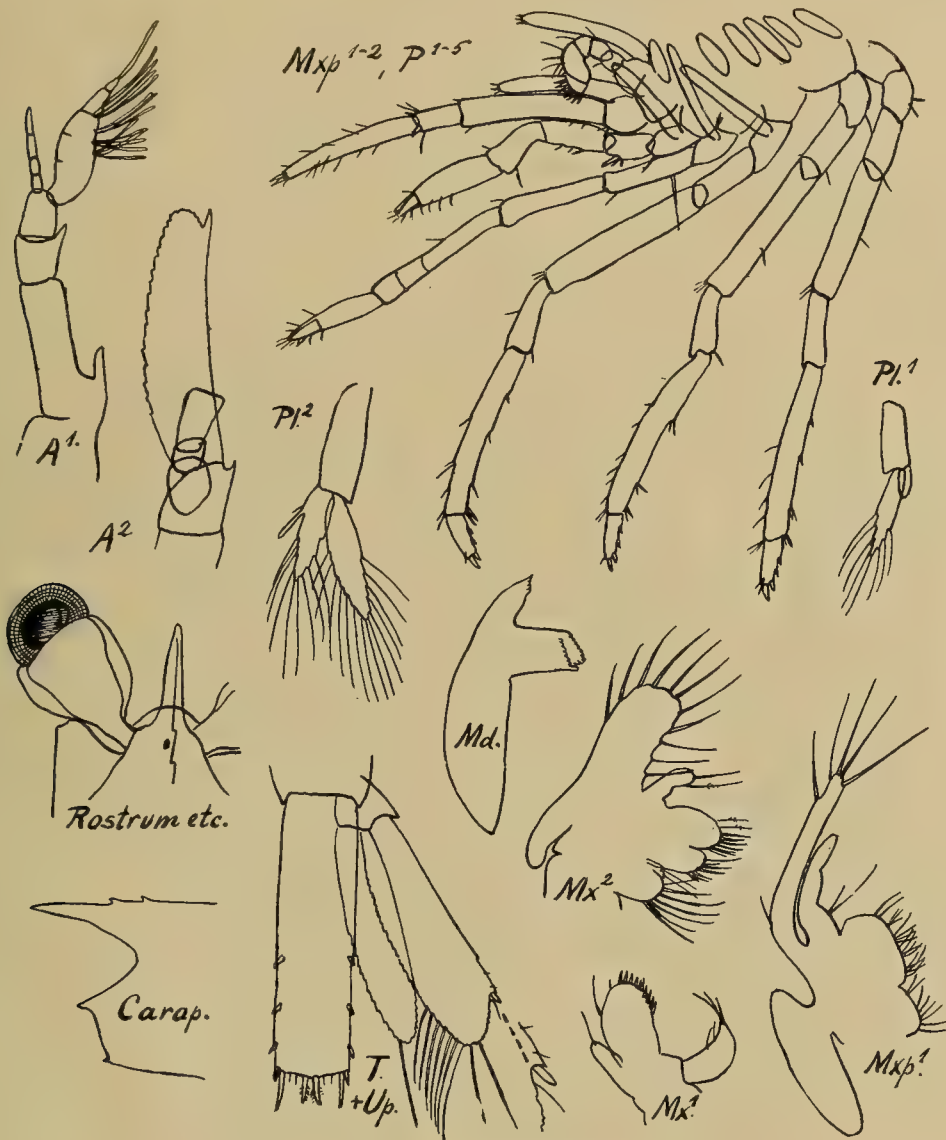


Fig. 14. *Spirontocaris Fábriicii(?)* juv.

of the posterior corners is armed with 2 small spines and one large. The posterior edge of the telson has 5 large spines in the centre; some few specimens however, have here 4 large spines and one small; others again only 4 or 3 (large) spines. Between the median portion and the large spine at the corner are 4 bristles and one between each two of the large spines of the posterior edge.

The adult has exopodite on p1—p3; in the young stage, there is

a small exopodite on p1—p2; I have not been able to discover any such on p3. On the ventral side at the base of p4—p5 (i. e. at each pair) are a pair of short appendices, apparently inarticulate, which I have not been able to determine. — Length abt. 11 mm.

*Spirontocaris (Fabricii?)* juv. (Fig.14).

Bredefjord St. 61, 12,5—13 m. (22/VII), 3 spec.; St. 66, 9—11 m. (23/VII) about 15 spec.; St. 69, 16—17 m. (31/VII), 7 spec.; St. 104, 7—20 m. (5/VIII), 50 spec.; St. 123, 5—8 m. (25/VIII), abt. 10 spec.

At these stations, some specimens of a *Spirontocaris* juv. were taken. The shape of the telson is very characteristic. Length 10 mm.

With regard to general appearance nothing is to remark. The carapace is cylindrical, with a fairly long rostrum (nearly as long as the eye minus the faceted portion). Behind the rostrum are 2 (in cases 3) spines, but there is no supra-ocular spine. There is, however, one beneath the eye, and one on the anterior lower corner of the carapace. There is a distinct median eye. The sides of the telson are absolutely parallel, with three pair of lateral spines, the middle pair, however, in some cases lacking, while at the posterior corners there is one short spine and one long. There are two ciliated setae on the median portion of the telson's posterior edge, with two setae between these and the corner spines. Both oral parts and pereopoda show that the stage in question is fairly far advanced. There is a gill at the base of mxp 3 and p1—p5; exopodites on p1—p3.

There would seem little room for doubt that this is the young stage of *Sp. Fabricii*. There are four species without supra-ocular spines, viz.: *Sp. Gaimardii*, *Sp. Fabricii*, *Sp. pusiola* and *Sp. macilenta*. *Sp. pusiola* is out of the question here, as it is not found in the material, and *Sp. Gaimardii* may be excluded for a similar reason, as it has not been taken in Bredefjord, where all the young stages in question were procured, but only in Kvanefjord, and there but a single specimen. *Sp. macilenta* is likewise barred, being a deep sea species.

There remains then only *Sp. Fabricii*, and that the specimens in question should belong to this species is rendered the more probable by the fact that *Sp. Fabricii* was taken in great numbers everywhere, especially at those stations where the young stages were found.

*Spirontocaris* juv. (Fig. 15).

Tunugdliarfik St. 142, 14—18 m. (2/IX), 1 spec., 7 mm.



Fig. 15. *Spirontocaris* juv. Rostrum etc.

At this station a young stage was found which on the whole, as far as can be seen without dissection, corresponds entirely to the numerous specimens just mentioned of the young stage of *Sp. Fabricii* (?), differing, however, by the presence

of a supra-ocular spine, and by its inferior size (7 m.m as against 10 mm.). The telson exactly resembles that of the form mentioned.

*Spirontocaris polaris* juv. (Fig. 16).

Bredefjord St. 32, 35—37 m. (16/vii), 1 spec.; St. 48, (19/vii), 2 spec.; St. 60, 500 m. w. (22/vii), 1 spec.; St. 61, 12,5—13 m. (22/vii), about 50 spec.; St. 64, 600 m. w. (23/vii), 1 spec.; St. 66, 9—11 m. (23/vii), 15 ccm.; St. 79, 30—50 m. (27/vii), 3 spec.; St. 89, 16—17 m. (31/vii), about 30 spec.; St. 104, 7—20 m. (5/viii), about 15 spec. — Bredefjord Sermilik St. 118, 500 m. w. (10/viii), 1 spec.; St. 119, 400 m. w. (10/viii), 2 spec.

I have already, in Danmark Exped., p. 518—22, Pl. 40—42, described two young stages of *Spirontocaris*; I now consider it certain that both are *Sp. polaris*, the form described on p. 521, Pl. 42, being the younger. The whole of their structure tends to show that they cannot be far from the adult stage, both the *mxp2* and *p1—p5* for instance, are of altogether adult form, and the telson

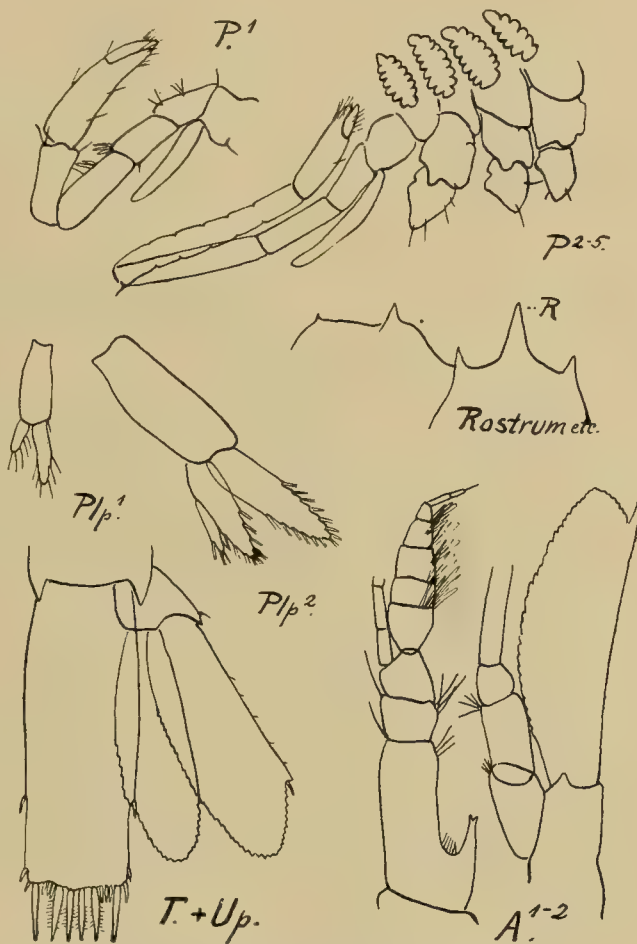


Fig. 16. *Spirontocaris polaris* juv.

has, on its posterior edge (excluding the corners) 4 strong spines, a character which is only found in *Sp. polaris*.

The "Rink" material includes a large number of specimens from the localities mentioned above, corresponding in all essentials to the younger of the forms referred to.

Length in most cases 1.1 mm., occasionally somewhat less.

The most striking difference is the presence, in most specimens, of 3 small spines between the outermost of the four on the posterior edge of the telson and the large corner spine; these are, however, lacking in several cases, as in the specimen from the Danmark Exped. There are three spines on each of the posterior corners of the telson.

My material from the "Rink" being altogether far superior to that from the Danmark Exped., I have dissected some specimens, and can now supplement the description with figures and notes. The flagellum in ant. 2 is slightly shorter than the whole animal. On the fore end of the carapace there is a tooth both above and below the 2. ant. Gills at the base of p1—p5, and a short exopodite on p1—p2; in some specimens this exopodite is much shorter than in the specimen shown. Plp1 is far smaller than the remaining pleopoda.

From the presence of exopodites on p1—p2 and the supra-ocular spine, the specimens in question cannot, according to KRØYER'S Monograph on Hippolyte (= Spirontocaris) possibly belong to any other species than *Sp. polaris*.

## 20. *Pandalus borealis* Kr.

Conspectus p. 40.

### A. The adult stage.

Kvanefjord St. 3, 210—225 m., 1 spec.; St. 11, 290—320 m., 1 spec.; St. 25, 115 m., 2 spec. — Bredefjord St. 79, 30—50 m., about 10 spec.; St. 81, 110 m., 1 spec.; St. 91, 110—180 m., 1 spec.; St. 131, ring trawl, 800 m. w., 1 spec. — Skovfjord St. 152, 80—120 m., 1 ♀ with ova; St. 155, 220 (240)—ca. 400 m., 2 spec.

### B. The young stage.

Bredefjord St. 128, ringtrawl, 700 m. w., 1 spec.; St. 131, ringtrawl, 800 m. w., 1 spec.

This species, which has hitherto been found in W. Greenland from its southern point right up far as Umanak Fjord, is thus of not infrequent occurrence in the deeper parts of the fjords here investigated.

The species with ova from St. 152 was abt. 130 mm. the largest from St. 155, no less than 160 mm.

## 21. *Pandalus propinquus* G. O. Sars (Fig. 17).

Conspectus p. 43.

*Pandalus propinquus*, larva, K. Stephensen, Tjalfe-Exped. 1912, p. 117, fig. 22—31.

Kvanefjord St. 27, Nansen-net 125—100 m. (5/vii), 1 spec. (4 st.); St. 28, 400 m. w. (5/vii), 1 spec. (2. st.), 14 ccm. (3. st.), 4 ccm. (4. st.). — Bredefjord St. 31, 700 m. w. (15/vii), 5 spec. (3. st.), 1 spec. (4. st.); St. 35, 400 m. w. (16/vii), 1 spec. (3. st.), 2 spec. (4. st.); St. 47, 600 m. w. (18/vii), 2 spec. (3. st.), 5 spec. (4. st.); St. 50, 100 m. w. (20/vii), 1 spec. (3. st.); St. 59, 300 m. w. (22/vii), 1 spec. (2. st.), 10 spec. (4. st.); St. 60, 500 m. w. (22/vii), 2 spec. (3. st.), 3 spec. (4. st.); ?St. 61, 12,5—

13 m. (22/vii), 1 spec. (5. st.?, defective); St. 64, 600 m. w. (23/vii), 3 spec. (4. st.); St. 73, 300 m. w. (25/vii), 1 spec. (4. st.?).; St. 86, 100 m. w. (31/vii), 1 spec. (4. st.?).; St. 100, 500 m. w. (5/viii), 2 spec. (4. st.); St. 102, 400 m. w. (5/viii), 1 spec. (4. st.); St. 106, 100 m. w. (7/viii), 1 spec. (4. st.); St. 126, 800 m. w. (26/viii), 1 spec. (4. st.), 3 spec. (5. st.); St. 128, 700 m. w. (26/viii), about 10 spec. (4. st.), about 50 spec. (5. st.), 1 spec. (6. st.?).; St. 129, 800 m. w. (26/viii), 4 spec. (4. st.), about 15 spec. (5. st.); St. 131, 800 m. w. (28/viii), about 10 spec. (5. st.); St. 132, 700 m. w. (28/viii), 2 spec. (4. st.), about 10 spec. (5. st.); St. 133, 600 m. w. (28/viii), about 15 spec. (5. st.).

In the "Tjalfe" Exped., p. 124 seq., I advanced reasons for supposing this larva to belong to *Pandalus propinquus*. This I now consider may be regarded as absolutely certain, as one of the specimens (6. stage?) from St. 128 exhibits an excellent *Pandalus*-character. The specimen in question measured 16 mm. to the base of the rostrum (which was lacking) and is thus remarkable large for a Decapod larva. It closely resembles 5. stage, differing, however, in some points. The pleopoda are longer, with natatory setae (also found in 5. stage). The most important feature, however, is that the left p2 is considerably longer than the right; in both, the distal end of the 5. joint is separated off as a distinct joint. This fact, that the left p2 is longer than the right, is a decided *Pandalus*-character, and as the larva does not agree with any of these described by Sars, it cannot be other than *Pandalus propinquus*.

All stages have a spine under the 1. joint of the peduncle in ant. 1. The chelae of p1—p2 in the 6. stage will be seen from my figures.

The 1. stage is not found in the material from the "Rink". The 2. stage was taken on the 5/vii ("Tjalfe" 7/vii to 16/vii); 3. stage 5/vii to 22/viii ("Tjalfe" 7/vii to 16/vii); 4. stage 5/vii to 28/viii ("Tjalfe" 17/viii); 5. stage 22/vii to 28/viii ("Tjalfe" 29/viii); and the 6. stage (?) 26/viii. The results from the "Rink" thus agree well enough with those from the "Tjalfe".

The fact that no grown specimens of *Pandalus propinquus* were taken by the "Rink" cannot, I think, be cited in disproof of my determination. A species of such considerable size and rapid movement would certainly have no difficulty in escaping from the ringtrawl; it must be borne in mind that the "Rink" could move but very slowly ringtrawl or dredge working at such a depth.

As will be seen from my list, the larva was only taken in the Kvanefjord close to the mouth, whereas it was found far up in Bredefjord, though not in Sermilik.



Fig. 17. *Pandalus propinquus*, p1—p2 (of 6. stage?).

22. *Pasiphaë tarda* Kr.

Conspectus p. 47, 424.

## A. The adult stage.

Bredefjord St. 63, Nansen-net, 450—350 m., 1 spec.; St. 126, ringtrawl, 800 m. w., about 10 spec.; St. 129, ringtrawl, 800 m. w., 1 spec.; St. 131, ringtrawl, 800 m. w., 7 spec.

## B. The larva (Fig. 18).

Bredefjord St. 126, ring trawl, 800 m. w., 1. larval stage, 1 spec., and older larval stage, 2 spec.

We have thus from this station 1 spec. of the youngest larval stage, and 2 of a somewhat older stage.

The youngest stage agrees entirely, as far as I have been able to see without dissection, with BJÖRCK's description of this stage in *Arkiv f. Zoologi*, vol. 7, Nr. 15, 1911, p. 4 seq. (*Bidrag til Kännedomen om Decapodernas Larveutveckling*,

1, *Pasiphaea*); the rostrum, however, is less pointed on the whole, being rounded with a sharply defined point, as here shown in the older stage.

This older stage is of an age between that of the oldest and the youngest described by BJÖRCK l. c. Length abt. 10 mm. which corresponds well enough to the length of 9 mm. for the youngest stage, and 11—12 for the oldest (BJÖRCK). I must here admit that my drawings are not as good as I could have wished. On being placed in glycerine, which I always use for specimens to be drawn, the legs swelled up in places, shrinking in others, so that the contours are hardly quite correct; in addition, I

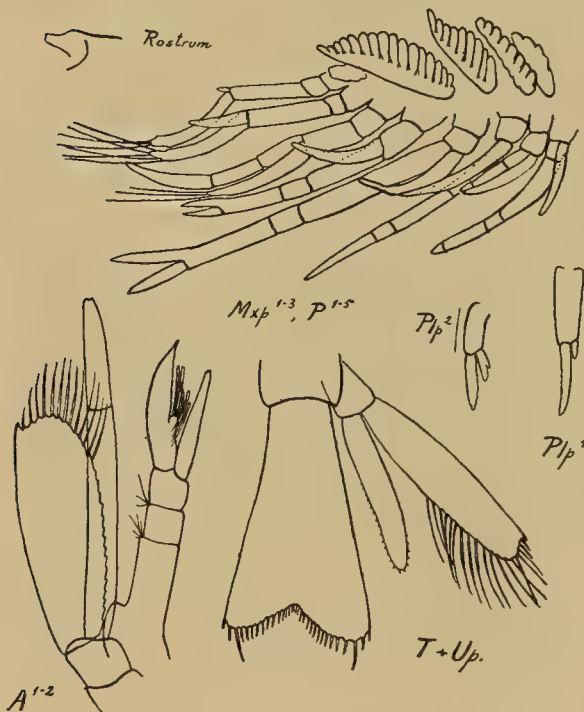


Fig. 18. *Pasiphaë tarda*. Larva in intermediate stage.

found considerable difficulty in determining the articulation. The shape of the antennae is between that of the 1. and that of the last larval stage. There is a very small exopodite on mxp 1, and a slightly larger one on mxp 2; i. e. about the same as in the youngest stage. Mxp 3 is about the same length as the foregoing, but the exopodite is longer. With regard to p1—p5, nothing particular to remark, save that p5 is, as in the adult form, longer than p4. There are, however, at least



5 gills, the foremost and hindmost simple plates, the others have distinct tranverse folds; the foremost is situated at the base of mxp3, the others at p1—p4. As to whether gills were present by the other limbs I was unable to determine.

The shape of the uropoda corresponds to that in BJÖRCK's figure of the uropoda in the oldest larva; there are, however, no ciliated setae on the endopodite, but small spines. The shape of the telson is similar to that in the case of the youngest larva, but narrower; there appear to be 16 pairs of spines on the posterior edge. The outermost of these, however, do not agree with BJÖRCK's description. He says that the outermost three at each corner are ciliated setae; this was not the case with my specimens, at least as far as I could see.

My larvae were taken on the 26th August, which fully agrees with BJÖRCK's description, where we read (l. c., p. 12) that he found the intermediate stage of this larva in the Koster Fjord (W. of Sweden) on the 15th August.

### Euphausiacea.

#### 23. *Meganctiphanes norvegica* M. Sars.

Conspectus p. 55.

*Nyctiphanes norvegica* Koelbel, Die oesterreich. Polar-Station Jan Mayen, 1886, p. 48, Pl. 3, fig. 7—10.

*Meganctiphanes* — Kramp, Schizop.; Bull. Trimestriel . . . bureau conseil permanent internat. explorat. de la mer, Resumé planktonique, 3. partie, 1913, p. 540, Pl. C (distrib., biol.).

Bredefjord St. 63, Nansen-net, 250—200 m., 1 spec.; St. 64, 600 m. w., 5 spec. — Bredefjord Sermilik St. 118, 500 m. w., 5 spec.; St. 119, 400 m. w., about 25 spec. — Bredefjord St. 129, 800 m. w., 3 spec.; St. 131, 800 m. w., 3 spec.; St. 133, 600 m. w., 1 spec.

This species is thus not being uncommon in Bredefjord and Sermilik at a depth of from 200—400 m. This is a point of considerable interest, as the species hitherto known only from the extreme southern portion of W. Greenland.

#### 24. *Thysanoëssa inermis* Kr.

Conspectus p. 56, 421.

*Thysanoëssa inermis* Kramp, Schizop.; Bull. Trimestriel . . . bureau conseil permanent internat. explorat. de la mer, Resumé planktonique, 3. partie, 1913, p. 544, Pl. C, II, 3—4 (distrib., biol.).

Kvanefjord St. 26, Nansen-net., 200—150 m., 1 spec. — Bredefjord St. 31, 700 m. w., 1 spec.; St. 35, 400 m. w., 2 spec.; St. 47, 600

m. w., 2 spec.; St. 60, 500 m. w., 1 spec.; St. 64, 600 m. w., 2 spec.; St. 65, 500 m. w., 1 spec.; St. 72, 400 m. w., 1 spec.; St. 100, 500 m. w., 22 spec.; St. 102, 400 m. w., 8 spec. — Bredefjord Sermilik St. 118, 500 m. w., 1 spec.; St. 119, 400 m. w., 5 spec. — Bredefjord St. 128, 700 m. w., 8 spec.; St. 129, 800 m. w., 8 spec.; St. 131, 800 m. w., 11 spec.; St. 132, 700 m. w., 18 spec.; St. 133, 600 m. w., 27 spec.

This species is thus fairly numerous, especially in Bredefjord, in its deeper parts (200—400 m.). From W. Greenland, it has been taken hitherto at certain places, as far as Lille Karajakfjord (abt. 71° N.); with the exception of this, however, not in the fjords at all. It is, with *Thysanoëssa longicaudata*, the most numerous Euphausid in the area investigated.

### 25. *Thysanoëssa longicaudata* Kr.

Conspectus p. 57.

*Thysanoëssa longicaudata* Kramp, Schizop.; Bull. Trimestriel ... conseil permanent internat. exploration de la mer, Résumé planktonique, 3. partie, 1913, p. 546, Pl. C, II, 1. (distrib., biol.).

Bredefjord St. 31, 700 m.w., 12 spec.; St. 35, 400 m.w. 2 spec.; St. 47, 600 m. w., 4 spec.; St. 60, 500 m. w., 7 spec.; St. 63, Nansen-net, 450—350 m., 1 spec., and 550—450 m., 2 spec.; St. 64, 600 m. w., about 15 spec.; St. 65, 500 m. w., 4 spec.; St. 94, Nansen-net, 250—200 m., 1 spec., and 350—250 m., 1 spec.; St. 100, 500 m. w., about 15 spec.; St. 102, 400 m. w., 1 spec. — Bredefjord Sermilik St. 118, 500 m. w., 1 spec. — Bredefjord St. 126, 800 m. w., about 50 spec.; St. 128, 700 m. w., about 10 spec.; St. 129, 800 m. w., 14 ccm.; St. 131, 800 m. w., about 50 ccm.; St. 132, 700 m. w., about 15 spec.; St. 133, 600 m. w., about 15 spec.

This species is thus very common in the deeper parts (550—200 m.) of Bredefjord; it is generally found together with *Th. inermis*, but appears to go somewhat deeper down, and has the same distribution in the waters at W. Greenland.

### 26. *Thysanoëssa Raschii* M. Sars.

*Rhoda Raschii*, Conspectus p. 59, 421.

*Thysanoëssa Raschii* H. J. Hansen, Bull. Inst. Monaco, Nr. 210, 1911, p. 42.

— — Kramp, Schizop.; Bull. Trimestriel ... conseil permanent internat. explorat. de la mer, Résumé planktonique, 3. partie, 1913, p. 547, Pl. C, II, 2. (distrib., biol.).

Bredefjord St. 31, 700 m. w., 1 spec.; ?St. 48, 1 spec.; St. 63, Nansen-net, 250—200 m., 1 spec.; St. 102, 400 m. w., 1 spec.

The distribution of this species in W. Greenland also resembles that of those just mentioned; it has been found in Lille Karajakfjord (VANHÖFFEN-1897) and in Northern Strømfjord by Dr. NORDMANN in 1911.

**Euphausiacea, spp. juv. et larvae.**

Bredefjord St. 31, 700 m. w., 2 spec.; St. 50, 100 m. w., 3 spec.; St. 60, 500 m. w., 1 spec.; St. 86, 100 m. w., 1 spec.; St. 94, Nansen-net, 10—0 m., about 10 spec., 50—25 m., about 10 spec., and 75—50 m., 3 spec.; St. 126, 800 m. w., 2 spec.; St. 132, 700 m. w., 1 spec. — Skovfjord St. 154, Nansen-net, 150—125 m., 2 spec., and 200—150 m., 2 spec.

The material contains at least 3 species.

**Mysidacea.**

**27. Boreomysis arctica Kr.**

Conspectus p. 67.

Bredefjord St. 30, Nansen-net, 450—350 m. 1 spec.; St. 31, 700 m. w., 5 spec.; St. 45, 430—450 m. (dredge), 1 spec.; St. 63, Nansen-net, 550—450 m., 2 spec., and 450—350 m., 5 spec.; St. 94, Nansen-net, 550—450 m., 1 spec., *ibid.* 450—350 m., about 15 spec., and 350—250 m., about 10 spec.; St. 98, 520—560 m. (dredge), 2 spec. — Bredefjord Sermilik St. 115, 500 m. (dredge), 1 spec.; St. 118, 500 m. w., 1 spec. — Bredefjord St. 126, 800 m. w., about 75 ccm.; St. 129, 800 m. w., about 35 spec.; St. 130, 900 m. w. (dredge), 1 spec.; St. 131, 900 m. w., about 75 ccm.

This is a very interesting find. KRÖYERS' original specimen was from W. Greenland, precise locality not stated; otherwise, it has only been recorded from W. Greenland by VANHÖFFEN from Lille Karajakfjord (abt. 71° N.). Judging from the "Rink" material, it would seem to be very numerous in Bredefjord (*vide* especially St. 126 and 131) at depths beyond 250 m. The material includes large specimens of 25—30 mm. and smaller ones of abt. 10 mm.; these latter are probably young ones of the same summer when caught. None of the grown specimens had ova.

**28. Mysis oculata Fabr.**

Conspectus p. 77, 425.

*Mysis oculata* E. Lönnberg, Ueber eine Zwischenform zwischen *M. ocul.* u. *M. relicta*; Zool. Anzeiger, vol. 26, 1903.

— — Sven Ekman, Stud. ub. marine Relikte d. nordeurop. Binnengewässer III, Auftreten v. *Limnocalanus grimaldii* u. *Mysis oculata* im Meere, besonders im Ostseebecken; Internat. Revue d. gesamt. Hydrogr. u. Hydrobiol., vol. 6, Heft 6, 1914, p. 509 seq.

Bredefjord St. 32, 35—37 m., 1 spec.; St. 48, 3 spec. (2 with *Dajus Mysidis*); St. 61, 12,5—13 m., about 10 spec. (2 with *Dajus Mysi-*

dis); St. 62, 10—15 m., 4 spec.; St. 66, 9—11 m., about 20 spec.; St. 89, 16—17 m., about 10 spec. (3 with *Dajus Mysidis*); St. 104, 7—20 m., about 10 spec. — Bredefjord Sermilik St. 118, 500 m. w., 1 spec.; St. 119, 400 m. w., 1 spec. — Bredefjord St. 123, 5—10 m., about 10 spec.; St. 127, 10—15 m., 4 spec. — Tunugdliarfik St. 142, 14—18 m., about 20 spec.

It is remarkable that this extremely common arctic species was not found at all in the Kvanefjord. Note St. 118 and 119, where it was taken by the ringtrawl at 500 and 400 m. w.

### 29. *Mysis mixta* Lilljeborg.

Conspectus p. 79, 425.

*Mysis mixta* Kramp, Schizop.; Bull. Trimestriel publié par le bureau du conseil permanent internat. pour l'explorat. de la mer, Résumé planktonique, 3. partie, 1913, p. 552, Pl. CV, 2. (Biol., distrib.).

— — S. Ekman, Internat. Revue d. gesamt. Hydrogr. u. Hydrobiol., vol. 6, Heft 6, 1914, p. 509 seq.

— — Blegvad, Undersøg. over Næring og Ernæringsforhold hos Havbundens invertebrate Dyresamfund i danske Farvande. Med et Tillæg; Beretn. Danske Biolog. Station, vol. 22, 1914, p. 103, and Tillæg A, p. 36 (food etc.).

Bredefjord St. 31, 700 m. w., 2 spec.; St. 79, 30—50 m., 1 spec.; St. 104, 7—20 m., 1 spec.; St. 123, 5—10 m., 2 spec.; St. 126, 800 m. w., 2 spec.; St. 129, 800 m. w., 6 spec.; St. 131, 800 m. w., 6 spec.; St. 132, 700 m. w., 2 spec. — Tunugdliarfik St. 142, 14—18 m., several spec. — Skovfjord St. 145, 10—35 m., 1 spec.; St. 154, Nansen-net, 270 (bottom)—200 m., 2 spec.

This species has not hitherto been found in W. Greenland S. of Holstensborg (abt. 66° N.). Note the catches made with the ringtrawl and with the Nansen-net at St. 154.

## Cumacea.

### 30. *Diastylis Rathkei* Kr.

Conspectus p. 86, 420, 422.

*Diastylis Rathkei* Blegvad, Beretning Danske Biolog. Station, vol. 22, 1914, p. 101, Tillæg p. 35 (food etc.).

Bredefjord St. 123, 5—10 m., 1 spec.; St. 127, 10—15 m., about 15 spec.; St. 131, 800 m. w., 1 spec. (♀).

It is remarkable that the specimen taken in the ringtrawl was a ♀, as these are generally less mobile than the ♂.

### 31. *Diastylis scorpioides* Lepech.

Conspectus p. 88.

Bredefjord St. 70, 225—290 m., 1 spec.; St. 127, 10—15 m., about 10 spec. — Skovfjord St. 143, 65—90 m., 1 spec.

32. *Diastylis Goodsirii* Bell.

Conspectus p. 90.

Bredefjord St. 97, 250—280 m., 1 spec. — Skovfjord St. 143, 65—90 m., 1 spec.

Not previously known from W. Greenland S. of abt.  $65\frac{1}{2}^{\circ}$  N.

**Amphipoda.**33. *Hyperia medusarum* O. Fr. Müller.

Conspectus p. 96.

Bredefjord St. 132, 700 m. w., 1 spec.

34. *Hyperia galba* Mont.

Conspectus p. 97.

Bredefjord St. 126, 800 m. w., 1 spec.

This locality is not without interest, as little is known concerning the distribution of this species in Greenland, owing to the fact of its having hitherto been confused with *Parathemisto oblivia*, *vide* Conspectus.

35. *Euthemisto libellula* Mandt.

Conspectus p. 100.

Kvanefjord St. 27, Nansen-net, 250—200 m., 1 spec.; St. 28, 400 m. w., 4 spec. — Bredefjord St. 29, surface, 3 spec.; St. 31, 700 m. w., about 20 spec.; St. 35, 400 m. w., about 15 spec.; St. 47, 600 m. w., 7 spec.; St. 48, 1 spec.; St. 60, 500 m. w., 1 spec.; St. 64, 600 m. w., 1 spec.; St. 72, 400 m. w., 12 spec.; St. 100, 500 m. w., 4 spec.; St. 108, 300 m. w., 3 spec. — Bredefjord Sermilik, St. 118, 500 m. w., about 20 spec.; St. 119, 400 m. w., about 20 spec. — Bredefjord St. 128, 700 m. w., 1 spec.; St. 129, 800 m. w., 2 spec.; St. 131, 800 m. w., 1 spec.; St. 132, 700 m. w., about 15 spec.; St. 133, 600 m. w., 6 spec.

This essentially arctic species has thus been found at nearly all the plankton stations, and appears to be more or less evenly distributed over all depths except at the surface itself. Most of the specimens are small, abt. 10 mm., some few, however, reaching a size of over 25 mm. (St. 31, 35, 119). It is interesting to note that it penetrates right up into the Bredefjord Sermilik.

36. *Euthemisto compressa* Goës.

Conspectus p. 102.

Bredefjord St. 30, Nansen-net, 250—200 m., 1 spec., and 350—250 m., 1 spec.; St. 31, 700 m. w., 8 spec.; St. 35, 400 m. w., about 20 spec.; St. 47, 600 m. w., about 20 spec.; St. 48, 1 spec.; St. 60, 500 m. w., 12 spec.; St. 64, 600 m. w., 6 spec.; St. 65, 500 m. w., 8 spec.; St. 72, 400 m. w., 11 spec.; St. 73, 300 m. w., 1 spec.; St. 84, 200 m. w., 1 spec.; St. 86, 100 m. w., 1 spec.; St. 94, Nansen-net, 75—50 m. w., 1 spec.;

St. 100, 500 m. w., 12 ccm.; St. 102, 400 m. w., 3 spec.; St. 106, 100 m. w., 1 spec.; St. 108, 300 m. w., 4 spec. — Bredefjord Sermilik St. 118, 500 m. w., 2 spec.; St. 119, 400 m. w., about 15 spec. — Bredefjord St. 126, 800 m. w., 12 spec.; St. 128, 700 m. w., 14 ccm.; St. 129, 800 m. w., 15 ccm.; St. 131, 800 m. w., 15 spec.; St. 132, 700 m. w., 8 ccm.; St. 133, 600 m. w., 8 ccm. — Skovfjord St. 154, Nansen-net, 270 m. (bottom)—200 m., 3 spec.

Second only to *Parathemisto oblivia*, this species is the most widely distributed and most common Hyperid. Of the total quantity of Hyperiidæ, *Parathemisto oblivia* represents nearly three-fourths; the present species makes up the greater portion of the remaining fourth.

### 37. *Euthemisto bispinosa* Boeck.

Conspectus p. 104.

Bredefjord St. 31, 700 m. w., 9 spec.; St. 47, 600 m. w., 5 spec.; St. 60, 500 m. w., 6 spec.; St. 64, 600 m. w., 4 spec.; St. 65, 500 m. w., 1 spec.; St. 72, 400 m. w., 1 spec.; St. 100, 500 m. w., 2 spec. — Bredefjord Sermilik St. 119, 400 m. w., 1 spec. — Bredefjord St. 128, 700 m. w., 3 spec.; St. 129, 800 m. w., 4 spec.; St. 131, 800 m. w., 1 spec.; St. 132, 700 m. w., 3 spec.; St. 133, 600 m. w., 4 spec.

This species was thus only taken by the "Rink" at considerable depths, 400—800 m. w.; otherwise, it has not infrequently been taken at the surface itself. It is found right up in Bredefjord Sermilik (St. 119).

### 38. *Parathemisto oblivia* Kr.

Conspectus p. 104.

Kvanefjord St. 26, Nansen-net, 200—150m., 1 spec.; ?St. 27, Nansen-net, 125—100 m., 1 spec. juv.? — Bredefjord St. 30, Nansen-net, 350—250 m., 2 spec., and 550—450 m., 6 spec.; St. 31, 700 m. w., 15 ccm.; St. 35, 400 m. w., 13 ccm.; St. 47, 600 m. w., 12 ccm.; St. 48, about 25 spec., St. 59, 300 m. w., 3 spec.; St. 60, 500 m. w., 15 ccm.; St. 63, Nansen-net, 125—100 m., 2 spec., 150—125 m., 2 spec., 200—150 m., 2 spec., 250—200 m., 5 spec.; 350—250 m., 2 spec., 450—350 m., 1 spec.; St. 64, 600 m. w., 8 ccm.; St. 65, 500 m. w., 8 ccm.; St. 72, 400 m. w., 30 ccm.; St. 73, 300 m. w., 12 ccm.; St. 85, surface, 1 spec.; St. 94, Nansen-net, 100—75 m., 2 spec.; 125—100 m., 5 spec., 150—125 m., 4 spec., 200—150 m., 1 spec., 250—200 m., 5 spec., 350—250 m., 2 spec., 450—350 m., 2 spec.; St. 100, 500 m. w., 30 ccm.; St. 102, 400 m. w., 15 ccm.; St. 108, 300 m. w., about 20 spec. — Bredefjord Sermilik St. 118, 500 m. w., 50 ccm.; St. 119, 400 m. w., 50 ccm. — Bredefjord St. 126, 800 m. w., 7 ccm.; St. 128, 700 m. w., 15 ccm.; St. 129, 800 m. w., 30 ccm.; St. 131, 800 m. w., 45 ccm.; St. 132, 700 m. w., 50 ccm.; St. 133, 600 m. w., 40 ccm. — Skovfjord St. 137, 200—150 m., 1 spec., and 250—200 m., 7 spec.

As seen from the hauls made by the Nansen-net (St. 63, 94) this species lives in the fjords at depths of from 75 to at least 450 m. It is by far the most common and numerous of all Hyperiidæ, frequently amounting to over three-fourths of the total Hyperiidæ taken at a single station. This is somewhat contrary to what might have been expected, as it had not hitherto been taken in any great quantity in Greenland waters.

× 39. *Scina borealis* G. O. Sars.

*Clydonia borealis* G. O. Sars, Oversigt af Norges Crust. 1; Christiania Vid. Selsk. Forhandl. 1882, Nr. 18, p. 76, Pl. 3, fig. 1.

× *Scina* — G. O. Sars, Account of the Crust. of Norway, vol 1, 1895, p. 20, Pl. 8.

— — Stebbing, Biscayan Plankton 2; Transact. Linn. Soc., London, ser. 2, Zool., vol. 10, pt. 2, 1904, p. 28 (*ubi lit. et syn.*).

Bredefjord St. 94, Nansen-net, 450—350 m., 1 spec.; St. 131, 800 m. w., 2 spec.

This species is new for Greenland. I have, however, in the "Tjalfe" exped. already made mention of a *Scina* sp. which being defective, could not be determined; possibly it was the same species.

Distribution. *Vide* especially Tattersall, Amphip. Ireland (Fisheries N. Ireland, Sci. Investig. 1905, pt. 4 (1906), p. 9—10) where it is recorded from the eastern Atlantic, from Lofoten to the Azores and Canaries, as also the Mediterranean; not previously known, however, from the western part of the Atlantic. Since then, A. O. WALKER (Transact. Linn. Soc., London, ser. 2, Zool., vol. 13, 1909—10, p. 53) has recorded it from the Indian Ocean, 25—1200 fathoms.

40. *Socarnes Vahlîi* Kr.

Conspectus p. 109.

Bredefjord St. 36, 29—100 m., about 15 spec.; St. 78, 30—50 m., 10 spec. — Skovfjord St. 156, 70—140 m., 4 spec.

41. *Aristias tumidus* Kr.

Conspectus p. 114.

Bredefjord St. 32, 35—37 m., 1 spec.; St. 78, 30—50 m., 2 spec.

42. *Anonyx nugax* Phipps.

Conspectus p. 115.

Bredefjord St. 46, 20—30 m., 1 spec.; St. 48, 12 spec.; St. 62, 10—15 m., 4 spec.; St. 78, 30—50 m., 7 spec.; St. 89, 16—17 m., 4 spec.; St. 104, 7—20 m., 7 spec.; St. 123, 5—10 m., 3 spec.; St. 127, 10—15 m., about 15 spec. — Skovfjord St. 136, 6 m., 2 spec. — Tunugdliarfik St. 142, 14—18 m., 1 spec. — Skovfjord St. 156, 70—140 m., 1 spec.

× 43. *Pseudalibrotus Nanseni* G. O. Sars?

*Pseudalibrotus Nanseni* G. O. Sars, Crust.; Nansen, The Norweg. North Polar Exped. 1893—96, Sci. Results, vol. 1, Nr. 5, 1900, p. 26, Pl. 4—5.

Bredefjord Sermilik St. 118, 500 m. w., 5 spec.; St. 119, 400 m. w., 1 spec. — Bredefjord St. 126, 800 m. w., 2 spec.

The material from these stations includes some specimens of an Amphipod belonging to the genus *Pseudalibrotus*. With the large 2. joint of p7 they resemble *P. Nanseni*, but differ in various points. Hardly any of them are full grown, save possibly that from St. 119.

I am inclined to think that the specimens in question must be young individuals of *P. Nanseni*, the resemblance being so great that the differences may presumably be taken as due to the fact that the specimens were not fully grown. A more serious objection, however, is the locality. Sars' original specimens were taken "about 80° latitude, north of the New Siberian Islands. The specimens seem not to have been taken by the aid of the tow-net, but on bait hung down from the ship. Moreover, some young specimens . . . occurred in a sample much farther west, near the 85th degree of latitude"; these were thus from a distinctly arctic locality. My specimens, on the other hand, were taken pelagically, under boreal conditions. Although this fact need not in itself be of very great importance, it would hardly support the suggestion of their belonging to the same species as that described by Sars; in the absence of further material, however, I think we cannot do better than record the specimens in question as *Pseudalibrotus Nanseni*?

For clearness' sake I have here considered the specimens from each station separately, numbering the 5 from St. 118 as from 1 to 5.

Station 118, specimen Nr. 1 (Fig. 19), ♂, length 14 mm. Being in doubt as to the determination, I have here drawn all appendages, after dissection, and will now point out what I consider the most important characters; I am, however, inclined to consider the deviation from Sars' description as due to difference in size. (My specimen is 14 mm.; Sars' largest — the one shown in his figure? — 20 mm.).

On the whole, the resemblance is very good, and I now mention differences only. Lateral lobes on the cephalon somewhat more pointed than shown by Sars; as to how far the eyes are "contracted above" (Sars) I am unable to state with certainty, as they have now lost all colour, and are therefore difficult to draw with accuracy; the ocelli at the edge are particularly indistinct. The postero-lateral corner of the 3. epimeral plate in the metasome is more pointed than shown by Sars, the point itself especially being more sharply defined.

In ant. 1, the accessory flagellum has 4 joints (Sars: 4—5), the flagellum has 45 (Sars: amounting to about 50 in all), it is furnished with setae, though I have not been able to discover calceoli, possibly



on account of the small size of the specimen. In ant. 2, the flagellum has 49 joints (SARS "about 60") furnished with calceoli; in the case of the distal portion, however, only on every alternate joint.

P1—p7 agree very well with SARS' figures, here also, however, there are some few small points of difference. The 1. joint of p1 is more

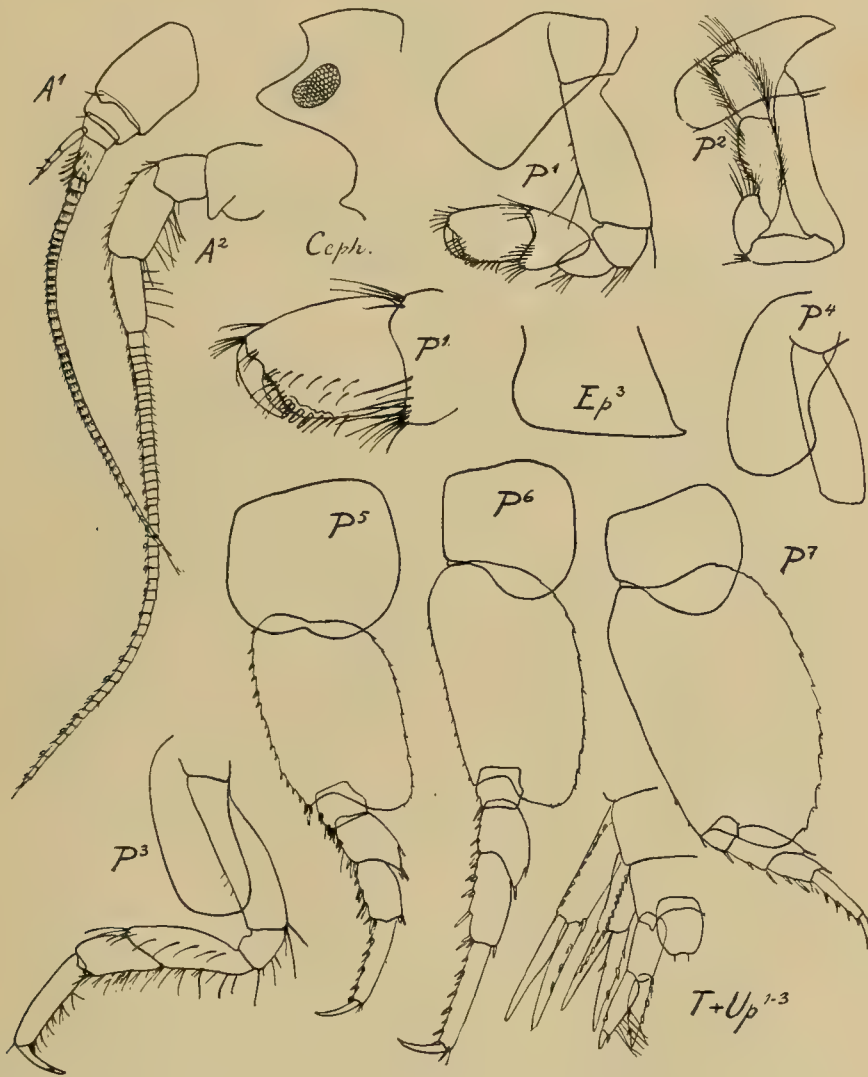


Fig. 19. *Pseudalibrotus Nanseni* Nr. 1 (♂).

rounded at the anterior corner than shown by SARS, but the 6. joint is of the same shape as there, the lower (posterior) corner being less obliquely cut off than in other species. The 1. joint in p2 is somewhat broader than stated by SARS, and the same applies to the 1. joint in p3—p4. P5—p7 also agree very well with SARS' figure, but in p6, the 4. joint especially is not a little stronger. The uropoda exhibit various differences in the arrangement of the spines, this is most distinctly shown in urop. 3, where there are no ciliated setae on the inner ramus

in my specimen. The telson is much narrower at the base than shown by Sars.

St. 118, specimen Nr. 2 (Figs. 20—21), ♀, length 16 mm. With regard to this specimen, the same may be said as of the foregoing; it

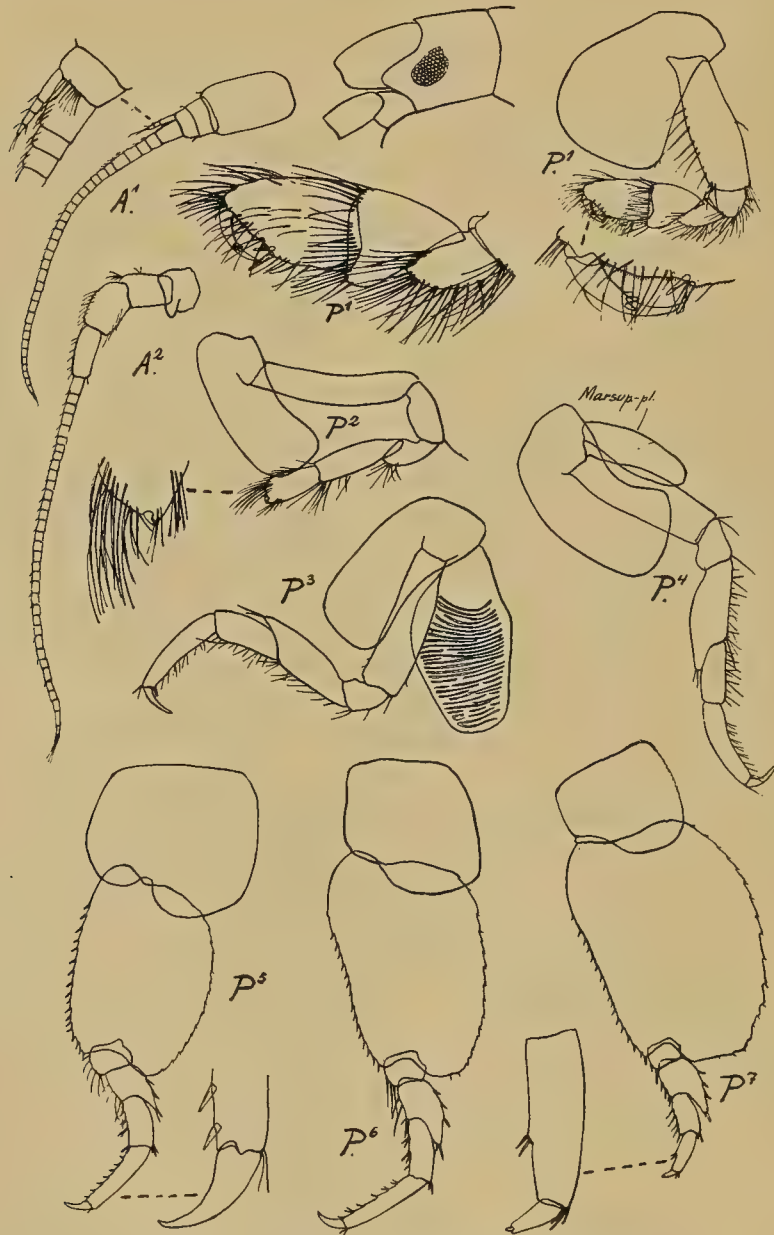


Fig. 20. *Pseudalibrotus Nanseni* Nr. 2 (♀).

resembles *Pseudalibrotus Nanseni* in p7 but differs somewhat in other features. The small marsupial plates (shown on p4) mark the specimen as a ♀; it is not mature, however, as the marsupial plates lack the usual bristles along the edge.

The lateral lobes of the cephalon are slightly shorter and less poin-

ted than in the foregoing specimen. The postero-lateral corner of the 3. epimeral plate in the metasome is of almost the same shape as shown by Sars, being less drawn out at the point than the foregoing.

The antennae are somewhat shorter than in the ♂ (specimen Nr. 1) and calceoli are of course altogether absent. In ant. 1, the accessory flagellum has 4 joints, the flagellum 33. In ant. 2, the flagellum has 36 joints. In p1 the 1. joint is very strongly curved in front, far more so than in Sars' and the foregoing specimen. The distal edge of the 6.

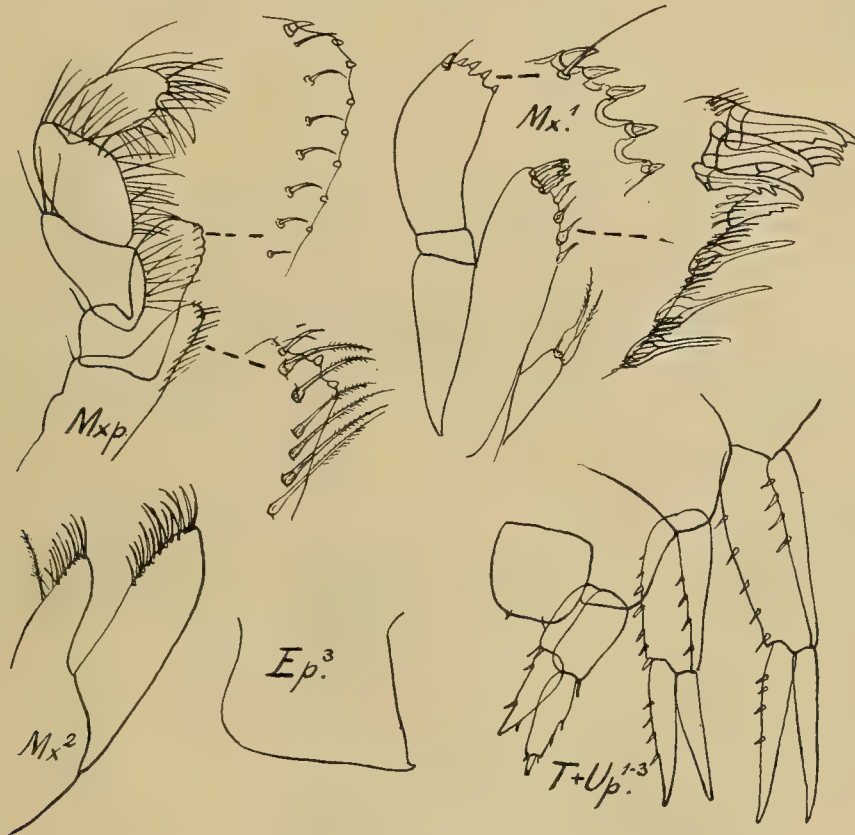


Fig. 21. *Pseudalibrotus Nansenii*, Nr. 2.

joint is also more obliquely cut. P2 is more slender than in the ♂ and the 1. joint slightly broader towards the point. With regard to p3—p4 nothing particular to remark, these answering entirely to the corresponding legs in the ♂. In p5 on the other hand, the 3.—7. joints are somewhat shorter and the dactylus on p5—p6 and especially p7 distinctly shorter and heavier. In p6—p7 also, the 3.—7. joints are slightly shorter than in the ♂. A remarkable feature is the slight spinous arrangement on anterior edge of the 6. joint in p7. Some of the oral parts are here drawn, to show the arrangement of spines; they agree, however, entirely with Sars' figure of *P. Nansenii*. The uropoda are slightly heavier, but with fewer spines than in the ♂. The fact of there being no ciliated setae on urop. 3, might possibly be taken

as indicating that the specimen in question could not be ♀ of the same species as the ♂ above described; in order to make certain therefore, I investigated this feature in the case of *P. littoralis*, the only species of which I had access to both male and female. As will be seen from my figure (fig. 22), the urop. 3 of *P. littoralis* ♂ has setae both on the outer and the inner ramus, whereas in the ♀, these are only found on the outer (I disregard the 3 separate setae on the inner ramus; *vide* Sars, Account, vol. 1, Pl. 35). The ♂ above described having only a few such setae, it would seem that the fact of none such being found in the ♀ here in question, need not count against the probability of both belonging to one and the same species. The telson in unusually broad.



Fig. 22. *Pseudalibrotus littoralis* ♂, Up. 3 (Danmark-Exped. St. 17).

St. 118, specimen Nr. 3 (Fig. 23). Young ♀, 14 mm. With regard to determination of this and the following two specimens, I am far more doubtful than in the case of the two foregoing. I am most inclined to consider it as a very young ♀ of *P. Nanseni*. The small marsupial plates shown for p5 lack setae at the edge. The cephalon resembles entirely that

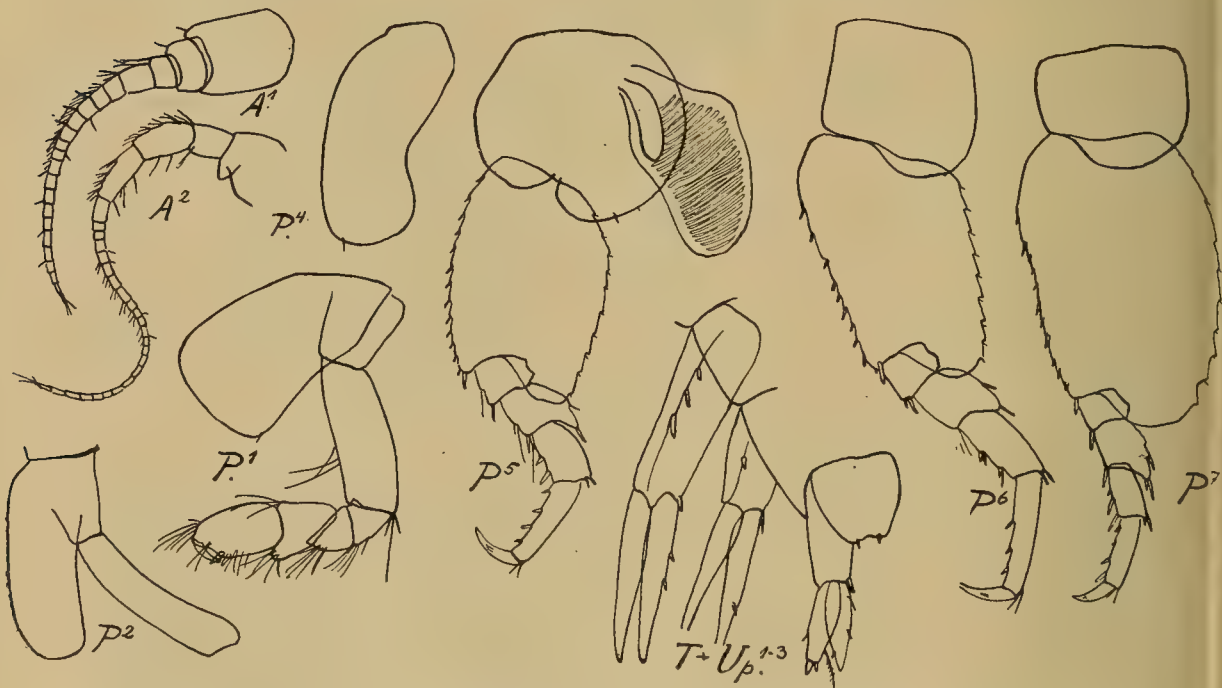


Fig. 23. *Pseudalibrotus Nanseni* Nr. 3 (young ♀).

of the ♀ above described. Postero-lateral corners of the 3. epimeral plate of the same shape as in the ♂ above mentioned (fig. 19). The antennae are short; in ant. 1, the accessory flagellum has only 1 joint, and the flagellum only 19; in ant. 2, the flagellum has 26.

In p1, the 1. joint resembles most the corresponding one in the ♂ mentioned above, but the 6. joint is more obliquely cut, nearly corresponding to that in the ♀ (Nr. 2). In p2, the 1. joint is of the same shape as in Sars' figure of *P. Nanseni*. P3 is exactly like that corresponding in Nr. 1—2. In p4, on the other hand, the 1. joint is narrower, and the lower posterior corner more rounded. P5—p7 agree very well with Sars' figures, but the 2. joint in p7 is comparatively short and broad, the dactylus on p5—p7 somewhat too heavy. With regard to the uropoda there is nothing to remark save that the spinous arrangement is even weaker than in Nr. 1—2. The outer ramus of urop. 3,

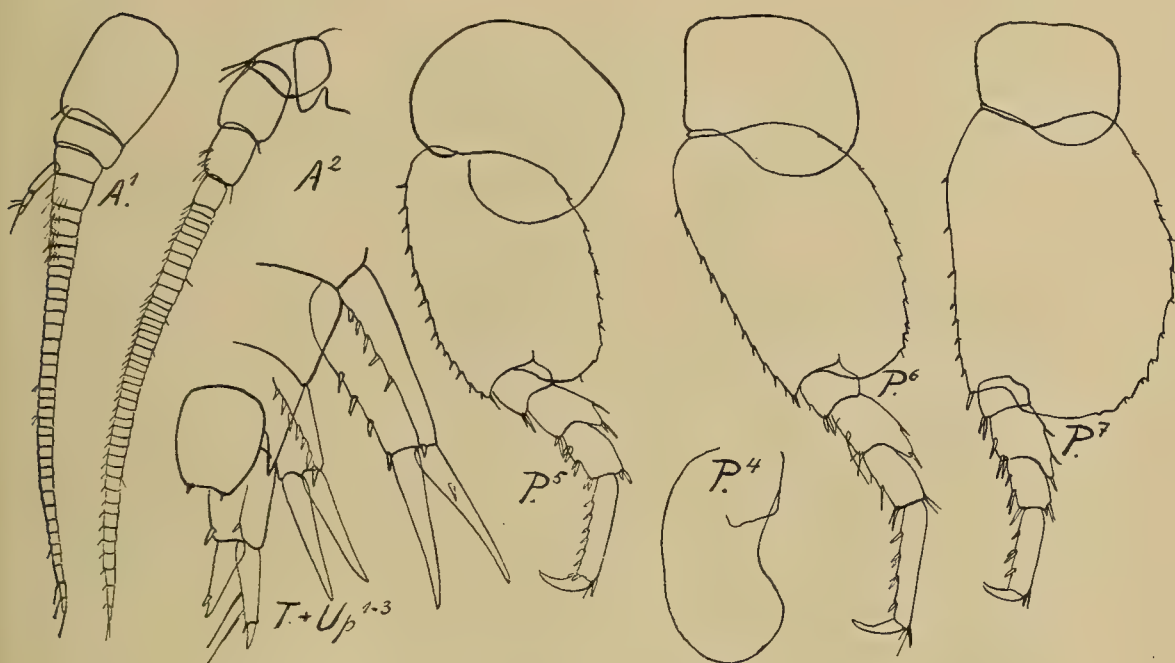


Fig. 24. *Pseudalibrotus Nanseni* Nr. 4.

however, has a single long ciliated seta. Telson exactly as in Sars' figure.

St. 118, specimens Nos. 4—5 (Fig. 24), 8 mm. Specimens 4—5 appear to be exactly alike; I have therefore only dissected the one. Sex I was unable to determine. The 3. epimeral plate in the metasome is of the same shape as in Nr. 1 and 3.

Despite the small size of the specimen, the antennae, especially ant. 1, are longer, and joints far more numerous than in Nr. 3; in ant. 1, the flagellum has 35, and the accessory flagellum 3; in ant. 2, the flagellum has 44 joints. In both pairs of antennae the joints of the flagellum are remarkably short. P1 is as in Nr. 3. In p2 the 1. joint is as in Nr. 1, but the arrangement of the setae on the 5. and 6. joints is stronger, about the same as in Nr. 2. P3 as in Nr. 1—3. In p4, the 1. joint (*vide* fig. 24) is of almost the same shape as in Nr. 3, but slightly broader.

P5—p7 resemble those of the previous specimen, but in p7 the 2. joint is comparatively short and broad. For the uropoda (*vide* fig. 24) there are 2 ciliated setae on the outer ramus in urop. 3. Telson of about the same shape as in Nr. 1.



Fig. 25. *Pseudalibrotus Nansenii* from St. 126.

St. 119, 400 m. w., 1 spec., ♂ 13 mm. The eyes have some slight trace of reddish colour remaining. The epimeral plate on the 3. metasome joint is of an intermediate shape between that of Nr. 1 and Nr. 2 from St. 118.

In ant. 1, the flagellum has abt. 45 short joints, with calceoli on

the proximal third part; the accessory flagellum has 4 (?) joints. Ant. 2 is slightly longer than ant. 1 and has about 60 joints in the flagellum with calceoli on the proximal third. P1 as in Nr. 2 from St. 118. P2: 1. joint as in Nr. 1 from St. 118, otherwise as in Nr. 2, St. 118. P3—p4 about the same as St. 118, Nr. 1. P5—p7 about the same as St. 118, Nr. 2, but the distal portion of p7 somewhat longer, more like that in St. 118, Nr. 1. With regard to the uropoda, nothing particular to remark, save that the outer ramus in urop. 3 has four long bristles. Telson about the same as in St. 118, Nr. 1.

St. 126, 800 m. w., 2 spec., ♀, 8 mm. (Fig. 25). At this station also were taken two specimens of a *Pseudalibrotus* species, possibly *P. Nanseni*; they cannot, however, be determined with certainty, as they are not full grown. Both are ♀ as there are small marsupial plates. The lateral corner of the cephalon as in Sars' figure of *P. Nanseni*, but the eyes are dark brown, despite the fact that the specimens have now been preserved for 2½ years in spirits. The posterior corner of 3. epimeral plate in the metasome drawn out a good deal, but the point is wanting.

The antennae are small, and with only few joints. (In ant. 1, the flagellum has 13, the accessory flagellum 3; the flagellum of ant. 2 has 18). In this respect they resemble specimen Nr. 3 from St. 118, but the size answers to that of Nos. 4—5 from St. 118, where the antennae had many joints. The anterior corner of 1. joint in p1 is even more drawn out than in *P. Nanseni* (Sars Pl. 4, fig. 14) and the distal edge more obliquely cut. P2, nothing particular to remark, save that the arrangement of the setae is weaker, and the 6. joint somewhat shorter. The emargination in the posterior edge of 1. joint in p4 is very slight. P5—p7 resemble those in *P. Nanseni*, the 4.—5. joints especially however, are much stronger, and the dactylus short and thick. There are no ciliated setae on urop. 3, this may however, possibly be merely a character of youth.

#### 44. *Onisimus Edwardsii* Kr.

Conspectus p. 121.

Kvanefjord St. 10, 12—14 m., between algae, 1 spec. — Bredefjord St. 48, 1 spec.; St. 62, 10—15 m., about 30 spec.; St. 89, 16—17 m., about 10 spec.; St. 104, 7—20 m., several spec.; St. 123, 5—10 m., 2 spec. — The harbour of Julianehaab, algae, 8—10 m., 4 spec.

#### 45. *Orchomenella minuta* Kr.

Conspectus p. 124.

Bredefjord St. 123, 5—10 m., about 15 spec.

This species, otherwise fairly common, has not hitherto been found S. of Frederikshaab.

46. *Orchomenella pinguis* Boeck?

Conspectus p. 423.

Tunugdliarfik St. 142, 14—18 m., 1 spec. Determination not altogether certain, as the crenelation on the 3. epimeral plate of the metasome is lacking.

The species has hitherto only been recorded from Greenland in N. Strømfjord (K. STEPHENSEN, 1913, p. 66).

47. *Tryphosa nanoides* Lilljb.?

Conspectus p. 125.

Bredefjord St. 32, 35—37 m., 1 spec. Determination not altogether certain, the specimen being somewhat defective.

Hitherto found in Greenland only at Sukkertoppen and Upernivik.

48. *Pontoporeia femorata* Kr.

Conspectus p. 127.

Kvanefjord St. 10, 12—14 m., 1 spec. — Bredefjord St. 62, 10—15 m., 5 spec.; St. 123, 5—10 m., 1 spec.; St. 127, 10—15 m., 3 spec. — Skovfjord St. 136 (the harbour of Narssak), 6 m., about 50 spec.

This species, otherwise common enough, has not hitherto been found S. of Frederikshaab.

49. *Stegocephalus inflatus* Kr.

Conspectus p. 132.

Bredefjord St. 48, 6 spec.; St. 134, 85—140 m., 1 spec.

50. *Amphilocheus manudens* Bate.

Conspectus p. 136.

Bredefjord St. 61, 12,5—13 m., 2 spec.; St. 66, 9—11 m., 1 spec. Hitherto recorded from W. Greenland at 2 places only.

51. *Metopa groenlandica* H. J. Hansen.= *Stenothoë (Proboloides) clypeata* Stimpson.

Conspectus p. 139, 426.

Kvanefjord St. 13, 34—40 m., 1 spec.

Hitherto found in W. Greenland at 2 places only.

52. *Metopa longimana* Boeck.

Conspectus p. 140.

Bredefjord St. 61, 12,5—13 m., 1 spec.

Hitherto found in W. Greenland at 2 places only.

53. *Metopa neglecta* H. J. Hansen.

Conspectus p. 140.

Bredefjord St. 61, 12,5—13 m., 1 spec.

Hitherto found in W. Greenland at 2 places only.



54. *Metopa Bruzelii* Goës.

Conspectus p. 141.

Bredefjord St. 61, 12,5—13 m., 1 spec.; St. 66, 9—11 m., 2 spec.

55. *Metopa sinuata* G. O. Sars.

Conspectus p. 142.

Bredefjord St. 79, 30—50 m., 1 ♀ with ova; St. 89, 16—17 m., 1 spec.

This species has hitherto only been recorded from Godthaab in W. Greenland and 2 places in N. Norway.

56. *Metopa carinata* H. J. Hansen.

Conspectus p. 142.

Bredefjord St. 61, 12,5—13 m., 2 spec.; St. 66, 9—11 m., 9 spec.; St. 89, 16—17 m., 7 spec. (and 3 spec. juv.); St. 104, 7—20 m., 6 spec.; St. 123, 5—10 m., 5 spec. (and 3 spec. juv.).

This endemic W. Greenland species, which, according to H. J. HANSEN'S V. Grønland, 1887, is stated as very common in a few fathoms of water, has, strangely enough not been recorded again from W. Greenland since 1887, save for a find made by VANHÖFFEN in Lille Karajakfjord (abt. 71° N.).

57. *Syrrhoë crenulata* Goës.

Conspectus p. 144.

Kvanefjord St. 4, 20,5—34 m., 1 spec.; St. 10, 19,5—54 (?) m., 3 spec. — Bredefjord St. 48, several specimens; St. 61, 12,5—13 m., 1 spec.; St. 66, 9—11 m., 3 spec.; St. 79, 30—50 m., about 10 spec.; St. 89, 16—17 m., 2 spec.; St. 104, 7—20 m., 2 spec.; St. 123, 5—10 m., 1 spec. — Tunugdliarfik St. 142, 14—18 m., 9 spec.

This species is thus far more common in the area investigated by the "Rink" than might be expected from what has hitherto been known as to its distribution.

58. *Paroediceros lynceus* M. Sars.

Conspectus p. 148, 426.

Kvanefjord St. 10, between algae, 12—14 m., 1 spec. — Bredefjord St. 48, 2 spec.; St. 61, 12,5—13 m., about 15 spec.; St. 104, 7—20 m., about 15 spec.; St. 123, 5—10 m., several, most of the specimens very small. — Tunugdliarfik St. 142, 14—18 m., about 15 spec.

59. *Monoculodes latimanus* Goës.

Conspectus p. 152.

Bredefjord St. 48, several specimens; St. 61, 12,5—13 m., 1 spec.; St. 62, 10—15 m., 7 spec.; St. 79, 30—50 m., 2 spec.; St. 89, 16—17

m., 9 spec.; St. 104, 7—20 m., 11 spec.; St. 123, 5—10 m., several spec.; St. 127, 10—15 m., 2 spec. — Tunugdliarfik St. 142, 14—18 m., several spec.

60. **Monoculodes borealis** Boeck.

Conspectus p. 153.

Bredefjord St. 32, 35—37 m., 1 spec.; St. 48, 7 spec.; St. 89, 16—17 m., 8 spec.; St. 104, 7—20 m., 5 spec.; St. 123, 5—10 m., 6 spec.; St. 127, 10—15 m., 5 spec. — Tunugdliarfik St. 142, 14—18 m., several spec.

This species has not hitherto been found S. of Godthaab.

61. **Pleustes panoplus** Kr.

Conspectus p. 158.

Kvanefjord St. 9, 22—24 m., 1 spec. — Bredefjord St. 66, 9—11 m., 3 spec. (2 of them very small).

62. **Paramphithoë Boeckii** H. J. Hansen.

Conspectus p. 160.

Skovfjord St. 156, 70—140 m., 3 spec.

This species, doubtless endemic for W. Greenland, is hitherto known only from four places between Godthaab and Egedesminde.

63. **Paramphithoë bicuspis** Kr.

Conspectus p. 161.

Bredefjord St. 32, 35—37 m., 6 spec.; St. 37, 20—30 m., about 20 spec.; St. 48, about 10 spec.; St. 61, 12,5—13 m., 12 ccm.; St. 62, 10—15 m., about 20 spec.; St. 66, 9—11 m., about 50—60 ccm.; St. 79, 30—50 m., 7 spec.; St. 89, 16—17 m., 20 ccm.; St. 107, 7—20 m., about 35 ccm.; St. 123, 5—10 m., about 13 ccm. — Tunugdliarfik St. 142, 14—18 m., about 7 ccm. — Skovfjord St. 145, 10—15 m., 3 spec.; St. 156, 70—140 m., 1 spec.

This species is thus extremely frequent in shallow water, the only exception being the specimen from St. 156, which, by the way, differs somewhat from the rest, the tooth on the 1. joint of the metasome being almost entirely wanting. The specimens fall into two sizes; abt. 5 and abt. 10 mm. so that we may probably suppose the former to be young, the latter year-old individuals. The smaller are the more numerous; large ones were found only at St. 32, 37 (large and small), St. 48, 66 (some few large) and St. 79 (3 large), all the others were small.

The species is so numerous as to make up, together with *Pontogeneia inermis*, the main portion of the Amphipoda found in shallow water.

64. *Paramphithoë assimilis* G. O. Sars.

Conspectus p. 162.

Kvanefjord St. 13, 34—40 m., 1 spec. — Bredefjord St. 32, 35—37 m., 1 spec.; St. 36, 29—100 m., 2 spec.

Hitherto found in Greenland only at Godthaab and Egedesminde.

65. *Parapleustes glaber* Boeck.

Conspectus p. 164.

Bredefjord St. 32, 35—37 m., 1 spec.

66. *Acanthonotosoma serratum* O. Fabr.

Conspectus p. 167.

Bredefjord St. 32, 35—37 m., 2 spec.; St. 36, 29—100 m., 2 spec.; St. 37, 20—30 m., about 10 spec.; St. 48, about 60 spec.; St. 61, 12,5—13 m., about 10 spec.; St. 66, 9—11 m., about 15 spec.; St. 78, 30—50 m., 1 spec.; St. 79, 30—50 m., about 10 spec.; St. 89, 16—17 m., 9 spec. — Skovfjord St. 145, 10—35 m., 1 spec.

67. *Odius carinatus* Sp. Bate.

Conspectus p. 170.

Bredefjord St. 61, 12,5—13 m., 1 spec.; St. 89, 16—17 m., 1 spec.  
Hitherto known only from 3 (4) places in W. Greenland.

68. *Pontogeneia inermis* Kr.

Conspectus p. 173.

Kvanefjord St. 13, 34—40 m., 5 spec. — Bredefjord St. 37, 20—30 m., 3 spec.; St. 48, 2 spec.; St. 61, 12,5—13 m., 20 ccm.; St. 62, 10—15 m., 3 spec.; St. 66, 9—11 m., 60 ccm.; St. 89, 16—17 m., 125 ccm.; St. 104, 7—20 m., 200 ccm.; St. 123, 5—10 m., 50 ccm.; St. 126, 800 m. w., 1 spec. — Tunugdliarfik St. 142, 14—18 m., 5 ccm.

This species, which, together with *Paramphithoë bicuspis* (Nr. 63) is altogether dominant among the Amphipoda found in shallow water, was found in two sizes, abt. 5 and abt. 10 mm., so that the same may possibly apply to both species. The specimens from St. 13 and 48 were large, and some large ones were also found at St. 37, 61, 66 and 89; all the others were small.

69. *Apherusa glacialis* H. J. Hansen.

Conspectus p. 175.

Kvanefjord St. 28, 400 m. w., 1 spec. — Bredefjord St. 30, Nansen-net, 550—450 m., 2 spec.; St. 31, 700 m. w., 1 spec.; St. 64, 600 m. w., 1 spec.; St. 126, 800 m. w., 1 spec.

The find made with the Nansen-net (St. 30) is interesting, this being, as far as I know, by far the greatest depth at which this species has been taken; otherwise, it always keeps close to the surface.

70. *Amphithopsis megalops* Buchh.

Conspectus p. 176.

Bredefjord St. 32, 35—37 m., 1 spec.; St. 48, 4 spec.; St. 61, 12,5—13 m., 12 spec.; St. 62, 10—15 m., 6 spec.; St. 66, 9—11 m., 4 spec.; St. 89, 16—17 m., several spec.; St. 104, 7—20 m., several spec.; St. 123, 5—10 m., several spec.; St. 127, 10—15 m., 2 spec. — Tunugdliarfik St. 142, 14—18 m., about 10 spec. — Skovfjord St. 145, 10—35 m., 2 spec.

Not previously found S. of Godthaab.

71. *Halirages fulvocinctus* M. Sars.

Conspectus p. 178, 426.

Bredefjord St. 46, 20—30 m., 2 spec.; St. 79, 30—50 m., 1 spec.; St. 87, 230 m., 1 spec.; St. 89, 16—17 m.; 1 spec. — Skovfjord St. 155, 220 (240)—400 m., 1 spec.

The depth at St. 87 and 155 was remarkably great, as the species is generally found in Greenland waters at up to 30 metres; it has however previously been recorded from Jacobshavn in 350 fathoms.

× × 72. *Halirages bispinosus* n. sp. (Fig. 26).

Bredefjord St. 89, 16—17 m., 2 spec., 8—9 mm.; St. 123, 5—10 m., 3 spec., 8—9 mm.

All these specimens appear to be ♂, they are, however, very defective, so that it was necessary to dissect two specimens for the figure here given.

The species so closely resembles *H. fulvocinctus* that I at first supposed the specimens in question to be young individuals of that species, the tooth on the 7. joint of the mesosome being there very small; on closer examination, however they were found to differ in several good characters. On the whole, the resemblance is so great that I here restrict myself to mentioning the points of difference.

There is no tooth on the 7. joint of the mesosome, there are, however, teeth on the 1. and 2. joints of the metasome. The 3. epimeral plate is of the same shape as in *H. fulvocinctus*, but the posterior edge has only about 5 small teeth (in *H. fulvoc.* 10 or more). There is no emargination in the posterior edge of the telson; dentition is, however, present, consisting of one large tooth in the centre, then one very small on either side, then a larger, followed by a fairly deep notch with a bristle, with a large tooth outermost at either corner. Both pairs of antennae have calceoli, so that the specimens are doubtless grown ♂♂, and the ant. are of the same length as in *H. fulvoc.* P1—p2 are of the same shape as in *H. fulvoc.* save that the 1. joint of p1 is more rounded at its anterior point, and the 1. joint of p2 narrower out towards the end; the same applies to 1. joint of p3. P5—p7 are of increasing length,

p7 being longest; but as p7 is here drawn from a specimen slightly smaller than that from which p5—p6 were taken, it appears smaller in the figure than is actually the case. Up. 1—3 are of about the same shape

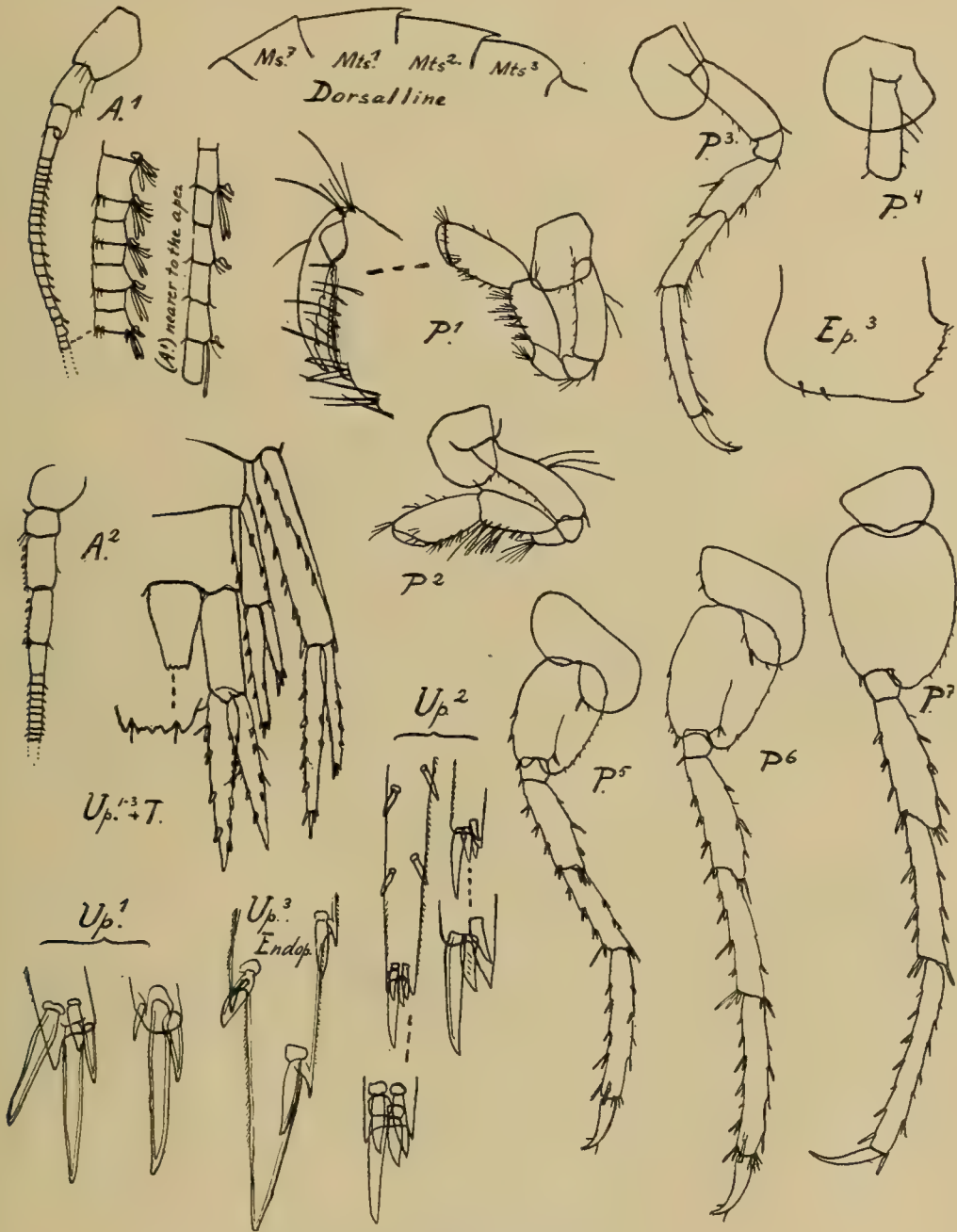


Fig. 26. *Hairages bispinosus*.

as in *H. fulvoc.* but up. 3 has much fewer teeth along the edge, and only a few long bristles.

Despite the great resemblance to *H. fulvoc.* therefore, the present species is easily distinguished by the following characters: Tooth wanting on 7. joint of the mesosome, posterior edge of telson, and up. 3.

In order to make sure that I had not after all here to deal with small specimens of *Hal. fulv.* I examined several specimens of that species at about the same size; these were certainly somewhat different from the grown specimens, there being for instance at times small teeth in the emargination of the telson, while the tooth on the 7. joint of the mesosome can be somewhat small; in spite of this, however, the two forms were easily distinguishable; there were no real intermediate forms.

The specific name of *bispinosus* refers to the fact of there being only 2 teeth in the dorsal line.

### 73. *Calliopius laeviusculus* Kr.

Conspectus p. 179, 426.

Bredefjord St. 66, 9—11 m., 7 spec. (?); St. 89, 16—17 m., 6 spec. (?); St. 104, 7—20 m., 8 spec. (?); St. 123, 5—10 m., 1 spec.

The specimen from St. 123 is determined with certainty; it measured 11 mm., the others only about 8 mm. And with regard to the others, I am not certain as to the correctness of the determination, as they closely resemble *C. Rathkei*, a point which HOLMES remarked some years back in the case of the smaller specimens (Bull. Bur. Fisheries, Washington, vol. 24, 1904, p. 494). The terminal lappet of the last peduncular joint of the ant. 1. is too short, and the hook on the 3. epimeral plate of the metasome is of an intermediate shape between those of the two species.

### 74. *Calliopius Rathkei* Zaddach.

Conspectus p. 180, 426.

Kvanefjord St. 21. surface, 1 spec. (?). — Bredefjord St. 61, 12,5—13 m., 1 spec.; St. 85, surface, 1 spec.

The specimens from St. 61 and 85 are doubtless correctly determined; there is some uncertainty, however, in the case of that from St. 21, which, with the longer lappet on ant. 1, resembles *C. laeviusculus*; the hook on the 3. epimeral plate of the metasome, however, agrees with SARS' figure (Account, Pl. 157, fig. 2). This species has, by the way, only been found in W. Greenland near Disko.

### 75. *Rhachotropis aculeata* Lepechin.

Conspectus p. 183, 427.

Kvanefjord St. 6, 45 m., 1 spec. — Bredefjord St. 79, 30—50 m., 6 spec.; St. 109, 125—140 m., 1 spec. — Skovfjord St. 156, 70—140 m., ♀ with ova.

Strangely enough, this species is not hitherto known from between Julianehaab (abt.  $60\frac{3}{4}^{\circ}$  N.) and abt.  $66\frac{1}{2}^{\circ}$  N.

76. *Rhachotropis inflata* G. O. Sars.

Conspectus p. 184.

Bredefjord St. 48, 2 spec.; St. 79, 30—50 m., 1 spec.

Hitherto found in W. Greenland only in Nivak Fjord (abt. 68½° N.).

77. *Gammarus locusta* L.

Conspectus p. 192.

Kvanefjord St. 10, 19,5—54 (?) m., 1 spec. — Bredefjord St. 29, taken at the surface, 1 spec. — Bredefjord Sermilik, Tasiusak, under stones at the shore, several specimens.

It is remarkable that this extremely common and widely distributed species is not found in very great numbers in the "Rink" material.

× 78. *Gammarus Zaddachi* Sexton.

*Gammarus Zaddachi* Sexton, Proc. Zool. Soc., London 1912, p. 657, Pl. 72, Pl. 73, fig. 1—12.

— — Sexton, Schriften Physik.-ökonom. Gesellsch., Königsberg i. Pr., vol. 54, 1913, Heft 1, p. 90, Pl. 4, fig. 2.

In the stream at Narssak, Skovfjord, 6—VIII, 1912, 1 spec.

The specimen is small (abt. 7 mm.), and not a little defective. There are no setae in "clusters" on the antennae, which is perhaps due to the youth of the individual, but up. 3 and especially the 1. joint of p4 are in excellent accordance with SEXTON'S figure; there are however, only 2 (not 3) teeth on the posterior portion of 1. joint in p4.

The species is new for Greenland, it is known however, from North Germany (Königsberg to the Elbe) and from Irish lakes; it is found in salt, fresh and brackish water.

79. *Amathilla pinguis* Kr.

Conspectus p. 199.

Bredefjord St. 32, 35—37 m., 1 spec.; St. 37, 20—30 m., 1 spec.; St. 61, 12,5—13 m., about 15 spec.; St. 62, 10—15 m., 2 spec.; St. 66, 9—11 m., 5 spec.; St. 89, 16—17 m., 13 spec.; St. 123, 5—10 m., 8 spec.

80. *Ampelisca Eschrichtii* Kr.

Conspectus p. 201.

Kvanefjord St. 6, 45 m., 5 spec. — Bredefjord St. 127, 10—15 m., 1 spec. — Skovfjord St. 156, 70—140 m., 1 spec.

Not hitherto known S. of Godthaab.

81. *Ampelisca macrocephala* Lilljb.

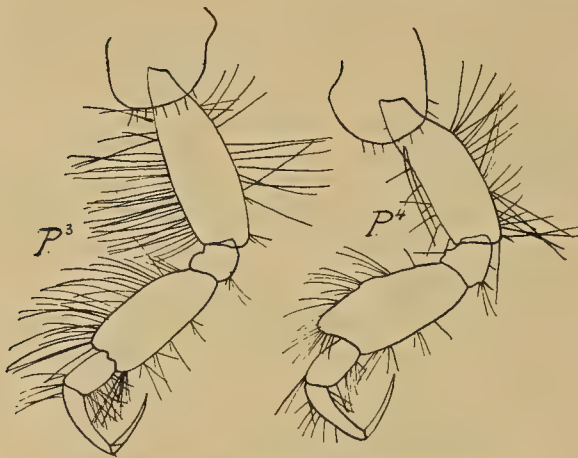
Conspectus p. 202, 427.

Bredefjord St. 127, 10—15 m., 6 spec.

This species, not common in Greenland, is not previously known S. of Godthaab.

82. *Haploops tubicola* Lilljb.

Conspectus p. 203.

Fig. 27. *Protomedeia fasciata* ♀.

4. joint in p3—p4 considerably heavier than usual; I have therefore drawn it.

Bredefjord St. 127, 10—15 m., 1 tube and 1 spec. — Skovfjord St. 143, 65—90 m., 1 spec.

Not known hitherto S. of abt. 65° N.

83. *Protomedeia fasciata* Kr. (Fig. 27).

Conspectus p. 206.

Bredefjord St. 48, 1 spec.; St. 62, 10—15 m., 1 spec.; St. 127, 10—15 m., 11 ♀♀ (with ova), 1 ♂.

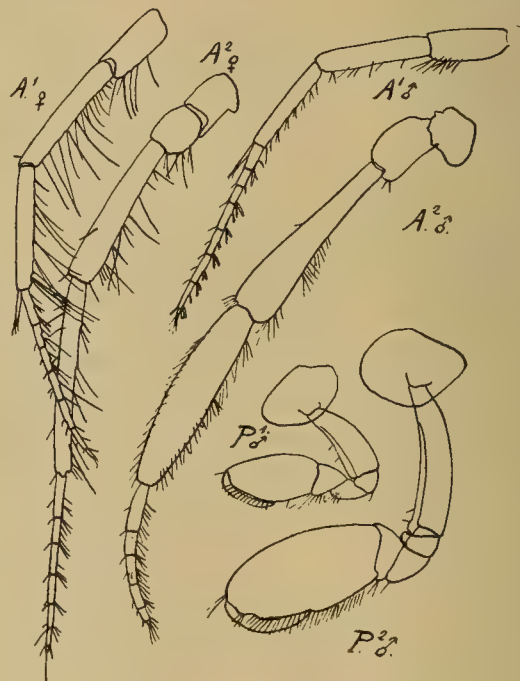
84. *Ischyrocerus anguipes* Kr. (Fig. 28).

Conspectus p. 209.

Kvanefjord St. 13, 34—40 m., several spec. — Bredefjord St. 32, 35—37 m., about 10 spec.; St. 36, 29—100 m., about 10 spec.; St. 37, 20—30 m., several spec.; St. 46, 20—30 m., 1 spec.; St. 48, several spec.; St. 61, 12,5—13 m., several spec.; St. 62, 10—15 m., a few spec.; St. 66, 9—11 m., several spec.; St. 79, 30—50 m., 2 spec.; St. 89, 16—17 m., several spec.; St. 104, 7—20 m., a few spec.; St. 123, 5—10 m., a few spec. — Tunugdliarfik St. 141, 35—70 m., 1 spec.; St. 142, 14—18 m., 2 spec.

By far the greater number are ♀♀ with ova, but there are also a number of ♂♂. Only a very few answer entirely to Sars' figure (Account, Pl. 210) the ant., especially in the ♂ being in most cases too slender, and in most of the ♂ p2 has even the same shape as in the ♀; only from St. 36 and 48 have we a few entirely normal ♂♂.

By way of indicating a form of which many specimens were

Fig. 28. *Ischyrocerus anguipes* ♂ (juv.?) and ♀.



found I have drawn some appendages of specimens from St. 32; in the ♀, the joints of the flagellum are very thin, and in the (young?) ♂, the 3. joint in the peduncle of ant. 2, and the 1. joint of the flagellum are of a peculiar and entirely divergent shape, while p2 is of exactly the same shape as in the ♀.

85. *Neohela monstrosa* Boeck.

Conspectus p. 216.

Bredefjord St. 96, 410 m., 2 spec.; St. 98, 520—560 m., 1 spec.  
Not hitherto found south of Umanak-Fjord (abt. 71° N.).

86. *Dulichia spinosissima* Kr.

Conspectus p. 217.

Bredefjord St. 32, 35—37 m., about 10 spec.; St. 36, 29—100 m., 2 spec.; St. 37, 20—30 m., 2 spec.; St. 48, about 50 spec.; St. 53, 260 m., 1 spec.; St. 61, 12,5—13 m., about 10 spec.; St. 66, 9—11 m., 8 spec.; St. 79, 30—50 m., 5 spec. — Skovfjord St. 145, 10—35 m., 1 spec.

This species is thus very common in Bredefjord down to abt. 50 m., and has even been found at 260 m. Strangely enough, it has hitherto only been recorded from 5 (6) places in W. Greenland.

87. *Dulichia tuberculata* Boeck.

Conspectus p. 218.

Bredefjord St. 66, 9—11 m., 2 ♀♀, 3 ♂♂; St. 89, 16—17 m., 1 ♀ with ova.

There can be no doubt as to the correctness of the determination, despite the fact that the ♂ are quite young, so that p2 is of the same shape as in the ♀.

The species has not hitherto been taken S. of Sukkertoppen (abt. 65½° N.).

88. *Aeginella spinosa* Boeck.

Conspectus p. 222.

Kvanefjord St. 3, 210—225 m., 1 spec.

Hitherto found only at two places in W. Greenland (abt. 65½° N.—abt. 68° N.) and was thus not known at all from the area investigated by the "Rink".

89. *Caprella septentrionalis* Kr.

Conspectus p. 223.

Kvanefjord St. 10, 19,5—54 (?) m., 1 spec.; St. 13, 34—40 m., 1 spec. — Bredefjord St. 32, 35—37 m., 5 spec.; St. 61, 12,5—13 m., several spec.; St. 62, 10—15 m., several spec.; St. 66, 9—11 m., several spec.; St. 89, 16—17 m., several spec.; St. 93, 10 m., 1 spec.; St. 104, 7—20 m., several spec.; St. 123, 5—10 m., several spec. — Tunugdliarfik St. 142, 14—18 m., 1 spec. — The harbour of Julianehaab, among algae, 8—10 m., several spec.

× × 90. *Caprella Rinkii* n. sp. (Fig. 29).

Bredefjord St. 34, 460—550 m., 1 ♀ (adult?), 13 mm.; St. 121, 700 m., 1 ♀ (not adult), 12 mm.

Since P. MAYER'S Caprellidae in the Siboga-Exped., the following new species have been described:

*C. hirsuta* var. n. *longimana* Chevreux, Bull. Inst. Océanogr., Monaco, Nr. 262, 1913, p. 5, figs.

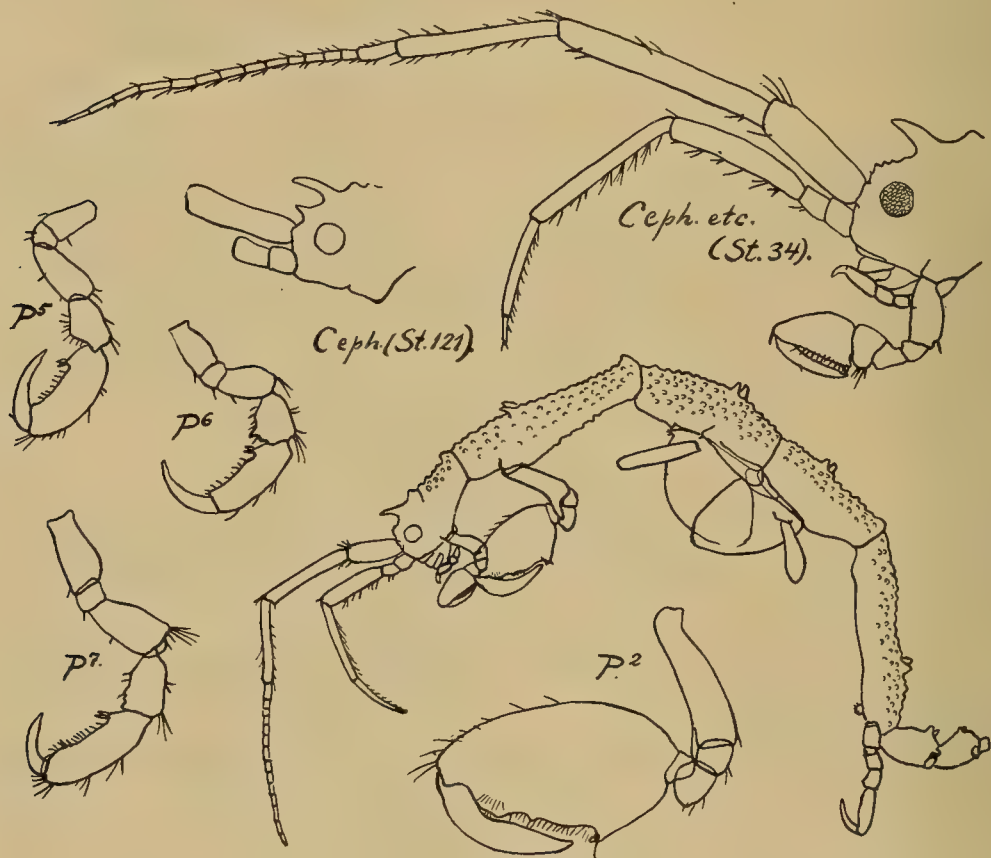


Fig. 29. *Caprella Rinkii* (St. 34; the little cephalon and p6—p7 are from St. 121).

*C. bermudia* Kunkel, New Haven Transact. Connecticut Acad., vol. 16, 1910, p. 108, figs.

*C. tridous* Stebbing, Cape Town, Ann. South Afric. Mus., vol. 6, 1910, p. 467, Pl. 48, fig. B.

*C. alaskensis* Holmes, Amphip.; Harriman Alaska-Exp., pt. 10, 1904, p. 241, fig. 125.

*C. scabra* Holmes l. c. p. 243, fig. 126.

*C. kincaidi* Holmes l. c. p. 245, figs. 127—128.

As, however, I was not able to obtain all the works in question, and my species did not agree with any of the descriptions I had access to, I requested Prof., Dr. PAUL MAYER, of Jena, to determine whether the species should not be regarded as new. I sent him the one speci-

men (from St. 121), and received the following reply: "Sie ist offenbar neu; leider freilich nur ein ♀ juv.; also kann man gar nicht wissen, wie die alten ♂ aussehen mögen". I take this opportunity of expressing my best thanks to Prof. P. MAYER for his courtesy in the matter.

I have drawn the grown ♀, but as p6—p7 are lacking in this specimen, these are here taken from the immature specimen from St. 121.

In point of habit, the present species resembles *C. septentrionalis*, as regards its strong build, but is immediately distinguished from this by its spines and warts: The whole of the body, with the exception of the two posterior segments of the mesosome, is warty down the back, the 2. segment being also slightly warty on the ventral side. Above and between the eyes there is a strong spine pointing forward; in front of this there are, in the grown ♀, a few small warts, and in the young ♀ a slightly smaller spine. The dorsal warts are setose. At the posterior end of the cephalon, 1., 2. and 4. mesosome segments, there is a large protuberance, and about the middle of the 2.—7. segments of the mesosome two thick spines set as a pair. The eyes are round and colourless. The antennae are of the same length and shape as in the ♀ of *C. septentr.* but the 3. joint in the peduncle of ant. 1. is slightly longer. P1—p2 nothing particular to remark. The gills are sausage-shaped, and there are no spines at their base. P5—p7 of about the same shape as in *C. septentr.*, but the 2. joint does not project so much behind.

No other Caprellid has been taken in Greenland at so great a depth; the nearest is *Aeginella spinosa*, which was taken at 210—225 m. ("Rink") and also at 167 fathoms.

At the both stations a number of Hydroidae were taken; there is thus but little doubt that the animals must have lived on these.

### Isopoda.

#### 91. *Calathura brachiata* Stimps.

Conspectus p. 229.

Bredefjord St. 55, 310—330 m., 1 spec.

The specimen in question lacks the depressions in the back. The species has not previously been taken S. of abt.  $66\frac{1}{2}^{\circ}$  N.

#### 92. *Gnathia* sp.

Bredefjord St. 45, 430—450 m. an old Praniza.

Three species of *Gnathia* in all are known from Greenland (*vide* Conspectus p. 230—31), *viz.*: *G. elongata*, *G. cristata*, and *G. robusta*; the Praniza stage of *G. cristata* however, is not known. The present specimen closely resembles that shown by Sars in Norske Nordhavs Exped., Pl. 8, fig. 27: a Praniza of *G. robusta*; I am not certain, however, that it really is this species.

I have recently given a full list of the literature and all species of Gnathiidae, in Isopoda, Tanaidacea, Cumac. Amphip. excl. Hyperidei; Report on the Danish Oceanographical Exped. 1908—10 to the Mediterranean and adjacent seas, vol. 2, Biol. D. 1, 1915, p. 5—9.

93. *Aega ventrosa* M. Sars.

Conspectus p. 233.

Bredefjord St. 97, 250—280 m., 1 spec.

Formerly known from two places only in W. Greenland. Both in the Danmark exped. and in the Conspectus, this species is incorrectly recorded from Spitzbergen and the Kara Sea, where as a matter of fact it has never been found.

94. *Ianira maculosa* Leach.

Conspectus p. 240.

Bredefjord St. 55, 310—330 m., 1 spec.

Formerly known only from two places in W. Greenland (abt.  $66\frac{1}{2}^{\circ}$  N. and abt.  $72\frac{1}{2}^{\circ}$  N.).

95. *Ianira tricornis* Kr. (= *Ianthe libbeyi* Ortmann).

Conspectus p. 241, 243, 427.

Bredefjord St. 75, 200—270 m., 1 spec. — Skovfjord St. 145, 10—35 m., 2 spec.; St. 152, 80—120 m., 1 spec.

I am indebted to Dr. H. J. HANSEN for pointing out that *I. libbeyi* is synonymous with *I. tricornis*; further particulars as to this point will appear in his work on the Isopoda from the "Ingolf" Exped. shortly to be published.

96. *Munna minuta* H. J. Hansen.

Conspectus p. 245.

Bredefjord St. 61, 12,5—13 m., 1 spec.; St. 66, 9—11 m., 2 spec.; St. 89, 16—17 m., 2 spec.

× 97. *Eurycope producta* G. O. Sars.

*Eurycope producta* G. O. Sars, Beretn. om en i Sommeren 1865 foretagen zool. Reise ved Kysterne af Christianias og Christiansands Stifter. Nyt Mag. for Naturvid., Christiania 1866, p. 32.

— — G. O. Sars, Account of the Crust. of Norway, vol. 2, Isop., 1899, p. 146, Pl. 65.

Bredefjord St. 55, 310 m., 2 spec.

These specimens were brought up in the water bottle, and as this was always suspended abt. 1 m. above the bottom, we have here a proof of the manner in which the species keeps to the sea floor.

The species is new for Greenland.

Further distribution: "Not rare in several localities of the Norwegian coast, from the Christiania Fjord to Vadsø, in depths varying from 60 to 400 fathoms. Out of Norway it has not yet been recorded." (SARS, l. c., 1899). It is thus one of the not inconsiderable number of species which have hitherto been found only in Greenland and Norwegian waters, possibly because the interjacent area has not yet been sufficiently investigated.

98. *Phryxus abdominalis* Kr.

Conspectus p. 250.

Kvanefjord St. 11, 290—320 m., 1 spec. on *Spirontocaris polaris*.

Bredefjord St. 48, 3 spec., on *Sp. turgida* and *Lilljeborgii*; St. 61, 12,5—13 m., 2 larvae; St. 66, 9—11 m., 3 larvae; St. 89, 16—17 m., 1 larva on young stage of *Spiront. groenlandica*.

The species has, as far I know, not hitherto been found on *Spiront. groenlandica*.

99. *Bopyroides Hippolytes* Kr.

Conspectus p. 251.

Bredefjord St. 48, about 12 spec., on *Spirontocaris polaris* and *Lilljeborgii*; St. 66, 9—11 m., 7 spec., on *Sp. polaris* (one with 2 parasites); St. 89, 16—17 m., 1 spec., on *Sp. polaris*; St. 104, 7—20 m., 1 spec., on *Sp. polaris*.

This species has, as far as I know, not hitherto been found on *Sp. Lilljeborgii*; in the "Tjalfe" exped. a specimen of *Sp. spinus* bearing this parasite was incorrectly determined as *Sp. macilenta*.

100. *Dajus Mysidis* Kr.

Conspectus p. 253.

Bredefjord St. 48, 2 spec.; St. 61, 12,5—13 m., 3 spec. and 3 larvae; St. 66, 9—11 m., 2 spec.; St. 89, 16—17 m., 3 spec.; St. 104, 7—20 m., 1 spec.; St. 123, 5—10 m., 1 spec. and 2 larvae.

This species, otherwise very widely distributed, has, strangely enough, not hitherto been recorded from W. Greenland S. of Claushavn (abt. 69° N.) i. e. over 400 miles north of the present localities.

**Leptostraca.**

101. *Nebalia bipes* Fabr.

Conspectus p. 282.

Kvanefjord St. 10, 19,5—54 (?) m., 4 spec. — Bredefjord St. 62, 10—15 m., 5 spec.; St. 93, 10 m., 2 spec.; St. 123, 5—10 m., 2 spec. — Skovfjord St. 136 (the harbour of Narssak), 6 m., 1 spec. — The harbour of Julianehaab (about the middle of the harbour), 8—10 m., on green filiform algae, more than 550 spec.

Strangely enough, this species is hitherto known from only 4 places in W. Greenland, the southernmost locality being abt. 67° N.; there is, however, in the Zool. Museum, a large amount of material from Greenland which has not yet been dealt with. The species keeps for the most part to somewhat sheltered, shallow bays, with rotten weed; note in particular the large numbers from Julianehaab harbour, where they were found adhering to weed drawn up with the anchor.

## ENTOMOSTRACA.

### Phyllopoda.

#### × 102. *Podon Leuckartii* G. O. Sars.

*Podon Leuckartii* Lilljeborg, Cladocera Sueciae; Nova acta Reg. soc. scient. Upsal., ser. 3, vol. 19, 1901, p. 636 (*ubi lit. et syn.*), Pl. 85, fig. 12, Pl. 86, fig. 1—3.

— — C. Apstein, Cladocera; Nordisches Plankton, Zool., vol. 4, Entomotr. VII, 1901, p. 13, fig. 24, Nachtrag p. 19, fig. 30.

Bredefjord St. 101, surface-plankton, 1 spec.

This species is new for Greenland; marine Cladocera have as a matter of fact, never before been found there at all.

Further distribution: "Aus dem nördlichen Eismeere kenne ich sie nicht . . . Westeurop. Küsten u. Mittelmeere" (LILLJEBORG l. c.), "Ostsee bis Finnischer Meerbusen (Juni—Oktbr. sehr häufig. STEENROOS), Skagerak, Westküste Norwegens, Nordsee, bei Helgoland im Juni häufig" (APSTEIN l. c.).

The following fresh water Cladocera and Copepoda were taken in four different small lakes, which for the sake of convenience may here be numbered 1—4, viz.:

Lake Nr. 1. A small lake in the innermost portion of Tasiusak, Bredefjord Sermilik.

Lake Nr. 2. A small lake a little distance inland from St. 123.

Lake Nr. 3. Some small pools above the old Norse ruin at Akuliaritsoq, Bredefjord; the water was 0,1 m. deep.

Lake Nr. 4. A small pool above Narssak, Skovfjord; the water 0,1 m. deep.

#### 103. *Latona glacialis* W.-L.

Conspectus p. 286.

Lake Nr. 1 (9/vii), several spec., some of them with ova; Lake Nr. 2 (26/vii), surface, several spec., some of them with ova; Lake Nr. 3 (28/vii), several spec., partly with ova; Lake Nr. 4 (1/ix), a few, partly with ova.

This species, which is endemic for Greenland, has hitherto only been found at Frederikshaab and Godthaab.

104. *Daphnia pulex* de Geer.

Conspectus p. 288.

Lake Nr. 1 (9/VIII), several spec.; (?) Lake Nr. 2 (26/VIII), surface, a few. Found in all quarters of the globe except Australia.

105. *Ceriodaphnia quadrangula* O. Fr. Müller.

Conspectus p. 290.

Lake Nr. 1 (9/VIII), 1 spec.; Lake Nr. 2 (26/VIII), surface, a few; Lake Nr. 3 (28/VIII), some spec.

In addition to the very wide distribution stated in the Conspectus, the species has also been found at Akmolinsk (Central Asia) and Altai (G. O. Sars, Ann. Mus. Acad., St. Petersbourg, vol. 8, 1903, p. 21).

106. *Scapholeberis mucronata* O. Fr. Müller.

Conspectus p. 291.

Lake Nr. 1 (9/VIII), some spec., a few with ova; Lake Nr. 3 (28/VIII), some spec.; Lake Nr. 4 (1/IX), several spec.

In the addition to the wide distribution mentioned in the Conspectus, this species has also been recorded from Akmolinsk (Central Asia), Mongolia and Altai (G. O. Sars, Ann. Mus. Zool. Imp., St. Petersbourg, vol. 8, 1903, p. 20, and DADAY, Math. Naturwiss. Berichte aus Ungarn, vol. 26, 1908 (1913), p. 324).

107. *Bosmina obtusirostris* G. O. Sars.

Conspectus p. 292.

Lake Nr. 1 (9/VIII), several spec., partly with ova; Lake Nr. 3 (28/VIII), several spec., but no with ova.

In addition to all the places mentioned in the Conspectus, this species has also been found at Dshujlju Köl (Altai) (G. O. Sars, Ann. Mus. Zool. Acad. Imp., St. Petersbourg, vol. 8, 1903, p. 24) and Mongolia (DADAY, Math. Naturwiss. Berichte aus Ungarn, vol. 26, 1908 (1913), p. 322).

108. *Acroperus leucocephalus* Schödler.

Conspectus p. 294.

Lake Nr. 2 (26/VIII), several spec., partly with ova, and some ephippia; Lake Nr. 4 (1/IX), 4 spec.

In addition to the localities mentioned in the Conspectus, this species has also been found at Akmolinsk (Central Asia) (G. O. Sars, Ann. Mus. Zool. Acad. Imp., St. Petersbourg, vol. 8, 1903, p. 26) and Mongolia (DADAY, Math. Naturwiss. Berichte aus Ungarn, vol. 20, 1908 (1913), p. 320).

109. *Lynceus affinis* Leydig.

Conspectus p. 295.

Lake Nr. 1 (9/VIII), ♂ and ♀ (partly with ova); Lake Nr. 2 (26/VIII), several spec., partly with ova.

In addition to the localities mentioned in the Conspectus, the species has also been found at Akmolinsk (Central Asia) and Altai (G. O. Sars, Ann. Mus. Zool. Acad. Imp., St. Petersburg, vol. 8, 1903, p. 27) and Mongolia (Daday, Math. Naturwiss. Berichte aus Ungarn, vol. 26, 1908 (1913), p. 318).

110. *Chydorus sphaericus* O. Fr. Müller.

Conspectus p. 297.

Lake Nr. 1 (9/VIII), several spec., partly with ova; Lake Nr. 2 (26/VIII), some spec., most of them with ova; Lake Nr. 3 (28/VIII), several spec., partly with ova; Lake Nr. 4 (1/IX), several spec., partly with ova.

111. *Eurycercus lamellatus* O. Fr. Müller.

Conspectus p. 298.

Lake Nr. 1 (9/VIII), several spec., a few with ova; Lake Nr. 2 (26/VIII), several spec.; Lake Nr. 3 (28/VIII), several spec., several with ova; Lake Nr. 4 (1/IX), several spec., partly with ova.

In addition to the places mentioned in the Conspectus this species has also been found at Akmolinsk (Central Asia) and Altai (G. O. Sars, Ann. Mus. Zool. Acad. Imp., St. Petersburg, vol. 8, 1903, p. 25) and Mongolia (Daday, Math. Naturwiss. Berichte aus Ungarn, vol. 26, 1908 (1913), p. 320).

112. *Polyphemus pediculus* L.

Conspectus p. 299.

*Polyphemus pediculus* L. Keilhack, Zur Biol. d. Pol. pedic.; Zool. Anzeiger, vol. 30, 1906, p. 911.

— — J. Strohl, Die Biol. von Pol. pedic., *ibid.*, vol. 32, 1907, p. 19.

Lake Nr. 1 (9/VIII), some spec., a few with ova; Lake Nr. 2 (26/VIII), several spec., partly with ova; Lake Nr. 3 (28/VIII), a few with ova; Lake Nr. 4 (1/IX), several spec., partly with ova.

**Copepoda.**

The following list of marine pelagic Copepoda is not complete, but includes only character forms. I have not had time to make an exhaustive survey of the subject; it would, moreover, have been premature to attempt such, in view of the fact that Mag. sc. C. Wirth has for the past years been at work upon the Copepoda from the "Ingolf" Exped. I have therefore considered it best to postpone the fuller treatment of my own Co-



pepoda until WITTE's work is published, in order to avoid giving new descriptions etc., which would doubtless be largely rendered superfluous by the publication of the "Ingolf" material.

113. *Cyclops strenuus* Fischer.

Conspectus p. 302.

Lake Nr. 1, 1 ♀.

In addition to the localities stated in the Conspectus, the species has also been taken in Giesecke Lake near Nordre Strømfjord (K. STEPHENSEN, N. Strømfjord 1913, p. 76).

114. *Cyclops viridis* Jurine.

Conspectus p. 303.

Lake Nr. 2, several specimens.

115. *Diaptomus minutus* Lilljb.

Conspectus p. 304.

*Diaptomus minutus*, K. Stephensen, N. Strømfjord, 1913, p. 76, Pl. 7—8.

Lake Nr. 1, several thousand spec., ♂♂ and ♀♀, but none of them with ova; Lake Nr. 2, several thousand spec., a few with ova; Lake Nr. 3, several thousand spec., a few with ova.

Ant. 1 dext. of the ♂ is shown in my work above quoted as without any expanded portion, such as is found in other *Diaptomus* species; this must be due to shrinkage in the glycerine. On renewed investigation, all the ♂♂ examined were found to have normally expanded antennae.

The species was present in the lakes investigated in such numbers as to colour the water red.

× 116. *Diaptomus castor* Jurine.

Conspectus p. 305.

Lake Nr. 4, 1 ♂.

The determination is absolutely certain, so that this species may now without reserve be ascribed to the fauna of Greenland, *vide* Conspectus.

117. *Calanus hyperboreus* Kr.

Conspectus p. 307.

Kvanefjord St. 27, Nansen-net, 300—250 m., some spec. — Bredefjord St. 30, 150—125 m., some spec.; *ibid.*, 550—450 m., some spec.; St. 58, Nansen-net, 340—290 m., 1 spec.; St. 63, Nansen-net, 450—350 m., some spec.; St. 64, 600 m. w., some spec.; St. 73, 300 m. w., 5 ccm.; St. 94, Nansen-net, 450—350 m., some spec.; *ibid.* 550—450 m., some spec.; St. 100, 500 m. w., about 15 ccm.; St. 108, 300 m. w., 10 ccm.

— Bredefjord Sermilik St. 118, 500 m. w., 5 ccm.; St. 119, 400 m. w., 10 ccm. — Bredefjord St. 126, 800 m. w., 5 ccm.; St. 131, 800 m. w., 1 ccm.; St. 132, 700 m. w., 1 ccm.; St. 133, 600 m. w., 7 ccm.

This species is thus very common, and has been found from 125 m. right down to the greatest depths investigated (550 m. with the Nansen-net; 800 m. w. with the ringtrawl) from temperature of 1° upwards and salinity abt. 33—abt. 35½ ‰.

#### 118. *Calanus finmarchicus* Gunnerus.

Conspectus p. 308.

Kvanefjord St. 26, Nansen-net, 200—150 m., some spec.; St. 27, Nansen-net, 150—125 m., some spec.; *ibid.*, 250—200 m., 2 ccm.; *ibid.*, 300—250 m., 1 ccm. — Bredefjord St. 30, Nansen-net, 100—75 m., some spec.; *ibid.*, 125—100 m., 1 ccm.; *ibid.*, 150—125 m., 3 ccm.; *ibid.* 200—150 m., 15 ccm.; *ibid.* 250—200 m., 1,5 ccm.; *ibid.*, 350—250 m., some spec.; *ibid.*, 450—350 m., some spec.; *ibid.*, 550—450 m., 1 ccm.; St. 31, 700 m. w., 65 ccm.; St. 35, 400 m. w., 50 ccm.; St. 47, 600 m. w., 125 ccm.; St. 50, 100 m. w., 1,5 ccm.; St. 58, Nansen-net, 340—290 m., some spec.; St. 59, 300 m. w., 10 ccm.; St. 60, 500 m. w., 425 ccm.; St. 63, Nansen-net, 100—75 m., about 2 ccm.; *ibid.* 125—100 m., 2 ccm.; *ibid.*, 150—125 m., 3 ccm.; *ibid.* 200—150 m., 2 ccm.; *ibid.*, 250—200 m., 1 ccm.; *ibid.*, 350—250 m., 1 ccm.; *ibid.*, 450—350 m., 2 ccm.; *ibid.* 550—450 m., 3 ccm.; St. 64, 600 m. w., 80 ccm.; St. 65, 500 m. w., 350 ccm.; St. 72, 400 m. w., 800 ccm.; St. 73, 300 m. w., 100 ccm.; St. 84, 200 m. w., 9 ccm.; St. 85, surface, 3 spec.; St. 86, 100 m. w., 4 ccm.; St. 94, Nansen-net, 75—50 m., 0,5 ccm.; *ibid.* 100—75 m., 1 ccm.; *ibid.*, 125—100 m., 1 ccm.; *ibid.* 150—125 m., 2 ccm.; *ibid.* 200—150 m., 0,5 ccm.; *ibid.*, 250—200 m., 0,5 ccm.; *ibid.*, 350—250 m., 0,5 ccm.; *ibid.* 450—350 m., 2 ccm.; *ibid.* 550—450 m., 7 ccm.; St. 100, 500 m. w., 250 ccm.; St. 101, surface, 2 spec.; St. 102, 400 m. w., 300 ccm.; St. 106, 100 m. w., 4 ccm.; St. 108, 300 m. w., 90 ccm. — Bredefjord Sermilik St. 118, 500 m. w., 90 ccm.; St. 119, 400 m. w., 80 ccm. — Bredefjord St. 126, 800 m. w., 190 ccm.; St. 128, 700 m. w., 75 ccm.; St. 129, 800 m. w., 150 ccm.; St. 131, 800 m. w., 190 ccm.; St. 132, 700 m. w., 95 ccm.; St. 133, 600 m. w., 135 ccm. — Skovfjord St. 137, Nansen-net, 200—150 m., 3 ccm.; *ibid.*, 250—200 m., < 10 ccm.; St. 154, Nansen-net, 200—150 m., 1 ccm.; *ibid.*, 270 (bottom)—200 m., 7 ccm.

This is the most numerous Copepod species, amounting in the plankton hauls to from (80) 90 to nearly 100 % of all Copepoda. Some few were taken at the surface, but most at greater depths. The maximum seems to lie at about 200 m. (400 m. w.); at St. 72 for instance, out of a total animal mass of 1 litre, abt. 800 ccm. was made up of this species. It thus appears to prefer a temperature of abt. 2°, and a salinity of 34 % or more.

119. *Pseudocalanus elongatus* Boeck.

Conspectus p. 312.

Bredefjord St. 30, Nansen-net, 350—250 m., some spec.; St. 31, 700 m. w., 0,5 ccm.; St. 65, 500 m. w., 15 ccm.; St. 100, 500 m. w., 15 ccm. — Bredefjord Sermilik St. 118, 500 m. w., 5 ccm.; St. 119, 400 m. w., 10 ccm. — Bredefjord St. 131, 800 m. w., 3,5 ccm.; St. 132, 700 m. w., 1,75 ccm.; St. 133, 600 m. w., 7 ccm.

This list of localities is not complete; most of the small Calanidae, which were found at practically all Plankton stations, doubtless belong to this species. I have not, however, included them here, as they were not determined with certainty. Although widely distributed, the species has previously been found in W. Greenland only in Lille Karajakfjord (VANHÖFFEN 1897) and N. Strømfjord (K. STEPHENSEN, N. Strømfjord 1913).

This species is doubtless far more numerous and widely distributed than the "Rink" material shows; there can be no doubt that enormous quantities must have been lost by passing through the comparatively large mesh of the ringtrawl. Save for *Calanus finmarchicus*, this is certainly the most numerous and frequent Copepod species.

120. *Euchaeta norvegica* Boeck.

Conspectus p. 320.

Bredefjord St. 35, 400 m. w., 2,5 ccm.; St. 131, 800 m. w., 3,5 ccm.; St. 132, 700 m. w., 1,75 ccm.

Previously recorded from Greenland only in Lille Karajakfjord (ca. 71° N.).

121. *Crypsidomus Terebellae* Levinsen.

Conspectus p. 343.

Bredefjord St. 88, 40—70 m., 1 spec. on *Nicolea zostericola* Mgrn. (Vermes)  
Not hitherto found in W. Greenland S. of Sukkertoppen.

122. *Saccopsis Terebellidis* Levinsen?

Conspectus p. 343.

Bredefjord St. 55, 310—330 m., 3 spec. on *Leucariste arcticus* (Vermes)  
M. Sars.

All three specimens were found adhering close behind the head of the worm; the determination is not however, altogether certain, as two of the specimens were small and ill preserved, while the third and largest had a constriction near the neck.

The species has never been found anywhere save at Egedesminde (W. Greenland abt. 68¾° N.).

123. *Herpyllobius arcticus* Stp. and Ltk.

Conspectus p. 343.

Bredefjord St. 32, 35—37 m., 1 spec.; St. 48, 2 spec.; St. 61, 12,5—13 m., 1 spec.

This species has hitherto been known from W. Greenland only from Ritenbenk and Umanak.

**Ostracoda.**

Besides the 3 fresh-water species mentioned in the Conspectus p. 352—53, G. Alm has, in Arkiv f. Zoologi, Stockholm, vol. 9, Nr. 5, 1914, mentioned the following species from Greenland:

*Candona rectangulata* Alm (Alm l. c. p. 12.)

*Candona candida* Müller (Müller, Ostrac. Tierreich 1912, p. 135).

*Eucypris affinis hirsuta* Fischer (*E. fuscata affinis* Müller, Ostrac., Tierreich p. 177).

*Cyprinotus incongruens* Ramd. (Müller, Ostrac., Tierreich p. 165).

124. *Cypris virens* Jurine?

Conspectus p. 353.

*Eucypris virens* Müller, Ostrac., Tierreich 1912, p. 170.

Lake Nr. 1, 1 spec., 0,7 mm.

The only specimen found was not dissected, and the determination is thus not certain.

**Ostracod sp.**

Lake Nr. 1, 1 spec.

A setose Ostracod, not dissected, and consequently not determined.

125. *Philomedes brenda* Baird.

Conspectus p. 353.

*Philomedes brenda* Müller, Ostrac., Tierreich 1912, p. 32.

Bredefjord St. 127, 10—15 m., several spec.; St. 128, 700 m. w., 7 spec.

This widely distributed species has hitherto been known from Greenland only in some few localities, and not S. of Holstensborg (abt. 67° N.).

126. *Conchoesia* sp.

Bredefjord St. 63, Nansen-net, 350—250 m., 7 spec.; St. 94, Nansen-net 350—250 m., 1 spec.; ibid. 450—350 m., 3 spec.; ibid. 550—450 m., 1 spec.

**Cirripedia.**× 127. **Scalpellum Stroemii** M. Sars.

Scalpellum Strømii M. Sars, Oversigt over de i den norsk-arktiske Region forekomm. Krebsdyr; Forhand. Vid. Selsk. Christiania for 1858, 1859, p. 38.

- — G. O. Sars, Crust., Norske Nordhavs-Exp., vol. 1, B, 1885, p. 241, Pl. 20, fig. 1—2.  
 — — Hoek, Cirripedia; Challenger Report, Zool., vol. 25, 1883, p. 64, 73.  
 — — Hj. Broch, Die Plattenentwickl. bei Scalpellum Strømii M. Sars; Kgl. Norske Vid. Selsk. Skr., Trondhjem 1912, Nr. 4.

Bredefjord St. 55, 310—330 m., 2 spec. on Hydroida and Bryozoa.

This species is new for Greenland. Hoek, in Nordisches Plankton, vol. 8, p. 269, gives its distribution as follows: "Tiefsee Art, 72—1570 m. (Kalte Zone); Novaja Zemlja; nördl. westl. u. südl. Küsten von Norwegen; atlant. Küsten von Nord-Amerika". It is doubtless hardly correct to refer it to the frigid zone; true, some of the localities from the Norske Nordhavs Exped. lie within this region, but by far the greater portion of its area of distribution lies within the Atlantic region, albeit in its northern part. Grieg states its distribution for Norway as follows: (Bidrag til Kundskaben om Hardangerfjordens Fauna; Bergens Museums Aarbok 1913, No. 1, p. 107):

"The southern limit of occurrence of Scalp. Str. on the Norwegian coast is Bergen. On our western coast it does not appear to penetrate up into the fjords, but is only found out in the rocky belt fringing the coast, as for instance at Solsvik 70—80 m. and on the coastal banks, where M. Sars found it in numbers, at 150—280 m., attached to the spines of Dorocidaris papillata. In contrast to these conditions on the west coast, S. S. is found in our northern waters not only out on the sea coast, but also up in the fjords; it was found for instance in Porsanger Fjord and Tanafjord. The same applies to the Throndhjem Fjord, where, according to Brock (l. c.) it is common in Hydroid-colonies in the deeper parts of the fjord".

128. **Balanus porcatus** da Costa.

Conspectus p. 377.

Bredefjord St. 32, 35—37 m., 2 spec.; St. 36, 29—100 m., several spec.

129. **Balanus crenatus** Brug.

Conspectus p. 378.

Kvanefjord St. 4, 20,5—34 m., some spec. on a stone. — Bredefjord St. 32, 35—37 m., 4 spec.; St. 37, 20—30 m., 3 spec.; St. 46, 20—30 m., 2 spec.; St. 48, several spec.; St. 66, 9—11 m., 1 spec.;

St. 89, 16—17 m., 1 spec. — Tunugdliarfik St. 142, 14—18 m., some spec. — Skovfjord St. 151, 58—60 m., some spec. on stones.

A number of the specimens belong to the long form.

This very common species, which is found for the most part in shallower water than the foregoing, serves well to illustrate the state of our knowledge as to the distribution of the Balanidae; it has hitherto been recorded from only three places in W. Greenland, and not south of abt. 70° N.

130. *Balanus balanoides* L.

Conspectus p. 379.

Bredefjord, the bay at St. 62, in the water-line, 2 spec.

131. *Coronula diadema* L.

Conspectus p. 379.

Frederikshaab, found on the bottom of the harbour 1-7-1912, 1 spec.

The finding of this specimen is not without interest. The species is mentioned as from Greenland by FABRICIUS in the *Fauna Groenlandica* 1780, p. 425, No. 425, under the name of *Lepas balaenaris*, but has never been found since until now. It is characteristic, also, that it should have been mentioned by FABRICIUS, for Frederikshaab, where he was chaplain, is the richest haunt in W. Greenland of its host, Megaptera boops (*vide* H. WINGE, *Grønlands Pattedyr*; *Meddel. om Grønland*, vol. 21, 1902, p. 498).

132. *Sylon Hippolytes* Kr.

Conspectus p. 381.

Kvanefjord St. 4, 20,5—34 m., 1 spec.; St. 13, 34—40 m., 1 spec. — Bredefjord St. 32, 35—37 m., 1 spec.; St. 36, 29—100 m., 1 spec.; St. 48, 13 spec.; St. 61, 12,5—13 m., 1 spec.; St. 66, 9—11 m., 1 spec.; St. 79, 30—50 m., 1 spec. — Tunugdliarfik St. 142, 14—18 m., 5 spec.

All the specimens were found attached to *Spirontocaris Fabricii*, on which they have not hitherto been found. In 4 cases, the host had 2 specimens of the parasite (St. 48 and St. 142).

The species has not hitherto been known from W. Greenland S. of abt. 66<sup>3</sup>/<sub>4</sub>° N. The present material is far larger than all which the Zool. Museum previously possessed from Greenland.

## PYCNOGONIDA.

133. *Pycnogonum littorale* Strøm.

Conspectus p. 382.

Bredefjord St. 53, 260 m., 1 spec.

This species, like *Coronula diadema* (No. 131) is mentioned in

FABRICIUS' Fauna Groenlandica 1780 (No. 212, p. 233) and has likewise never been found again since then.

134. *Phoxichilidium femoratum* Rathke.

Conspectus p. 383.

Tunugdliarfik St. 141, 35—70 m., 1 spec.

This species is mentioned by KRØYER from Greenland, precise locality not stated; this is, however, the only record of its having been found there.

135. *Pseudopallene circularis* Goodsir.

Conspectus p. 386.

Kvanefjord St. 9, 22—24 m., 2 spec. — Bredefjord St. 32, 35—37 m., 2 spec.; St. 44, 165—190 m., 1 spec.; St. 46, 20—30 m., 1 spec.; St. 88, 40—70 m., 1 spec.

136. *Nymphon grossipes* O. Fabr.

Conspectus p. 388.

Kvanefjord St. 10, 19,5—54(?) m., 1 spec. (*N. glaciale*) — Bredefjord St. 32, 35—37 m., 1 spec. (*N. grossipes* Fabr.)

Not known from W. Greenland S. of abt. 66½° N.

137. *Nymphon longitarse* Kr.

Conspectus p. 391.

Bredefjord St. 91, 110—180 m., 1 spec. — Bredefjord Sermilik St. 110, 55—90 m., 1 spec. (with ova) — Skovfjord St. 145, 10—35 m., 1 spec.

138. *Nymphon Stroemii* Kr.

Conspectus p. 392.

*A. N. Stroemii* Kr. sensu str. Skovfjord St. 144, 250—300 m., 2 spec. (1 with ova); St. 155, 220 (240)—400 m., 1 spec.

*B. N. Stroemii* Kr., × *N. gracilipes* Heller. Bredefjord St. 76, 260—320 m., 1 spec. — Bredefjord Sermilik St. 116, 80—95 m., 1 spec. The specimen from St. 116 resembles mostly *N. gracilipes*.

139. *Nymphon macrum* Wilson.

Conspectus p. 396.

Bredefjord St. 34, 460—550 m., 1 spec.; St. 55, 310—330 m., 2 spec.

*Nymphon* sp.

Bredefjord St. 48, 1 spec.; St. 97, 250—280 m., 1 spec.

140. *Chaetonymphon hirtipes* Bell.

Conspectus p. 399.

Bredefjord St. 49, 490 m., 1 spec.; St. 55, 310—330 m., 2 spec.;  
St. 121, 700 m., 2 spec.

**Pycnogonid-larva.**

Bredefjord St. 66, 9—11 m., 1 spec.

**ECHINODERMATA.**

The Echinodermata in the "Rink" material are included in Dr. TH. MORTENSEN'S work, Grønlands Echinodermer 1913 (Meddel. om Grønland, vol. 23, 1914, p. 299—399); the "Rink" specimens, however, are not separately noted there, nor is anything stated as to the stations at which they were taken.

In "Some new Echinoderms from Greenland" (Vid. Meddel. Dansk Naturhist. Foren. Kbhv., vol. 66, 1913(1915)), Dr. TH. MORTENSEN has on p. 37, described the new Asterid taken by the "Rink", *Pteraster hastatus* Mortensen.

The Echinodermata of Greenland will be found treated from a zoogeographical point of view by Dr. TH. MORTENSEN, in his "Report on the Echinoderms collected by the Danmark Expedition at North-east Greenland" (Meddel. om Grønland, vol. 45, 1910, p. 287—300).

The following list of the Echinoderms in the "Rink" material has been drawn up by Dr. TH. MORTENSEN, to whom I beg to express my best thanks for permission to publish the same here.

**Crinoidea.**141. *Heliometra glacialis* Leach.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 371.

Bredefjord St. 45, 430—450 m., 1 spec.; St. 55, 310—330 m.,  
6 spec.; St. 69, 290—355 m., 1 spec.; St. 97, 250—280 m., 1 spec.;  
St. 121, 700 m., 3 spec.

Rather common along the whole of W. Greenland 61°—81¾° N.,  
10—1200 m.

× 142. *Hathrometra Sarsii* Düb. Kor.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 373.

Bredefjord St. 55, 310—330 m., 2 spec.; St. 121, 700 m., 1 spec.

New for Greenland. Hitherto known only from W. Norway, 100—  
700 m.



**Asteroidea.**143. *Asterias Mülleri* Sars var. *groenlandica* Stp.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 343.

Bredefjord St. 48, 1 spec.; St. 88, 40—70 m., 1 spec. (with young); St. 127, 10—15 m., 1 spec. — Tunugdliarfik St. 139, 280—300 m., 1 spec.

Very common along the whole of W. Greenland. Littoral —800 m.

144. *Asterias polaris* M. Tr.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 344.

Bredefjord St. 32, 35—37 m., 2 spec.; St. 46, 20—30 m., 1 spec.; St. 48, 3 spec.; St. 68, 60—95 m., 1 spec.; St. 88, 40—70 m., 1 spec.; St. 104, 7—20 m., 1 spec.

Rather common at W. Greenland 61°—73° N. Littoral —200 m.

145. *Stichaster albulus* Stimps.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 342.

Kvanefjord St. 1, 84 m., 1 spec. — Bredefjord St. 33, 100—220 m., 16 spec.; St. 44, 165—190 m., 6 spec.; St. 103, 90—100 m., 2 spec. — Bredefjord Sermilik St. 110, 55—90 m., 14 spec.; St. 111, 115 m., 2 spec.; St. 112, 20—30 m., 2 spec. — Bredefjord St. 134, 85—140 m., 8 spec.; St. 135, 225—240 m., 1 spec. — Skovfjord St. 155, 220 (240)—400 m., 3 spec.

Very common along the whole of W. Greenland, littoral —450 (795) m.

146. *Pedicellaster typicus* Sars.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 341.

Bredefjord St. 44, 165—190 m., 1 spec. — Skovfjord St. 155, 220 (240)—400 m., 1 spec.

At W. Greenland hitherto known only from 66 $\frac{3}{4}$ ° N. ("Tjalfe" exped.). 20—1130 m.

147. *Henricia (Cribrella) sanguinolenta* O. Fr. Müll.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 340.

Kvanefjord St. 1, 84 m., 1 spec.; St. 10, 19,5—54 (?) m., 1 spec. — Bredefjord St. 40, 170—180 m., 2 spec.; St. 55, 310—330 m., 2 spec.; St. 68, 60—95 m., 2 spec.; St. 78, 30—50 m., 1 spec.; St. 79, 30—50 m., 1 spec. — Skovfjord St. 152, 80—120 m., 1 spec.; St. 156, 70—140 m., 1 spec.

Common along the whole of W. Greenland, littoral —2450 m.

148. *Solaster papposus* L.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 333.

Bredefjord St. 33, 100—220 m., 1 spec.

Rather common at W. Greenland, littoral — 1170 m.

149. *Pteraster militaris* O. Fr. Müll.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 336.

Bredefjord St. 112, 20—30 m., 1 spec.

Not very common at W. Greenland. 10—1100 m.

×× 150. *Pteraster hastatus* Mortensen.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 338.

Bredefjord St. 55, 310—330 m., 1 spec.

This species is not alone new to Greenland, but also new to science.

151. *Poraniomorpha tumida* Stuxberg.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 332.

Kvanefjord St. 6, 37—45 m., 1 spec.

Hitherto from W. Greenland only known from Umanak Fjord, 260 fath. 15—1200 m.

× 152. *Poraniomorpha hispida* M. Sars.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 332.

Bredefjord St. 55, 310—330 m., 1 spec.

New to Greenland.

× 153. *Astrogonium Parellii* Düb. Kor.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 329.

Bredefjord St. 70, 225—290 m., 1 spec.

New to Greenland.

154. *Ctenodiscus crispatus* Rtk.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 330.

Kvanefjord St. 3, 210—225 m., 4 spec.; St. 5, 420 m., 6 spec.; St. 11, 290—320 m., 1 spec.; St. 23, 200—410 m., 1 spec.; St. 25, 115 m., 15 spec. — Bredefjord St. 33, 100—220 m., 13 spec.; St. 45, 430—450 m., 19 spec.; St. 67, 220—310 m., 30—40 spec.; St. 68, 60—95 m., 2 spec.; St. 69, 290—355 m., 5 spec.; St. 70, 225—290 m., more than 100 spec.; St. 74, 90—200 m., 1 spec.; St. 75, 200—270 m., 4 spec.; St. 76, 260—320 m., 12 spec.; St. 77, 245—470(?) m., 4 spec.; St. 80, 365 m., 1 spec.; St. 87, 230 m., 11 spec.; St. 91, 110—180 m.,

21 spec.; St. 95, 115—155 m., 6 spec.; St. 97, 250—280 m., 12 spec.; St. 98, 520—560 m., 4 spec. — Bredefjord Sermilik St. 110, 55—90 m., 9 spec.; St. 117, 100—120 m., 3 spec. — Bredefjord St. 121, 700 m., 1 spec.; St. 127, 10—15 m., 1 spec.; St. 130, 900 m. w., 2 spec.; St. 134, 85—140 m., 6 spec.; St. 135, 225—240 m., many hundreds, about the whole of the dredge. — Tunugdliarfik St. 138, 300—360 m., 1 spec.; St. 139, 280—300 m., many spec. — Skovfjord St. 143, 65—90 m., 6 spec.; St. 146, 305—310 m., 5 spec.; St. 155, 220 (240)—400 m., 1 spec.

Rather common at W. Greenland 61°—69¼° N. 10—1940 m.

### Ophiuroidea.

#### 155. *Ophiura (Ophioglypha) Sarsii* Ltk.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 348.

Kvanefjord St. 6, 37—45 m., 2 spec.; St. 25, 115 m., 1 spec. — Bredefjord St. 33, 100—220 m., 2 spec.; St. 70, 225—290 m., 2 spec.; St. 87, 230 m., 1 spec.; St. 91, 110—180 m., 1 spec. — Skovfjord St. 155, 220 (240)—400 m., several spec.

Very common at W. Greenland. 10—3000 m.

#### 156. *Ophiura (Ophioglypha) robusta* Ayres.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 349.

Bredefjord St. 75, 200—270 m., 1 spec.; St. 79, 30—50 m., 2 spec.; St. 87, 230 m., 2 spec.; St. 97, 250—280 m., 1 spec.; St. 127, 10—15 m., 1 spec. — Skovfjord St. 156, 70—140 m., 1 spec.

Very common at W. Greenland. 6—450 (1000) m.

#### 157. *Ophiocten sericeum* Forbes.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 351.

Bredefjord St. 103, 90—100 m., 1 spec.

Rather common at W. Greenland. 5—4000 m.

#### 158. *Ophiopholis aculeata* O. Fr. Müll.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 355.

Bredefjord St. 33, 100—220 m., 3 spec.; St. 40, 170—180 m., 1 spec.; St. 44, 165—190 m., 2 spec.; St. 46, 20—30 m., 1 spec. St. 53, 260 m., 1 spec.; St. 55, 310—330 m., 2 spec.; St. 68, 60—95 m., 1 spec.; St. 103, 90—100 m., 1 spec.; St. 134, 85—140 m., 7 spec. — Skovfjord St. 143, 65—90 m., 4 spec.; St. 152, 80—120 m., 4 spec.; St. 155, 220 (240)—400 m., 10 spec.; St. 156, 70—140 m., 3 spec.

Very common at W. Greenland. Littoral — 1880 m.

159. *Amphiura Sundevalli* M. Tr.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 357.

Bredefjord St. 33, 100—220 m., 1 spec.; St. 40, 170—180 m., 4 spec.; St. 44, 165—190 m., 2 spec.; St. 46, 20—30 m., 1 spec.; St. 68, 60—95 m., 1 spec.; St. 74, 90—200 m., 1 spec.; St. 75, 200—270 m., 4 spec.; St. 76, 260—320 m., 1 spec.; St. 81, 110 m., 1 spec.; St. 87, 230 m., 13 spec.; St. 91, 110—180 m., 2 spec.; St. 103, 90—100 m., 3 spec. — Bredefjord Sermilik St. 111, 115 m., 9 spec. — Bredefjord St. 127, 10—15 m., several spec.; St. 134, 85—140 m., 1 spec. — Skovfjord St. 143, 65—90 m., 1 spec.

Rather common at W. Greenland. 10—380 m.

160. *Amphiura denticulata* Koehler.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 358.

Bredefjord St. 34, 460—550 m., 3 spec.; St. 45, 430—450 m., 7 spec.; St. 49, 490 m., 2 spec.; St. 55, 310—330 m., 2 spec.; St. 120, 750(?) m., fragments; St. 121, 700 m., 6 spec.

Hitherto only known from W. Greenland  $64^{\circ}$ — $64\frac{1}{2}^{\circ}$  N. 155—1100 m.

161. *Ophiacantha bidentata* Retz.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 358.

Kvanefjord St. 1, 84 m., 1 spec.; St. 3, 210—225 m., 1 spec.; St. 25, 115 m., 12 spec. — Bredefjord St. 33, 100—220 m., 1 spec.; St. 40, 170—180 m., 17 spec.; St. 44, 165—190 m., 1 spec.; St. 53, 260 m., 14 spec.; St. 55, 310—330 m., 1 spec.; St. 75, 200—270 m., 5 spec.; St. 87, 230 m., 13 spec.; St. 91, 110—180 m., 10 spec.; St. 95, 115—155 m., 3 spec.; St. 109, 125—140 m., 2 spec.; St. 134, 85—140 m., 3 spec.; St. 135, 225—240 m., 2 spec. — Tunugdliarfik St. 138, 300—360 m., 1 spec.; St. 140, 125—175 m., 1 spec. — Skovfjord St. 143, 65—90 m., 17 spec.; St. 144, 250—300 m., 2 spec.; St. 155, 220 (240)—400 m., 19 spec.; St. 156, 70—140 m., several spec.

Very common at W. Greenland. 10—4500 m.

162. *Ophiacantha anomala* G. O. Sars.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 360.

Bredefjord St. 55, 310—330 m., 5 spec.; St. 121, 700 m., 2 spec.

Hitherto only known from W. Greenland  $64^{\circ}$ — $65^{\circ}$  N. 200—1400 m.

163. *Ophiolebes claviger* Ljg.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 361.

Bredefjord St. 34, 460—550 m., 1 spec.; St. 45, 430—450 m., 1 spec.; St. 55, 310—330 m., 4 spec.; St. 121, 700 m., 4 spec.

From W. Greenland hitherto only known from the "Tjalfe" exped. (without locality). 300—500 m.

164. *Ophioscolex glacialis* M. Tr.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 361.

Bredefjord St. 55, 310—330 m., 1 spec.

From W. Greenland hitherto only known from 2 localities (66½°—71° N.). 100—1800 m.

165. *Gorgonocephalus Lamarekii* M. Tr.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 364.

Bredefjord St. 121, 700 m., 2 spec.

From W. Greenland hitherto only known from 2 localities (64½°—65½° N.). 75—775 m.

**Echinoidea.**166. *Strongylocentrotus droebachiensis* O. Fr. Müll.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 365.

Kvanefjord St. 4, 20,5—34 m., 1 spec.; St. 6, 37—45 m., 1 spec.; St. 9, 22—24 m., 3 spec.; St. 25, 115 m., 2 spec. — Bredefjord St. 32, 35—37 m., 3 spec.; St. 33, 100—220 m., 5 spec.; St. 37, 20—30 m., 2 spec.; St. 40, 170—180 m., 2 spec.; St. 44, 165—190 m., 1 spec.; St. 46, 20—30 m., 3 spec.; St. 48, 3 spec.; St. 68, 60—95 m., 2 spec.; St. 70, 225—290 m., 1 spec.; St. 79, 30—50 m., 5 spec.; St. 88, 40—70 m., 2 spec.; St. 92, 50—90 m., 1 spec.; St. 103, 90—100 m., 2 spec.; St. 109, 125—140 m., 2 spec.; St. 127, 10—15 m., 3 spec.; St. 134, 85—140 m., 6 spec. — Tunugdliarfik St. 141, 35—70 m., 1 spec. — Skovfjord St. 143, 65—90 m., 2 spec.; St. 144, 250—300 m., 1 spec.; St. 145, 10—35 m., many hundreds, filled about the whole of the dredge; St. 152, 80—120 m., 1 spec.; St. 155, 220 (240)—400 m., 1 spec.

Extremely common at W. Greenland. Littoral — 1170 m.

**Holothurioidea.**167. *Myriotrochus Rinkii* Stp.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 318.

Bredefjord St. 127, 10—15 m., 5 spec. — Skovfjord St. 136 (the harbour of Narssak), 6 m., 1 spec.

Rather common at W. Greenland. Littoral — 650 m.

168. *Chirodota laevis* Fabr.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 317.

Skovfjord St. 136 (the harbour of Narssak), 6 m., several spec.

Not rare at W. Greenland. Littoral — 380 m.

169. *Eupyrgus scaber* Ltk.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 319.

Bredefjord St. 127, 10—15 m., 10 spec.

From W. Greenland hitherto only known from Arsuk (ca. 61° N.).  
7—480 m.

× 170. *Molpadia oolitica* Pourt.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 320.

Bredefjord St. 45, 430—450 m., 2 spec.; St. 120, 750 m., 1 spec.;  
St. 121, 700 m., 1 spec.

New to Greenland.

171. *Laetmogone violacea* Théel.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 322.

Bredefjord St. 49, 490 m., 10 spec.; St. 70, 225—290 m., 1 spec.;  
St. 77, 245—470 m., 1 spec.

From W. Greenland hitherto only known 63°17'N. ("Tjalfe" exped.).  
225—1750 m.

172. *Cucumaria frondosa* Gunn.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 322.

Bredefjord St. 46, 20—30 m., 1 spec.; St. 48, 1 spec. — Skov-  
fjord St. 152, 80—120 m., 1 spec.

Rather common at W. Greenland. Littoral —200 m.

173. *Cucumaria calceigera* Stimps.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 323.

Bredefjord St. 87, 230 m., 1 spec.

Rather common at W. Greenland. 5—500 m.

174. *Phyllophorus pellucidus* Flem.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 325.

Bredefjord St. 87, 230 m., 1 spec.

Not rare at W. Greenland. 10—380 m.

175. *Psolus Fabricii* Düb. Kor.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 324.

Bredefjord St. 33, 100—220 m., 5 spec.; St. 40, 170—180 m.,  
1 spec.; St. 87, 230 m., 1 spec.; St. 88, 40—70 m., 1 spec.

Common at W. Greenland. 4—270 m.

176. *Psolus phantapus* Strsf.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 324.

Bredefjord St. 33, 100—220 m., 7 spec.; St. 75, 200—270 m., 1 spec.; St. 88, 40—70 m., 1 spec.

Somewhat rare at W. Greenland. Littoral —380 m.

× 177. *Psolus valvatus* Östergr.

Th. Mortensen, Grønlands Echinodermer 1913 (1914), p. 325.

Bredefjord St. 55, 310—330 m., 1 spec.

New to Greenland.

## ANTHOZOA.

## ALCYONARIA.

The following section is an extract from the manuscript of Prof. H. JUNGENSEN's work on coral animals in the *Conspectus Faunae Groenlandicae* (Meddel. om Grønland, vol. 23) which will shortly be published, and to which I may refer for further particulars.

I beg to express my best thanks to Prof. JUNGENSEN for the permission to publish this list of the "Rink" material.

## Alcyonacea.

178. *Eunephthya glomerata* (Ltk. M. S.) Verrill.

Bredefjord St. 121, 700 m., 1 spec.

179. *Eunephthya fruticosa* (M. Sars) Jungersen.

Kvanefjord St. 1, 84 m., several spec. — Bredefjord St. 55, 310—330 m.; St. 111, 115 m., 3 spec.; St. 134, 85—140 m., 1 spec. — Skovfjord St. 143, 65—90 m., 3 spec.

180. *Eunephthya florida* Rathke.

Bredefjord St. 121, 700 m., 1 spec.

This species has not hitherto been found in W. Greenland; it is recorded, however, from Cape Tobin, at 57 fath. and in Turner Sound, 3 fath. (E. Greenland).

## Gorgonacea.

× 181. *Primnoa resedaeformis* Gunn.

Bredefjord St. 55, 310—330 m.; St. 69, 290—355 m.

This species is new to Greenland.

× × 182. *Stenogorgia borealis* (n. sp.) Jungersen.

Bredefjord St. 121, 700 m.

This species is not only new to Greenland, but also to science.

## PISCES.

With regard to the literature on Greenland fish, reference may be made to the work of AD. S. JENSEN, shortly to be published in *Meddel. om Grønl.* vol. 21.

This section of the material is very small, owing to the fact that no real fishing implements were employed: all that was taken having been brought up incidentally by the dredge or the ringtrawl. Some few larger fish from Kvanefjord were however, purchased from a fisherman at Frederikshaab. The "Rink" collection of fish has been kindly determined by Museumsinspector AD. S. JENSEN, to whom I beg to express my thanks for the following list.

183. *Sebastes marinus* L.

Bredefjord St. 116, 80—95 m., 1 spec.; St. 109, 125—140 m., 1 spec. — Kvanefjord St. 5, 420 m., 1 otolith.

184. *Cottus scorpius* L.

Bredefjord St. 89, 16—17 m., 1 spec.; St. 104, 7—20 m., 1 spec. juv.

185. *Triglops pingelii* Reinh.

Bredefjord Sermilik St. 115, 500 m., 1 spec.

186. *Centridermichthys uncinatus* Reinh.

Kvanefjord St. 10, 19,5—54(?) m. — Bredefjord St. 103, 90—100 m., 1 spec. — St. 109, 125—140 m., 1 spec. — Bredefjord Sermilik St. 110, 55—90 m., 2 spec.

187. *Icelus bicornis* Reinh.

Kvanefjord St. 6, 37—45 m., 1 spec. — Bredefjord St. 75, 200—270 m., 1 spec.

188. *Centronotus fasciatus* Bl. Schn.

Bredefjord St. 62, 10—15 m., 1 spec.

189. *Gymnelis viridis* Fabr.

Bredefjord St. 48, 500 m. w., 1 spec.



190. *Cyclopterus spinosus* Fabr.

Bredefjord St. 48, 500 m. w., 2 spec.; St. 79, 30—50 m., 1 spec.

191. *Liparis liparis* L.

Bredefjord St. 104, 7—20 m., 1 spec.

192. *Lycodes VahlII* Reinh.

Kvanefjord, south of the northern caplin-place, 2 spec.

193. *Hippoglossoides platessoides* Fabr.

Kvanefjord, south of the northern caplin-place, 1 spec.

194. *Salmo alpinus* L.

Bredefjord, a little river in the bay at St. 62, 1 spec.

195. *Scopelus glacialis* Reinh.

Bredefjord, St. 131, 800 m. w., 1 spec.

196. *Raia radiata* Don.

Kvanefjord, south of the northern caplin-place, 2 spec. —  
Bredefjord St. 45, 430—450 m., 1 egg-capsule; St. 49, 490 m., 1 egg-  
capsule; St. 55, 310—330 m., 1 egg-capsule; St. 121, 700 m., 1 egg-capsule.

## LIST OF THE STATIONS.

## 1. Marine stations.

Kvanefjord, St. 1—28. Map see fig. 30 (the next page).

St. 1, 21. 6. 1912. — 84 m., 2°—2,4°, salinity 32,5 ‰; stones with-  
out algae.

Nectocrangon lar, 1	Stichaster albulus, 1
Spirontocaris polaris, 1	Henricia (Cribrella) sanguinolenta, 1
	Ophiacantha bidentata, 1
Eunephthya fruticosa, several spec.	

St. 2, 21. 6. 1912. — 17—19 m., 3°, salinity 31.0—31.6 ‰; clay  
with algae.

Hyas coarctatus, 1	Spirontocaris Lilljeborgii, 1
Nectocrangon lar, 1	

St. 3, 22. 6. 1912. — 210—225 m., 3°, salinity 33.8 ‰; clay and  
stones with Bryozoa etc.

Pandalus borealis, 1	Ctenodiscus crispatus, 4
Æginella spinosa, 1	Ophiacantha bidentata, 1

St. 4, 22. 6. 1912. — 20,5—34 m., 1,5°—2,0°, salinity 31,5—32,2 ‰; brown and red algae with stones.

Hyas coarctatus, 8	Spirontocaris polaris, 4
Eupagurus pubescens, 1	Syrrhoë crenulata, 1
Spirontocaris Fabricii, 3 (1 with Sylon Hippolytes)	Balanus crenatus, some spec.
— Gaimardii, 1	Sylon Hippolytes, 1
— Lilljeborgii, 1	Strongylocentrotus droebachiensis, 1
— turgida, 8	

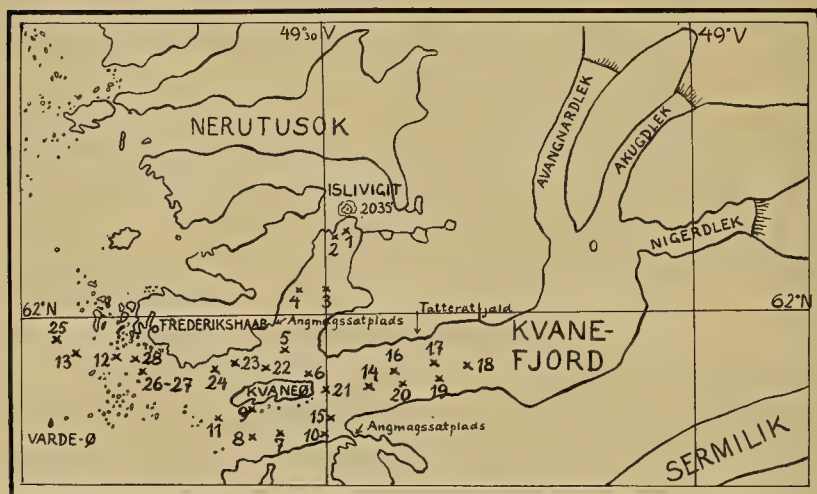


Fig. 30. Map of Kvanefjord. (Angmagssætplads = caplin-place.)

St. 5, 23. 6. 1912. — 420 m., 3°, salinity 34,1 ‰; clay with a few stones.

Chionoecetes Phalangium, 1	Sebastes marinus, 1 otolith
Ctenodiscus crispatus, 6	

St. 6, 23. 6. 1912. — 37—45 m., 0,7°—0,5°, 31,8—32,1 ‰ salinity; shell-fragments (very small and undeterminable) with a few stones.

Hyas coarctatus, 1	Strongylocentrotus droebachiensis, 1
Spirontocaris turgida, 8	Ophioglypha (Ophiura) Sarsii, 2
— polaris, 1	Poraniomorpha tumida, 1
Rhachotropis aculeata, 1	Icelus bicornis, 1.
Ampelisca Eschrichtii, 5	

St. 7, 25. 6. 1912. — 210—230 m., 1°—2°, salinity 33,3 ‰; stones and a little clay. No content of the animals to be dealt with in this paper.

St. 8, 25. 6. 1912. — 140 m., 0,2°, 33,0 ‰ salinity; clay with a few stones and dead algae. No content of the animals to be dealt with in this paper.

St. 9, 25. 6. 1912. — 22—24 m., 1°, salinity 32.2—32.1 ‰; algae.

Hyas coarctatus, 4	Pseudopallene circularis, 2
Spirontocaris turgida, 1	
— polaris, 2	Strongylocentrotus droebachiensis, 3.
Pleustes panoplus, 1	

St. 10, 25. 6. 1912. — 19.5—54(?) m., 1.5—0.8 ‰; salinity 31.8—32.1 ‰; stones with algae and a little clay.

Hyas coarctatus, 15	Paroediceros lynceus (in algae on the anchor, 12—14 m.), 1
Spirontocaris Lilljeborgii, 1	Gammarus locusta, 1
Onisimus Edwardsii (in algae on the anchor, 12—14 m.), 1	Caprella septentrionalis, 1
Pontoporeia femorata (in algae on the anchor, 12—14 m.), 1	Nebalia bipes, 4
Syrrhoë crenulata, 3	Nymphon glaciale, 3
	Henricia (Cribrella) sanguinolenta 1
	Centridermichthys uncinatus, 1.

St. 11, 25. 6. 1912. — 290—320 m., temp.?, salinity 34.0 ‰; stony clay.

Pandalus borealis, 1	Ctenodiscus crispatus, 1.
Spirontocaris polaris, 1, with	
Phryxus abdominalis	

St. 12, 26. 6. 1912. — 290—400 m., 0.7°—?, salinity? — 33.3 ‰; stones with a little clay.

Spirontocaris polaris, 1.

St. 13, 26. 6. 1912. — 34—40 m., 1°, 32.1 ‰ salinity; algae with Hydroida.

Hyas araneus, 1	Pontogeneia inermis, 5
— coarctatus, 5	Ischyrocerus anguipes, several spec.
Spirontocaris Fabricii, 4	Caprella septentrionalis, 1
Paramphithoë assimilis, 1	Sylon Hippolytes, 1

St. 14, 27. 6. 1912. — 330—500 m., 2.8—3.0°, salinity 34.1—33.7 ‰; clay with stones. No content of the animals to be dealt with in this paper.

St. 15, 28. 6. 1912. — Plankton-net, surface, 15 min. 1 ccm. — Cirripede-cyprides and some detritus.

St. 16, 28. 6. 1912. — 440—460 m., 2.0°, salinity 33.7 ‰. No content.

St. 17, 28. 6. 1912. > 700 m.(?). Hydrography see further on (p. 364).

Could not reach bottom. At St. 18 a little to the east of this station, the dredge did not touch bottom, although out with 700 m. w.

St. 18, 28. 6. 1912.

Both sides of the fjord are very steep here; the dredge with 700 m. w. out failed to touch bottom.

St. 19, 28. 6. 1912. — Plankton-net, surface, 15 min., 2 ccm.

*Hyas coarctatus*, Zoea, 1

Small Calanidae and Euphausid-larvae.

St. 20, 28. 6. 1912. — Plankton-net, surface, 15 min., 6 ccm.

Small Calanidae.

St. 21, 29. 6. 1912. — Plankton-net, surface, 15 min., 0.2 ccm.

?*Calliopius Rathkei*, 1

Cirripede-cyprides.

St. 22, 29. 6. 1912. — > 470 m., 3°, salinity 33.8 ‰.

Could not reach bottom; dredging therefore not attempted.

St. 23, 29. 6. 1912. — 200—410 m., 1.6—3.0°, salinity 33.7 ‰—?; clay with partly very large stones.

*Ctenodiscus crispatus*, 1.

St. 24, 29. 6. 1912. — Hydrography, see further on (p. 364).

St. 25, 3. 7. 1912. — 115 m., 0°, salinity?; clay with some stones and fragments of shells.

*Chionoecetes Phalangium*, 1

*Hyas coarctatus*, 1

*Pandalus borealis*, 2

*Ctenodiscus crispatus*, 15

*Ophiura Sarsii*, 1

*Ophiacantha bidentata*, 12.

St. 26—27, (3) 5. 7. 1912. — Nansen-net. Depth > 300 m.

25—0 m., 1.5 ccm. Small Calanidae about 65 ‰, Cirripede-cyprides (and Euphausid-larvae) about 35 ‰. — 50—25 m., 2 ccm. *Hyas coarctatus*, Zoea, about 15 spec. Small Calanidae; some young Euphausidae and Cirripede-cyprides. — 75—50 m., 1 ccm. Small Calanidae; young Euphausidae; Cirripede-nauplii and — cyprides. Some *Sagitta*. — 100—75 m., 3 ccm. Small Calanidae; a few Cirripede-nauplii and — cyprides. — 125—100 m., 4 ccm. ?*Parathemisto oblivia*, 1?; small Calanidae; a few Cirripede-nauplii and — cyprides. — 150—125 m., 5 ccm. Small Calanidae with a few *Calanus finmarchicus* and some Cirripede-cyprides. — 200—150 m., 1 ccm. *Thysanoessa inermis*, 1. *Parathemisto oblivia*, 1. Some *Calanus finmarchicus* and some small Calanidae; some *Sagitta*. — 250—200 m., 2 ccm. *Euthemisto libellula*, 1. Several *Calanus finmarchicus*, and a few small Calanidae. — 300—250 m., 1.5 ccm. Some young Euphausidae. *Calanus finmarchicus* (abt. 0.75 ccm.)

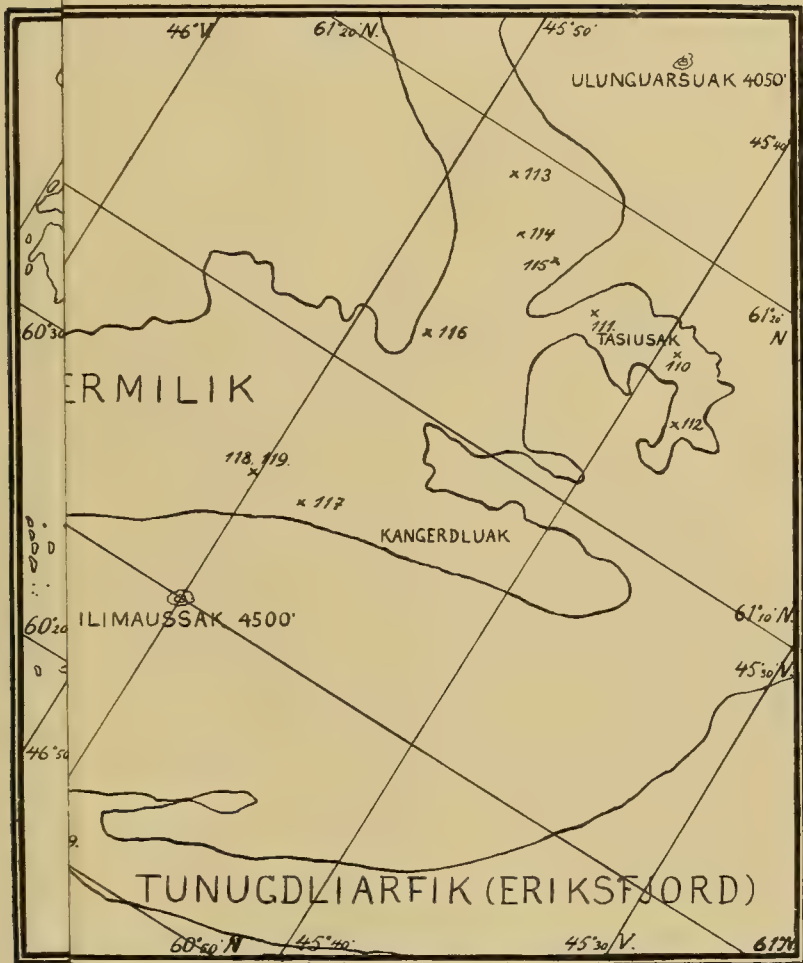






Fig. 31. Map of Bredefjord with adjacent fjords.





and a few *C. hyperboreus*. Small Calanidae. Cirripede-nauplii and (several) — cyprides. Sagitta. Ctenophora.

St. 28, 5. 7. 1912. — Ringtrawl. 400 m. w., 25 min.

Hyas coarctatus, Zoea, 35		?Apherusa glacialis, 1
Euthemisto libellula, 4		Cirripede-nauplii.
Decapod-larvae, several spec.		

That the yield from this station was so small in comparison with the other ringtrawl hauls is due to the fact that here, as elsewhere mentioned, the whole of the contents was not filtered, but an attempt made to pick out the specimens separately; a method which doubtless occasioned considerable loss. —

In the bay south of the northern caplin-place in Kvanefjord (where the Eskimos from Frederikshaab fish for the caplin (*Angmagssæt*, *Malotus arcticus*) some long lines were set out on the 30. 6. 1912 by DANIEL KLEIST, a smith from Frederikshaab. The resultant yield was as follows:

2 <i>Somniosus microcephalus</i>		22 <i>Gadus uvak</i>
25 <i>Raia radiata</i>		5 <i>Lycodes Vahlii</i>
25 <i>Hippoglossoides platessoides</i>		7 <i>Anarrhichas minor</i>
5 <i>Gadus morrhua</i>		

Some of these fish were purchased and brought home to the Zool. Museum.

**Bredefjord**, St. 29—109, 120—135 (see the map fig. 31).

St. 29, 15. 7. 1912. — 60°35' N., 46°53' W. Plankton-net, surface, 10 min., 2 ccm.

*Euthemisto libellula*, 3. Small Calanidae and some detritus.

St. 30, 15. 7. 1912. — 60°30' N., 46°53' W. Nansen-net. Hydrography see further on (p. 363).

10—0 m., 5 ccm. Almost nothing but small Calanidae. Some young Euphausidae and Cirripede-cyprides. — 25—10 m., 3 ccm. Content about like that from 10—0 m. — 50—25 m., 2 ccm. Content like that from 25—10 m., but with some Appendiculariae. — 75—50 m., 1 ccm. Content like that from 50—25 m., with 1 *Hyas coarctatus*, Zoea. — 100—75 m., 1 ccm. Small Calanidae and a few Calan. finmarch. — 125—100 m., 1 ccm. Calanus finmarchicus. — 150—125 m., 3 ccm. Calan. finmarch. with a few *C. hyperboreus*. — 200—150 m., 15 ccm. Calan. finmarch. — 250—200 m., 1.5 ccm. *Euthemisto compressa* 1; besides almost only Calan. finmarch. — 350—250 m., 2 ccm. (Calanidae 1 ccm). *Euthemisto compressa* 1; *Parathemisto oblivia*, 2. Calanus finmarchicus; many small Calanidae, among others *Pseudocalanus elongatus*. Sagitta, Tomopteris. — 450—350 m., 2 ccm. (Calanidae 1 ccm.). *Boreomysis arc-*

ticus, 2. Young Euphausidae. *Calanus finmarchicus*; small Calanidae. Tomopteris. — 550—450 m., 3 ccm. (Calanidae 2 ccm.). *Parathemisto oblivia*, 6. *Apherusa glacialis*, 2. *Calanus finmarchicus* with a few *Calanus hyperboreus* and some small Calanidae. *Conchoesia* sp., 2 spec.

St. 31, 15. 7. 1912. 60°31' N., 46°54' W. — Ringtrawl, 700 m. w., 15 min., 75 ccm. (incl. 50 ccm. Copepoda).

<i>Hyas coarctatus</i> , Zoea, 5	<i>Euthemisto libellula</i> , abt. 20
<i>Pontophilus norvegicus</i> , Zoea, 1	— <i>bispinosa</i> , 9
<i>Munida Bamffica</i> , Zoea, 4	— <i>compressa</i> , 8 ccm.
Young Euphausidae, 1	<i>Parathemisto oblivia</i> , 15 ccm.
<i>Thysanoessa inermis</i> , 1	<i>Apherusa glacialis</i> , 1
— <i>longicaudata</i> , 12	<i>Calanus finmarchicus</i> , 99% of the
— <i>Raschii</i> , 1	Copepoda
<i>Boreomysis arctica</i> , 5	<i>Pseudocalanus elongatus</i> , 1% of
<i>Mysis mixta</i> , 2	the Copepoda.

St. 32, 16. 7. 1912. 60°32' N., 46°53' W. — 35—37 m., 0.7°, salinity 32.1‰; stones with algae.

<i>Hyas coarctatus</i> , abt. 10	<i>Amphithopsis megalops</i> , 1
<i>Sclerocrangon boreas</i> , 6	<i>Amathilla pinguis</i> , 1
<i>Spirontocaris Fabricii</i> , 4 (1 with	<i>Ischyrocerus anguipes</i> , abt. 10
Sylon)	<i>Dulichia spinosissima</i> , abt. 10
— <i>turgida</i> , 3	<i>Caprella septentrionalis</i> , 5
— <i>polaris</i> , 5	<i>Herpyllobius arcticus</i> , 1
— <i>groenlandica</i> , 2	<i>Balanus porcatus</i> , 2
<i>Mysis oculata</i> , 1	— <i>crenatus</i> , 4
? <i>Tryphosa nanoides</i> , 1	Sylon <i>Hippolytes</i> , 1
<i>Monoculodes borealis</i> , 1	<i>Pseudopallene circularis</i> , 2
<i>Paramphithoë bicuspis</i> , 6	<i>Nymphon grossipes</i> , 1
— <i>assimilis</i> , 1	
<i>Parapleustes glaber</i> , 1	<i>Asterias polaris</i> , 1
<i>Acanthonotosoma serratum</i> , 2	<i>Strongylocentrotus droebachiensis</i> , 3.

St. 33, 16. 7. 1912. Between St. 32 and St. 34. — 100—220 m., 0.4—2.8°, salinity 33.1—34.1‰; stones without algae.

<i>Stichaster albus</i> , 16	<i>Amphiura Sundevalli</i> , 1
<i>Solaster papposus</i> , 1	<i>Ophiacantha bidentata</i> , 1
<i>Ctenodiscus crispatus</i> , 13	<i>Strongylocentrotus droebachiensis</i> , 5
<i>Ophioglypha Sarsii</i> , 2	<i>Psolus Fabricii</i> , 5
<i>Ophiopholis aculeata</i> , 3	— <i>phantapus</i> , 7

St. 34, 16. 7. 1912. 60°32' N., 46°54' W. — 460 — > 550 m., 3.8—4°, salinity 35.2 ‰.

From the slight remains in the dredge, the bottom here would seem to have been clay; evidently however, the implement only worked in the bottom for a short part of the haul.

Caprella Rinkii, 1		Ophiolebes claviger, 1
Nymphon macrum, 1		Amphiura denticulata, 1.

St. 35, 16. 7. 1912. = St. 31. — Ringtrawl, 400 m. w., 20 min., 75 ccm. incl. 50 ccm. Copepoda.

Thysanoessa inermis, 2		Calanus finmarchicus, 95 ‰ of the Copepoda
— longicaudata, 2		
Euthemisto libellula, abt. 20		Euchaeta norvegica, 5 ‰ of the Copepoda.
— hispinosa, abt. 20 ccm.		
— compressa, abt. 30 spec.		

St. 36, 16. 7. 1912. 60°32' N., 46°55' W. — 29—100(?) m., 1—0.7°, 32.2—33.2 ‰ salinity.

Chiefly shell gravel, with stones and some few algae. The great depth (100 m.) appears to be due to a hole in the bottom; the dredge can hardly have been deeper down than abt. 50 m.

The content here strikingly resembles that from St. 32, but is less rich.

Hyas coarctatus, 2		Paramphithoë assimilis, 2
Sclerocrangon boreas, 1		Ischyrocerus anguipes, abt. 10
Spirontocaris Fabricii, abt. 10 (1 with Sylon)		Dulichia spinosissima, 2
Socarnes VahlII, abt. 15		Balanus porcatus, several spec.
Acanthonotosoma serratum, 2		Sylon Hippolytes, 1

St. 37, 17. 7. 1912. 60°29' N., 46°52' W. — 20—30 m., 1.25—0.9°, salinity 31.5—32.1 ‰; Laminariae.

Hyas coarctatus, abt. 10		Amathilla pinguis, 1
Sclerocrangon boreas, 1		Dulichia spinosissima, 2
Spirontocaris groenlandica, 1		Ischyrocerus anguipes, several spec.
Paramphithoë bicuspis, abt. 20		
Acanthonotosoma serratum, abt. 10		Strongylocentrotus droebachiensis, 2.
Pontogeneia inermis, 5		

St. 38, 17. 7. 1912. 60°29' N., 46°53' W. — 290—320 m., 3.5—3.7°, salinity 34.4—34.6 ‰.

The dredge here stuck in the bottom, and had to be cut away, with 350 m. of line.

St. 39, 17. 7. 1912. 60°30' N., 46°51' W. — Plankton-net, surface, 10 min., 3 ccm. Small Calanidae.

St. 40, 17. 7. 1912. 60°31' N., 46°49' W. — 170—180 m., 3—2.5°, 34.3—34.0 ‰ salinity

NB. The temperature and salinity from 170 m. at this station do not agree with the proper figures for that depth, but rather correspond to abt. 250 m. (*vide* St. 30); both the lead and the sounding apparatus however, showed 170 m.

Shell-fragments with stones.

Hyas coarctatus, 1	Amphiura Sundevalli, 4
Eupagurus pubescens, 1	Ophiacantha bidentata, 17
Spirontocaris polaris, 3	Strongylocentrotus droebachiensis, 2
Henricia (Cribrella) sanguinolenta, 2	Psolus Fabricii, 1.
Ophiopholis aculeata, 1	

St. 41, 17. 7. 1912. 60°32' N., 46°49' W. — Plankton-net, surface, 15 min., 5 cm. Small Calanidae.

St. 42, 17. 7. 1912. 60°34' N., 46°51' W. — Plankton-net, surface, 15 min., 7 cm. Small Calanidae.

St. 43, 17. 7. 1912. 60°35' N., 46°52' W. — Plankton-net, surface, 10 min., 3 cm. Small Calanidae.

St. 44, 18. 7. 1912. 60°35' N., 46°48' W. — 165—190 m., 2.0—2.8°, ?—34.0 ‰ salinity.

Bottom small stones and clay; of the latter, however, no traces were found in the dredge, but some remained adhering to the lead.

The yield was very small, and the net was found to be broken when hauled up. The Eskimos declared that they could tell from the smell that it had been bitten through by a Greenland shark.

Pseudopallene circularis, 1	Ophiopholis aculeata, 2
Stichaster albulus, 6	Amphiura Sundevalli, 2
Pedicellaster typicus, 1	Ophiacantha bidentata, 1
	Strongylocentrotus droebachiensis, 1.

St. 45, 18. 7. 1912. 60°36' N., 46°47' W. — 430—450 m., 4—3.4°, 34.7 ‰ salinity; clay.

Munidopsis curvirostra, 3	Ctenodiscus crispatus, 19
Boreomysis arctica, 1	Amphiura denticulata, 7
Gnathia sp., 1	Ophiolebes claviger, 1
Heliometra glacialis, 1	Molpadia oolitica, 2
	Raia radiata, 1 egg-capsule.

St. 46, 18. 7. 1912. 60°37' N., 46°47' W. — 20—30 m., 1—0.5°, salinity 31.2—32.0‰. Shell-fragments with partly very large stones.

Hyas coarctatus, 5	Asterias polaris, 1
Anonyx nugax, 1	Ophiopholis aculeata, 1
Halirages fulvocinctus, 2	Amphiura Sundevalli, 1
Ischyrocerus anguipes, 1	Strongylocentrotus droebachiensis, 3
Balanus crenatus, 2	Cucumaria frondosa, 1
Pseudopallene circularis, 1	

St. 47, 18. 7. 1912. 60°45' N., 46° 47' W. — Ringtrawl, 600 m. w., 20 min., 250 ccm. (incl. 125 ccm. Copepoda).

Pontophilus norvegicus, Zoea, 1	Euthemisto libellula, ca. 60
Thysanoessa inermis, 2	— bispinosa, ca. 45
— longicaudata, 4	— compressa, abt. 175
	Parathemisto oblivia, 100 ccm.

St. 48, 19. 7. 1912. 60°34' N., 46°49' W. — Ringtrawl, 600 m. w., 30 min.

This haul should be regarded as a dredge, the ringtrawl having for some distance at least been working in the bottom itself, the depth being found to be far less than could be expected (no soundings had been taken). The contents of the net included weed and shell gravel among which were enormous quantities of the usual shallow water organisms.

Hyas coarctatus, abt. 10	Paroediceros lynceus, 2
Sclerocrangon boreas, abt. 10	Monoculodes latimanus, several
Spirontocaris Fabricii, ½ liter, (11 with Sylon, 1 with Phryxus abd.)	— borealis, 7
Spirontocaris Lilljeborgii, abt. 30	Paramphithoë bicuspis, abt. 10
— turgida, abt. 15 (1 with Phryxus abd.)	Acanthonotosoma serratum, abt. 60
— polaris, abt. 100	Pontogeneia inermis, 2
— groenlandica, abt. 10	Amphithopsis megalops, 4
— microceros, 1	Rhachotropis inflata, 2
?Thysanoessa Raschii, 1	Protomedeia fasciata, 1
Mysis oculata, 3 (2 with Dajus Mysidis)	Ischyrocerus anguipes, several
Euthemisto libellula, 1	Dulichia spinosissima, abt. 50
— compressa, 1	Phryxus abdominalis, 3, on Spiront. turgida and S. Lilljeborgii
Parathemisto oblivia, abt. 25	Bopyroides Hippolytes, 12, on Spiront. polaris and S. Lilljeborgii
Anonyx nugax, 4	Dajus Mysidis, 2
Onisimus Edwardsii, 1	Herpyllobius arcticus, 2
Stegocephalus inflatus, 6	Balanus crenatus, some spec.
Syrrhoë crenulata, several	Sylon Hippolytes, 13

Nymphon sp., 1	Strongylocentrotus droebach., 1
Asterias Mülleri var. groenlandica, 1	Cucumaria frondosa, 1
— polaris, 3	Gymnelis viridis, 1
	Cyclopterus spinosus, 2.

St. 49, 19. 7. 1912. 60°33' N., 46°47' W. — 490 m., 3.4—4.5°, 34.6—35.0 ‰ salinity; clay.

Chaetonymphon spinosum, 1	Amphiura denticulata, 2
Raia radiata, 1 egg-capsule	Laetmogone violacea, 10

St. 50, 20. 7. 1912. 60°34' N., 46°49' W. — Ringtrawl, 100 m. w., 15 min., 3 cem.

Hyas coarctatus, Zoea, 2	different small Copepoda
Decapod-larvae (defective)	Calanus finmarchicus, 1.5 cem.
Euphausid-larvae	Cirripede-larvae
	Sagitta

St. 51, 20. 7. 1912, 60°34' N., 46°48' W. — Ringtrawl, 200 m. w., 20 min.

In the content was not found any of the species to be dealt with in this paper.

St. 52, 20. 7. 1912. 60°34' N., 46°47' W. — Ringtrawl, 300 m.w., 20 min.  
No content.

St. 53, 20. 7. 1912. 60°35' N., 46°45' W. — 260 m., 2.8°, 34.1 ‰ salinity; bottom?

Dulichia spinosissima, 1	Ophiopholis aculeata, 1
Pycnogonum littorale, 1	Ophiacantha bidentata, 1

St. 54, 20. 7. 1912. 60°35' N., 46°45' W. — 420 m., 2°, 34.6 ‰ salinity.

Bottom not reached, though dredge was out on 500 m. w.

St. 55, 20. 7. 1912. 60°34' N., 46°45' W. — 310—330 m., 3.5—2°, 34.7—34.4 salinity; clay with a few small stones.

Calathura brachiata, 1	Nymphon macrum, 2
Ianira maculosa, 1	Chaetonymphon spinosum, 2
Eurycope producta, 2	
?Saccopsis Terebellidis, 3, on Leuc- ariste arcticus	Heliometra glacialis, 6
Scalpellum Stroemii, 2	Hathrometra Sarsii, 2
	Henricia (Cribrella) sanguinolenta, 2
	Pteraster hastatus, 1

Poraniomorpha hispida, 1	Ophioscolex glacialis, 1
Ophiopholis aculeata, 2	Psolus valvatus, 5
Ophiura denticulata, 2	
Ophiacantha bidentata, 1	Raia radiata, 1 egg-capsule
— anomala, 1	
Ophiolebes claviger, 4	Primnoa resedaeformis, several spec.
	Eunephthya fruticosa

St. 56, 20. 7. 1912 (= St. 55). — Plankton-net, surface, 5 min., 1 ccm.

Small Calanidae.

St. 57, 20. 7. 1912 (= St. 55). — Plankton-net, a few m. under the surface, 5 min., 1 ccm.

Small Calanidae.

St. 58, 20. 7. 1912 (= St. 55). — Nansen-net, 340—290 m., 1 ccm. Calanus finmarchicus, some spec.

— hyperboreus, 1

Euchaeta sp., 1; some small Calanidae; a few Sagitta.

St. 59, 22. 7. 1912. 60°35' N., 46°48' W. — Ringtrawl, 300 m. w., 20 min., 15 ccm. (incl. 12 ccm. Copepoda).

Hyas coarctatus, Zoea, 1	Decapod-larvae
Eupagurus pubescens, Zoea, 1	young Euphausidae
Parathemisto oblivia, 3	a Ctenophora
Calanus finmarchicus, 10 ccm	Appendiculariae
some small Copepoda	

St. 60, 22. 7. 1912. 60°35' N., 45°46' W. — Ringtrawl, 500 m. w., 20 min., 500 ccm. (425 ccm. Copepoda, 75 ccm. Hyperiidæ).

Euthemisto libellula, 5	Young Euphausid, 1
— bispinosa, 30	Thysanoessa inermis, 1
— compressa, 60	— longicaudata, 7
Parathemisto oblivia, 70 ccm.	Calanus finmarchicus

St. 61, 22. 7. 1912. 66°35' N., 46°48' W. — 12.5—13 m. Laminariae. Stramin-dredge. Amphipoda alone 50 ccm.

?Nectocrangon lar, juv., 1	Mysis oculata, abt. 10 (2 with
Spirontocaris Fabricii, ¼ liter (1	Dajus Mysidis)
with Sylon)	Amphilochus manudens, 2
— turgida, abt. 10	Metopa longimana, 1
— polaris, abt. 10	— neglecta, 1
— groenlandica, 4	— Bruzelii, 1
	— carinata, 2

Syrrhoë crenulata, 1	Amathilla pinguis, abt. 15
Paroedicerus lynceus, 1	Ischyrocerus anguipes, several spec.
Monoculodes latimanus, 1	Dulichia spinosissima, abt. 10
Paramphithoë bicuspis, 12 ccm.	Caprella septentrionalis, 5
Acanthonotosoma serratum, abt. 10	Munna minuta, 1
Odius carinatus, 1	Phryxus abdominalis, 2 larvae
Pontogeneia inermis, 20 ccm.	Dajus Mysidis, 3, and 3 larvae
Amphithopsis megalops, 12	Hérpyllobius arcticus, 1
Calliopius Rathkei, 1	Sylon Hippolytes, 1

St. 62, 22. 7. 1912. 60°41' N., 46°43' W. — 10—15 m. Clay with gravel and dead algae.

Spirontocaris Fabricii, 6 (1 with Sylon)	Amphithopsis megalops, 6
— turgida, 5	Amathilla pinguis, 2
Mysis oculata, 4	Ischyrocerus anguipes, a few spec.
Anonyx nugax, 4	Protomedeia fasciata, 1
Onisimus Edwardsii, abt. 30	Caprella septentrionalis, several spec.
Pontoporeia femorata, 5	Nebalia bipes, 5
Paroedicerus lynceus, abt. 15	Balanus balanoides (on the rocks at the water-line)
Monoculodes latimanus, 7	Centronotus fasciatus, 1
Paramphithoë bicuspis, abt. 20	
Pontogeneia inermis, 3	

St. 63, 23. 7. 1912. 60°38' N., 46°41' W. — Nansen-net; > 550 m.; Hydrography see further on (p. 363).

10—0 m., 0.5 ccm. Small Calanidae. — 25—10 m., 0.2 ccm. Detritus and some small Calanidae. — 50—25 m., 1 ccm. Small Calanidae. — 75—50 m., 1 ccm. Small Calanidae. — 100—75 m., 3 ccm. Calanus finmarchicus; a few Sagitta. — 125—100 m., 3 ccm. Parathemisto oblivia, 2; Calanus finmarchicus. — 150—125 m., 5 ccm. Parathemisto oblivia, 2; Calanus finmarchicus and some Sagitta. — 200—150 m., 3 ccm. Parathemisto oblivia, 2; Calanus finmarchicus 2.5 ccm.; some Sagitta. — 250—200 m., 2 ccm. Copepoda. Meganyctiphanes norvegica, 1; Thysanoessa Raschii, 1; Parathemisto oblivia, 5; Calanus finmarchicus (2 ccm.); a few Sagitta. — 350—250 m., 2 ccm. Parathemisto oblivia, 2; Calanus finmarchicus and some small Copepoda 1 ccm.; Conchoesia sp., 7; Sagitta, 1 spec., 6 cm. long. — 450—350 m., 3 ccm. Copepoda. Pasiphaë tarda, 1; Thysanoessa longicaudata, 1; Boreomysis arctica, 5; Parathemisto oblivia, 1; Calanus finmarchicus and a few C. hyperboreus, 3 ccm.; a few Tomopteris. — 550—450 m., 4 ccm. (incl. 3 ccm. Copepoda). Thysanoessa longicaudata, 2; Boreomysis arctica, 2; Calanus finmarchicus and a few C. hyperboreus and some very small Copepoda; some Tomopteris.



St. 64, 23. 7. 1912. 60°37' N., 46°43' W. — Ringtrawl, 600 m. w., 20 min., 150 ccm. (incl. 100 ccm. Copepoda + Sagitta).

Meganyctiphanes norvegica, 5	Parathemisto oblivia, 40 ccm.
Thysanoessa inermis, 2	Apherusa glacialis, 1
— longicaudata, abt. 15	Calanus finmarchicus and some small C. hyperboreus
Euthemisto libellula, 5	
— bispinosa, 20	
— compressa, 40	

St. 65, 23. 7. 1912 (= St. 65). — Ringtrawl 500 m. w., 20 min.; 450 ccm. (incl. 400 ccm. Copepoda and Sagitta).

?Nectocrangon lar, juv., 1	Parathemisto oblivia, 40 ccm.
Thysanoessa inermis, 1	Calanus finmarchicus, 95 ‰ of the Copepoda
— longicaudata, 4	Pseudocalanus elongatus, 5 ‰ of the Copepoda
Euthemisto bispinosa, 5	

St. 66, 23. 7. 1912. 60°39' N., 46°44' W. — Dredge with straminet. 9—11 m. Laminariae. Amphipoda alone abt. 150 ccm.

Eupagurus pubescens, Zoea, 1	Pontogeneia inermis, abt. 60 ccm.
?Nectocrangon lar, juv., 2	Amphithopsis megalops, 4
Sclerocrangon boreas, 4	?Calliopius laeviusculus, 7
Spirontocaris Fabricii, 0.4 liter (1 with Sylon)	Amathilla pinguis, 5
— turgida, abt. 15	Ischyrocerus anguipes, several spec.
— polaris, abt. 150 ccm.	Dulichia spinosissima, 8
— groenlandica, 8	— tuberculata, 5
Mysis oculata, abt. 20	Caprella septentrionalis, several spec.
Amphilochus manudens, 1	Munna minuta, 2
Metopa Bruzelii, 2	Phryxus abdominalis, 3 larvae
— carinata, 2	Bopyroides Hippolytes, 7, on Spiront. polaris
Syrrhoë crenulata, 3	Dajus Mysidis, 2
Pleustes panoplus, 3	Balanus crenatus, 1
Paramphithoë bicuspis, 50—60 ccm.	Sylon Hippolytes, 1
Acanthonotosoma serratum, abt. 15	Pycnogonid-larva, 1

St. 67, 24. 7. 1912. 60°38' N., 46°36' W. — 220—310 m., 2.8°—?, salinity 34.0—34.5 ‰; stony clay. Ctenodiscus crispatus, 1.

St. 68, 24. 7. 1912. 60°38' N., 46°45' W. — 60—95 m., 0.5—0.2°, 32.7—33.1 ‰ salinity; stones.

Asterias polaris, 1	Ophiopholis aculeata, 1
Henricia (Cribrella) sanguinolenta, 2	Amphiura Sundevalli, 1
Ctenodiscus crispatus, 2	Strongylocentrotus droebachiensis, 2

St. 69, 24. 7. 1912. 60°37' N., 46°45' W. — 290—355 m.? — 3.7° salinity 34.3—34.8 ‰. Clay.

Heliometra glacialis, 1	Primnoa resedaeformis, several spec.
Ctenodiscus crispatus, 1	

St. 70, 24. 7. 1912. 60°38' N., 46°45' W. — 225—290 m. Temp.? salinity 32.8—34.3 ‰. Stones and some clay.

Chionoecetes Phalangium, 1	Ctenodiscus crispatus, more than hundred spec.
Diastylis scorpioides, 1	
Laetmogone violacea, 1	Ophiura Sarsii, 2
Astrogonium Parelii, 1	Strongylocentrotus droebachiensis, 1

St. 71, 25. 7. 1912. 60°41' N., 46°38' W. — Plankton-net, surface, 20 min., 0.2 ccm. Detritus.

St. 72, 25. 7. 1912 (= St. 71). — Ringtrawl, 400 m. w., 20 min., 1 liter (incl. 800 ccm. Copepoda).

NB. Half the content was thrown overboard; the figures given below but not above should therefore be multiplied by 2 in making quantitative comparison with the results from the other stations.

Pontophilus norvegicus, Zoea, 1	Euthemisto compressa, 33 Parathemisto oblivia, 90 ccm. Calanus finmarchicus (abt. 100 ‰ of the Copepoda)
Thysanoessa inermis, 1	
Euthemisto libellula, 35	
— bispinosa, 3	

St. 73, 25. 7. 1912 (= St. 71). — Ringtrawl, 300 m. w., 20 min., 135 ccm. (incl. 110 ccm. Copepoda with a few Sagitta).

Pontophilus norvegicus, Zoea, 1	Calanus finmarchicus, 95 ‰ of the Copepoda Calanus hyperboreus, 5 ‰ of the Copepoda
Euthemisto compressa, 2	
Parathemisto oblivia, 25 ccm.	

St. 74, 25. 7. 1912. 60°42' N., 46°38' W. — 90—200 m., 0.3—2.8°, salinity 33.2—34.1 ‰.

Stones, some clay. Dredge almost filled with stones, which had crushed a great part of the not very large quantity of animal content.

Ctenodiscus crispatus, 1	Amphiuira Sundevalli, 1
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St. 75, 25. 7. 1912. 60°44' N., 46°38' W. — 200—270 m., 3—3.2°. Salinity 34.1—34.2°. Stony clay.

Ianira tricornis, 1	Ophiura robusta, 1 Amphiura Sundevalli, 4
Ctenodiscus crispatus, 4	

Ophiacantha bidentata, 5		Icelus bicornis, 1
Psolus Phantapus, 1		

St. 76, 25. 7. 1912. 60°44' N., 46°36' W. — 260—320 m., 3.0—3.3°. Stony clay.

Spirontocaris Lilljeborgii, 1		Ctenodiscus crispatus, 12
Nymphon Stroemii gracilipes, 1		Amphiura Sundevalli, 1

St. 77, 27. 7. 1912. 60°41' N., 46°33' W. — 245—470(?) m. Temp. 3.2°—? Stony clay.

NB. Judging from the dredge line, the great depth (470 m.) must be due to a hole in the bottom.

Laetmogone violacea, 1		Ctenodiscus crispatus, 4
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St. 78, 27. 7. 1912. 60°42' N., 46°29' W. — 30—50 m., 0.5°—0.5°.

Net torn, wherefore nature of bottom cannot be stated.

Hyas coarctatus, 5		Acanthonotosoma serratum, 1
Socarnes Vahlii, abt. 10		
Aristias tumidus, 2		Henricia (Cribrella) sanguinolenta, 1
Anonyx nugax, 7		

St. 79, 27. 7. 1912. The same locality as St. 78. — Dredge of stramin. Bottom: shell-fragments.

Hyas coarctatus, several spec.		Halirages fulvocinctus, 1
Spirontocaris Fabricii, abt. 20 (1		Rhachotropis aculeata, 6
with Sylon)		—    inflata, 1
—    Lilljeborgii, 4		Ischyrocerus anguipes, 2
—    turgida, 7		Dulichia spinosissima, 5
—    polaris, abt. 35		Sylon Hippolytes, 1
—    groenlandica, 2		
Pandalus borealis, abt. 10		Henricia (Cribrella) sanguinolenta, 1
Mysis mixta, 1		Ophiura (Ophioglypha) robusta, 2
Syrrhoë crenulata, abt. 10		Strongylocentrotus droebachien-
Monoculodes latimanus, 2		sis, 5
Paramphithoë bicuspis, 7		
Acanthonotosoma serratum, abt. 10		Cyclopterus spinosus, 1

St. 80, 30. 7. 1912. 60°46' N., 46°33' W. — 365 m., 3.7°. Fine clay with a few stones (glacial clay).

Ctenodiscus crispatus, 1

St. 81, 30. 7. 1912. 60°48' N., 46°32' W. — 110 m., 0.8°. Fine clay (glacial clay).

Pandalus borealis, 1		Amphiura Sundevalli, 1
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St. 82, 30. 7. 1912. 60°48' N., 46°33' W. — 80—90 m. Fine clay (glacial clay).

In the content was found none of the species to be dealt with in this paper.

St. 83, 31. 7. 1912. 60°45' N., 46°33' W. — Plankton-net, surface, 15 min., 0.5 cm.

Detritus and some small Calanidae.

St. 84, 31. 7. 1912 (= St. 83). — Ringtrawl, 200 m. w., 20 min., 10 cm. (almost only Copepoda).

Hyas coarctatus, Zoea, 2	Calanus finmarchicus, about 95 % of the Copepoda Some small Copepoda; a few Sagitta
Euthemisto compressa, 1	

St. 85, 31. 7. 1912. 60°45' N., 46°31' W. — Plankton-net, surface, 20 min., 3 cm.

Parathemisto oblivia, 1	Calanus finmarchicus (abt. 3 ccm.) a few small Copepoda
Calliopius Rathkei, 1	

St. 86, 31. 7. 1912. (= St. 85). — Ringtrawl, 100 m. w., 20 min., 5 cm. (almost only Copepoda).

Hyas coarctatus, Zoea, 1	Calanus finmarchicus, 95 % of the Copepoda Some small Copepoda Cirripede-nauplii.
Pontophilus norvegicus, Zoea, 1	
Young Euphausidae	
Euthemisto compressa, 1	

St. 87, 31. 7. 1912. 60°45' N., 46°26' W. — 230 m., 3°. Stony clay.

Spirontocaris Lilljeborgii, 1	Amphiuira Sundevalli, 13 Ophiacantha bidenticulata, 13 Cucumaria calcigera, 1
Halirages fulvocinctus, 1	
Ctenodiscus crispatus, 11	Phyllophorus pellucidus, 1 Psolus Fabricii, 1
Ophiura (Ophioglypha) Sarsii, 1	
— — robusta, 2	

St. 88, 31. 7. 1912. 60°45' N., 46°25' W. — 40—70 m.

Hyas coarctatus, abt. 10	Asterias polaris, 1 — Mülleri var. groenlandica, 1 with young Strongylocentrotus droebachiensis, 2 Psolus Fabricii, 1 — phantapus, 1
Spirontocaris Fabricii, 1	
Crypsidomus Terebellae, 1, on Ni- colea zostericola	
Pseudopallene circularis, 1	

St. 89, 31. 7. 1912. 60°45' N., 46°25' W. — 16—17 m. Laminariae.  
Dredge of stramin.

Amphipoda alone 160 ccm.

Hyas coarctatus, 1	Acanthonotosoma serratum, 9
?Nectocrangon lar, juv., 1	Odius carinatus, 1
Sclerocrangon boreas, 1	Pontogeneia inermis, abt. 125 ccm.
Spirontocaris Fabricii, 125 ccm. (1 with Bopyroides)	Amphithopsis megalops, several spec.
Spirontacoris turgida, abt. 15	Halirages fulvocinctus, 1
— polaris, abt. 15	?Calliopius laeviusculus, 6
— groenlandica, 2 (1 with larva of Phryxus abdom.)	Amathilla pinguis, 13
Mysis oculata, abt. 10 (3 with Dajus Mysidis)	Ischyrocerus anguipes, several spec.
Anonyx nugax, 4	Dulichia tuberculata, 1
Onisimus Edwardsii, abt. 10	Caprella septentrionalis, several spec.
Metopa sinuata, 1	Munna minuta, 2
— carinata, 7	Bopyroides Hippolytes, 1
? — — , juv., 3	Phryxus abdominalis, 1 larva, on Spiront. groenlandica
Syrrhoë crenulata, 2	Dajus Mysidis, 3
Monoculodes latimanus, 9	Balanus crenatus, 1
— borealis, 8	
Paramphithoë bicuspis, 20 ccm.	Cottus scorpius, 1

St. 90, 31. 7. 1912. 60°49' N., 46°36' W. — 100—110 m. Fine clay  
(glacial clay? though the station is not situated in an ice-fjord).

In the content was found none of the species to be dealt with in  
this paper.

St. 91, 1. 8. 1912. 60°48' N., 46°28' W. — 110—180 m., 0.5—2.1°.  
Stony clay.

Spirontocaris polaris, 2	Ctenodiscus crispatus, 21
Pandalus borealis, 1	Ophiura (Ophioglypha) Sarsii, 1
Nymphon longitarse, 1	Amphiura Sundevalli, 2
	Ophiacantha bidentata, 10

St. 92, 1. 8. 1912. 60°49' N., 46°27' W. — 50—90 m. Net torn.

Hyas coarctatus, 1	Strongylocentrotus droebachiensis, some spec.
Spirontocaris Lilljeborgii, 1	

St. 93, 2. 8. 1912. 60°51' N., 46°9' W. — 10 m. Black malodorous  
clay, with decomposed weed.

Caprella septentrionalis, 1	Nebalia bipes, 2
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St. 94, 3. 8. 1912. 60°51' N., 46°17' W. — Nansen-net.

10—0 m., 0.2 ccm. Young Euphausidae, abt. 10. Small Calanidae and detritus. — 25—10 m., 0.2 ccm. *Hyas coarctatus*, Zoea, 5. Detritus and a few small Calanidae. — 50—25 m., 0.2 ccm. Young Euphausidae, abt. 10. Small Calanidae and detritus. — 75—50 m., 1 ccm. *Euthemisto compressa*, 1. *Calanus finmarchicus*, 0.5 ccm. Small Calanidae, 0.5 ccm. — 100—75 m., 1 ccm. Euphausidae, young, 3. *Parathemisto oblivia*, 3. *Calanus finmarchicus*. — 125—100 m., 1 ccm. *Parathemisto oblivia*, 5. *Calanus finmarchicus*. — 150—125 m., 2 ccm. *Parathemisto oblivia*, 4. *Calanus finmarch.* — 200—150 m., 1 ccm. *Parathemisto oblivia*, 1. *Calanus finmarch.*, 0.5 ccm. Small Calanidae, 0.5 ccm. — 250—200 m., 1 ccm. *Thysanoessa longicaudata*, 1. *Parathemisto oblivia*, 5. *Calanus finmarchicus* and other Copepoda. A few *Sagitta*. — 350—250 m. Copepoda 1 ccm. *Thysanoessa longicaudata*, 1. *Boreomysis arctica*, abt. 10. *Parathemisto oblivia*, 2. *Calanus finmarch.* and some small Calanidae. *Conchoesia* sp., 1. — 450—350 m. Copepoda 3 ccm. *Boreomysis arctica*, abt. 15. *Parathemisto oblivia*, 2. *Scina borealis*, 1. *Calanus finmarch.* with a few *C. hyperboreus* and *Euchaeta*. *Conchoesia* sp., 1. — 550—450 m. Copepoda 8 ccm. *Boreomysis arctica*, 1. *Calanus finmarch.* with a few *C. hyperboreus*. *Conchoesia* sp., 1.

St. 95, 3. 8. 1912. 60°55' N., 46°23' W. — 115—155 m., 0.6°—1.6°. Stony clay.

*Ctenodiscus crispatus*, 6

*Ophiacantha bidentata*, 3

St. 96, 3. 8. 1912. 61°1' N., 46°21' W.

After two soundings with 550 m. w. had failed to touch bottom, a depth of 410 m. was found quite close in to land, temp. 3.6°. Fine clay (glacial clay) with a very few stones.

*Neohela monstrosa*, 2

St. 97, 4. 8. 1912. 60°49' N., 46°18' W. — 250—180 m., 3.0—3.2°. Stony clay.

*Spirontocaris polaris*, 1

*Diastylis Goodsirii*, 1

*Aega ventrosa*, 1

*Nymphon* sp., 1

*Heliometra glacialis*, 1

*Ctenodiscus crispatus*, 12

*Ophiura* (*Ophioglypha*) *robusta*, 1

St. 98, 4. 8. 1912. 60°48' N., 46°21' W. — 520—560 m., 3.6—3.9°. Fine clay with some stones.

*Boreomysis arctica*, 2

*Neohela monstrosa*, 1

*Ctenodiscus crispatus*, 4

St. 99, 5. 8. 1912. 60°53' N., 46°15' W. — Plankton-net, surface, 20 min., 0.5 ccm. Almost nothing but detritus.

**St. 100**, 5. 8. 1912 (= St. 99). — Ringtrawl, 500 m. w., 20 min., 375 ccm. (incl. 300 ccm. Copepoda and Sagitta).

Hyas coarctatus, Zoea, 1	Euthemisto compressa, 12 ccm.
Pontophilus norvegicus, Zoea, 1	Parathemisto oblivia, 30 ccm.
Thysanoessa inermis, 22	Calanus finmarch. 90 % of the Cop.
— longicaudata, abt. 15	— hyperboreus 5 % of the Cop.
Euthemisto libellula, 4	Pseudocalanus elongatus 5 % of
— bispinosa, 2	the Copep.

**St. 101**, 5. 8. 1912. 60°51' N., 46°18' W. — Plankton-net, surface, 20 min.

Calanus finmarchicus, 2	Podon Leuckartii, 1
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**St. 102**, 5. 8. 1912. (= St. 101). — Ringtrawl, 400 m. w., 20 min., 450 ccm. (incl. 325 ccm. Copepoda + Sagitta).

Hyas coarctatus, Zoea, 1	Euthemisto compressa, 15
Euphausid, young, 1	Parathemisto oblivia, 75 ccm.
Thysanoessa inermis, 40	Calanus finmarchicus (100 % of the
— longicaudata, 5	Copepoda)
— Raschii, 5	Sagitta, several spec.

**St. 103**, 5. 8. 1912. 60°51' N., 46°25' W. — 90—100 m., 0.4°. Stones.

Hyas coarctatus, 5	Ophiopholis aculeata, 1
Spirontocaris polaris, 1	Amphiura Sundevalli, 3
	Strongylocentrotus droebachien-
Stichaster albulus, 2	sis, 2
Ophiocten sericeum, 1	Centridermichtys uncinatus, 1

**St. 104**, 5. 8. 1912. 60°50' N., 46°26' W. — 7—20 m. Laminariae. Fine dredge. Amphipoda alone 250 ccm.

Sclerocrangon boreas, 8	Paramphithoë bicuspis, abt. 35 ccm.
Nectocrangon lar, 2	Pontogeneia inermis, 200 ccm.
? — — juv., 4	Amphithopsis megalops, several
Spirontocaris Fabricii, 100 ccm.	?Calliopius laeviusculus, 8
— turgida, 10	Ischyrocerus anguipes, a few
— polaris, abt. 20 (1	Caprella septentrionalis, several
with Bopyroides)	Bopyroides Hippolytes, 1 on Spi-
Mysis mixta, 1	rontocaris polaris
Anonyx nugax, 7	Dajus Mysidis, 2
Onisimus Edwardsii, several spec.	
Metopa carinata, 6	Asterias polaris, 1
Syrrhoë crenulata, 2	
Paroediceros lynceus, abt. 15	Cottus scorpius, juv., 1
Monoculodes latimanus, 11	Liparis liparis, 1
— borealis, 5	

St. 105, 7. 8. 1912. 60°53' N., 46°13' W. — Plankton-net, surface, 20 min., 0.2 ccm. Almost nothing but detritus.

St. 106, 7. 8. 1912 (= St. 105). — Ringtrawl, 100 m. w., 20 min., 9 ccm. almost nothing but Copepoda (the half) and fragments of Ctenophora (the rest).

Hyas coarctatus, Zoea, abt. 10	Some small Copepoda
Young Euphausidae	Cirripede-nauplii and -cyprides
Some defective Hyperidae	
Ethemisto compressa, 1	Some fish-larvae
Calanus finmarchicus	

St. 107, 7. 8. 1912. (= St. 105) — Ringtrawl, 200 m. w., 20 min. No content.

St. 108, 7. 8. 1912 (= St. 105). — Ringtrawl, 300 m. w., 20 min.

In contrast to other hauls with similar length of wire, the content of this is remarkably large, 0.75 litre, of which abt. 100 ccm. Copepoda; almost the whole of the remainder being Sagitta. The net must thus have encountered a shoal of these.

Ethemisto libellula, 3	Calanus finmarchicus, 90 ccm.
— compressa, 4	— hyperboreus, 10 ccm.
Parathemisto oblivia, abt. 20 spec.	Sagitta, abt. 650 ccm.

St. 109, 7. 8. 1912. 60°51' N., 46°15' W. — 125—140 m., 1.1—1.5°. Stones and a little clay and shell-fragments.

Spirontocaris polaris, 2	Strongylocentrotus droebachiensis, 2
Rhachotropis aculeata, 1	Sebastes marinus, juv., 1
Ophiacantha bidentata, 2	Centridermichthys uncinatus, 1

(Bredefjord is continued St. 120—135.)

### Bredefjord Sermilik St. 110—119.

(See the map fig. 31.)

St. 110, 8. 8. 1912. 61°17' N., 45°39' W. — 55—90 m., 0.5—0.5°. Clay with stones.

Sclerocrangon boreas, 2	Stichaster albulus, 14
Spirontocaris polaris, 1	Ctenodiscus crispatus, 9
Nymphon longitarse, 1	Centridermichthys uncinatus, 2



St. 111, 8. 8. 1912. 61°16' N., 45°44' W. — 115 m., 0.4°. Clay with stones.

Stichaster albus, 2	Eunephthya fruticosa, 3
Amphiura Sundevalli, 9	

St. 112, 8. 8. 1912. 61°15' N., 45°38' W. — 20—30 m., 0.5°—0.8°. Clay with stones.

Stichaster albus, 2	Pteraster militaris, 1
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St. 113, 9. 8. 1912. 61°19' N., 45°48' W. — > 565 m., 3.2°.

Deep sea lead failed to reach bottom with 565 m. w.; dredging therefore not attempted.

St. 114, 9. 8. 1912. 61°17' N., 45°47' W. — > 550 m., 3.3°.

Deep sea lead failed to touch bottom with 550 m. w.; dredging therefore not attempted.

St. 115, 9. 8. 1912. 61°17' N., 45°45' W. — 500 m., 3.2°. Stony glacial clay; dredge almost full.

Boreomysis arctica, 1	Triglops Pingelii, 1
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St. 116, 9. 8. 1912. 61°13' N., 45°47' W. — 80—95 m., 1.7°—1.9°. Stony glacial clay.

NB. As showing the sharp declivity of the sea floor in this portion of the fjord it may be mentioned that a sounding made close outside this station showed 400 m. without touching bottom.

Nymphon Stroemii gracilipes, 1	Sebastes marinus, juv. 1
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St. 117, 10. 8. 1912. 61°05' N., 45°48' W. — 100—120 m., 1°—0.8°. Stones and a little clay.

Ctenodiscus crispatus, 3

St. 118, 10. 8. 1912. 61°05' N., 45°50' W. — Ringtrawl, 500 m. w., 20 min., 150 cem. (incl. 100 cem. Copepoda).

Pontophilus norvegicus, Zoea, 1	Euthemisto libellula, abt. 20
Meganyctiphanes norvegicus, 5	— compressa, 2
Thysanoessa inermis, 1	Parathemisto oblivia, 50 cem.
— longicaudata, 1	Calanus finmarchicus, 90 %
Boreomysis arctica, 1	— hyperboreus, 5 %
Mysis oculata, 1	Pseudocalanus elongatus, 5 %
? Pseudalibrotus Nanseni, 5	

St. 119, 10. 8. 1912 (= St. 118). — Ringtrawl, 400 m. w., 20 min., 175 ccm. (incl. 100 ccm. Copepoda).

Sabinea septemcarinata, young stage, 2	Euthemisto compressa, abt. 15
Meganyctiphanes norvegica, 25	Parathemisto oblivia, 50 ccm.
Thysanoessa inermis, 5	? Pseudalibrotus Nanseni, 1
Mysis oculata, 1	Calanus finmarchicus, 90 %
Euthemisto libellula, abt. 20	— hyperboreus, 5 %
— bispinosa, 1	Pseudocalanus elongatus, 5 %

**Bredefjord St. 120—135** (Continuation from St. 109).  
(See the map fig. 31.)

St. 120, 25. 8. 1912. 60°35' N., 46°47' W. — 750 m. Clay with some small stones.

Dredge out with 900 m. wire; a loop in the line 150 metres above the implement however, was found to have a long twisted worm tube (?) attached, so that the depth can hardly have been more than 750 m.

Amphiura denticulata, fragments | Molpadia oolitica, 1

St. 121, 25. 8. 1910. 60°32' N., 46°51' W. — 700 m. Clay.

Caprella Rinkii, 1	Gorgonocephalus Lamarcki, 2
Chaetonymphon spinosum, 2	Ophiacantha anomala, 2
	Molpadia oolitica, 1
Heliometra glacialis, 3	
Hathrometra Sarsii, 1	Raia radiata, 1 egg-capsule
Ctenodiscus crispatus, 1	
Amphiura denticulata, 6	Eunephthya glomerata
Ophiolebes claviger, 4	— florida
	Stenogorgia borealis

St. 122, 25. 8. 1912. 60°32' N., 46°52' W. — Ringtrawl, 900 m. w., 20 min.

The net had here been working in the bottom, as was shown by the fact that it was torn in places, soiled with clay, and contained fragments of a Crinoid and Retepora (not preserved); beyond this, however, the content was lost, the cord on the bottom of the net having been torn off.

St. 123, 25. 8. 1912. 60°37' N., 46°47' W. — 5—10 m. Algae with some gravel. Fine dredge. Amphipoda alone 65—75 ccm.

Sclerocrangon boreas, 1	Spirontocaris Fabricii, abt. 35
Nectocrangon lar, 2	— turgida, abt. 12

Spirontocaris polaris, 3	Monoculodes latimanus, several spec.
Mysis oculata, abt. 10	— borealis, 6
— mixta, 2	Paramphithoë bicuspis, 13 ccm.
Diastylis Rathkei, 1	Pontogeneia inermis, 50 ccm.
Anonyx nugax, 3	Halirages bispinosus, 3
Onisimus Edwardsii, 2	Amphithopsis megalops, several spec.
Orchomenella minuta, abt. 15	Calliopius laeviusculus, 1
Pontoporeia femorata, 1	Amathilla pinguis, 8
Metopa carinata, 5	Ischyrocerus anguipes, a few spec.
— — juv., 3	Caprella septentrionalis, sever. spec.
Syrrhoë crenulata, 1	Dajus Mysidis, 1, and 2 larvae
Paroediceros lynceus, several spec.	Nebalia bipes, 2

St. 124, 26. 8. 1912. 60°38' N., 46°42' W. — 700 m. Only clay.

St. 125, 26. 8. 1912. 60°37' N., 46°43' W., Plankton-net, surface, 20 min., 1 ccm. Almost nothing but detritus.

St. 126, 26. 8. 1912 (= St. 125). — Ringtrawl, 800 m. w., 20 min., 300 ccm. (incl. 75 ccm. Boreomysis arctica and 200 ccm. Copepoda).

Pasiphaë tarda, abt. 10, and 3 larvae	Parathemisto oblivia, 7 ccm.
Hyas coarctatus, Zoea, 1	Pontogeneia inermis, 1
Pontophilus norvegicus, Zoea, 3	Apherusa glacialis, 1
Young Euphausidae, 2	Calanus finmarchicus, 95 %
Thysanoessa longicaudata, abt. 50	— hyperboreus, a few spec.,
Boreomysis arctica, 75 ccm.	and other Calanidae, upon the
Mysis mixta, 2	whole 5 %
Hyperia galba, 1	Tomopteris
Euthemisto compressa, 12	Sagitta

St. 127, 26. 8. 1912. 60°38' N., 46°47' W. — 10—15 m. Gravel and a little clay. Fine dredge.

Sclerocrangon boreas, 1	Ampelisca Eschrichtii, 1
Nectocrangon lar, 4	— macrocephala, 6
Spirontocaris Lilljeborgii, 3	Protomedeia fasciata, 12
Mysis oculata, 4	Philomedes brenda, several spec.
Diastylis Rathkei, abt. 15	
— scorpioides, abt. 10	Strongylocentrotus droebachiensis, 3
Anonyx nugax, abt. 15	Asterias Mülleri var. groenlandica, 1
Pontoporeia femorata, 3	Ctenodiscus crispatus, 1
Monoculodes latimanus, 2	Ophiura (Ophioglypha) robusta, 1
— borealis, 5	Amphiura Sundevalli, several spec.
Amphithopsis megalops, 2	Myriotrochus Rinkii, 5
Haploops tubicola, 1, and 1 tube	Eupyrgus scaber, 10

St. 128, 26. 8. 1912. 60°37' N., 46°45' W. — Ringtrawl, 700 m. w., 20 min., 175 ccm. (incl. 75 ccm. Copepoda).

Pandalus borealis, young stage, 1	Euthemisto libellula, 3
Thysanoessa inermis, 8	— bispinosa, 9
— longicaudata, abt. 10	— compressa, 40 ccm.
Parathemisto oblivia, 45 ccm.	Philomedes brenda, 7
	Calanus finmarchicus, 75 ccm.

St. 129, 26. 8. 1912. 60°32' N., 46°51' W. — Ringtrawl, 800 m. w., 20 min., 275 ccm. (incl. 150 ccm. Copepoda).

Pasiphaë tarda, 1	Mysis mixta, 6
Young Euphausidae, 1	Euthemisto libellula, 4
Meganyctiphanes norvegica, 3	— bispinosa, 8
Thysanoessa inermis, 8	— compressa, 30 ccm.
— longicaudata, 14 ccm.	Parathemisto oblivia, 60 ccm.
Boreomysis arctica, abt. 35	Calanus finmarchicus, 150 ccm.

St. 130, 28. 8. 1912.

St. 130A. 800 m. w. without bottom; dredge. 60°43' N., 46°35' W.

St. 130B. 900 m. w., dredge; clay. 60°44' N., 46°34' W.

Boreomysis arctica, 1	Ctenodiscus crispatus, 2
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St. 131, 28. 8. 1912. 60°47' N., 46°27' W. — Ringtrawl 800 m. w., 20 min., 300 ccm. (incl. 200 ccm. Copepoda).

Pandalus borealis, 1	Euthemisto bispinosa, 1
— — young stage, 1	— compressa, 1
Pasiphaë tarda, 6, and 1 young	Parathemisto oblivia, 45 ccm.
Young Euphausidae, 5	Scina borealis, 2
Meganyctiphanes norvegica, 3	Calanus finmarchicus, 95% of the
Thysanoessa inermis, 11	Copepoda
— longicaudata, abt. 50	— hyperboreus } 5% of
Boreomysis arctica, abt. 75 ccm.	Pseudocalanus elongatus } the Co-
Mysis mixta, 6	Euchaeta norvegica } pepoda
Diastylis Rathkei, 1	
Euthemisto libellula, 1	Scopelus glacialis, 1

St. 132, 28. 8. 1912. 60°48' N. 46°26' W. — Ringtrawl, 700 m. w., 20 min., 175 ccm. (incl. 100 ccm. Copepoda).

Pontophilus norvegicus, Zoea, 1	Mysis mixta, 2
Young Euphausid, 1	Hyperia medusarum, 1
Thysanoessa inermis, 18	Euthemisto libellula, abt. 15
— longicaudata, abt. 15	— bispinosa, 3

Euthemisto compressa, 8 ccm.	} 5 % of the Cö- pepoda
Parthemisto oblivia, 50 ccm.	
Calanus finmarchicus, abt. 95 % of the Copepoda	

St. 133, 28. 8. 1912. 60°49' N., 46°24' W. — Ringtrawl, 600 m. w., 20 min., 300 ccm. (incl. 150 ccm. Copepoda).

Meganyctiphanes norvegicus, 1	Parthemisto oblivia, 120 ccm.
Thysanoessa inermis, 27	Calanus finmarchicus, 90 % of the Copepoda
— longicaudata, abt. 15	Calanus hyperboreus, 5 %
Euthemisto libellula, 18	Pseudocalanus elongatus, 5 %
— bispinosa, 12	
— compressa, 25 ccm.	

St. 134, 29. 8. 1912. 60°54' N., 46°04' W. — 85—140 m., 0.1°—0.8°. Stones and a little clay.

Hyas coarctatus, 1	Amphiura Sundevalli, 1
Stegocephalus inflatus, 1	Ophiacantha bidentata, 3
	Strongylocentrotus droebachiensis, 6
Stichaster albulus, 8	
Ctenodiscus crispatus, 1	
Ophiopholis aculeata, 7	Eunephthya fruticosa, 1

St. 135, 29. 8. 1912. 60°51' N., 46°04' W. — 225—240 m., 0.8°. Stones with clay.

The dredge almost filled with *Ctenodiscus crispatus*.

Stichaster albulus, 1	Ophiacantha bidentata, 2
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### Skovfjord (St. 136—137, 143—156).

(See the map fig. 31).

St. 136, 30. 8. 1912 (the harbour of Narssak). 60°48' N., 45°57' W. — 6 m.

Black malodorous clay with fragments of decomposing algae.

Anonyx nugax, 2	Myriotrochus Rinkii, 1
Pontoporeia femorata, abt. 50	Chirodota laevis, several spec.
Nebalia bipes, 1	

St. 137, 1. 9. 1912. 60°45' N., 46°00' W. — Nansen-net.

10—0 m., 0.1 ccm. Detritus with small Calanidae. — 25—10 m., 0.2 ccm. Detritus with small Calanidae. — 50—25 m., 0.2 ccm. Small Calanidae, some detritus. — 75—50 m., 1 ccm. Small Calanidae, some

detritus. — 100—75 m., 0.1 ccm. Small Calanidae, some detritus. — 125—100 m., 2 ccm. Small Calanidae. — 150—125 m., 2 ccm. Small Calanidae. — 200—150 m., 5 ccm. Parathemisto oblivia, 1. Calanus finmarchicus and some small Calanidae and Sagitta. — 250—200 m., 10 ccm. Parathemisto oblivia, 7. Calanus finmarchicus and other Calanidae. — 280 (bottom)—250 m. This sample is lost.

(Skovfjord is continued St. 143—156).

### Tunugdliarfik (Eriksfjord) (St. 138—142).

(See the map fig. 31).

St. 138, 1. 9. 1912. 60°47' N., 45°55' W. — 300—360 m., 2.1°—2.1°. Bottom?

Ctenodiscus crispatus, 1 | Ophiacantha bidentata, 2

St. 139, 2. 9. 1912. 60°51' N., 45°49' W. — 280—300 m., 2.1°—2.1°. Clay without stones.

Asterias Mülleri var. groenlandica, 1 | Ctenodiscus crispatus, several spec.

St. 140, 2. 9. 1912. 60°49' N., 45°53' W. — 125—175 m., 0.8°—1.7°. Stones.

Ophiacantha bidentata, 1

St. 141, 2. 9. 1912. 60°47' N., 45°54' W. — 35—70 m., 1.2°—0.6°. Stones with Balanidae.

Hyas coarctatus, 1 | Phoxichilidium femoratum, 1  
Ischyrocerus anguipes, 1

St. 142, 2. 9. 1912. 60°48' N., 45°55' W. — 14—18 m., Algae and gravel. Amphipoda alone 20 ccm.

Hyas coarctatus, 4	Paroedicerus lynceus, abt. 15
Sclerocrangon boreas, 3	Monoculodes latimanus, sever. spec.
Spirontocaris Fabricii, abt. 50	— borealis, several spec.
(3 with Sylon)	Paramphithoë bicuspis, abt. 7 ccm.
— turgida, 7	Pontogeneia inermis, 5 ccm.
— polaris, several spec.	Amphithopsis megalops, abt. 10
Mysis oculata, abt. 20	Ischyrocerus anguipes, 2
— mixta, several spec.	Caprella septentrionalis, 1
Anonyx nugax, 1	Balanus crenatus, some spec.
?Orchomenella pinguis, 1	Sylon Hippolytes, 5
Syrrhoë crenulata, 9	

**Skovfjord** St. 143—156 (and St. 136—137).

(See the map fig. 31).

St. 143, 3. 9. 1912. 60°48' N., 46°06' W. — 65—90 m., 1.3°—0.8°.

Clay with large stones.

Chionoecetes Phalangium, 1	Ctenodiscus crispatus, 6
Diastylis scorpioides, 1	Ophiopholis aculeata, 4
— Goodsirii, 1	Amphiura Sundevalli, 1
Haploops tubicola, 1	Ophiacantha bidentata, 17
Eunephthya fruticosa, 3	Strongylocentrotus droebachien- sis, 2

St. 144, 3. 9. 1912. 60°43' N., 46°09' W. — 250—300 m., 2.1°. Stones with clay.

Nymphon Stroemii, 2	Ophiacantha bidentata, 2
	Strongylocentrotus droebachien- sis, 1

St. 145, 5. 9. 1912. 60°39' N., 46°07' W. — 10—35 m., 2.1°. Stones and Laminariae. The dredge almost totally filled with Strongylocentrotus.

Hyas coarctatus, 1	Acanthonotosoma serratum, 1
Spirontocaris Fabricii, 2	Amphithopsis megalops, 2
— Lilljeborgii, 2	Dulichia spinosissima, 1
— turgida, 1	Nymphon longitarse, 1
Mysis mixta, 1	
Ianira tricornis, 2	Strongylocentrotus droebachien- sis, many hundreds
Paramphithoë bicuspis, 3	

St. 146, 5. 9. 1912. 60°39' N., 46°08' W. — 305—310 m. Temp.? Clay with stones.

Ctenodiscus crispatus, 5

St. 147, 5. 9. 1912. 60°38' N., 46°10' W. — Plankton-net, surface, 15 min., 1 ccm.

Hyas coarctatus, Zoea, 1 | Detritus with small Calanidae

St. 148, 5. 9. 1912 (= St. 147). — Ringtrawl, 300 m. w., 20 min. Some Ctenophora, but no Crustacea.

St. 149, 5. 9. 1912. 60°37' N., 46°12' W. — Ringtrawl, 200 m. w., 20 min. Some Ctenophora, but no Crustacea.

St. 150, 5. 9. 1912. 60°36' N., 46°13' W. — Ringtrawl, 100 m. w., 20 min. Some Ctenophora, but no Crustacea.

St. 151, 13. 9. 1912. 60°25' N., 46°30' W. — 58—60 m. Temp.?  
Stones with Balanidae.

Hyas coarctatus, 1	Balanus crenatus, some spec. on stones
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St. 152, 13. 9. 1912. 60°25' N., 46°28' W. — 80—120 m. 1.8°—1.9°.  
Stones with Balanidae.

The dredge must have been drawn over a ridge, as it contained a quantity of Laminariae.

Hyas coarctatus, abt. 15	Henricia (Cribrella) sanguinolenta, 1
Sabinea Sarsii, 1	Cucumaria frondosa, 2
Spirontocaris spinus, 1	Ophiopholis aculeata, 4
Pandalus borealis, 1	Strongylocentrotus droebachiensis, 1
Ianira tricornis, 1	

St. 153, 13. 9. 1912. 60°27' N., 46°25' W. — Some Ctenophora collected in the surface.

St. 154, 15. 9. 1912. 60°24' N., 46°36' W. — Nansen-net.

10—0 m., 0.1 ccm. Detritus and small Calanidae. — 25—10 m., 0.5 ccm. Detritus and small Calanidae. — 50—25 m., 0.5 ccm. Detritus and small Calanidae. — 75—50 m., 0.5 ccm. Detritus and small Calanidae. — 100—75 m., 0.5 ccm. Detritus and small Calanidae and Ctenophora. — 125—100 m., 0.75 ccm. Small Calanidae and Ctenophora. — 150—125 m., 1 ccm. Small Calanidae. Some Sagitta. Fragments of Ctenophora (?) — 200—150 m., 4 ccm. Young Euphausidae, 2. Calanus finmarchicus. Some Ctenophora. — 270 (bottom)—200 m., 7 ccm. Mysis mixta, 2. Euthemisto compressa, 3. Calanus finmarchicus.

St. 155, 15. 9. 1912. 60°25' N., 46°34' W. — 220 (240)—abt. 400 m., 2.6°—2.8°. Stones without clay.

The 400 m. due to a hole in the bottom; average depth far less than this.

Spirontocaris Lilljeborgii, 1	Ctenodiscus crispatus, 1
Pandalus borealis, 2	Ophiura (Ophioglypha) Sarsii, several spec.
Halirages fulvocinctus, 1	Ophiopholis aculeata, 10
Nymphon Stroemii, 1	Ophiacantha bidentata, 19
Stichaster albulus, 3	Strongylocentrotus droebachiensis, 1
Pedicellaster typicus, 1	

St. 156, 15. 9. 1912. 60°27' N., 46°28' W. — 70—140 m.? — 2.3°.

Hyas coarctatus, abt. 15	Spirontocaris polaris, 2
Eupagurus pubescens, 2	— groenlandica, 1



Socarnes VahlII, 4	Ampelisca Eschrichtii, 1
Anonyx nugax, 1	Henricia (Cribrella) sanguinolenta, 1
Paramphithoë Boeckii, 3	Ophiura (Ophioglypha) robusta, 1
— bicuspis, 1	Ophiopholis aculeata, 3
Rhachotropis aculeata, 1	Ophiacantha bidentata, sever. spec.

## 2. Fresh-water stations.

(See the map fig. 31.)

Lake Nr. 1 = Small lake up in the inner part of Tasiusak, Bredefjord Sermilik, abt. 61°13' N., 45°37' W.

Lake Nr. 2 = Small lake close inside St. 123, Bredefjord, abt. 60°37' N., 46°48' W.

Lake Nr. 3 = Some small pools above the old Norse ruins at Akuliaritsok, Bredefjord, abt. 60°52' N., 46°30' W.

Lake Nr. 4 = Small pool above Narssak, Skovfjord, abt. 60°48' N., 45°57' W.

	Lake Nr. 1	Lake Nr. 2	Lake Nr. 3	Lake Nr. 4
<i>Latona glacialis</i> . . . . .	x	x	x	x
<i>Daphnia pulex</i> . . . . .	x	?	..	..
<i>Ceriodaphnia quadrangula</i> . . . . .	x	x	x	..
<i>Scapholeberis mucronata</i> . . . . .	x	..	x	x
<i>Bosmina obtusirostris</i> . . . . .	x	..	x	..
<i>Acroperus leucocephalus</i> . . . . .	..	x	..	x
<i>Lynceus affinis</i> . . . . .	x	x	..	..
<i>Eurycercus lamellatus</i> . . . . .	x	x	x	x
<i>Polyphemus pediculus</i> . . . . .	x	x	x	x
<i>Chydorus sphaericus</i> . . . . .	x	x	x	x
<i>Cyclops strenuus</i> . . . . .	x	..	..	..
— <i>viridis</i> . . . . .	..	x	..	..
<i>Diaptomus minutus</i> . . . . .	x	x	x	..
— <i>castor</i> . . . . .	..	..	..	x

## DISTRIBUTION OF THE SPECIES.

### 1. Bottom Organisms.

(Crustacea, Pycnogonida, Echinodermata.)

As in the Danmark Expedition, I have taken 200 m. as the limit between the littoral zone and the deeper portions. The littoral zone is further divided into an algae belt (0—35 m.) and a non-algal (35—200 m.).







	Kvanefjord			Bredefjord			Sermilik			Skovfjord			Tunugdliarfik		
	< 35 m.	35— 200 m.	> 200 m.	< 35 m.	35— 200 m.	> 200 m.	< 35 m.	35— 200 m.	> 200 m.	< 35 m.	35— 200 m.	> 200 m.	< 35 m.	35— 200 m.	> 200 m.
<i>Astrogonium Parelii</i> . . . . .	..	..	..	..	..	x									
<i>Ctenodiscus crispatus</i> . . . . .	..	..	xx	x	x	xxx	..	x	..	..	x	x	..	..	x
<i>Ophiura Sarsii</i> . . . . .	..	x	x	..	..	x	..	..	..	..	..	x			
— <i>robusta</i> . . . . .	..	..	..	..	x	x	..	..	..	..	x				
<i>Ophiocten sericeum</i> . . . . .	..	..	..	..	x										
<i>Ophiopholis aculeata</i> . . . . .	..	..	..	x	xx	x	..	..	..	..	x	x			
<i>Amphiura Sundevalli</i> . . . . .	..	..	..	x	x	xx	..	x	..	..	x				
— <i>denticulata</i> . . . . .	..	..	..	..	..	x									
<i>Ophiacantha bidentata</i> . . . . .	..	x	x	..	x	xx	..	..	..	..	x	x	..	x	x
— <i>anomala</i> . . . . .	..	..	..	..	..	x									
<i>Ophioscolex glacialis</i> . . . . .	..	..	..	..	..	x									
<i>Ophiolebes claviger</i> . . . . .	..	..	..	..	..	x									
<i>Gorgonoceph. Lamarekii</i> . . . . .	..	..	..	..	..	x									
<i>Strongylocentr. droebach.</i>	x	x	..	x	xx	x	..	..	..	xx	x	x	..	x	
<i>Myriotrochus Rinkii</i> . . . . .	..	..	..	x	..	..	..	..	..	x					
<i>Chirodota laevis</i> . . . . .	..	..	..	x											
<i>Eupyrigus scaber</i> . . . . .	..	..	..	x											
<i>Molpadia oolitica</i> . . . . .	..	..	..	..	..	x									
<i>Laetmogone violacea</i> . . . . .	..	..	..	..	..	x									
<i>Cucumaria frondosa</i> . . . . .	..	..	..	x	x										
— <i>calcigera</i> . . . . .	..	..	..	..	..	x									
<i>Phyllophorus pellucidus</i> . . . . .	..	..	..	..	..	x									
<i>Psolus Fabricii</i> . . . . .	..	..	..	..	x	x									
— <i>phantapus</i> . . . . .	..	..	..	..	x	x									
— <i>valvatus</i> . . . . .	..	..	..	..	..	x									

As will be seen from the foregoing list, by far the greatest yield was obtained from the Bredefjord, which appears to be due not only to the fact that most of the dredgings were made in this fjord, but also to its being the richest water. Only a few of the forms found there penetrate up into Sermilik. Very much the same may be said of Skovfjord as compared with Tunugdliarfik, thus distinctly indicating that the fauna grows poorer from the mouth of the fjords inward. Kvanefjord is seen to be far poorer than Bredefjord, and this despite the fact that the mouth only of this latter was investigated, which one would suppose to be the richest portion of the fjord.

With regard to vertical distribution, and comparison between the different fjords, the list speaks for itself; some few features should, however, be pointed out. The results are based chiefly on the material

from Bredefjord, as the best investigated water. For their zoogeographical importance *vide infra* (p. 366).

In the algae belt, (0—35 m.) the character forms were:

Hyas coarctatus	Monoculodes latimanus
Sclerocrangon boreas	Paramphithoë bicuspis
Spirontocaris polaris	Acanthonotosoma serratum
— Fabricii	Pontogeneia inermis
— turgida	Ischyrocerus anguipes
Mysis oculata	Dulichia spinosissima
— mixta	Caprella septentrionalis
Anonyx nugax	Dajus Mysidis
Onisimus Edwardsii	Balanus crenatus
Syrrhoë crenulata	Sylon Hippolytes
Paroediceros lynceus	Strongylocentrotus droebachiensis.

Of these again, however, some few species are seen to predominate over the rest *viz*; (No. 3) *Hyas coarctatus*, (No. 12) *Spirontocaris Fabricii*, (No. 16) *Sp. turgida*, (No. 17) *Sp. polaris*, but more especially (No. 63) *Paramphithoë bicuspis*, and (No. 68) *Pontogeneia inermis*.

In H. J. HANSEN, V. Grønlands Malakostraka 1887, the collections of several species present remarkable resemblance to some of the "Rink" stations, especially St. 61 (12.5—13 m.) even though the depths do not agree. Thus HOLBØLL has, from "Godthaab, deep water (abt. 40—60 fath.); on Sertularia, with *Metopa* species" sent home the following species which are of interest in this connection: *Amphilochus manudens*, *Metopa clypeata*, *M. borealis*(?), *M. longimana*, *M. Bruzelii*, *M. neglecta*, *M. longicornis*, and *Odius carinatus*.

In closed bays with decomposing weed, *Nebalia bipes* (No. 101) may almost be reckoned as a character form; in Julianehaab harbour over 550 specimens were taken at one time.

*Strongylocentrotus droebachiensis* (No. 166) may be noted as a character form also for deep water (as far down as about 400 m.) for the most part on rocky bottom. It would seem to be extremely common everywhere; in several places (though not in the area investigated, where the depth was generally too great) I have seen it in clear water at about 10 m. depth, covering the bottom so thickly that the animals lay close up to one another; this we were frequently able to observe from the boat while under way for over five minutes at a time without a break. This applies, moreover, not merely to the fjord near the old Norse church, Kakortok, but also to several places between Ivigtut and Bredefjord.

At depths from 35—200 m. only a very few species occur in great numbers; the only ones which can be said to do so are *Ctenodiscus crispatus*, *Amphiura Sundevalli*, and *Ophiacantha bidentata*, but none of the bottom forms of Crustacea or Pycnogonida.

Among the deeper stations, one in particular should be mentioned, *viz*; St. 55, (mouth of Bredefjord; 60°34' N., 46°45' W. 310—330 m. clay bottom with some small stones and large red corals). As shown in the station list p. 329, this station includes 22 species belonging to the groups dealt with in the present work. Of these, a single one, (No. 150) *Pteraster hastatus* was new to science, and the following 6 new for Greenland, *viz*; (No. 97) *Eurycope robusta*, (No. 127) *Scalpellum Stroemii*, (No. 142) *Hathrometra Sarsii*, (No. 152) *Poraniomorpha hispida*, (No. 177) *Psolus valvatus*, and (No. 181) *Primnoa resedaeformis*. This station alone has thus augmented the fauna of Greenland with 7 species. Other species also, moreover, are interesting; (No. 91) *Calathura brachiata*, (No. 94) *Ianira maculosa*, (No. 122) *Saccopsis Terebellidis*, (No. 164) *Ophioscolex glacialis* had not previously been found south of the ridge across Davis Strait (abt. 66° N.) while (No. 160) *Amphiura denticulata* had hitherto only been found at 64—64½° N. and very much the same applies to (No. 162) *Ophiacantha anomala*. Again, (No. 163) *Ophiolebes claviger*, was formerly only known from W. Greenland, locality not stated. Of the 22 species, therefore, all save 8 represent finds of some particular interest.

At depths beyond 100 m. the bottom was as a rule stony, in some few cases also with shell gravel, and at some places with much clay, *viz*:

Bredefjord St. 34 (?), 460— > 550 m.; St. 44, 165—190 m.; St. 45, 430—450 m.; St. 49, 490 m.; St. 55, 310—330 m.; St. 67, 220—310 m.; St. 69, 290—355 m.; St. 75, 200—270 m.; St. 76, 260—320 m.; St. 80, 365 m.; St. 81, 110 m.; St. 82, 80—90 m.; St. 87, 230 m.; St. 90, 100—110 m.; St. 91, 110—180 m.; St. 95, 115—155 m.; St. 96, 410 m.; St. 97, 250—280 m.; St. 98, 520—560 m.; and Sermilik St. 115, 500 m.; St. 116, 80—95 m.; with Bredefjord St. 121, 700 m.; St. 124, 700 m.; St. 130, < 900 m.; and St. 135, 225—240 m.

Such of these stations where the depth amounted to only abt. 100 m. or even less (St. 81, 82, 116, and probably also St. 90) are doubtless affected in this respect by their proximity to the inland ice, the bottom being evidently formed by glacier clay; in the branch fjord where the island of Nuk is situated, (abt. 46°35' W.) the water, even at a distance of a couple of nautical miles from the ice, was so clayey that one could not see so much as a single millimetre down. It is evident that this glacier clay has everywhere stifled practically all animal life; at St. 81—82, the dredge contained hardly anything but a quantity of tube worms with long, thin tubes. Dr. V. NORDMANN has, by the way, noticed exactly similar conditions in Northern Strømfjord, where the glacier clay marks a limit of animal life; only few species can exist in the bottomless clay or in water which must be altogether impregnated therewith.

The following list shows the stations arranged in order of depth:

Kvanefjord. St. 2, 17—19 m.; St. 10, 19.5—54 (?) m.; St. 9, 22—24 m.; St. 4, 20.5—34 m.; St. 13, 34—40 m.; St. 6, 37—45 m.; St. 1,

84 m.; St. 25, 115 m.; St. 3, 210—225 m.; St. 11, 290—320 m.; St. 23, 200—410 m.; St. 12, 290—400 m.; St. 5, 420 m.

Bredefjord. St. 123, 5—10 m.; St. 104, 7—20 m.; St. 93, 10 m.; St. 66, 9—11 m.; St. 62, 10—15 m.; St. 127, 10—15 m.; St. 61, 12.5—13 m.; St. 89, 16—17 m.; St. 37, 20—30 m.; St. 46, 20—30 m.; St. 32, 35—37 m.; St. 36, 29 (—100 m. ?); St. 78, 30—50 m.; St. 79, 30—50 m.; St. 88, 40—70 m.; St. 92, 50—90 m.; St. 68, 60—95 m.; St. 103, 90—100 m.; St. 134, 85—140 m.; St. 74, 90—200 m.; St. 81, 110 m.; St. 95, 115—155 m.; St. 91, 110—180 m.; St. 33, 100—220 m.; St. 109, 125—140 m.; St. 44, 165—190 m.; St. 40, 170—180 m.; St. 75, 200—270 m.; St. 135, 225—240 m.; St. 87, 230 m.; St. 70, 225—290 m.; St. 97, 250—280 m.; St. 67, 220—310 m.; St. 53, 260 m.; St. 76, 260—320 m.; St. 77, 245 (—470 m. ?); St. 69, 290—355 m.; St. 55, 310—330 m.; St. 80, 365 m.; St. 96, 410 m.; St. 45, 430—450 m.; St. 34, 460—550 m.; St. 49, 490 m.; St. 98, 520—560 m.; St. 121, 700 m.; St. 120, 900 m. w.; depth ca. 750 m.; St. 130, 900 m. w., ca. 750 m.

Bredefjord Sermilik. St. 112, 20—30 m.; St. 110, 55—90 m.; St. 116, 80—95 m.; St. 117, 100—120 m.; St. 111, 115 m.; St. 115, 500 m.

Skovfjord. St. 136, 6 m.; St. 145, 10—35 m.; St. 151, 58—60 m.; St. 143, 65—90 m.; St. 152, 80—120 m.; St. 156, 70—140 m.; St. 155, 220 (240)—ca. 400 m.; St. 144, 250—300 m.; St. 146, 305—310 m.

Tunugdliarfik (Eriksfjord). St. 142, 14—18 m.; St. 141, 35—70 m.; St. 140, 125—175 m.; St. 139, 280—300 m.; St. 138, 300—360 m.

The slight number of hauls made at only a few metres depth is due to the fact that the irregular contour of the bottom in the shallows rendered navigation dangerous, as there was always the risk of running the motor boat upon a rock. And it may doubtless safely be said that this feature is largely responsible for the fact that the shallower portions of the Greenland coastal waters have been so little investigated.

The depths about 300 m. also frequently involved considerable difficulty, the dredge often getting hung up here, which is probably due to rough rocky bottom, or possibly large stones. At St. 38, we had to cut away the dredge with 350 m. of line, to escape being run down ourselves by an iceberg.

## 2. Plankton.

In addition to the plankton-net, which was used in several places at the surface, NANSEN's closing net and the ringtrawl were also employed, working together, and also in conjunction with the water bottle and reversing thermometer; for hydrographical features, *vide infra* (p. 362).

In order to determine at what depth the ringtrawl actually fished with a certain length of line, the Nansen-net was called into play at about the same places, and a comparison of the hauls made showed the



actual depth fished to be = about half the length of wire out. The diameter of the Nansen-net was 50 cm., that of the ringtrawl 1 m.

In the Kvanefjord, the Nansen-net was only used once, as was also the ringtrawl; we dared not have them out oftener, owing to the quantities of fjord ice about.

In Bredefjord, the Nansen-net was used at the mouth (St. 30), in the central portion (St. 63) and at the base of the fjord (St. 94).

By way of comparison with St. 30 (at the mouth of the fjord) the following ringtrawl hauls were made:

St. 50, 100 m. w.; St. 51, 200 m. w.; St. 52 and 59, 300 m. w.; St. 35, 400 m. w.; St. 48 and 60, 500 m. w.; St. 47, 600 m. w.; St. 31, 700 m. w.; St. 129, 800 m. w.; St. 122, 900 m. w.

For comparison with St. 63 (the central portion of the fjord) the following hauls were made with the ringtrawl:

St. 86, 100 m. w.; St. 84, 200 m. w.; St. 73, 300 m. w.; St. 72, 400 m. w.; St. 65, 500 m. w.; St. 64, 600 m. w.; St. 128, 700 m. w.; St. 126, 800 m. w.

And for comparison with the work of the Nansen-net at the base of the fjord, (St. 94) the ringtrawl was called into play as follows:

St. 106, 100 m. w.; St. 107, 200 m. w.; St. 108, 300 m. w.; St. 102, 400 m. w.; St. 100, 500 m. w.; St. 133, 600 m. w.; St. 132, 700 m. w.; St. 131, 800 m. w.

In Bredefjord Sermilik the Nansen-net was not used at all, and the ringtrawl only twice, with 400 m. w. (St. 119) and 500 m. w. (St. 118).

In Skovfjord, the Nansen-net was used at St. 137 (the extreme innermost portion) and at St. 154 (at the mouth); the ringtrawl however, was only used 3 times (St. 148—150, with 300, 200 and 100 m. w.).

In Tunugdliarfik (Eriksfjord) no plankton work was done.

With regard to the method of dealing with the contents of the ring trawl, *vide supra* p. 236.

In the list of ringtrawl hauls given below, the number of individuals of each species has been calculated from a sample drawn from the whole; i. e. where one-tenth of the total yield from one station was examined, the resultant figures were multiplied by ten, giving the figure shown in the list.

### Plankton character forms.

#### 1. Ringtrawl.

In order to render the figures for all stations comparable one with another, all have been reckoned as for the same duration of haul, *viz.* 20 min. excl. paying out and hauling in.

The percentage for the two *Calanus* species denotes their ratio of each to each, not to the total yield including other Crustacea.

	Wire	Total content	<i>Meganctiphanes norvegica</i>	<i>Thysanoessa inermis</i>	<i>Th. longicaudata</i>	<i>Th. Raschii</i>	<i>Boreomysis arctica</i>	<i>Euthemisto libellula</i>	<i>Euth. compressa</i>	<i>Euth. bispinosa</i>	<i>Parathemis obliqua</i>	Hyperiidea in the whole	<i>Calanus finmarchicus</i>	<i>C. hyperboreus</i>	Copepoda in the whole
St. 50 (Breddefjord, the mouth) ..	100	3	..	..	..	..	..	..	..	..	..	..	100	..	2
St. 86 (Breddefjord, central part)	—	5	..	..	..	..	..	..	..	..	..	..	95	..	5
St. 106 (Breddefjord, the head) ..	—	9	..	..	..	..	..	..	1	..	..	..	95	..	4
St. 51 (Breddefjord, the mouth) ..	200	1)	..	..	..	..	..	..	..	..	..	..	..	..	..
St. 84 (Breddefjord, central part)	—	10	..	..	..	..	..	..	1	..	..	..	..	..	..
St. 107 (Breddefjord, the head) ..	—	0	..	..	..	..	..	..	..	..	..	..	..	..	10
St. 52 (Breddefjord, the mouth) ..	300	0	..	..	..	..	..	..	..	..	..	..	..	..	..
St. 59 (Breddefjord, the mouth) ..	—	15	..	..	..	..	..	..	..	..	..	..	..	..	..
St. 73 (Breddefjord, central part)	—	135	..	..	..	..	..	..	2	..	..	..	..	..	..
St. 108 (Breddefjord, the head) ..	—	750	..	..	..	..	..	..	4	..	..	..	..	..	..
St. 35 (Breddefjord, the mouth) ..	400	75	..	2	2	..	..	25	30	20	..	25	95	..	55
St. 72 (Breddefjord, central part)	—	1000	..	2	2	..	..	75	60	6	175	200	100	..	800
St. 102 (Breddefjord, the head) ..	—	450	..	8	..	1	..	..	15	15	75	150	100	..	325
St. 119 (Sermilik) .....	—	175	25	5	..	..	..	20	1	30	70	55	80	10	100
St. 60 (Breddefjord, the mouth) ..	500	500	..	1	7	..	..	5	60	5	40	75	95	..	425
St. 65 (Breddefjord, central part)	—	450	..	1	4	..	..	..	..	..	40	50	90	..	400
St. 100 (Breddefjord, the head) ..	—	375	..	22	15	..	..	4	..	2	30	45	90	5	300
St. 118 (Sermilik) .....	—	150	5	1	1	..	1	20	12	..	50	50	90	5	100
St. 47 (Breddefjord, the mouth) ..	600	250	..	2	4	..	..	60	15	50	100	125	..	..	125
St. 64 (Breddefjord, central part)	—	150	5	2	15	..	..	5	20	40	40	45	..	..	125
St. 133 (Breddefjord, the head) ..	—	300	1	27	15	..	..	18	25	12	120	150	90	5	150
St. 31 (Breddefjord, the mouth) ..	700	100	..	1	16	1	..	25	10	12	20	35	99	..	65
St. 128 (Breddefjord, the mouth) ..	—	175	..	8	10	..	..	3	40	9	45	100	100	..	75
St. 132 (Breddefjord, central part)	—	175	..	18	15	..	..	15	8	3	50	60	95	..	100
St. 129 (Breddefjord, the mouth) ..	800	275	3	8	14	..	..	4	30	8	60	100	100	..	150
St. 126 (Breddefjord, central part)	—	200	..	..	50	..	..	..	12	..	7	10	95	..	100
St. 131 (Breddefjord, the head) ..	—	300	3	11	50	..	75	1	..	1	45	45	95	..	200

<sup>1)</sup> *Ctenophora*, *Medusae*.

The three ringtrawl hauls made in Skovfjord (St. 148—150, with 300, 200 and 100 m.w.) yielded some few *Ctenophora*, but strangely enough no *Crustacea*.

### Remarks on the Plankton fauna.

1. Bredefjord. The surface plankton, (St. 29, 39, 41, 42, 43, 56, 57, 71, 83, 85, 99, 101, 105, 125), consisted mainly of small Calanidae (chiefly *Pseudocalanus elongatus*); there was also, however, a considerable quantity of detritus, Euphausida larvae and Zoeæ of *Hyas coarctatus*. At St. 85, a single specimen of *Parathemisto oblivia* was taken. At St. 101 a specimen of *Podon Leuckartii* G. O. Sars, was found; this being new for Greenland. The quantity varies considerably.

Nansen's closing-net (St. 30, the mouth) St. 63, (central part) St. 94 (the head). In the upper water layers, from 0—125 m. the quantity decreases in a marked degree from the mouth inwards, and the fauna of these strata is the same as that taken with the surface plankton net. Below this depth, where the temperature increases owing to the subjacent Atlantic water, we find *Calanus finmarchicus*, Euphausidae and Hyperiidæ, the quantity of the yield increasing from the mouth inwards; *vide* especially 550—450 m. In these deep layers, 550—350 m. (we had unfortunately only 550 m. of wire for the Nansen-net, and were thus unable to reach farther down) we found, most unexpectedly, *Boreomysis arctica* as a constant component; at St. 94, it was even taken as high up as 350—250 m. Another remarkable find was that of *Scina borealis*, St. 94, at 450—350 m., this species being new for Greenland. In the deep layers also, some specimens of *Conchoesia* sp. were found, and, apart from Crustacea, Tomopteris and Sagitta were of fairly frequent occurrence.

The ring trawl yielded, strange to say, nothing at all from St. 107 (200 m. w.) and St. 52 (300 m. w.), while at St. 51 (200 m. w.) it brought up a Ctenophora and a Medusa, nothing more. The yield was extremely variable; greatest with 300—500 m. w. and extremely poor with 100 m. w. which is doubtless due to the fact that the small Calanidae found near the surface (*vide* remarks on the Nansen-net) passed through the mesh.

On comparing the results from Bredefjord for plankton-net, Nansen-net and ringtrawl, it will be seen that the poor surface plankton goes down to abt. 100—125 m. Beyond this depth ( $> 33$  ‰ salinity) where the temperature increases, we find the Euphausidae and Hyperiidæ, while among the Copepoda, *Calanus finmarchicus* appears as a character form, amounting to 80—100 ‰ of all Copepoda. Euphausidae did not appear at any of the stations in such quantity as to predominate over the others; the greater portion is still made up of Hyperiidæ and Copepoda, there being as a rule at least twice as many of the latter as of the former (reckoned in ccm.); St. 108 (300 m. w.) is remarkable as yielding over 500 ccm. Sagitta.

Of Euphausidae, *Thyanoessa longicaudata* and *Th. inermis* were the most numerous (maximum at 500—800 m. w.); also *Meganctiphanes norvegica* however, must here be reckoned as a character form, albeit

	Kvanefjord	Bredefjord	
	St. 26—27 (the mouth)	St. 30 (the mouth)	St. 63 (central part)
10—0 m.	(25—0 m.) 1.5 ccm. Cirripede-cyprides (and some young Euphausidae) 35 % small Calanidae 65 %	5 ccm. almost only small Calanidae some Euphausidae (young) and Cirripede-cyprides	0.5 ccm. small Calanidae
25—10 m.	vide supra	3 ccm. small Calanidae; a few young Euphausidae and Vermes	0.2 ccm. detritus and some small Calanidae
50—25 m.	2 ccm. Hyas coarctatus, Zoea, 15. small Calanidae, some young Euphausidae and Cirripede-cyprides	2 ccm. Content = 25—10 m., but with some Appendiculariae	1 ccm. small Calanidae
75—50 m.	1 ccm. small Calanidae; a few young Euphausidae and Cirripede-nauplii and -cyprides, some Sagitta	1 ccm. Content = 50—25 m., with Hyas coarctatus, Zoea, 1	1 ccm. small Calanidae
100—75 m.	3 ccm. almost nothing but small Calanidae; some Cirripede-nauplii and -cyprides	1 ccm. small Calanidae with a few Calanus finmarchicus	3 ccm. Calanus finmarchicus, a few Sagitta
125—100 m.	4 ccm. Content = 100—75 m. ?Parathemisto oblivia, 1	1 ccm. Calanus finmarch.	3 ccm. Parathemisto oblivia, 2 Calanus finmarchicus
150—125 m.	5 ccm. almost nothing but small Calanidae; a few Calanus finmarch. some Cirripede-nauplii	3 ccm. Calanus finmarchicus; a few Calanus hyperboreus	5 ccm. Parathemisto obliv., 2 Calanus finmarchicus; some Sagitta
200—150 m.	1 ccm. Thysanoessa inermis, 1 Calanus finmarchicus; some small Calanidae; some Sagitta	15 ccm. Calanus finmarch.	3 ccm. Parathemisto obliv., 2 Calanus finmarchicus; some Sagitta
250—200 m.	2 ccm. Euthemisto libell., 1 Calanus finmarchicus; some small Calanidae	1.5 ccm. Euthemisto compr., 1 Calanus finmarchicus	2 ccm. Meganyct. norveg., 1 Thysanoessa Raschii, 1 Parathemisto obliv., 1 Calanus finmarchicus; a few Sagitta

## Closing-net.

	Skovfjord	
	St. 94 (the head)	St. 137 (the head)
0.2 ccm. small Calanidae and detritus young Euphausidae, 10 spec.	0.1 ccm. small Calanidae and detritus	0.1 ccm. small Calanidae and detritus
0.2 ccm. detritus and small Calanidae <i>Hyas coarctatus</i> , Zoea, 5	0.2 ccm. Content = 10—0 m.	0.5 ccm. Content = 10—0 m.
0.2 ccm. Content = 10—0 m.	0.2 ccm. Content = 10—0 m.	0.5 ccm. Content = 10—0 m.
1 ccm. <i>Euthemisto compressa</i> , 1 <i>Calanus finmarchicus</i> , 0.5 ccm. small Calanidae, 0.5 ccm.	1 ccm. Content = 10—0 m.	0.5 ccm. Content = 10—0 m.
1 ccm. young Euphausidae, 3 <i>Parathemisto obliqua</i> , 3 <i>Calanus finmarchicus</i>	0.1 ccm. Content = 10—0 m.	0.5 ccm. small Calanidae, detritus and Ctenophora
1 ccm. <i>Parathemisto obliqua</i> , 5 <i>Calanus finmarchicus</i>	2 ccm. small Calanidae	0.75 ccm. small Calanidae and Ctenophora
2 ccm. <i>Parathemisto obliqua</i> , 4 <i>Calanus finmarchicus</i>	2 ccm. small Calanidae	1 ccm. young Euphausidae, 2 small Calanidae and defective Ctenophora(?); a few Sagitta
1 ccm. <i>Parathemisto obliqua</i> , 1 <i>Calanus finmarchicus</i> , 0.5 ccm. small Calanidae, 0.5 ccm.	5 ccm. <i>Parathemisto obliqua</i> , 1 <i>Calanus finmarch.</i> and some small Calanidae Sagitta	4 ccm. young Euphausidae, 2 <i>Calanus finmarch.</i> ; some Cteno- phora
1 ccm. <i>Thysanoessa longicauda</i> , 1 <i>Parathemisto obliqua</i> , 5 <i>Calanus finmarch.</i> ; some small Calanidae; a few Sagitta	10 ccm. <i>Parathemisto obliqua</i> , 7 <i>Calanus finmarch.</i> ; some small Calanidae	[270 m. (bottom) —200 m.] 7 ccm. <i>Mysis mixta</i> , 2 <i>Euthemisto compr.</i> , 3 <i>Calanus finmarch.</i>

	Kvanefjord	Bredefjord	
	St. 26—27 (the mouth)	St. 30 (the mouth)	St. 63 (central part)
350— 250 m.	[300—250 m.] 1.5 ccm. young Euphausidae Calanus finmarch. 0.75 ccm. — hyperb., a few small Copepoda Cirripede-nauplii and (many) Cyprides Sagitta Ctenophora	1 ccm. Euthemisto compr., 1 Parathemisto obliv., 2 Calanus finmarchicus small Calanidae (among others Pseudocal. elong.) Sagitta Tomopteris	1 ccm. Parathemisto obliv., 2 Calanus finmarchicus; some small Calanidae Conchoesia sp., 7; 1 great Sa- gitta (1 ccm., 6 cm.)
450— 350 m.		1 ccm. young Euphausidae Boreomysis arct., 1 Calanus finmarch.; some other (the greater part small) Calanidae Tomopteris	3 ccm. Pasiphae tarda, 1 Thysanoessa longic., 1 Boreomysis arctica, 5 Parathemisto obliv., 1 Calanus finmarchicus — hyperb., a few To- mopteris
550— 450 m.		2 ccm. Parathemisto oblivia, 6 Apherusa glacialis, 2 Calanus finmarchicus — hyperb., a few; some small Calanidae Conchoesia sp., 2	4 ccm. Thysanoessa longic., 2 Boreomysis arct., 2 Calanus finmarchicus — hyperb., a few; some small Calanidae; some To- mopteris

occurring in lesser quantity. As regards Mysidae, the finding of *Boreomysis arctica* in the inner portion of Bredefjord, at great depths (700—800 m. w., 250—550 m.) was altogether unexpected. This species is thus a true character form in the deep warm water, and furnishes additional proof of the fact that the Atlantic water penetrates right up to the base of the fjord.

Among Hyperiidea, *Parathemisto oblivia* is by far the most numerous, frequently amounting to 80% of all Hyperiidea; *Euthemisto compressa*, also, with *E. hispinosa*, were fairly numerous, especially at 500—800 m. w. On the other hand, *E. libellula*, was least numerous, which, in the case of an arctic species, was only to be expected; it is found however, right down to 800 m. w.

Among the Copepoda, *Pseudocalanus elongatus* appears as a character form for the arctic surface water, making up the greater portion of what I have noted in the list as small Calanidae. Beyond abt. 100—125 m. however, *Calanus finmarchicus* is the character form, although

Skovfjord		
St. 94 (the head)	St. 137 (the head)	St. 154 (the mouth)
1 ccm. Thysanoessa longic., 1 Boreomysis arctica, 10 Parathemisto oblivia, 2 Calanus finmarch.; some small Calanidae Conchoesia sp., 1	[280 m. (bottom) —250 m.] this sample is lost	see above
3 ccm. Boreomysis arctica, 15 Parathemisto obliv., 2 Scina borealis, 1 Calanus finmarch. with a few C. hyperb. and Euchaeta Conchoesia sp., 3		
8 ccm. Boreomysis arctica, 1 Calanus finmarch. — hyperb., a few Conchoesia sp., 1		

Cal. hyperboreus often represented abt. 5% of the Copepoda at these depths, besides other species found in lesser quantity.

2. Bredefjord Sermilik. The two ringtrawl hauls (St. 118—119, 400 and 500 m. w.) revealed the same fauna as in Bredefjord itself, but less numerously represented.

3. Skovfjord and 4. Tunugdliarfik (Eriksfjord). The ringtrawl hauls in Skovfjord brought up only Ctenophora, strangely enough no Crustacea. The yield of the Nansen-net was similar to that in Bredefjord, but poorer; Hyperideae were almost entirely wanting.

In Tunugdliarfik no plankton was collected.

5. Kvanefjord. The surface hauls (St. 15, 19, 20, 21) were of about the same content as in Bredefjord, with the addition of Cirrepede cyprides. A single Amphipod (*Calliopius Rathkei?*) was also taken.

As to the haul with the Nansen-net (St. 26—27) nothing to remark.

The only ringtrawl haul made here (St. 28) cannot be compared with the hauls in Bredefjord, as much of the material must have been lost; as mentioned above (p. 236) we did not here employ the same method of dealing with the content as at the other stations.

## HYDROGRAPHY.

Investigation of the physical conditions was made by measurement of temperature and salinity. Dr. J. NIELSEN, Hydrographer to the "Tjalfe" expedition, and Dr. J. P. JACOBSEN have here assisted me in various ways, for which I beg to proffer my best thanks. I have also to thank Prof. MARTIN KNUDSEN for kindly lending me the areometers from the "Ingolf" expedition.

The salinity was measured by areometer; the figures for this however, make no claim to absolute accuracy, as it was very difficult to take a correct reading owing to the vibration of the motor boat. We were unfortunately unable to measure the salinity during the second half of the expedition, as our water bottle was broken at St. 76, and it was found impossible to get it repaired at the machine shops in Ivigtut.

Both temperature and salinity were noted at all dredgings (up to St. 75, of course) we had also intended to measure the salinity and temperature at the same places and depths where the Nansen-net was employed; i. e. at the mouth, in the central portion, and at the base, of each fjord. In the Kvanefjord, we were prevented by ice from going even half way up the fjord, so that no measurements are available for the inner portion; while as regards Bredefjord, the accident to our water bottle precluded the measuring of salinity in the inner portion, and the same applies to Bredefjord Sermilik, to Skovfjord, and Tunugdliarfik.

The results will be seen from the accompanying tables; as already mentioned, however, the figures for salinity can hardly be strictly accurate. For purposes of comparison with the measurements made at the same places where the Nansen-net was used, the results of the dredgings are arranged for each fjord according to depth. (Unfortunately we had only 600 metres of line for the thermometer and water bottle, so that it was impossible to measure at greater depth). The comparison of these figures will naturally not give any absolutely reliable result, as the manner in which the stations were spread over the whole of the fjord is here disregarded; the figures should however, serve to give some sort of an idea as to the condition from the surface downward.

### 1. The Atlantic Fjords.

Bredefjord and Sermilik. (for depths etc. *vide* p. 233, 353). The surface temperature is here very variable, but is at any rate fairly high; salinity likewise variable, but at 10 m. depth it is still only abt. 30 ‰.



Bredefjord						
depth	The mouth			Central part		The head
	"Tjalfe" 21-7-1909	"Rink" St. 30 15-7-1912		"Rink" St. 63 23-7-1912		
	temp.	temp.	salinity	temp.	salinity	temp.
m.			‰		‰	
0	3.87°	6.75°	27.0	5.5°	24.9	
10	0.80°	3.00°	31.2	0.6°	27.2	
25	0.10°	0.5°	32.2	0.5°	31.7	
50	0.38°	0.1°	32.7	0.3°	32.7	85 m.: 0.1° (St. 134)
75	0.30°	0	32.9	0.2°	32.9	100 m.: 0.4° (St. 103)
100	0.19°	0	33.1	0.1°	33.1	110 m.: 0.5° (St. 91)
125	—	0.5°	33.2	0.9°	33.6	115 m.: 0.6° (St. 95)
150	0.94°	1.0°	33.6	1.8°	33.9	140 m.: 0.8° (St. 134)
200	3.13°	2.7°	34.0	2.8°	34.3	155 m.: 1.6° (St. 95)
250	..	3.0°	34.4	3.0°	34.4	180 m.: 2.1° (St. 91)
350	3.57°	3.4°	34.5	?	34.7	240 m.: 0.8° (St. 135)
450	..	3.8°	35.2	3.7°	34.7	250 m.: 3.0° (St. 97)
500	3.73°	..	..	..	..	280 m.: 3.2° (St. 97)
550	..	3.8°	35.2	?	34.6?	520 m.: 3.6° (St. 98)
650	3.77°	..	..	..	..	560 m.: 3.9° (St. 98)

Sermilik	Skovfjord	Tunugdliarfik
temp.	temp.	temp.
.....	10 m.: 2.1° (St. 145)	
20 m.: 0.5° (St. 112)		
30 m.: 0.8° (St. 112)	65 m.: 1.3° (St. 143)	35 m.: 1.2° (St. 141)
80 m.: 1.7° (St. 116)	80 m.: 1.8° (St. 152)	70 m.: 0.6° (St. 141)
95 m.: 1.9° (St. 116)	90 m.: 0.8° (St. 143)	
100 m.: 1.0° (St. 117)		
115 m.: 0.4° (St. 111)		
120 m.: 0.8° (St. 117)	120 m.: 1.9° (St. 152)	125 m.: 0.8° (St. 140)
.....	140 m.: 2.3° (St. 156)	175 m.: 1.7° (St. 140)
.....	220 (240) m.: 2.6° (St. 155)	280 m.: 2.1° (St. 139)
.....	300 m.: 2.1° (St. 144)	300 m.: 2.1° (St. 139)
.....	400 m.: 2.8° (St. 155)	300 m.: 2.1° (St. 138)
550 m.: 3.3° (St. 114)	.....	360 m.: 2.1° (St. 138)
565 m.: 3.2° (St. 113)		

This is a natural result of the many glaciers. At 25 m. depth, the temperature was 0.5°, falling thereafter to 0° at abt. 100 m., and rising again towards the bottom, so that at 150 m. we have abt. 1.0°, at 250 m. abt. 3°, and at 350 m. abt. 3.5°, beyond which the increase is only very slight (650 m.: 3.77°).

The salinity likewise increases downwards. In the central portion of the fjord, the salinity at 10 m. depth is less (27.2 ‰) than at the mouth

## Kvanefjord.

depth	The mouth (St. 24)		Central part (St. 17)		Other stations			
	temp.	salinity	temp.	salinity	station	depth	temp.	salinity
m.		‰		‰		m.		‰
0	2.3°	27.3	2.9°	25.6	St. 2	17—19	..	31.0—31.6
10	2.0°	29.6	2.3°	26.9	St. 10	19.5	1.5°	31.8
25	1.6°	31.5	..	..	St. 4	20.5	1.5°	31.5
28	..	..	1.4°	31.8	St. 9	22	2° (?)	32.2
50	0.85°	32.5	0.9°	32.4	St. 9	24	1°	32.1
75	0.80°	32.7	..	..	St. 4	34	2.0° (?)	32.2
80	..	..	0.6°	32.7	[St. 13	34	1°	32.1]
90	..	..	0.2°	?	St. 6	37	0.7°	31.8
100	0.0°	32.9	÷ 0.5°	..	[St. 13	40	1°	32.1]
125	÷ 1.25°	33.0	..	..	St. 6	45	0.5°	31.1
130	..	..	÷ 0.8°	33.3	St. 10	54	0.8°	32.1
150	÷ 0.2°	33.3	÷ 0.8°	33.3	St. 1	84	?	32.5
162	..	..	+ 1.0°	..	[St. 25	115	0°	?] ]
175	1.0°	33.6	..	..	St. 8	140	0.2°	33.0
180	..	..	(1.5° ?)	..	St. 23	200	1.6°	33.7
200	1.5°	..	1.2°	33.7	St. 3	210	?	33.6
250	1.9°	..	2.0°	33.8	St. 7	210	1.0°	33.3
260	..	..	(1.2° ?)	..	St. 3	225	3.0°	33.8
300	2.2°	33.9	(1.2° ?)	33.8	St. 7	230	2.0°	33.3
350	2.7°	..	(1.5° ?)	34.0	St. 11	290	2.65°	34.0
380	2.7°	34.1	..	..	St. 12	290	0.7°	?
400	..	..	1.2°	33.9	St. 14	330	2.8°	34.1
440	..	..	0.2°	33.8	St. 12	400	?	33.3
					St. 23	410	3°	?
					St. 5	420	3°	34.1
					St. 16	440	2°	33.7
					St. 22	470	3°	33.8
					St. 14	500	3°	33.7

(31.2 ‰) which is due to the water from the glaciers. At 25 m. depth, we have abt. 32 ‰, 100 m. abt. 33 ‰, 200 m. abt. 34 ‰, after which the increase is only very slight (550 m.; 35.2 ‰). In the central portion of the fjord, the warm layers go somewhat farther up than at the mouth. The warm Atlantic water penetrates almost right up to the glacier at the base of the Sermilik (St. 113, 565 m. 3.2°). The low temperature (0.8°) at 250 m. (St. 135) I am unable to explain.

Skovfjord and Tunugdliarfik (for depths etc. *vide* p. 233, 354). The conditions here were not so well investigated as in Bredefjord; it is evident however, that the Atlantic water has access at least to some degree, although the bottom temperature is not as high as in Bredefjord.

Kvanefjord, (for depths etc. *vide* p. 234). At 10 m. depth, the salinity at the mouth was 29.6 ‰, as against only 26.9 ‰ in the central portion, which is due to the many icebergs. From 1.6° at 25 m. depth, the temperature decreases, down to abt. 125 m. where it was ÷ 1.25°;

## Northern Strømfjord (see the map Meddel. om Grønl. vol. 51, 1913, p. 57).

station	depth	temp.	salinity	station	depth	temp.	salinity
?	m. 0	6°	..	St. 1	m. 41	÷ 0.5°	‰
St. 2	0—2	3.5°	..	St. 4 B	46—48	÷ 0.7°	
St. 10B	5	5°	31.9	St. 23	50—52	+0.1°—+0.2°	32.3
St. 24	6	1°	..	St. 7	51—54	..	32.2
St. 34	8	1°	..	St. 17	56	0°	33.3
St. 8	12	4°	..	St. 10A	58	..	32.5
St. 3 B	14	0.3°	..	St. 11C	65—98	÷ 0.7°	33.3
St. 29	16	1.5—1.2°	32.7	St. 27	77	÷ 1.2°	
St. 24	18	0.5°	..	St. 33	45—100	÷ 1.0°	
St. 19	20	5°	33.5	St. 33	150	÷ 1.1°	34.3
St. 32	20	0.7°	..	St. 36A	170—200	..	33.5
St. 1, 34	21	0.5°	..	St. 3	190—250	0° (?)	
St. 36B	21—24	2°	..	St. 35	210—225	÷ 1.2°	35.1
St. 28	28—36	0.8°	32.3	St. 18	225—240	÷ 1.5°	33.3
St. 8	29	1.4°	..	St. 4	250—300	ca. 0°	
St. 32	35	0.2°	..	St. 21B	325	÷ 1.0°	
St. 31	35—41	1°	..	St. 3 A	325—330	÷ 0.1°	33.3
St. 3 B	38	0.2°	..	St. 11D	360—380	÷ 1.5°	
St. 14	40—45	0.2—0°	32.2	St. 4 A	400—410	÷ 0.7°	

after this, it increases downwards, 0° being probably about 150 m. (the water is naturally also at 0° some distance higher up, *viz*; at abt. 100 m.); at 250 m. the temperature is abt. 2°; at 380, at the mouth, 2.7°, while in the central portion, at 400—440 m. it is only 1.2°—2.0°, although 3° was recorded at several places from 225—500 m. This fjord is thus less Atlantic in character than Bredefjord.

The salinity increases gradually downwards; 25 m.; 31.5 ‰. 50 m.; 32.5 ‰. 125 m.; 33.0 ‰. 175 m.; 33.6 ‰. 380 m.; 34.1 ‰; i. e. the salinity also less than in Bredefjord.

## 2. An Arctic Fjord. Northern Strømfjord.

By way of comparison, we may take the figures for Northern Strømfjord, as shown in Dr. NORDMANN'S Journal. Unfortunately, the method of taking hydrographical observations at certain places from surface to bottom, as in the southern fjords, was not followed here; the measurements distinctly show, however, that the fjord is arctic in character. The temperature falls, by greatly varying degrees, to 0° at 50 m. and thence to ÷ 1.5° at 225—240 m. and 360—380 m. Not all the measurements of temperature are probably correct, but it is at least certain that the temperature is negative everywhere at all depths below 60 m. or thereabout. The salinity increases downwards; 5 m.; abt. 32 ‰; at 50 m. it appears to be abt. 32.2—33.3 ‰; the highest figure for salinity was noted at St. 35; 210—225 m.; 35.1 ‰.

## ZOOGEOGRAPHY.

As stated in the Introduction (p. 231) the object of the expedition was to show that the fauna in the deeper portion of the fjords investigated was Atlantic, and not arctic in character, and as will be seen from the following, this has been fully proved to be the case.

The method of arrangement is as follows; first all fjords together, with I, bottom organisms and II, Plankton; then each fjord taken separately, so as to determine the character of each.

For the sake of convenience, I have followed the same order as in the zoogeographical section of my work on the Danmark expedition, to which I may refer. For the Echinodermata, reference may be made to Dr. TH. MORTENSEN'S works in the "Danmark" Expedition (Meddel. om Grønland vol. 45) and on Grønlands Echinodermata (Conspectus Faunae Groenlandicae, *ibid.* vol. 23).

### I. Bottom Fauna.

#### 1. Arctic Deep-water species (> 200 m.).

(K. STEPHENSEN, Danmark-Exp., p. 565; K. St., Conspectus p. 417 — TH. MORTENSEN, Danmark-Exp., p. 291; Th. M., Conspectus, p. 313).

##### 1 A. Species endemic in the cold Polar deep of W. Greenland.

(N. of abt. 66° N.).

(K. St., Danmark-Exp., p. 566, 577; K. St., Conspectus, p. 417).

TH. MORTENSEN, in the Danmark Exped. (p. 292—93) expresses the opinion that this area is not arctic, but Atlantic, which is entirely in opposition to the testimony of the Malacostracan fauna, even though some few Atlantic species may be found. The southern portion of this polar deep (abt. 66° — abt. 71° N.) should doubtless be regarded mainly as a mixed region. Its arctic character has quite recently been distinctly demonstrated by AD. S. JENSEN, from the distribution of *Raia hyperborea* (AD. S. JENSEN; The Selachians of Greenland, *Mindeskript for Japetus Steenstrup*, 1913, No. XXX, p. 37—39, Chart p. 38).

##### 1 B. Species from the cold area of the Polar Ocean (N. of abt. 66°N.).

(K. St., Danm.-Exped., p. 567; Conspectus p. 417).

##### 1 C. Species common to Areas 1 A and 1 B.

K. St., Danm.-Exped., p. 570; Conspectus, p. 418).

In TH. MORTENSEN'S work quoted above, 12 species of Echinodermata are recorded from the great arctic deep of E. Greenland, the western portion not included (in the Conspectus only 8 species).

To these must be added the following Echinodermata:

*Lophaster furcifer* (Th. Mortensen, Conspectus, p. 355).

*Hathrometra proluxa* (*ibid.* p. 372).

The first-named species is not mentioned in the Danmark-Exped. the second, however, is in the passage quoted ascribed to the littoral

fauna, whereas judging from the depths given, it would seem rather to belong to the arctic deep.

None of these Echinodermata are included in the material from the "Rink".

Of Crustacea and Pycnogonida, none belonging to Groups 1 A and 1 B were found; of those belonging to Group 1 C, we have *Stegocephalus inflatus*, *Neohela monstrosa*, *Æginella spinosa*, and *Calathura brachiata*. None of these, however, are truly arctic forms, as none of them are restricted to purely arctic conditions; the three first are found far to the south along the coast of Norway, (the two first into the Skagerak or even the Kattegat) while the last is even known from the Bay of Biscay.

## 2. The Atlantic (boreal) Deep-sea fauna (> 200 m.).

(K. St., Danmark-Exp., p. 577; Conspectus p. 418. — Th. Mortensen, Danmark-Exp., p. 292; Conspectus p. 313).

Of Malacostraca and Pycnogonida 70 species are mentioned l. c. Of these, grown specimens of the following were taken by the "Rink"<sup>1)</sup>.

- × *Munidopsis curvirostra*
- Spirontocaris Lilljeborgii*
- Pandalus borealis*, with the larvæ of
- × *Munida Bamffica* (? , new to Greenland)
- × *Pontophilus norvegicus*
- × *Pandalus propinquus*, and the following spp. new to Greenland
- Caprella Rinkii* (n. sp.)
- Eurycope producta*
- Scalpellum Stroemii*, besides
- ? *Saccopsis Terebellidis*.

Of Echinoderms, TH. MORTENSEN mentions in all 31 species, to which must be added the following six:

- Molpadia Blakei* var. *groenlandica*
- Pteraster hastatus*
- Ophiozona tjalpiana*
- Ophiotjalpa vivipara*
- Amphiura denticulata*
- Ophiomyx serpentaria*.

Of these 37 Echinodermata the following are found in the "Rink" material:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>× <i>Molpadia oölitica</i></li> <li>× <i>Psolus valvatus</i></li> <li>× <i>Laetmogone violacea</i></li> <li>× <i>Astrogonium Parelii</i></li> </ul> | <ul style="list-style-type: none"> <li>× <i>Poraniomorpha hispida</i></li> <li>× <i>Pedicellaster typicus</i></li> <li>  <i>Pteraster hastatus</i></li> <li>× <i>Ophiacantha anomala</i></li> </ul> |
|--|---|

<sup>1)</sup> × indicates that the species should be reckoned not merely as properly belonging to this zoogeographical group, but also as a true type form.

× <i>Ophiolebes claviger</i>	× <i>Gorgonocephalus Lamarckii</i>
× <i>Amphiura denticulata</i>	× <i>Hathrometra Sarsii</i>

Disregarding *Saccopsis terebellidis*, which is not determined with certainty, and which is not included in the zoogeographical survey of the Danmark Expedition, we arrive at the result that of the 70 + 3 Malacostraca (*Scalpellum Stroemii*, which is included, although belonging to the Entomostraca) and Pycnogonida, the "Rink" has taken 9 species, i. e. abt. 12% of the Atlantic deep sea forms, while of the 37 Atlantic Echinodermata, no less than 12 are found, or abt. 31%.

One could hardly wish for better proof as to the Atlantic character of the waters investigated, especially when it is borne in mind that the "Rink" material was drawn from a very restricted area, and collected within the space of three months, whereas the lists previously published by Dr. TH. MORTENSEN and the present writer in the "Danmark" exped. and in the *Conspectus* include all earlier collections from the whole of Greenland, some of which were made at considerable distance from the coast.

In addition to the 22 species above mentioned, the following were taken by the "Rink" at depths beyond 200 m. viz:

- Neohela monstrosa* (lives both at negative and positive temp.)
- Aega ventrosa* (mainly boreal and mainly a deep sea species)
- Ianira maculosa* (mainly boreal, both deep and shallow water)
- Pycnogonum littorale* (mainly boreal, both deep and shallow water)
- Nymphon macrum* (mainly boreal, both deep and shallow water)
- *Stroemii* (both boreal and arctic, both deep and shallow water)
- Chaetonymphon hirtipes* (both boreal and arctic, depth as a rule < 150 m.)
- Heliometra glacialis* (mainly arctic, 10—1200 m.)
- Ophioscolex glacialis* (mainly arctic, 100—1800 m.)
- Cucumaria calcigera* (mainly arctic, 5—500 m.)
- Phylloporus pellucidus* (mainly arctic, 10—380 m.)

None of these species, however, can, as will be seen from the remarks appended, be regarded as furnishing absolutely certain proof of the Atlantic character of the fjords, although *Aega ventrosa*, *Ianira maculosa*, *Pycnogonum littorale*, and *Nymphon macrum* tend mostly in this direction. The 4 Echinodermata are here not of much account, being but little sensitive as regards depth or temperature.

### 3. Littoral Fauna (0—200 m.)

(K. St. Danmark Exped. p. 581; *Conspectus* p. 419. — Th. Mortensen, Danmark Exped. p. 294; *Conspectus* p. 313).

To this group should be added such bottom forms as are not included under Groups 1 and 2.

**3 A. Endemic West Greenland (and Eastern American) species + the corresponding "American" species.**

(K. St., Danmark Exped. p. 582; Conspectus p. 419).

To this group belong 24 (21) Crustacea (*Ianthe libbeyi* Ortmann erased as being synonymous with *Ianira tricornis* Kr.); the "American" fauna including *Chionoecetes opilio*, *Spirontocaris Fabricii*, *Sp. macilentus*, and *Eudorelopsis integra*. In addition, we have here to add the new species *Halirages bispinosus* n. sp. Of Echinodermata there are 3 (*Asterias polaris*, *Ophioglypha nodosa*, and *A. Stuwitzi*) which are only found in East-American and W. Greenland waters.

Of these 27 (24) species, the "Rink" has only found 8, viz. *Spirontocaris microceros*, *Metopa groenlandica*, *M. carinata*, *Paramphithoë Boeckii* and *Halirages bispinosus*, and (of American species) *Chionoecetes opilio*, *Spirontocaris Fabricii*, and *Asterias polaris*. Of these, *Chionoecetes* has not hitherto been found S. of abt.  $66\frac{1}{2}^{\circ}$  N. and *Paramphithoë Boeckii* not S. of Godthaab (abt.  $64^{\circ}$  N.). The new *Halirages bispinosus* was only found in one place.

**3 B. Endemic Greenland species.**

(K. St., Danmark Exped. p. 584; Conspectus p. 419).

Of Crustacea, 5 species belong here, of which two are "American" viz; *Nectocrangon lar* and *Spirontocaris groenlandica*. Of Echinodermata the only one falling to this group, is *Pedicellaster palaeocrystallus*.

This group is in the "Rink" material represented by the two "American" species and *Amphithopsis megalops*.

**3 C. Arctic littoral species, found from Greenland to Spitzbergen or farther east, but not N. of Siberia, and in Norwegian waters not S. of Finmark.**

(K. St., Danmark Exped. p. 584).

To this group belong 36 (27) species of Malacostraca and Pycnogonida, besides the following 6 (3) Echinodermata:

<i>Trochoderma elegans</i>	? <i>Stichaster albulus</i>
? <i>Solaster glacialis</i>	? <i>Pedicellaster typicus</i>
— <i>squamatus</i>	<i>Amphipholis Torelli</i>

In addition, the group should also include the following Echinodermata, which may be called "American" as they are also found on both sides of the American continent.

<i>Chirodota laevis</i>	<i>Henricia sanguinolenta</i>
<i>Eupyrgus scaber</i>	? <i>Pteraster obscurus</i>
<i>Cucumaria calcigera</i>	

Of these 47 (33) species, the "Rink" has only taken 12, viz; *Sclerocrangon boreas*, *Aristias tumidus*, *Anonyx nugax*, *Dulichia spinosissima*,

*Ianira tricornis*, *Diastylis Goodsiri*, *Chirodota laevis*, *Cucumaria calcigera*, *Eupyrgus scaber*, *Stichaster albulus*, *Pedicellaster typicus*, *Henricia sanguinolenta*; their occurrence in the area investigated by the "Rink" does not, however, augment their area of distribution as formerly known to any essential degree, save in the case of *Pedicellaster typicus*, which had not previously been found S. of  $66\frac{3}{4}^{\circ}$  N. and which possibly belongs to the deep Atlantic fauna.

**3 D. Arctic littoral species, found from Greenland to the eastward as Siberia inclusive, and thus probably circumpolar, but not found in Norwegian waters S. of Finmark.**

(K. St., Danmark Exped. p. 588; K. St., Conspectus p. 420).

To the 15 (13) Crustacea mentioned in the Danmark Exped. should be added *Typhlotanais finmarchicus*, (?) *Leptognathia Sarsii*, and possibly also *Metopa leptocarpa*, although this last-named species has been found S. of the area at Kristianssund in Norway. And in addition, *Mysis oculata*.

Of Echinodermata, the following belong here:

<i>Myriotrochus Rinkii</i>	<i>Asterias panopla</i>
<i>Psolus Fabricii</i>	<i>Ophiura Sarsii</i>
<i>Pteraster militaris</i>	<i>Ophiocten sericeum</i>
<i>Paraniomorpha tumida</i> (also in deeper water)	<i>Ophiopleura borealis</i>
<i>Asterias Mülleri</i>	<i>Gorgonocephalus arcticus</i>
— <i>Linckii</i>	— <i>eucnemis</i>
	<i>Heliometra glacialis</i>

in addition to some also found in the North Pacific, viz

*Ctenodiscus crispatus*  
*Ophiopholis aculeata*  
*Amphiura Sundevalli*.

Of all these species the "Rink" material includes:

<i>Mysis oculata</i>	<i>Asterias Mülleri</i>
<i>Paroedicerus lynceus</i>	<i>Ophiura Sarsii</i>
<i>Rhachotropis aculeata</i>	<i>Ophiocten serium</i>
<i>Amathilla pinguis</i>	<i>Heliometra glacialis</i>
<i>Dajus Mysidis</i>	<i>Ctenodiscus crispatus</i>
<i>Psolus Fabricii</i>	<i>Ophiopholis aculeata</i>
<i>Pteraster militaris</i>	<i>Amphiura Sundevalli</i>
<i>Poraniomorpha tumida</i>	

**3 E. Boreo-arctic species, found from America or Greenland to Spitzbergen, but not N. of Siberia, and in Europe not south of Finmark.**

(K. Stephensen, Danmark Exped. p. 590; Conspectus p. 420).

To this group belong 103 Crustacea and Pycnogonida mentioned in the Danmark Exped. and the Conspectus (*Idotea metallica* is erased, belonging in reality to the surface plankton; *Leptognathia longiremis*



likewise erased) to which must now be added *Mysis mixta* and *Metopa sinuata*, making 105 species in all.

The groups includes on the other hand but few Echinodermata, viz:

<i>Cucumaria frondosa</i>	<i>Diplopteraster multipes</i>
<i>Psolus Phantapus</i>	<i>Ophiura robusta</i>

all of which are found in the "Rink" material with the exception of *Diplopteraster*.

Of Crustaceans, the "Rink" found 35 species, viz:

<i>Hyas coarctatus</i>	<i>Paramphithoë bicuspis</i>
— <i>araneus</i>	— <i>assimilis</i>
<i>Eupagurus pubescens</i>	<i>Parapleustes glaber</i>
<i>Sabinea Sarsii</i>	<i>Acanthonotosoma serratum</i>
<i>Spirontocaris spinus</i>	<i>Odius carinatus</i>
— <i>Gaimardii</i>	<i>Calliopius laeviusculus</i>
— <i>turgida</i>	— <i>Rathkei</i>
<i>Mysis mixta</i>	<i>Rhachotropis inflata</i>
<i>Socarnes VahlII</i>	<i>Ampelisca macrocephala</i>
<i>Tryphosa nanoides</i>	<i>Protomedeia fasciata</i>
<i>Orchomenella pinguis</i>	<i>Dulichia tuberculata</i>
<i>Amphiloachus manudens</i>	<i>Aeginella spinosa</i>
<i>Metopa longimana</i>	<i>Caprella septentrionalis</i>
— <i>neglecta</i>	<i>Calathura brachiata</i>
— <i>Bruzellii</i>	<i>Munna minuta</i>
— <i>sinuata</i>	<i>Phryxus abdominalis</i>
<i>Syrrhoë crenulata</i>	<i>Bopyroides Hippolytes</i>
<i>Monoculodes latimanus</i>	

The following 8 (6) Pycnogonida were also found:

<i>Pycnogonum littorale</i>	<i>Nymphon glaciale</i>
<i>Phoxichilidium femoratum</i>	— <i>longitarse</i>
<i>Pseudopallene circularis</i>	— <i>Stroemii</i>
<i>Nymphon grossipes</i>	— <i>grossipes</i>

3 F. Boreo-arctic circumpolar (?) species, found in Europe S. of Finmark.  
(K. St., Danmark Exped. p. 601).

In the Danmark Exped. 19 Malacostraca are recorded from this area. The "Rink" found a surprisingly large number (13 in all) viz:

<i>Spirontocaris polaris</i>	<i>Pontogeneia inermis</i>
<i>Diastylis Rathkei</i>	<i>Halirages fulvocinctus</i>
— <i>scorpioides</i>	<i>Gammarus locusta</i>
<i>Orchomenella minuta</i>	<i>Ampelisca Eschrichtii</i>
<i>Pontoporeia femorata</i>	<i>Haploops tubicola</i>
<i>Monoculodes borealis</i>	<i>Ischyrocerus anguipes</i>
<i>Pleustes panoplus</i>	

To the same group belong 6 Echinodermata, viz:

*Phyllophorus pellucidus* (extending southwards as far as England)

*Pteraster pulvillus* (to southern Norway)

*Solaster papposus* (southward as far as the Channel)

— *endeca* (southward as far as Ireland, but not found N. of Siberia)

*Ophiacantha bidentata* (also found in the deep Atlantic, and Japan)

*Strongylocentrotus droebachensis* (southward as far as the Channel).

These are found in the "Rink" material with the exception of *Pteraster pulvillus* and *Solaster endeca*.

Both Crustacea and Echinodermata belonging to this group are thus represented in the "Rink" material by about the same high percentage, viz: abt. 67—70 %.

#### 4. Species of uncertain zoogeographical position.

(K. St., Danmark Exped. p. 615; Conspectus p. 421).

Under this head should be classed at least 16 (15) Crustacea and Pycnogonida, and among Echinodermata, *Ophioscolex glacialis*, which however, belongs rather to the deep Atlantic, but is also found in the arctic deep. Only the lastnamed is found in the "Rink" material.

The fact that it is not at present possible to refer all the Greenland species to definite zoogeographical groups would seem to be due, not only to incomplete knowledge of the species in question, but also to the fact that some species are not particularly sensitive as regards temperature, and may thus be found outside the area of their principal occurrence. APPELLÖF has, in "Havbundens Dyreliv, (Norsk Havfiske; Norges Fiskerier, 1. 1905, p. 72, 73, 101, and also in Murray and Hjort; The Depths of the Ocean 1912, p. 533) mentioned a number of transition forms. J. GRIEG also, in "Evertebratfaunaen paa Havdypet utenfor 'Tampen' — Bergens Museums Aarbok 1914, No. 3, p. 4 seq.) mentions forms properly belonging to the high arctic regions, but which also penetrate into the boreal areas. Among Greenland Echinodermata Grieg thus notes *Ophiopleura borealis*, *Ophiopus arcticus*, *Gorgonocephalus eucnemis*, *Tylaster Willei*, *Poraniomorpha tumida*, *Solaster squamatus*, *Korethraster hispidus* and *Hymenaster pellucidus*.

#### 5. Species found both in the Atlantic and the Pacific ("American" species).

(K. St., Danmark Exped. p. 617; Conspectus p. 422.)

Of Crustacea and Pycnogonida this group includes, besides the 25 species named in the Danmark Exped. and the Conspectus, also *Eupagurus pubescens*.

Of Echinodermata, we have here:

*Chirodota laevis*  
?*Eupyrgus scaber*  
*Molpadia oölitica*

*Laetmogone violacea*  
*Cucumaria calcigera*  
*Leptychaster arcticus*

Astrogonium Parelii	Ophiura Sarsii
Ctenodiscus crispatus	? — robusta
Solaster papposus	— nodosa
— endeca	Ophiomusium Lymani
Lophaster furcifer	Ophiopholis aculeata
Pteraster militaris	Amphiura Sundevalli
Diplopteraster multipes	Ophiacantha bidentata
Henricia sanguinolenta	Phormosoma placenta
?Asterias polaris	Strongylocentrotus droebachiensis

## II. Plankton.

(K. St., Danmark Exped. p. 606; Conspectus p. 421). — This group naturally includes neither Pycnogonida nor Echinodermata.

### A. Arctic Plankton species.

(K. St., Danmark Exped. p. 607; Conspectus p. 421).

In the Danmark Exped., 18 species of Malacostraca are noted, to which must be added Boreomysis scyphops; on the other hand, Mysis oculata and Dajus Mysidis at least should be erased, as being in reality littoral forms; these are therefore noted in the present work under the heading of bottom fauna.

Of all the mainly arctic species the "Rink" material includes only Euthemisto libellula, this, however, only in small quantities as compared with the other Hyperines.

Apherusa glacialis (Conspectus p. 175) which is an arctic species, and may with some reason be referred to the plankton, was strangely enough found at great depths both at the mouth of Kvanefjord and up in Bredefjord (*vide* p. 289).

Pseudalibrotus Nanseni (*vide* p. 278) which is new for Greenland, was taken up in the Sermilik and in Bredefjord with 400, 500 and 800 m.w., i. e. probably about 200—400 m. below the surface. This is an arctic species, hitherto found only in the Siberian sea; the determination is, however, not absolutely certain, and it is moreover, not impossible that it may have been taken nearer the surface than the length of wire would seem to indicate.

Entomostraca are not included in the geographical survey given in the Danmark Exped.; the character forms for plankton are however, noted in the present work.

Pseudocalanus elongatus (Conspectus p. 312) appears in the "Rink" material as a surface form (0—abt. 100 m.) predominating over all other species at these depths; it is mainly an arctic form, but is found as far south as the Mediterranean and the Black Sea.

Calanus hyperboreus (Conspectus p. 307) is mainly arctic, but is also found in warmer water layers, as for instance along the whole of the Norwegian coast. In the "Rink" material it amounts to abt. 5—10% of the Copepoda from 200 m. depth and beyond.

Very much the same applies to the distribution of *Calanus finmarchicus* (Conspectus p. 308); at depths of 200 m. and beyond, however, it amounts to abt. 80—90 ‰.

#### B. Boreal (Atlantic) Plankton species.

(K. St., Danmark Exped. p. 609; Conspectus p. 421).

In the Danmark Exped., 52 Atlantic Plankton Malacostraca are mentioned; *Mysis mixta* should be erased, as being a bottom form, while on the other hand, *Idotea metallica* should be reckoned to the plankton and not to the bottom fauna.

Of these, the "Rink" found 14 species in all, viz:

- × *Pasiphaë tarda* (Conspectus p. 47)
- Meganyctiphanes norvegica* (ibid. p. 55)
- Thysanoessa inermis* (ibid. p. 56)
- *longicaudata* (ibid. p. 57)
- *Raschii* (ibid. p. 59)
- × *Boreomysis arctica* (ibid. p. 67)
- Hyperia galba* (ibid. p. 97)
- *medusarum* (ibid. p. 96)
- Euthemisto compressa* (ibid. p. 102)
- *bispinosa* (ibid. p. 104)
- Parathemisto oblivia* (ibid. p. 104)
- × *Scina borealis* (new for Greenland).
- Aega ventrosa* (Conspectus p. 233)
- besides (of Entomostraca) × *Podon Leuckartii*.

Of these, only the 4 marked × are known exclusively from the Atlantic region. The others should mainly be called Atlantic, having their principal occurrence in the warm atlantic water; they have, however, also been found living under purely arctic conditions, and cannot therefore testify to the character of the fjord fauna. As however, the Atlantic water ( $> 3.5^{\circ}$ ,  $> 3.5$  ‰ salinity) does not appear until a depth of 200—250 m. below the surface, (corresponding to 400—500 m. w. with the ringtrawl) we may disregard such species as were found nearer the surface. The distinctly Atlantic species *Pasiphaë tarda*, *Boreomysis arctica* and *Scina borealis* were taken in these deep layers, whereas *Podon Leuckartii* was found at the surface.

#### Zoogeographical character of the separate fjords.

The present investigations are chiefly concerned with the deeper parts of the fjords, as the littoral fauna, being common to Greenland generally, is of minor importance to the question at issue. The following pages, therefore, deal only with the stations in 200 m. of water and

beyond; the species taken nearer the surface will easily be seen from the lists on p. 347 (bottom fauna) and p. 354 (plankton).

### 1. Bredefjord and Sermilik (chart p. 323).

Bredefjord, with Sermilik, will here be taken first as the richest and best investigated water. With regard to the depths, *vide* p. 233, 353 and for hydrographical conditions p. 362.

The bottom Crustacea taken in this fjord at depths  $> 200$  m. are as follows<sup>1</sup>:

*Chionoecetes opilio*,  $\times$  *Munidopsis curvirostra*, *Diastylis Goodsirii*, *Neohela monstrosa*, *Caprella Rinkii*, *Calathura brachiata*, (*Aega ventrosa*), *Ianira maculosa*, *I. tricornis*,  $\times$  *Eurycope producta*, *Saccopsis Terebellidis*(?),  $\times$  *Scalpellum Stroemii*.

The following Pycnogonida were taken at  $> 200$  m.: *Pycnogonum littorale*, *Nymphon Stroemii*  $\approx$  *gracilipes*, *N. macrum*, *Chaetonymphon hirtipes*.

Also the following Echinodermata: *Heliometra glacialis*,  $\times$  *Hathrometra Sarsii*, *Pteraster hastatus*,  $\times$  *Poraniomorpha hispida*,  $\times$  *Astrogonium Parelii*, *Ophiura Sarsii*,  $\times$  *Amphiura denticulata*,  $\times$  *Ophiacantha anomala*,  $\times$  *Ophiolebes claviger*, *Ophioscolex glacialis*,  $\times$  *Gorgonocephalus Lamarckii*,  $\times$  *Molpadia oölitica*,  $\times$  *Laetmogone violacea*, *Cucumaria calcigera*, *Phyllophorus pellucidus*,  $\times$  *Psolus valvatus*.

Among the Plankton the following species of Crustacea were only found at depths  $> 200$  m.:  $\times$  *Pasiphaë tarda*,  $\times$  *Boreomysis arctica*,  $\times$  *Scina borealis*, (?) *Pseudalibrotus Nanseni* and *Apherusa glacialis*, i. e. 3 true Atlantic species, whereas the two lastnamed are arctic. These two last species were however, with the exception of *Apherusa glacialis*, (Bredefjord, St. 30, Nansen-net 550—450 m.) taken with the ringtrawl, so that it is not impossible that they may in reality have been taken nearer the surface.

This gives, for Crustacea, Pycnogonida, and Echinodermata, 37 species in all, of which 14 are true types of Atlantic fauna.

Two species, *Calathura brachiata*, and *Neohela monstrosa*, are known from the arctic deep, but cannot be said to be truly arctic; *vide* Group 1. C. p. 366.

Some species are also found in shallower water, and cannot therefore be certainly classed as Atlantic deep sea forms, viz:

*Neohela monstrosa*, *Aega ventrosa*, *Ianira maculosa*, *Pycnogonum littorale*, *Nymphon Stroemii*, *N. macrum*, *Chaetonymphon hirtipes*, *Heliometra glacialis*, *Ophioscolex glacialis*, *Cucumaria calcigera*, *Phyllophorus pellucidus*.

With regard to these species, *vide* p. 368.

The remainder should doubtless most properly be classed as arctic

<sup>1</sup> Denotes species which are true types of the deep Atlantic fauna.

(or boreo-arctic) littoral species; these are: *Chionoectes opilio*, *Diastylis Goodsiri*, *Ianira tricornis*, *Ophiura Sarsii*, *vide* Group 3A, 3C—3D, p. 369—70.

Of all these 37 species, only two, viz: *Nymphon Stroemii*  $\approx$  *gracilipes* and *Boreomysis arctica* were also found in the Sermilik.

Bredefjord and Sermilik thus include among their deep water fauna 14 true types of the deep Atlantic, while of arctic deep sea forms there is at the most but one (*Pseudalibrotus Nanseni*? — *Apherusa glacialis* is mainly a littoral form). This is thus a good foundation for the conclusion that the fauna of the fjord is Atlantic.

The littoral forms (0—200 m.) will, as already mentioned, not be dealt with here, being of no interest in this connection; some few of them penetrate farther down than 200 m. These also, however, show that the fauna is far poorer in Sermilik than in Bredefjord itself; of the 89 bottom forms found in Bredefjord, only 7 were taken in Sermilik, while our material from the latter water contains no species not also found in Bredefjord. For the rest, *vide* list p. 348—51, where all bottom forms are noted.

## 2. Skovfjord and Tunugdliarfik (Eriksfjord).

(For depths etc. *vide* p. 233, 354; hydrographical conditions p. 363).

The species only found at depths beyond 200 m. are:

*Pandalus borealis*, *Halirages fulvocinctus*, *Nymphon Stroemii* (non *gracilipes*), *Asterias Mülleri*, *Stichaster albulus*, *Pedicellaster typicus*, *Ophiura Sarsii*.

None of these species are exclusively Atlantic deep sea forms, but should rather be called boreo-arctic littoral forms, being but little dependent either upon depth or temperature. Skovfjord and Tunugdliarfik are therefore, if not Atlantic, at any rate not truly arctic waters, since no purely arctic deep sea forms were found there.

The littoral fauna includes 46 species (*vide* list p. 348—51) but is of no interest in this connection.

## 3. Kvanefjord.

(For depth etc. *vide* p. 234; hydrographical conditions p. 364).

Of species only found at depths beyond 200 m. we have here but 4, viz: *Pandalus borealis*, *Aeginella spinosa*, *Phryxus abdominalis*, and *Ctenodiscus crispatus*; these species however, tell us nothing as to the character of the fauna, as they cannot be exclusively ascribed to any particular group. *Aeginella spinosa* is, it is true, mainly an arctic deep sea form; on the other hand, *Pandalus borealis* is more Atlantic.

The littoral species found numbered 34 (*vide* list p. 348—51).

#### 4. Northern Strømfjord (67°27'—68° N.) as the type of a West Greenland fjord with arctic bottom water.

(Hydrographical conditions *vide* p. 365).

As already mentioned several times in the foregoing, this fjord was investigated in 1911 by Dr. V. NORDMANN, who took it as a type of the fjords with negative temperature at bottom. The Crustacea and Pycnogonida from these investigations were dealt with by the present writer in Meddel. om Grøn., vol. 51, 1913, p. 53—77; the Echinodermata have not been treated in any special work, but were determined by Dr. TH. MORTENSEN and included in his survey of the Greenland Echinodermata in Meddel. om Grøn., vol. 23, 1913 (1914), p. 299—379, from which the list here given has been taken.

In order to show the differences apparent in the deeper parts (> 200 m.) of this arctic fjord, I append a list of the Crustacea and Pycnogonida taken at depths beyond this, (NORDMANN had no ring-trawl, and the Nansen-net was only employed at some few places, so that only a small amount of plankton was brought home, apart from the surface forms).

Hyas coarctatus	Acanthozone cuspidata
Eupagurus pubescens	Parapleustes pulchellus
Spirontocaris spinus	Unciola leucopis
— Gaimardii	Erichthonius megalops
Eudorella emarginata	Podocerus latipes
Aristias tumidus	— pusillus
Stegocephalus inflatus	Ianira Vilhelminae n. sp.
Acanthonotosoma serratum	Mesidotea Sabinei
Haploops setosa	Balanus porcatus
— tubicola	Herpyllobius arcticus
Metopa pollexiana	Pseudopallene circularis
Melita dentata	

True, this list contains no deep sea forms of true arctic character, but the species are boreo-arctic or purely arctic littoral forms (no Atlantic deep sea forms). There is this important difference between the arctic and the Atlantic species, that the latter are only found below a certain depth (abt. 200—300 m.) as the Atlantic water does not reach higher, whereas the arctic (or boreo-arctic) species are not nearly so dependent upon depth. Given a sufficiently low temperature, then even species which must be classed as deep sea forms may move up into comparatively shallow water, even to abt. 5—10 m. (*vide* my work on Denmark Exped. p. 504) whereas on the other hand, species essentially belonging to the littoral belt may go down to greater depths, (which last applies by the way, to the Echinodermata in a far higher degree than the Crustacea).

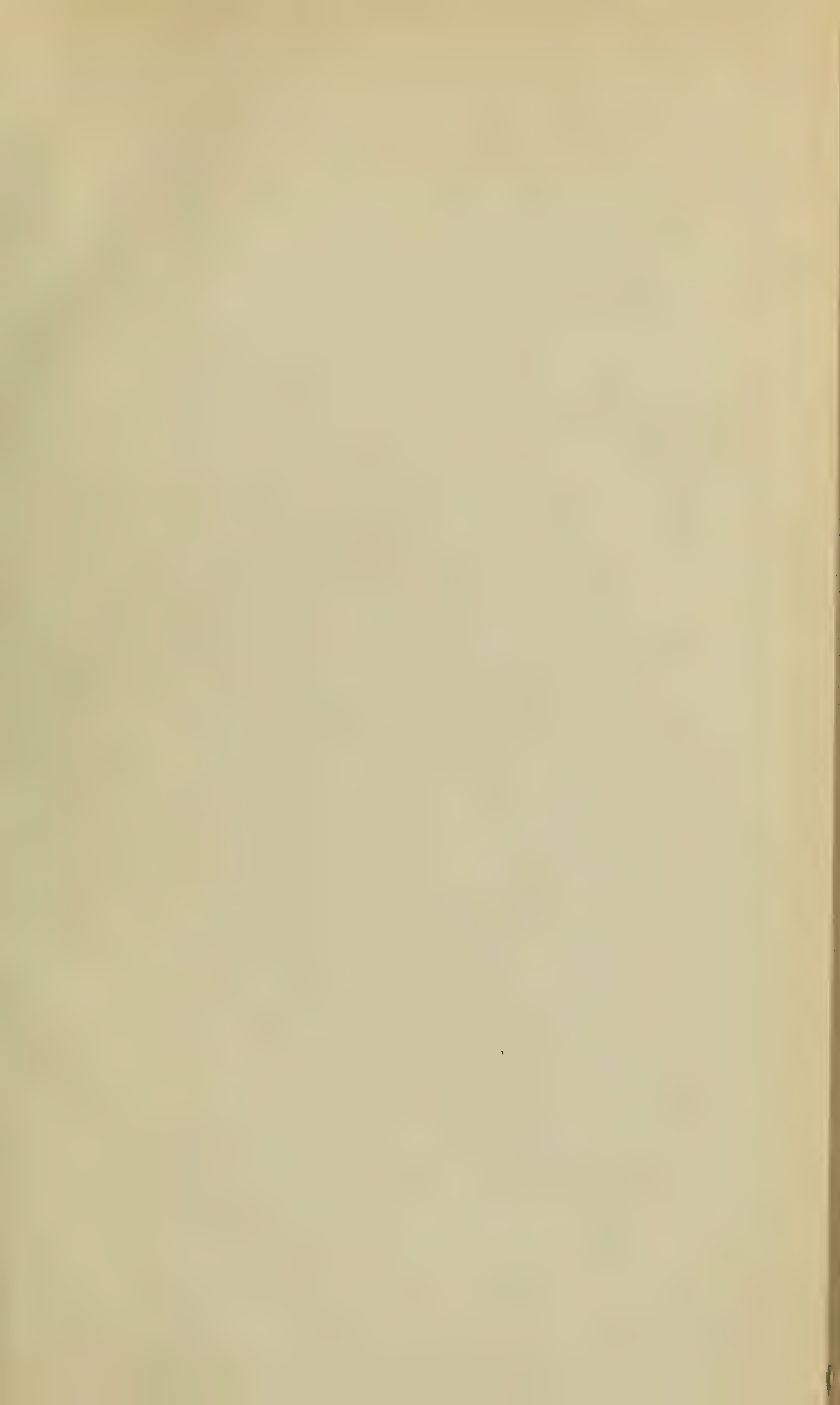
Of the 23 Crustacea and Pycnogonida above mentioned 2 (*Mesiodotea sabinei* and *Herpyllobius arcticus*) are truly arctic; 9 are mainly arctic, viz: *Eupagurus pubescens*, *Spirontocaris spinus*, *Stegocephalus inflatus*, *Acanthozone cuspidata*, *Parapleustes pulcher*, *Unciola leucopis*, *Erichthonius megalops*, *Podocerus latipes*, *Pseudopallene circularis*; the remainder are boreo-arctic. Of true arctic species, the "Rink" found only *Eupagurus pub.*, *Spiront. spinus*, *Stegoceph. infl.*, *Herpyll. arct.* and *Pseudopallene circ.* and these only at depths  $< 200$  m. i. e. in the arctic littoral belt.

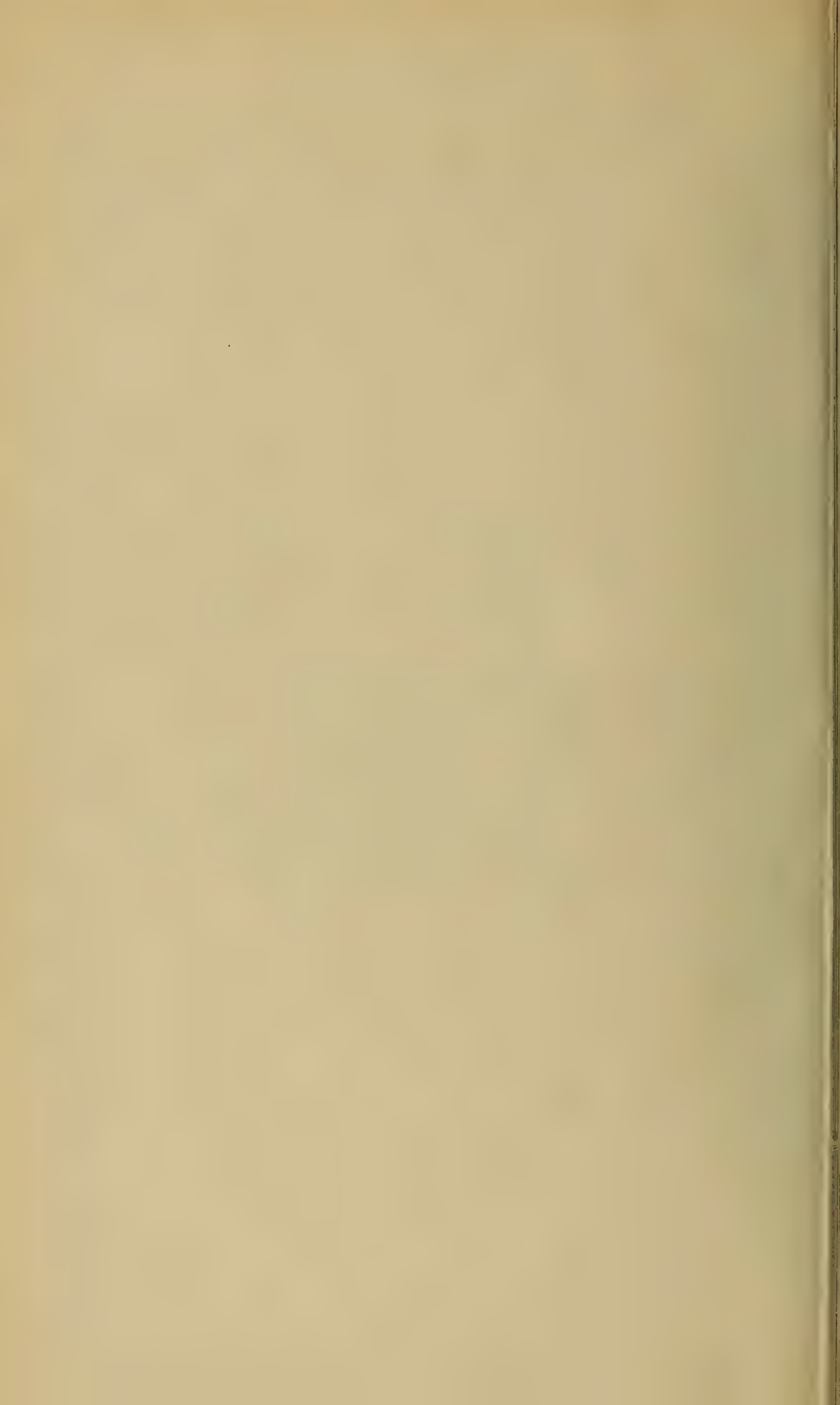
Dr. NORDMANN found in all 23 Echinodermata, as follows:

<i>Chirodota laevis</i>	<i>Asterias Mülleri</i>
<i>Myriotrochus Rinkii</i>	— <i>polaris</i>
<i>Cucumaria frondosa</i>	<i>Ophiura Sarsii</i>
— <i>calcigera</i>	— <i>robusta</i>
<i>Psolus Fabricii</i>	— <i>nodosa</i>
— <i>phantapus</i>	<i>Ophiocten sericeum</i>
<i>Phylloporus pellucidus</i>	<i>Ophiopholis aculeata</i>
<i>Ctenodiscus crispatus</i>	<i>Amphiura Sundevalli</i>
<i>Solaster papposus</i>	<i>Amphipholis Torelli</i>
<i>Pteraster militaris</i>	<i>Ophiacantha bidentata</i>
<i>Henricia sanguinolenta</i>	<i>Gorgonocephalus eucnemis</i>
<i>Stichaster albulus</i>	

Of these, only 2, viz: *Chirodota laevis* and *Phylloporus pellucidus* were taken exclusively at depths  $> 200$  m.; all the others were taken at somewhat varying depths, in the case of one species varying moreover from abt. 10 to abt. 400 m. As to these, the same applies as in the case of the Crustacea, i. e. none of them are true deep sea forms, but all are (boreo-arctic or) arctic littoral forms, which can go down to considerable depths. The fact that a number of these species were also found in Bredefjord, not only  $< 200$  m., but also in the more Atlantic water deeper down, shows that several of the Echinodermata are comparatively little affected by considerations of temperature.





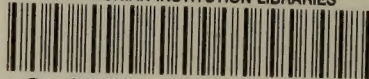








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