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THE ZOOLOGY OF EAST GREENLAND

Edited by

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in Cooperation with the Editorial Committee of »Meddelelser om Grønland«.

DECAPOD CRUSTACEANS

BY

P. E. HEEGAARD

||

WITH 27 FIGURES IN THE TEXT

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KØBENHAVN

C. A. REITZELS FORLAG

BIANCO LUNOS BOGTRYKKERI A/S

1941

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INTRODUCTION

The present paper comprises an account of the Crustacean Decapods so far found off the coast of East Greenland. It is primarily based on collections made by Danish Expeditions during the last few years, amongst which can be mentioned: „Treaarsexpeditionen til Christian d. X's Land" 1931—1934, the 6th and 7th Thule Expeditions 1933, "Thors" Expedition to Iceland and East Greenland in 1935, "Dana" 1933 and certain collectors, among them Kolonibestyrer HEDEGAARD. In addition the material of all previous expeditions has been included, partly as it has been discussed in literature and partly as it is represented in the collections at the Zoological Museum of Copenhagen.

The material which has been at my disposal does not contain any species new to science, but the following 3 species are new to East Greenland: viz. *Hyas coarctatus*, LEACH; *Lithodes grimaldii*, MILNE-EDW. et BOUVIER and *Munidopsis curvirostra*, WHITEAVES. The first and second of these have each been found one specimen only and the third in two specimens. *Hyas coarctatus* is also known from the far South of West Greenland and so could be expected also in the Southern part of East Greenland where the East Greenland specimen was captured. *Lithodes grimaldii* has only been caught in very few localities as far as is known and nothing can be said definitely about its distribution, although it was found by the "Ingolf" Expedition. It is unexpected to find that *M. curvirostra* has been found as far north as in an East Greenland Fjord (Lindenowfjord) under semi-arctic conditions, since it is a deep water species occurring on both sides of the Atlantic.

For this reason, and various others, a wider range of bottom animals has been included than of the pelagic ones. The first group includes species which can be found at great depths in Danmark Strait and also inside some of the East Greenland fjords. Some of the deep water *Anomura* included here have not yet been caught on the East Greenland shelf, but may be expected to live there, as they are found just outside in the deep water.

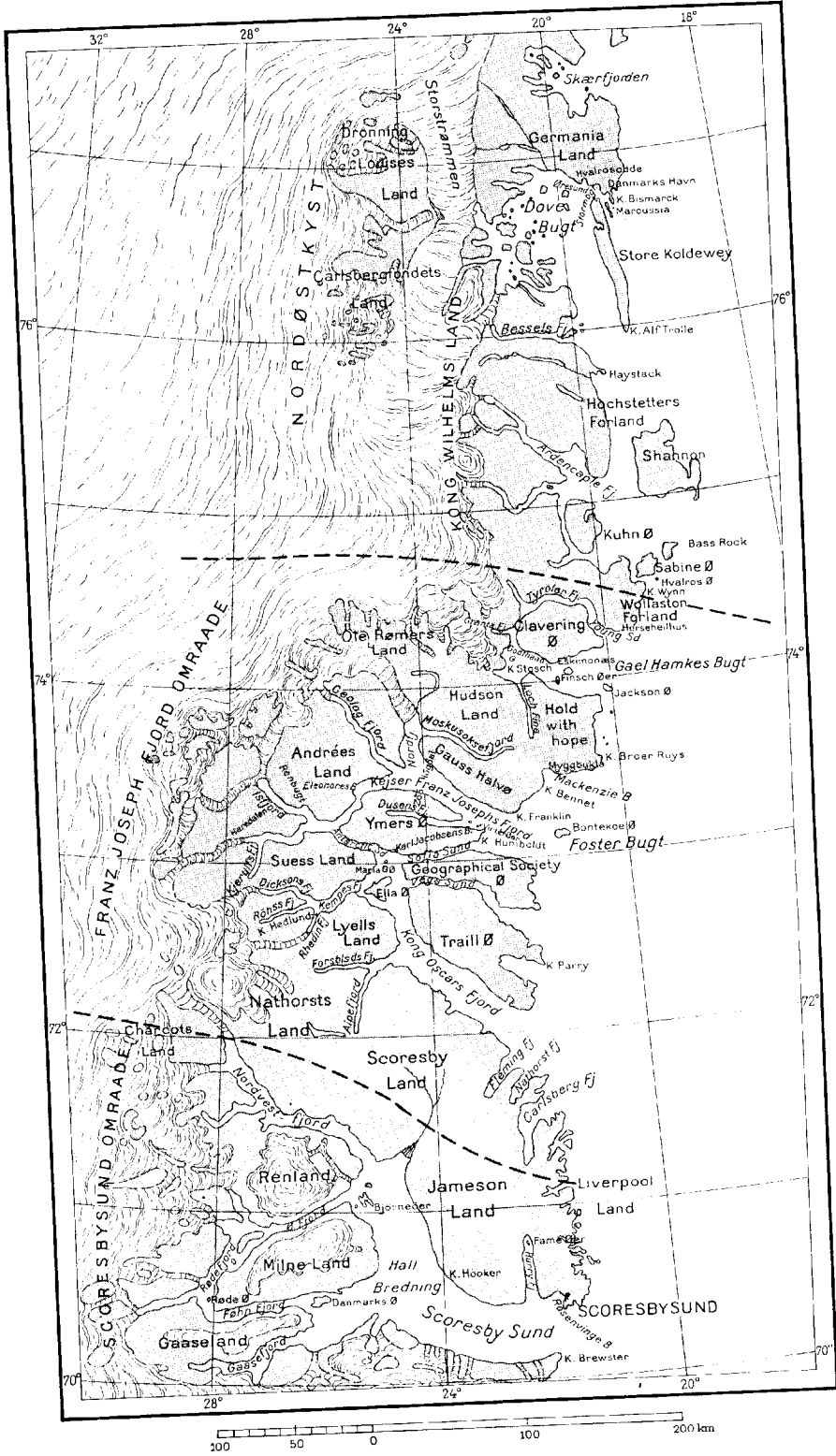


Fig. 1. Map of North-East Greenland.

Omraade = area Kyst = coast Sund = sound O = island Havn = harbour

When such forms are included in this paper they are mentioned without being numbered.

The present paper contains 33 species; the occurrence of two of these, however, is doubtful in East Greenland: viz. *Eupagurus pubescens* and *Spirontocharis liljeborgii*. *Eupagurus pubescens*, KRØYER has only once been found in East Greenland at Hekla Havn by AMDRUP 1900, and has never been seen there again, though the latest Danish Expedition specially searched for it. The recorded locality may therefore be doubtful, possibly a mistake in labelling. The other doubtful species is: *Spirontocaris liljeborgii*, DANIELSEN, represented by only one specimen from Danmarks Havn (STEPHENSEN 1912). Here the decision is not absolutely certain owing to the small size of the animal and its imperfect state of preservation. It seems more likely that the specimen belongs to *S. spinus*, SOWERBY.

The following is the complete list of species from East Greenland:

Brachyura:

Hyas coarctatus, LEACH.

Anomura:

Lithodes maja, LEACH.

Lithodes grimaldii, MILNE-EDW. et BOUVIER.

Paralomis spectabilis, HANSEN.

Paralomis bouvieri, HANSEN.

Eupagurus pubescens, KRØYER.

Munida tenuimana, G. O. SARS.

Galacantha rostrata, A. MILNE-EDW.

Munidopsis curvirostra, WHITEAVES.

Munidopsis similis, SMITH.

Macrura:

Polycheles nanus, SMITH.

Sclerocrangon ferox, G. O. SARS.

Sclerocrangon boreas, PHIPPS.

Nectocrangon lar, OWEN.

Sabinea hystrix, A. MILNE-EDW.

Sabinea septemcarinata, SAB.

Pontophilus norvegicus, G. O. SARS.

Glyphocrangon sculptus, SMITH.

Spirontocaris gaimardii, H. MILNE-EDW.

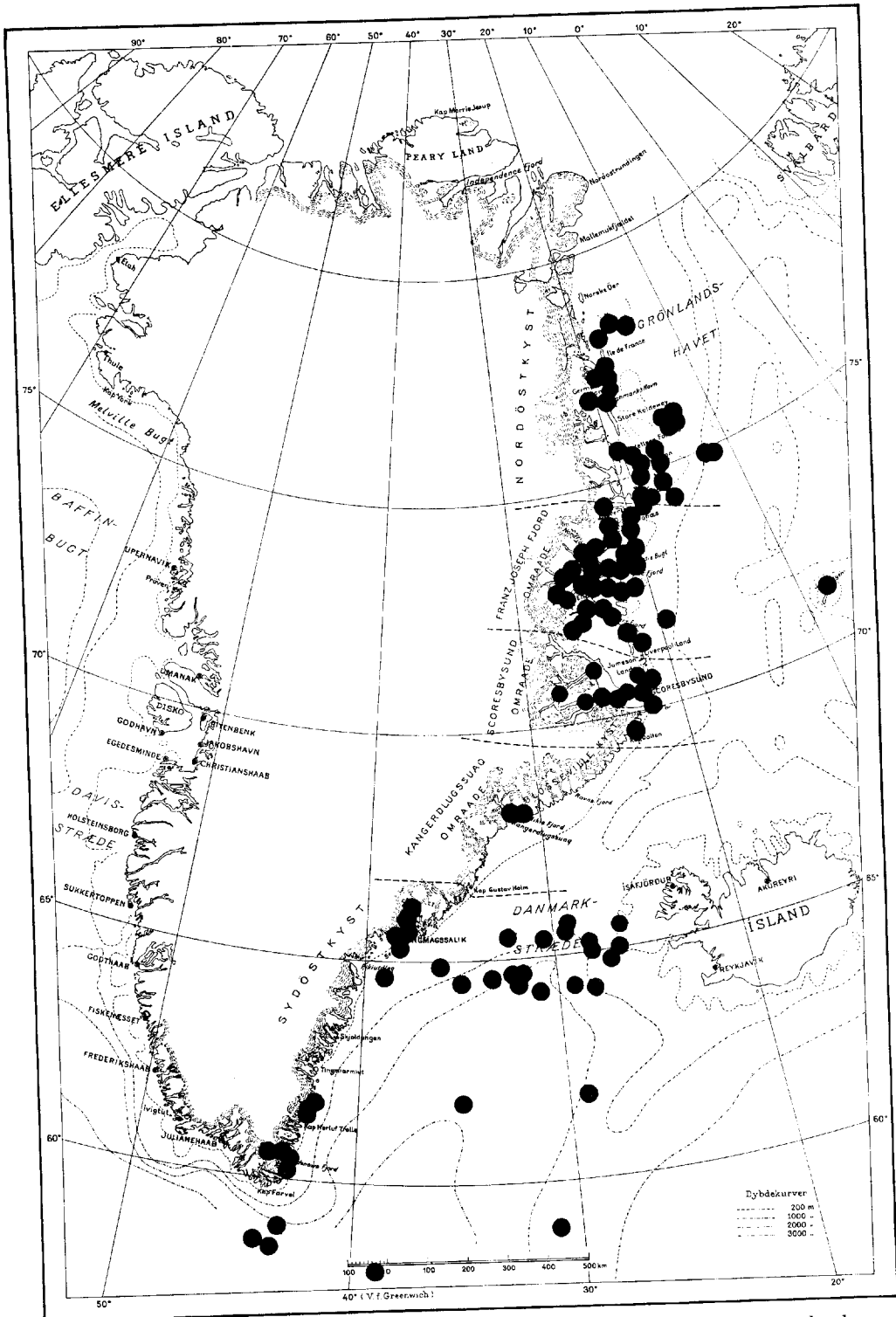


Fig. 2. Localities where Decapod crustaceans are captured off. East Greenland.

- Spirontocaris spinus*, SOW.
Spirontocaris lilljeborgii, DANIELSSEN.
Spirontocaris turgida, KRØYER.
Spirontocaris polaris, SAB.
Spirontocaris groenlandica, I. C. FABR.
Bythocaris payeri, HELL.
Bythocaris leucopis, G. O. SARS.
Bythocaris simplicirostris, G. O. SARS.
Pandalus borealis, KRØYER.
Pandalus propinquus, G. O. SARS.
Pasiphae tarda, KRØYER.
Hymenodora elegans, SMITH.
Sergestes arcticus, KRØYER.

I. SYNOPSIS OF THE SPECIES

A. Brachyura.

1. *Hyas coarctatus*, LEACH.

Hyas coarctatus, LEACH 1815, p. 329.

Hyas coarctatus, LAGERBERG 1908, p. 86, Pl. 5, fig. 8.

Hyas coarctatus, RATHBUN 1925, p. 258, lit. figs.

Larval Stage. *Hyas coarctatus*, LEBOUR 1928, p. 544, Pl. 2, fig. 9; Pl. 14, figs. 8-10, text-fig. 4, No. 14-15 and text-fig. 5, No. 29-30.

Occurrence in East Greenland (fig. 3): *Sydøstkyst Area*: At the mouth of Lindenowsfjord, depth 125-150 m, only one small specimen has been found.

Occurrence in West Greenland: *Hyas coarctatus* usually occurs in West Greenland from the most Southern point as far up as to about $70\frac{1}{2}^{\circ}$ N. It is abundant in the litoral zone at depths ranging from a few meters to 100 m, and occasionally at depths up to 350 m. ($66^{\circ}44'$ N., $56^{\circ}08'$ W.). Lindenowfjord is the first locality in which this species has been found in East Greenland, but as the species is common as far down as to Kap Farvel in West Greenland it is only to be expected that occasional individuals may occur on the East coast while it may hardly be expected to be able to enter the more arctic inner parts of the fjord areas here.

Distribution (fig. 4):

I. The Atlantic area with adjacent waters to the North. On West Greenland to $70\frac{1}{2}^{\circ}$ N. From Cape Cod to Labrador and Hudson Strait and a few localities in Hudson Bay. North and South East of Iceland up to $66\frac{1}{2}^{\circ}$ N. From S. E. Spitzbergen and Bear Island to N. W. Spitzbergen about $79\frac{1}{2}^{\circ}$ N. Along the European arctic coast from 49° E. along the Norwegian coast to the North Sea and the English Channel in the South.

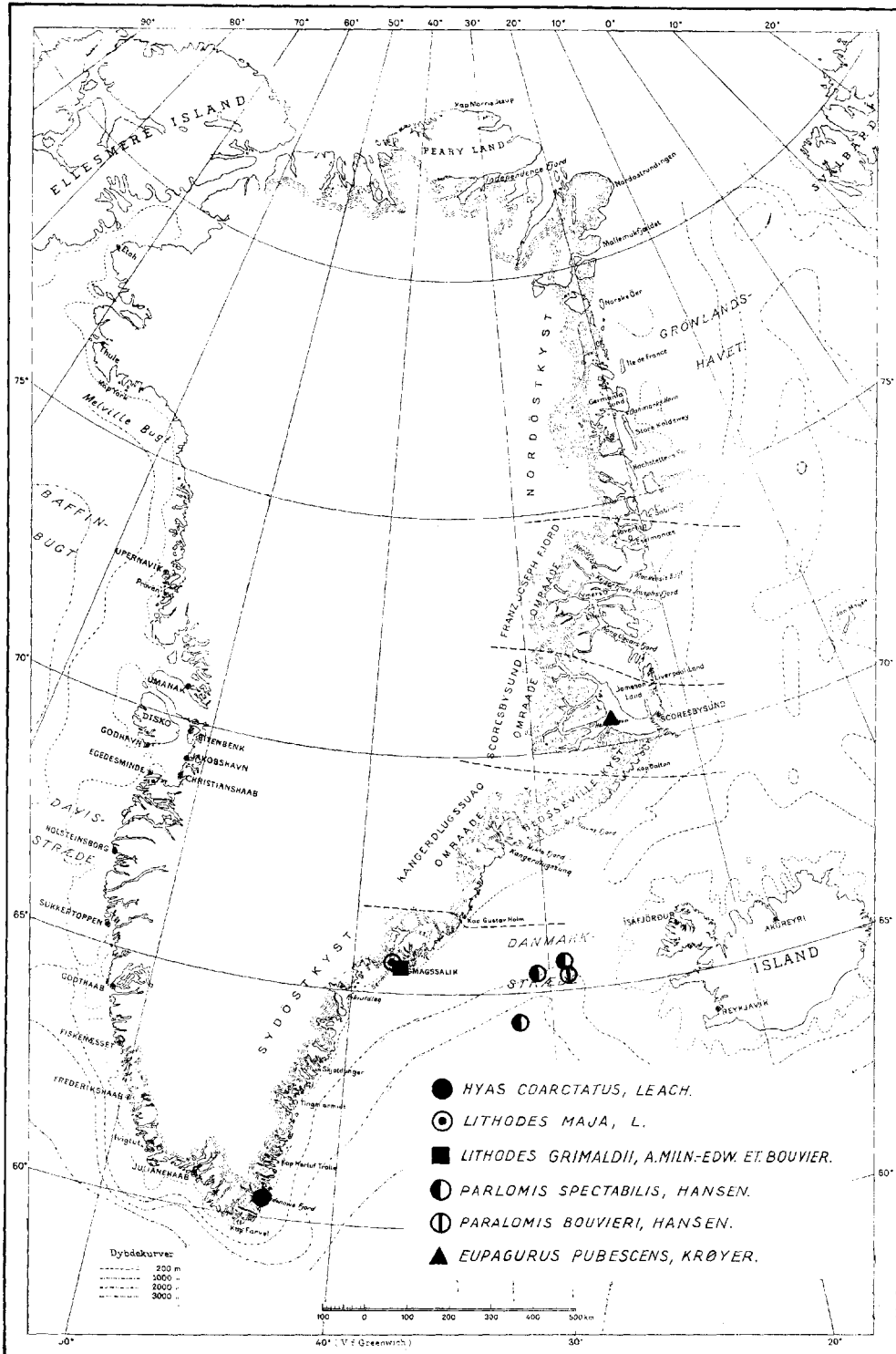


Fig. 3.

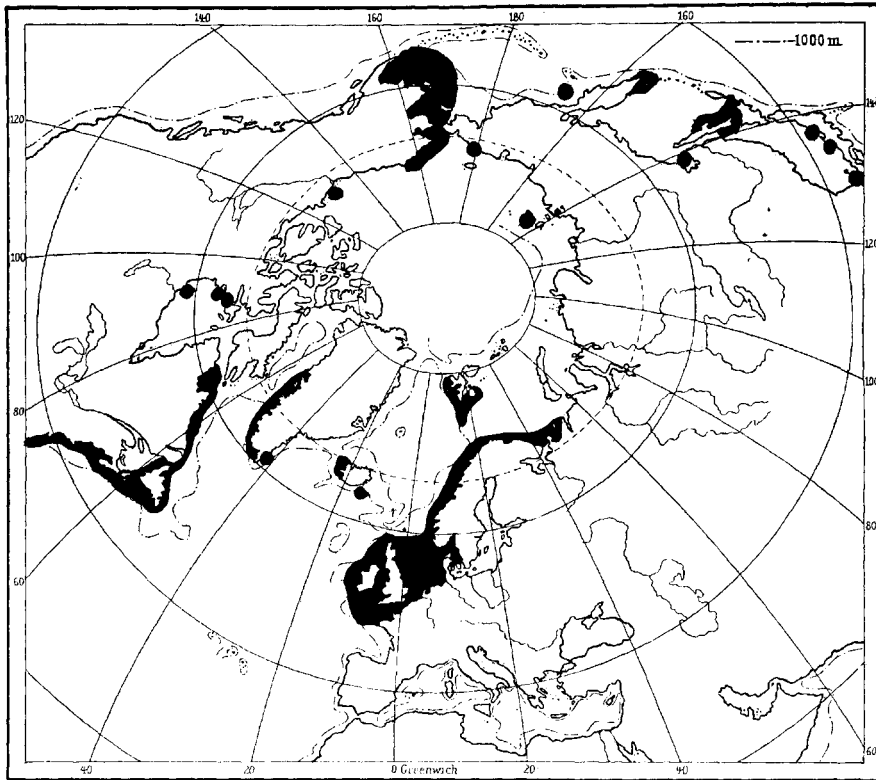


Fig. 4. *Hyas coarctatus*, LEACH.

II. The Pacific area with adjacent waters to the north. From the Bering Strait along the West coast of Alaska to about 56° N. and along the Asiatic side of Korea and possibly to Shanghai and Amoi ($24\frac{1}{2}^{\circ}$ N.). From the Bering Strait along the Siberian coast to Bennett Island and along the American arctic coast to Langton Bay E. of Mackenzie river, about 70° N., 135° W. A note accompanying the Mackenzie crabs states that they are known to the Kotzebue sound Eskimos as "Pu-tu-ri-ak", but are unknown to the people East of the Mackenzie River. (RATHBUN 1919, p. 9, and 1925, p. 270).

As it will be seen from the above its distribution is divided into two areas: an Atlantic and a Pacific, the species not having been found in N. America between Hudson Bay and the Mackenzie River (about 135° W.) and it has not been found north of Europe-Asia between 49° E. and 150° E. (Bennett Island). This interrupted distribution may be caused by the very hard arctic conditions of these seas. Even though *Hyas coarctatus* has been found West of Spitzbergen as far up as $79\frac{1}{2}^{\circ}$ N. it may be described as lower arctic boreal.

B. Anomura.

2. *Lithodes maja*, L.

Cancer maja, LINNÉ 1758, p. 629.

Lithodes maja, SELBIE 1921, p. 56, Pl. 9, figs. 1—4.

Larval Stage: *Lithodes maja*, WILLIAMSON 1915, p. 540.

East Greenland records:

Lithodes maja, H. I. HANSEN 1908, p. 22.

Occurrence in East Greenland (fig. 3): Off Angmagssalik about 65° N. at 280 m. Second Amdrup Expedition 1900, 1. spec.

Distribution (fig. 5): In West Greenland three localities have been recorded between 65°30' N. and 68°17' N.

The species extends from south of Iceland to the Shetlands and the Orkneys, southwards on the west side of Great Britain to the Isle of Man, in the North Sea to the coasts of Belgium and Holland.

In Danish waters to the northerly half of the Sound and along the Norwegian Coast to the Murman coast but not into the White Sea. species is also found round Bear Island (several places 167—245 m) and off West Spitzbergen.

On the east coast of America it has been found from New Foundland and southwards to Sandy Hook, New Jersey (40°30' N. L.).

The species is consequently mostly boreal and it has never been found at any place with a positive summer temperature.

3. *Lithodes grimaldii*, A. MILNE-EDW. et BOUVIER.

Lithodes grimaldii, A. MILNE-EDW. et E. L. BOUVIER 1894, p. 62.

Neolithodes grimaldii, BOUVIER 1896, p. 22.

Occurrence at East Greenland (fig. 3): Angmagssalik, Sermelik-fjorden by Ikatek, ♀ with eggs found on 1—2—1919.

Distribution: Davis Strait and South West of Iceland. This species has also been found several times off the east coast of America between 39°30' N. or and 41°30' N. possibly a little further north but it has often been confused with *L. agassizii*. *L. grimaldii* has been found in depths from 800 to 2500 m.

Remarks: The specimen is a female with a carapace, including the spine or processlike rostrum, 128 mm long and 100 mm broad. The 4th thoracic leg. 394 mm from the base of the coxa to the tip. The number and the position of the spines agree with the figures by S. I. SMITH and A. MILNE-EDWARDS et E. L. BOUVIER, and it has

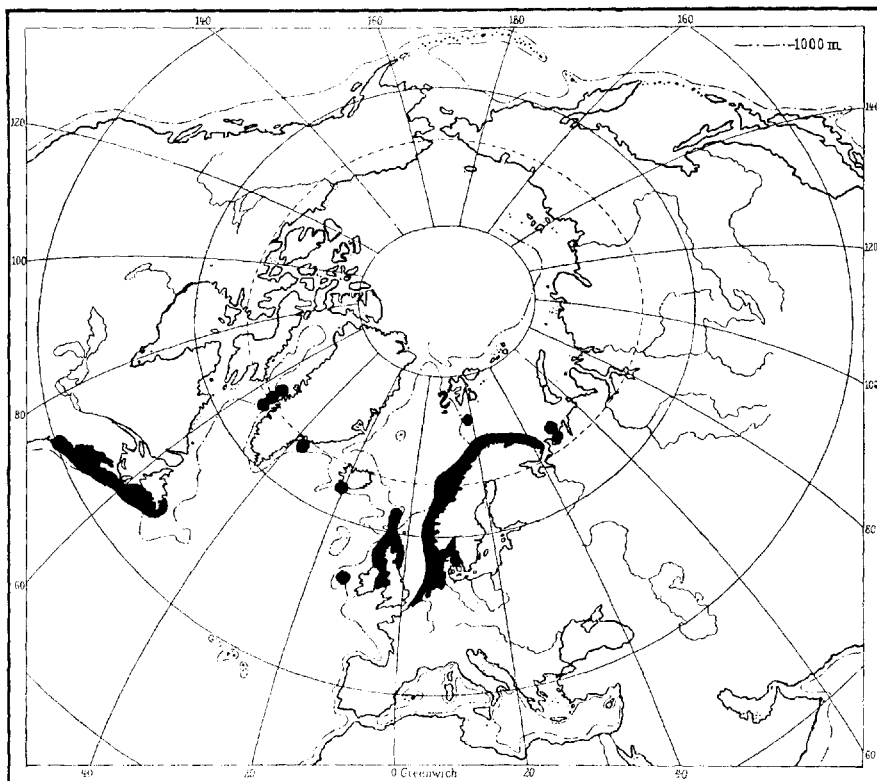


Fig. 5. *Lithodes maja*, L.

also been proved by HANSEN (1908) that near the margin of the carapace are some low tubercles which must be regarded as rudimentary spines. In the young individuals illustrated by A. MILNE-EDWARDS et E. BOUVIER as well as in 2 of the "Ingolf" Exped.s 3 individuals (7—8 mm carapace length respectively) the spines are considerably longer in proportion to the length of the carapace than in older specimens.

HANSEN explains this by saying that the longer dorsal spines in the older individual, which he had from the material collected by S. S. "Ingolf" from the Davis Strait, are broken. This is partly the case with some of the spines in this (male) specimen, but only the very points are broken and therefore the missing piece can not have added much to the length of the spine. In the individual from Angmagssalik which is a ♀ and somewhat larger than HANSEN's biggest individual, all the spines are quite undamaged, the longest spine of the carapace measuring 22 mm, and a single spine on the first abdominal segment 24 mm. (HANSEN: "the longest fragment of a spine is, however, 26 mm"). This shows that the spines do not grow in the same proportion as the animal.

Small individuals may have spines as long or even longer than the length of the carapace, while the spines of the largest known individual (the above mentioned ♀ from Angmagssalik), only measures about $\frac{1}{5}$ of the length of the carapace. It is also possible that ♀♀ have shorter spines than ♂♂.

This specimen was captured at a depth of 0—2 m by a Greenlander who brought it still alive to Kolonibestyrrer HEDEGAARD in Angmasalik. The species had not been found in depths below 800 m, but the Sermelikfjord at Ikatek, where it was found, is 800—900 m deep close inshore, and it is often tightly packed with icebergs. It is therefore possible that the animal had been resting on the foot of an iceberg from whence it was thrown into the beach in quite shallow water by some movement of the iceberg.

Although the find dates back to 1919 it is the first and only occasion in which this species has been found in East Greenland.

Larval stage: unknown.

Paralomis spectabilis, H. I. HANSEN.

Paralomis spectabilis, H. I. HANSEN 1908, p. 22, Pl. 1, fig. 3; Pl. 2, fig. 1.

East Greenland records:

Paralomis spectabilis, H. I. HANSEN 1908, p. 22.

Paralomis spectabilis, STEPHENSEN 1912, p. 577.

Occurrence at East Greenland (fig. 3): This species has been found 3 times between South Greenland and Iceland. 64°44' N., 32°52' W., 1950 m, temp. 1°.4 C. — 65°14' N., 30°39' W., 1500 m, 2°.1 C. — 65°24' N., 29°00' W., 1470 m, 1°.2 C. (HANSEN 1908).

Distribution: South of Iceland 62°06' N., 19°00' W., 2075 m, temp. 3°.1 C.

As can be seen from the above, *Paralomis spectabilis*, as well as the following species, belongs to the Atlantic (boreal) deep water fauna, which has its northern boundary at the ridge of the Shetlands—Faeroes—Iceland—Greenland—Baffin Land. This fauna does not strictly belong to the East-Greenland fauna as it has not been found on the shore-shelf.

Larval stage: unknown.

Paralomis bouvieri, H. I. HANSEN.

Paralomis bouvieri, H. I. HANSEN 1908, p. 24, Pl. 2, fig. 2.

East Greenland records:

Paralomis bouvieri, HANSEN 1908, p. 24, Pl. 2, fig. 2.

Paralomis bouvieri, STEPHENSEN 1918, p. 578.

Occurrence at East Greenland (fig. 3): 65°24' N., 29°00' W., 1470 m, 1°.2 C. (HANSEN 1908).

Distribution: Only found South of Iceland (63°15' N., 15°07' W., 1585 m, 3°.1 C.).

This species, like the previous one belongs to the Atlantic (boreal) deep-sea fauna.

Larval stage: unknown.

Eupagurus pubescens, (KRØYER).

Pagurus pubescens, KRØYER 1846, Pl. 2, fig. 1.

Eupagurus pubescens, SELBIE 1921, p. 29, Pl. 11, figs. 4—7.

Larval Stage: *Pagurus pubescens*, WILLIAMSON 1915, p. 480 with figs.

East Greenland records:

Eupagurus pubescens, H. I. HANSEN 1908, p. 27.

Occurrence at East Greenland (fig. 3): At Hekla Havn in Scoresby Sound, a single small specimen was found by the Amdrup Expedition. This specimen is the only one ever found in East Greenland though later Expeditions have looked carefully for it, especially during the "East Greenland 3 year Expedition", during which many dredgings were performed and Hekla Havn was specially combed for this species. Remembering these facts it may be a question whether the Amdrup Expedition's record is really to be trusted. It seems possible that a mistake was made in labelling.

Distribution: This species spreads along the coast of West Greenland from 72°37' N. to about 60° N. in the Shetlands and Hebrides, southwards along the British coast to Durham, also along the West Coast of Scotland into the Irish Sea and to the south west of Ireland. It is known from the northern part of Kattegat in the Skagerrak along the whole coast of Norway, on the North coast of Europe to Novaja Zemlya to about 60° E. It occurs at Spitzbergen and at Bear Island. On the East coast of North America it is found off Labrador in the Gulf of St. Lawrence, Newfoundland and southwards along the coast to 37°08' N. It has also been recorded from Kamchatka and the Bering Sea.

The geographical distribution is boreal arctic as the species is apparently absent from the Kara Sea, Jan Mayen, Franz Josef Land and North of Siberia and from the Arctic coast of North America.

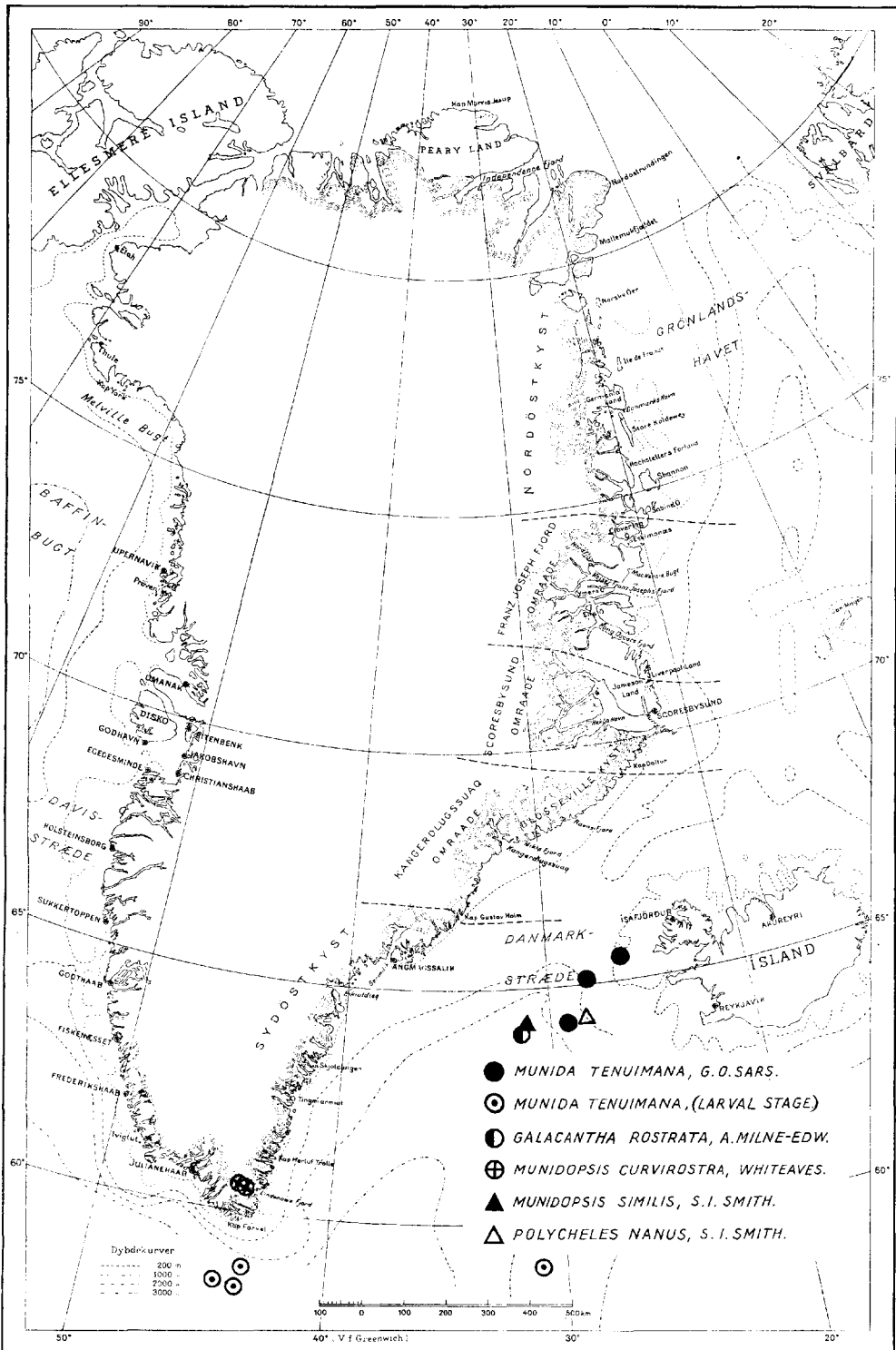


Fig. 6.

Munida tenuimana, G. O. Sars.

Munida tenuimana, G. O. Sars 1871 (1872), p. 247.

Munida tenuimana, H. I. Hansen 1908, p. 34, Pl. 2, fig. 4; Pl. 3, fig. 1.

Munida tenuimana, Dons 1915, p. 73—85, figs. 23, 27, 30, Pl. 2, fig. 11.

Munida tenuimana, A. Brinkman 1936, p. 14, 24.

Larval Stage: *Munida tenuimana*, I. Huus 1935, p. 8 with figs.

East Greenland records:

Munida tenuimana, H. I. Hansen 1908, p. 34.

Occurrence at East Greenland (fig. 6): 64°54' N., 29°06' W., 1130 m, 4°.4 C. — 65°28' N., 27°39' W., 900 m, 5°.5 C. — 65°43' N., 26°58' W., 500 m, 6°.1 C. (H. I. Hansen 1908).

The larval stage has been found in some localities south of Greenland near Kap Farvel by the S.S. "Tjalfe" (Stephensen 1913). 57°51' N., 43°57' W., 500 m Wire — 57°51' N., 43°48' W., 1000 m Wire — 58°16' N., 47°12' W., 80—200 m Wire — 58°24' N., 30°35' W., 500 m Wire.

Distribution: The species was found by Sars in the deep Norwegian fjords situated between 60° and 68°12' N. in depths from 600—1300 m. In the Skagerrak it has been found in the deep part at 400—600 m. It is not known off the East coast of Great Britain or from the shallow part of the North Sea.

It goes southwards in the deeper water of the Atlantic to Southern Europe and perhaps northern Africa and it is definitely recorded from the southern part of the Adriatic (Pesta 1918).

In the older literature it has been confused with *M. bamfida* by Milne-Edwards, Bouvier, Senna, Adensamer and others. Therefore it is impossible to give the southern limit of its distribution with certainty. Compared with *M. bamfida* which lives in more shallow water, *M. tenuimana* is an Atlantic (boreal) deep water species usually living between 400—1500 m. (Björk 1913 records it from 105 m, from the Skagerrak).

Galacantha rostrata, A. Milne-Edw.

Galacantha rostrata, A. Milne-Edw. 1880, p. 52.

Galacantha rostrata, A. Milne-Edw. et Bouvier 1900, p. 308, Pl. 6, fig. 9.

East Greenland records:

Galacantha rostrata, H. I. Hansen 1908, p. 35.

Occurrence at East Greenland (fig. 6): 64°34' N., 31°12' W., 2600 m, 1°.6 C. (H. I. Hansen 1908).

Distribution: It is apparently a cosmopolitan deep-water species, as it is distributed from the Antilles northwards to 40°17' N.,

off North Africa (30° N.), in the Arabian Sea, the Indian Ocean (Bay of Bengal, Banda), and the Pacific (West Columbia, the Galapagos Islands).

Larval stage: unknown.

4. *Munidopsis curvirostra*, WHITEAVES.

Munidopsis curvirostra, WHITEAVES 1874, p. 212.

Munidopsis curvirostra, H. I. HANSEN 1908, p. 36, Pl. 3, fig. 2.

Munidopsis curvirostra, SELBIE 1914, p. 84, Pl. 13, fig. 14.

Occurrence at East Greenland (fig. 6): In the Lindenowfjord near Narsak 500–700 m (“Thor” 1935, st. 11⁴) and in the innermost part of Lindenowfjord at 245 m (“Thor” 1935, st. 14²). This is a species new to the East Greenland fauna; it has sometimes been found in the Davis Strait, but always at higher temperatures 3°–4° C.; in the Lindenowfjord the temperature was only between zero and +1° C.

Distribution: This species was originally found in the Gulf of St. Lawrence and it has since been recorded from a number of places on the East Coast of the United States between 33°35' N. and 40° N. In the name of *M. longirostris* A. M.-EDW. et BOUVIER it is mentioned from Newfoundland waters and the West Coast of the Sudan at 30° N. As mentioned above HANSEN has found it in the Davis Strait and also to the south and south west of Iceland. According to its distribution *M. curvirostra* belongs to the arctic deep-sea fauna, but as HANSEN points out it may prove to have a far wider distribution than is known at present.

Larval stage: unknown.

Munidopsis similis, S. I. SMITH.

Munidopsis similis, S. I. SMITH 1886, p. 647, Pl. 5, fig. 1; Pl. 6, fig. 2.

Munidopsis similis, H. I. HANSEN 1908, p. 38, Pl. 3, fig. 4.

East Greenland records:

Munidopsis similis, HANSEN 1908, p. 38.

Occurrence at East Greenland: 64°34' N., 31°12' W., 2600 m, temp. 1°.6 C., 1 spec. HANSEN 1908.

Distribution: HANSEN writes as follows: “*M. similis* was founded on a specimen taken off the East coast of America at 39°46'¹/₂ N. in 2120 m, *M. crassa*, SMITH, of which *M. similis* appears to be a variety, was founded on a specimen taken off the East coast of America at 36°16'¹/₂ N., in 5145 m. There is also a likelihood that *Munidopsis*

subsquamosa var. *aculeata*, HEND. belongs to *M. crassa* + *M. similis* and these forms were taken by the "Challenger" West of Patagonia (2900 m) and between Marion Island and the Crozets (2750 m)". According to this the species may be said to have a cosmopolitan deep-sea distribution.

Larval stage: unknown.

C. Macrura.

Polycheles nanus, (S. I. SMITH).

Pentacheles nanus, S. I. SMITH 1884, p. 359.

Polycheles nanus, H. I. HANSEN 1908, p. 42.

Polycheles nanus, SELBIE 1914, p. 21, Pl. 1, figs. 14—15.

East Greenland records:

Polycheles nanus, H. I. HANSEN 1908, p. 42.

Occurrence at East Greenland (fig. 6): 64°24' N., 28°50' W., 1575 m, 3°.5 C. (H. I. HANSEN 1908).

Distribution: The species has a very wide range, having been found in Davis Strait, the west, south west and south of Iceland. It is found on the East coast of North America between 35° N. and 41° N., known from Ireland and the Bay of Biscay, off the West coast of Senegal northeast of the Cape of Good Hope, and off the Pacific coast of America between 0°31' S. and 7°30' N. This shows that this species also is a cosmopolitan deep-sea form.

Larval stage: Not definitely known but probably the genus *Eryoneicus* is the larval stage of *Polycheles*.

5. *Sclerocrangon ferox* (G. O. SARS).

Cheraphilus ferox, G. O. SARS 1877, p. 239.

Sclerocrangon salebrosus, G. O. SARS 1885, p. 15, Pl. 2.

Larval stage: *Sclerocrangon ferox*, WOLLEBÆK 1908, No. 11 p. 1—9.

East Greenland records:

Sclerocrangon ferox, H. I. HANSEN 1895, p. 125.

Sclerocrangon ferox, OHLIN 1901, p. 26.

Sclerocrangon ferox, HANSEN 1908, p. 49.

Sclerocrangon ferox, KOEFOED 1909.

Sclerocrangon ferox, STEPHENSEN 1912, p. 506.

Sclerocrangon salebrosus, NOUVEL 1932, p. 887.

Sclerocrangon ferox, GRIEG 1932, p. 11.

Sclerocrangon ferox, SIVERTSEN 1935, p. 43.

Sclerocrangon ferox, WINKLE and SCHMITT 1936, p. 329.

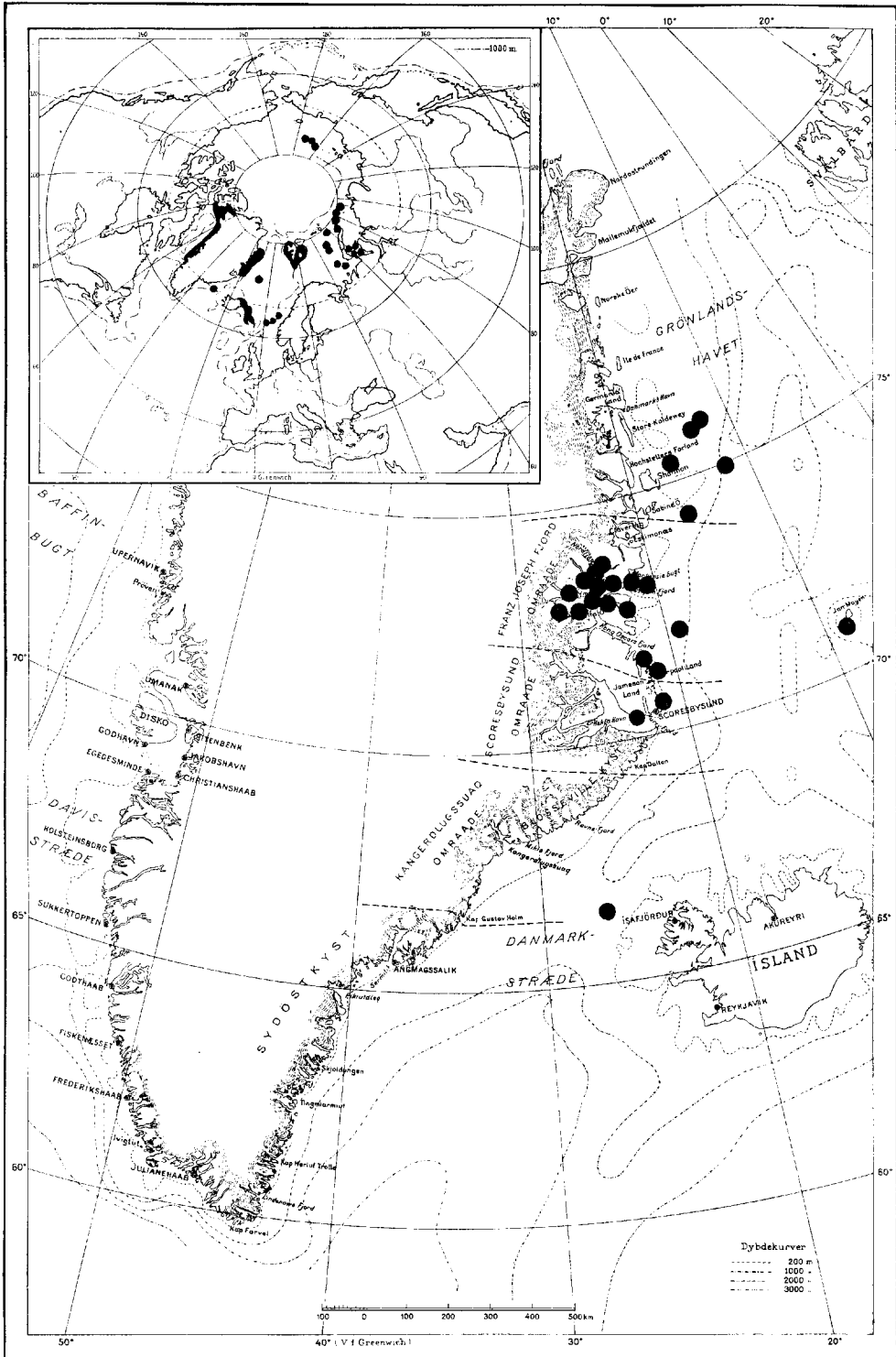


Fig. 7. *Sclerocrangon ferox* G. O. Sars.

Occurrence at East Greenland (fig. 7): The only finds south of the Franz Joseph Fjord are in the Danmarkstrait $66^{\circ}34' N.$, $26^{\circ}43' W.$, 308—340 m ("Veiding" 1931, st. 156, GRIEG 1932), those at Scoresbysund, (two finds at Rosenvinge Bugt, NOUVEL 1932) and one specimen from Kap Hooker, Jameson Land.

Franz Joseph Fjord Area: In this area it is distributed as both scattered specimens in deeper waters (58 m) 250—1000 m and at some distance off the coast and also within the East Greenland fjords in deep water. $71^{\circ}37' N.$, $21^{\circ}10' W.$, Liverpool Land 260 m. Cape Stosch—Flemming Inlet—Carlsberg Fjord—Forsblad Fjord—Vega Sund, several localities—Kempe Fjord—Dicksonfjord—Kong Oscars Fjord—Ella Ø—Franz Joseph Fjord, from the mouth to the innermost parts of the fjord — Ymerø, Dusenfjord—Moskusoxefjord. In most places only one or two individuals have been found at each station. Depth (150 m) 200—450 m (780 m). (H. I. HANSEN 1895, 1908, OHLIN 1901, SIVERTSEN 1935, WINKLE and SMITH 1936).

Nordostkyst Area: $74^{\circ}17' N.$, $15^{\circ}20' W.$, 264 m — $74^{\circ}56' N.$, $12^{\circ}50' W.$, 200 m — $75^{\circ}58' N.$, $14^{\circ}08' W.$, 300 m — $75^{\circ}59' N.$, $14^{\circ}12' W.$, 300 m — $76^{\circ}06' N.$, $13^{\circ}26' W.$, 200—250 m. (HANSEN 1895, KOEFOED 1909, STEPHENSEN 1912, SIVERTSEN 1935).

Distribution: In West Greenland from Etah ($78^{\circ} N.$) to Holsteinborg ($66^{\circ}16' N.$), (depths 235—875 m). Baffin Bay and the Polar Basin from Greenland to S. E. of Novaja Zemlya. Also in the western and northern parts of the Kara Sea and in the east Siberian Sea. The most northerly place is north of Spitzbergen at $81^{\circ}20' N.$ — Southwards to N. E. of Shetland Islands. It has not yet been found in the Pacific or along the arctic coasts of North America. It may, however, after further investigation, prove to be circumpolar in its distribution.

It is the most high arctic decapod known from East Greenland where it lives in temperatures between $+1^{\circ}.1$ and $-1^{\circ}.7 C.$, only once found in $+2^{\circ} C.$ *Sclerocrangon ferox* does not go into water shallower than about 100 m, and it is more often found in depths from 200—800 m, but also down to 1060 m (SARS, Spitzbergen).

Biology: In accordance with its preference of low temperatures it is only found in deeper water or near the bottom of the East Greenland fjords, where it is mostly found in localities with negative temperature. Therefore it naturally will be found on mud although this is approximately of no value for the shrimp from the biological point of view.

Sc. ferox eggs are extremely large, 3.5 mm in diameter (fig. 8), the largest eggs of any arctic crustacean, and, in proportion to the size of the animal, probably the largest crustacean eggs known. The eggs are hatched during the summer, but the young ones are not, like our boreal

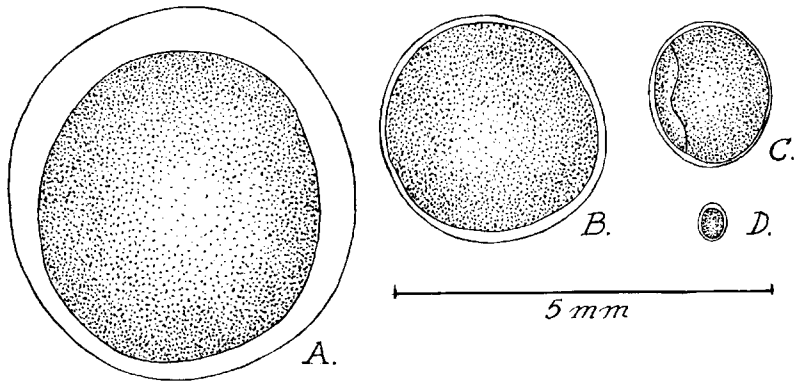


Fig. 8. A.—C. Eggs of arctic Crangoninae. A. *Sclerocrangon ferox*. B. *Sc. boreas*. C. *Nectocrangon lar.* compared with D. The boreal *Crangon vulgaris*. (THORSON 1936).

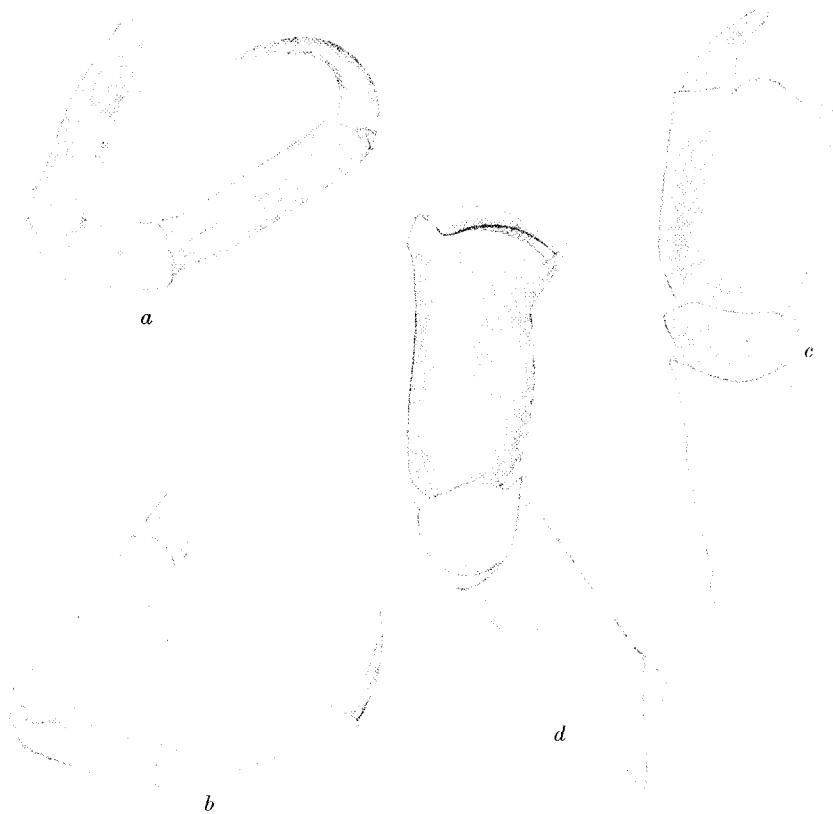


Fig. 9. *Sclerocrangon ferox*, G. O. Sars.
 a. 5th Pereiopod of a larva (11 mm). b. Of a full-grown specimen (about 110 mm).
 c. 1st Pereiopod of a larva (11 mm). d. Of a full-grown individual (about 110 mm).
 (WOLLEBÆK 1908).

crangonids, pelagic Mysidlarvae but of the adult form (KOELBEL 1881, WOLLEBÆK 1906). As in *Potamobius* the young cling to the mothers abdominal-feet. The 4th and 5th pairs of pereopods (fig. 9 a, b) are extremely strong and terminate in a sickle formed claw in adaption to this "parasitic" life stage. In the full grown animal the claws on the corresponding pereopods are proportionately much shorter and narrower and only slightly curved when developed into the true ambulatory limbs. The subchela on the first pair of pereopods are on the other hand of no use in the postembryonic life and are undeveloped, but in the adult they act as prehensile organs and are well developed (fig. 9 c, d). This development agrees with what has lately been found in other groups of arctic invertebrates (THORSON 1936). It is found, for instance, amongst various prosobranchs that the same genus in boreal waters has species with many small eggs and pelagic larvae, while its arctic species only lays few and large eggs, rich in yolk. The embryos pass through metamorphosis inside the eggshell, a case analogous with the wellknown example of the larval development of *Palaemonetes varians* respectively in brackish and fresh water (BOAS 1890). This is an adaptation suitable to the short period of phytoplankton production in accordance with the very low temperatures which make reproduction through pelagic larval stages somewhat difficult (THORSON 1936).

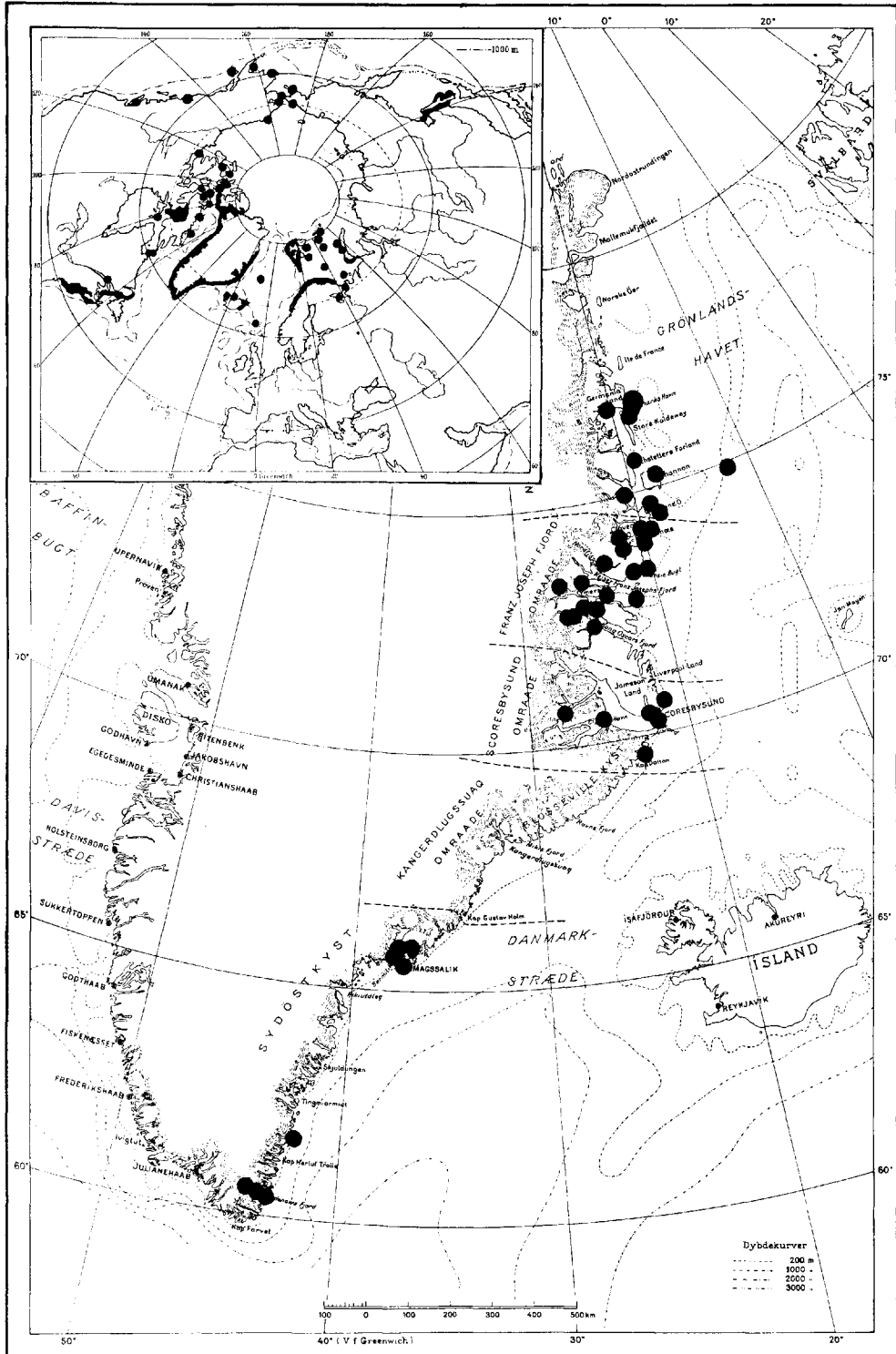
6. *Sclerocrangon boreas*, (PHIPPS).

Cancer boreas, PHIPPS 1774, p. 190, Pl. 12, fig. 1.
Sclerocrangon boreas, HOFSTEN 1916, p. 43.
Sclerocrangon boreas, K. STEPHENSEN 1935, p. 9.

East Greenland records:

Crangon boreas, BUCHHOLTZ 1874, p. 271.
Sclerocrangon boreas, HANSEN 1895, p. 125.
Sclerocrangon boreas, OHLIN 1901, p. 3.
Sclerocrangon boreas, HANSEN 1908, p. 47.
Sclerocrangon boreas, STEPHENSEN 1912, p. 47.
Sclerocrangon boreas, REMY 1928, p. 238.
Sclerocrangon boreas, NOUVEL 1932, p. 886.
Sclerocrangon boreas, SIVERTSEN 1935, p. 48.
Sclerocrangon boreas, WINKLE and WALDO SCHMITT 1936, p. 329.

Occurrence at East Greenland (fig. 10): This species occurs along the whole coast of East Greenland from Lindenowfjord about 60°25' N. to Danmarks Havn at about 76° $\frac{1}{2}$ ' N. It is specially abundant in the Franz Joseph Fjord area between 70° N. and 75° N. It is found in depths from 0—50 m, occasionally to 180 m. Forsblad Fjord 72°27' N., 25°28' W., 100—180 m (HANSEN) and Lindenow Fjord in 60°25' N., 125—150 m (3 specimens).

Fig. 10. *Sclerocrangon boreas*, Phipps.

Sydøstkyst Area: In Lindenowfjord it is found all through the fjord from the mouth to its innermost part at all depths from 8 m to 150 m (18 tests dredgings yielding 47 individuals) a single station at 10—12 m at the mouth of Lindenowfjord was particularly rich close to the shore, where a single dredging yielded 18 animals. North of Lindenowfjord in this area it has been found close to Naparsarsuak at about 61°33' N. a single individual at a depth of 26 m. Finally it occurs frequently in the inlets round Angmagssalik, where not less than 3 different expeditions have found it abundantly in shallow water down to 44 m where each haul contained up to 25 specimens.

Kangerdlugssuaq Area: In this area *Sclerocrangon boreas* has not yet been found, but this area is also the least known at present. It may, however, be supposed that this species occurs here, possibly in Kangerdlugssuaq, where only the outer fjord area is known. Nobody has been able to dredge inside in shallow water.

Scoresbysund Area: It has been found at Kap Dalton—Scoresbysund—Hekla Havn—Rosenvinge Bugt—Hurry Inlet—Røde Fjord. (HANSEN 1895, REMY 1929, NOUVEL 1932 and several new finds).

Franz Joseph Fjord Area: In this area the species is extremely common, being found everywhere in the outer parts of the fjords in shallow water. It is also very abundant on the thresholds of these, if such are present, and along the coast down to 150 m, whilst it is replaced by the high arctic form *S. ferox* in deeper waters outside as well as inside at the bottom of the deep fjords.

In the Franz Joseph area it has been found in the following places: Kong Oscarsfjord—Forsblad Fjord—Jackson Ø, 73°34' N.—Kap Hedlund—Rhedin Fjord—Ella Ø—Solitærbugt—Sophia Sund—Eleonora Bugt—Haredalen, Isfjorden. —Franz Joseph Fjord—Moskusokse Fjord —Mackensie Bugt—Eskimonæs—Gael Hamkes Bugt and round Clavering Øen, mostly in depths about 50 m. Besides new discoveries these localities date from BUCHHOLZ 1874, OHLIN 1901, HANSEN 1908, STEPHENSEN 1912, REMY 1928, NOUVEL 1932, SIVERTSEN 1935, WINKLE and SCHMITT 1936.

Nordøstkyst Area: It has been found as far North as zoological samples have been made, at Danmarks Havn, 76°30' N. Furthermore it has been found in this area from: Sabine Ø—Fligeby Fjord—Kuhn Ø—Shannon Island, 74°56' N., 12°50' W.—Hochstetter Forland—Hvalrosodden—Danmarks Havn.

The occurrence comprises all depths between 3 and 50 m, in the area of Danmarks Havn, where there are many stations; most of the animals are found at depths between 3—10 m. (BUCHHOLTZ 1874, STEPHENSEN 1912, SIVERTSEN 1935, WINKLE and SCHMITT 1936).

Distribution: This species has a very wide arctic distribution but it is not truly circumarctic as it has not yet been recorded from Kara Sea, Siberian- and Nordenskiöld Seas, and north of America between 120° and 160° West. The last area has not been carefully examined, and it may have been overlooked there. But in the Siberian- and Kara Sea several investigations have been carried out, the last one published by GORBUNOV in 1932—1934; therefore it is not likely that it has been overlooked in this area. It appears to have been replaced here by the higharctic species *S. ferox*.

S. boreas ranges from arctic Siberia near Bering Strait and arctic Alaska, southwards via Bering Sea to Kilesnov, and the Straits of Georgia, British Columbia. From 120° W. over Melville Island, Baffins Land, Ellesmere Land to West Greenland and arctic America, southwards to Cape Cod. North west and east Iceland and the Norwegian coast, north of the North Polar circle and Spitzbergen, Bear Island, Kola peninsula and the White Sea to Novaja Zemlya. In depths of 0—400 m. It is an eurythermic species partly living under boreal conditions also.

Biology: Within its area of distribution this species seems not to depend so much on the nature of bottom as do many other decapods. It has been found on a purely muddy bottom as well as on mud mixed with refuse of algae or smaller stones and gravel. Even on stony bottom and in the shallow water in the *Laminaria*-zone it occurs, but in particular does it seem to prefer *Balanus porcatus* colonies where it hides between the cirripedes; this is the reason why it is always found in dredgings from areas with such biotops. (See also HOFSTEN 1916).

In accordance with its distribution (from 40° N. Br. to 80° N. Br.) its eurytherm adaptation is very pronounced.

During the summer it often occurs in water of 1—2° C., and even in the warmest surface water at 5°.6 (HOFSTEN 1916), and also occurs near melting ice where the temperature is below zero; down to —1½° C. Among the species of East Greenland decapods *Sc. boreas* is thus the species which is found under the most varied temperature conditions.

As regards development very little is known for certain; but several facts support the supposition of a direct development, as is the case with *Sc. ferox*. The eggs are extremely large, about 2 mm in diameter (see fig. 8). Within the arctic crustacean fauna only *Sc. ferox* exceeds it in the size of eggs.

SARS (1890) regarding the extreme size of the eggs as well as comparing the earlier stages of the embryos with the youngest known individual (11 mm) which already had all the characters of the adult,

concluded, that the larva may either have a shortened pelagic stage or it might not pass through any pelagic stage at all. This, compared with KOELBEL's and WOLLEBÆK's studies on *ScL. ferox*, makes it probable, that *ScL. boreas* also passes through its metamorphosis inside the egg.

7. *Nectocrangon lar*, (OWEN).

Crangon lar, OWEN 1838, p. 88, Pl. 28, fig. 1.

Argis lar, KROYER 1842 a, p. 255, Pl. 5, figs. 45—62.

Larval Stage:

Nectocrangon lar?, STEPHENSEN 1916, p. 244, fig. 3.

Nectocrangon lar + *N. dentata*, M. RATHBUN 1904, p. 137, 138.

East Greenland records:

Nectocrangon lar, H. I. HANSEN 1896, p. 125.

Nectocrangon lar, H. I. HANSEN 1908, p. 49.

Nectocrangon lar, OURLIN 1901, p. 34.

Nectocrangon lar, STEPHENSEN 1912, p. 508.

Nectocrangon lar, NOUVEL 1932, p. 887.

Nectocrangon lar, SIVERTSEN 1935, p. 43.

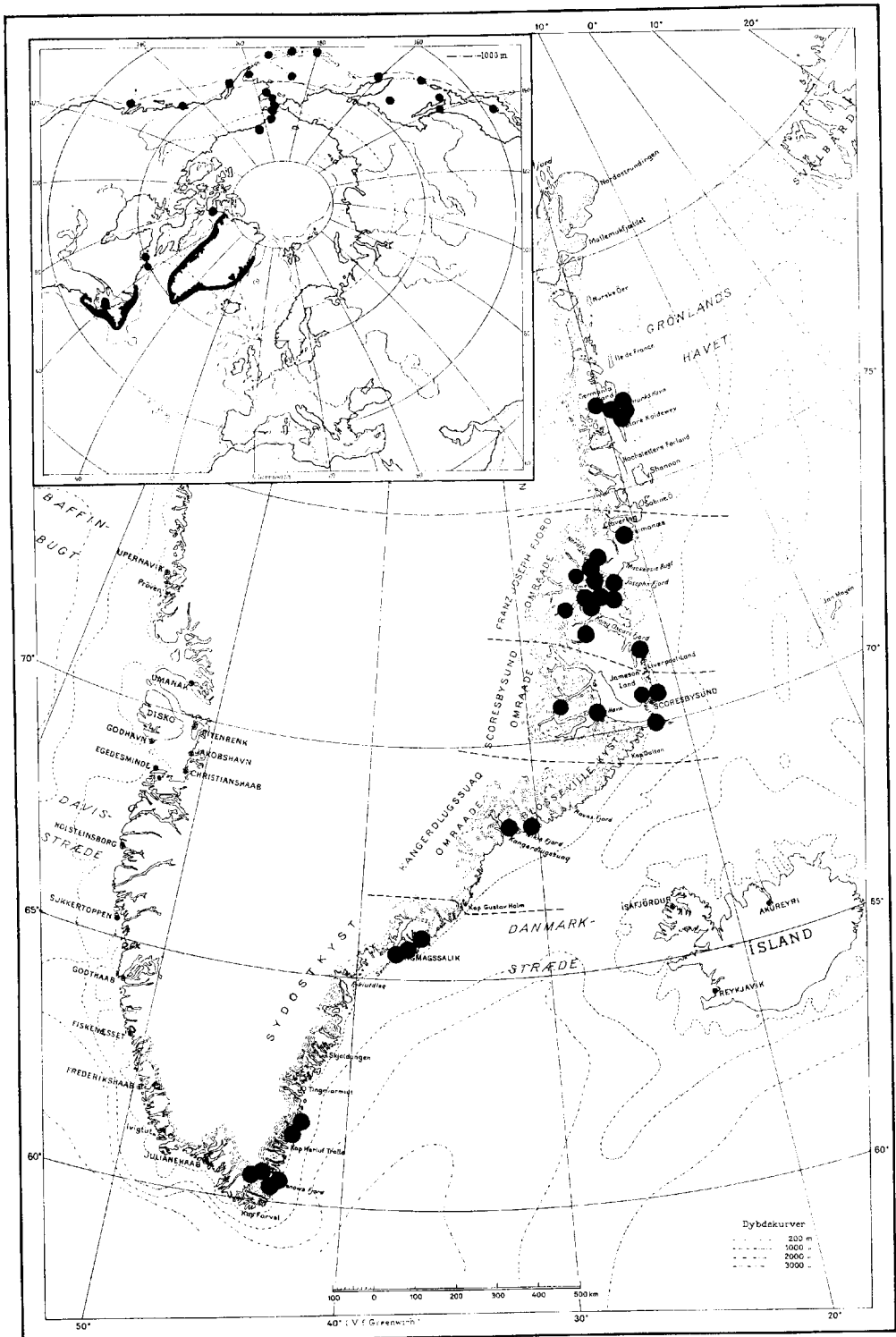
Argis lar + *Argis dentata*, WINKLE and SCHMITT 1936, p. 329.

Occurrence at East Greenland (fig. 11): This species has a similar distribution in Greenland waters as *Sclerocrangon boreas*. In East Greenland it is a common form all along the coast from Lindenowfjord ($60^{\circ}25' N.$) in the south to Danmarks Havn in the north ($76\frac{1}{2}^{\circ} W.$). *Nectocrangon lar* is a littoral species living from the shore to 100 m (—200).

The Sydøstkyst Area: In Lindenow Fjord this species occurs generally in shallow water from 12—75 m (125 m). Altogether 95 individuals have been found in 19 dredgings within the fjords. Also a few individuals have been found at Kutdlik and Kap Tordenskjold in 25—30 m. It is also quite common in shallow water in the sounds round Angmagssalik.

Kangerdlugssuaq Area: In this area *N. lar* is common in the localities examined at the mouth of the Kangerdlugssuaq fjord and its sounds, as well as in Mikisfjord. 6 dredgings at depths of 0—15 m produced 24 specimens.

The Scoresbysund Area: In this area it has been found only 5 times viz. at Cap Tobin, $70^{\circ}23' N.$, $22^{\circ}57' W.$, 105 m., Hurry Fjord and Hekla Havn 20—22 m, Røde Fjord and Rosvinge Bugt (2 individuals) (HANSEN 1895 and 1908, NOUVEL 1932). This is probably due to the fact that only a few expeditions have worked in this area. In all probability we can presume that *Nect. lar* occurs frequently also along the coast of this area.

Fig. 11. *Nectocrangon lar.*, OWEN.

Franz Joseph Fjord Area: In this area, which is the best known in East Greenland, *Nectocrangon lar* is extremely common. It has been found in the following localities: 72°45' N., 22°58' W., near Carlsbergfjord—Alpfjord—Kong Oscars Fjord—Kap Hedlund, Kempe Fjord—Ella Ø—Solitær Bugt—Vega Sund—Kap Humbolt—Dusenfjord—Eleonora Bugt—Franz Joseph Fjord—Moskusoxefjord—Eskimonæs—Clavering Ø. Depths 4—70 m (220 m). (OHLIN 1901, SIVERTSEN 1935).

Nordøstkyst Area: In several places at Hvalrosodde and Danmarks Havn. Depths 0—50 m. (OHLIN 1901, STEPHENSEN 1912).

Distribution and Zoogeographical remarks: It has been found in West Greenland from Etah in the North to Kap Farvel in the South, along the East coast of America from Labrador to about 43° N.; south of Ellesmere Land; N. W. America from Point Barrow North of Alaska, through Bering Strait and Bering Sea along Alaska southwards to Vancouver Island which lies in 50° N., East Asia from the Bering Sea, Kamtchatka, in the Sea of Ochotsk and at the Kuriles to Japan at about 37° N. It is thus a notable Pacific form contrary to the genus *Sclerocrangon* which has a typical Atlantic centre of distribution. While from the Atlantic Area we know one single species, *Nectocrangon (N. lar)*, the Pacific area has not less than 6 species of the genus *Nectocrangon* (RATHBUN, 1904) excluding the doubtful species *N. dentata*, RATHBUN.

Although *Nectocrangon lar* can occur high up in the Arctic and to a certain degree is eurythermic, it cannot live in high arctic climates; it is a boreo-arctic Pacific species in its distribution. This may be presumed to be the reason why it does not occur along the coast of the Siberian Polar sea and therefore it has not been able to penetrate this sea to reach milder localities along the Eurasian northwest coast. Besides being a notable littoral form (depth 0—150 m (240 m)) with a shortened pelagic larval development (see below) it has not been able to cross the Greenland sea to Spitsbergen or through Danmarks Strait to reach the Faroe Islands and other places from there, where the biological conditions are favourable for its distribution.

Biology: *Nectocrangon lar* is found in quite shallow water at 2—3 m but most commonly at depths of 30—50 m; nevertheless it is not uncommon at 125—150 m, and in the more boreal part of its distribution at depths down to 200 m. It has not been found in greater depths than 240 m. It is often found on a muddy bottom, but also on algal grounds, especially in the *Laminarian* zone on stones and sand. The eggs are very large (fig. 8 c) 1.50—2.0 mm in diameter. The larval development is not known in detail, but it appears to be much shortened as the larva probably leaves the egg at a very late stage of development.

The free swimming larva is only known at a late larval stage, (STEPHENSEN 1916) almost at the postlarval stage, with a distinctly developed telson and first thoracal limb ending in a subchelate claw.

Sabinea hystrix, (A. MILNE-EDW.).

Paracrangon hystrix, A. MILNE-EDW. 1881, p. 6.

Sabinea princeps, S. I. SMITH 1882, p. 38, Pl. 8, fig. 1.

East Greenland records:

Sabinea hystrix, H. I. HANSEN 1908, p. 51.

Occurrence at East Greenland (fig. 12): 62°25' N., 28°30' W., 3820 m, 3°.5 C. (H. I. HANSEN 1908).

Distribution: Davis Strait, Eastern North America at Guadeloupe and between 35°45' N. and 41°53' N.

It is a North Atlantic deep sea species living in depths which range from 700—3800 m.

Larval stage: unknown.

8. *Sabinea septemcarinata*, (SABINE).

Crangon septemcarinatus, SABINE 1824, p. 236, Pl. 2, figs. 11—13.

Sabinea septemcarinata, KRØYER 1843, p. 224, Pl. 4, figs. 34—40; Pl. 5, figs. 41—44.

Larval Stage: *Sabinea septemcarinata*, WILLIAMSON 1915, p. 240 with figs.

East Greenland records:

Sabinea septemcarinata, OHLIN 1901.

Sabinea septemcarinata, HANSEN 1908, p. 52.

Sabinea septemcarinata, KOEFOD 1909.

Sabinea septemcarinata, STEPHENSEN 1912, p. 506.

Sabinea septemcarinata, REMY 1928, p. 237.

Sabinea septemcarinata, NOUVEL 1932, p. 888.

Sabinea septemcarinata, SIVERTSEN 1935, p. 42.

Occurrence at East Greenland (fig. 12):

Sydøstkyst Area: At Lindenowfjord it has been found in the inner, deep part of the fjord on 3 localities on depths of 60—350 m (5 dredges 6 specimens).

Kangerdlugssuaq Area: 4 localities in the outer part of Kangerdlugssuaq fjord. Depths 20—100 m (11 specimens).

Scoresbysund Area: Kap Stuart 69°44' N.—Scoresby Sund—Hurry Inlet—Rosenvinge Bugt, depth (10 m) 30—60 m. (HANSEN 1908, REMY 1928, NOUVEL 1932).

Franz Joseph Fjord Area: Kong Oscars Fjord—Alp Fjord—Ella Ø—Vega Sund—Ymer Ø—Eleonora Bugt—Dusenfjord—near Zoologdalen—Franz Joseph Fjord—Cape Weber—Nordfjord—Moskusoksefjord—Cape

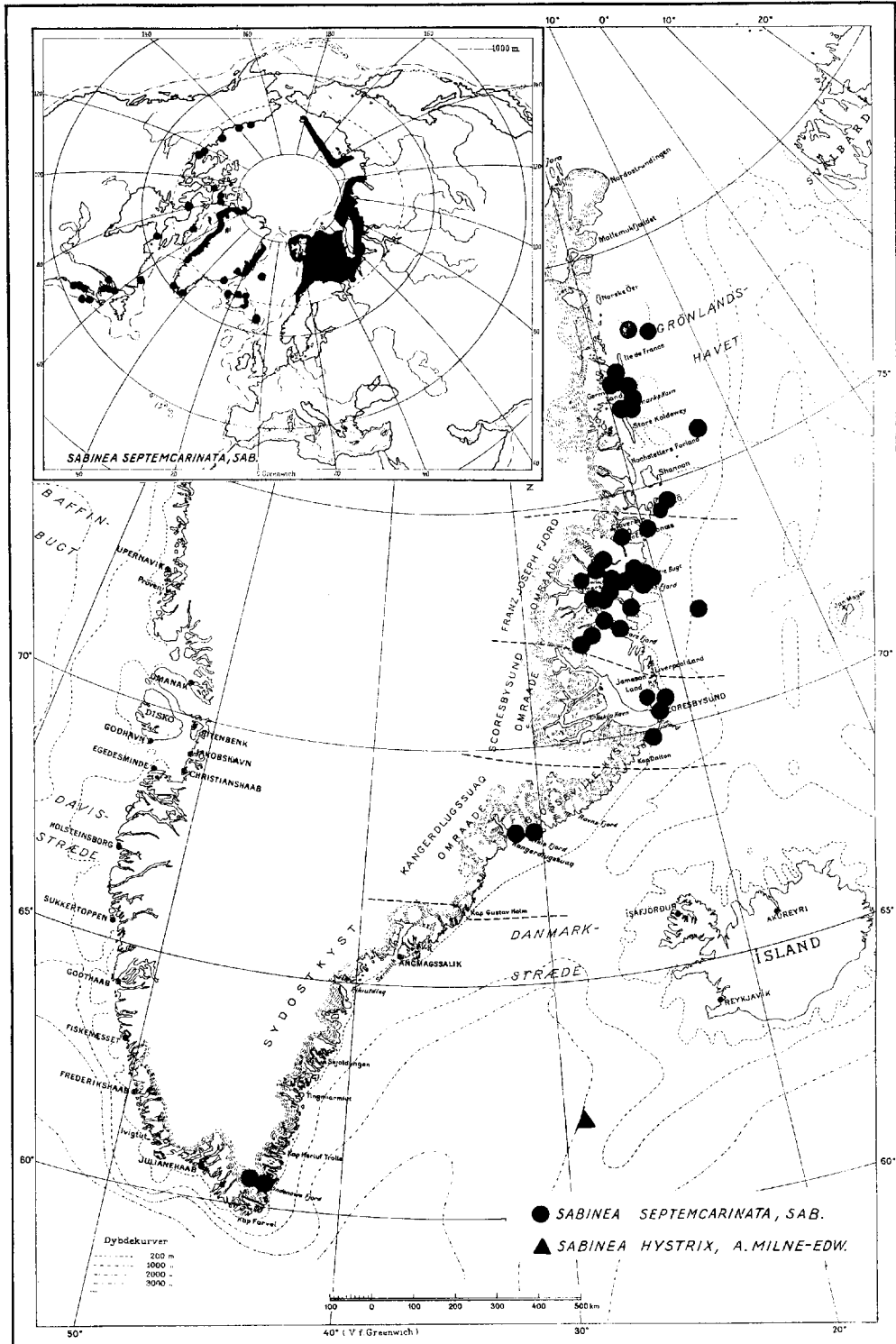


Fig. 12.

Franklin—Bontekoe Ø—72°25' N., 17°56' W. Mackensie Bugt—Clavering Fjord—Herschelhus 74°35' N., 18°15' W. Depths (30 m) 100—300 m. (OHLIN 1901, HANSEN 1908, SIVERTSEN 1935).

Nordøstkyst Area: Sabine Islands, 150 m and 245 m — 75°48' N., 12°59' W., 200 m — 75°48' N., 13°04' W., 200 m — 76°49' N., 18° W., 100 m. — Danmarks Havn (5 loc. 10—20—30 m). — Stormbugt, 40—60 m and 20—40 m — 77°31' N., 18°24' W. — 78°09' N., 14°01' W., 75 m — 78°14' N., 14°18' W., 100 m. (OHLIN 1901, KOEFOED 1909, STEPHENSEN 1912).

In spite of this species having a panarctic distribution, being commonly known in East Greenland between 70° and 80° N., it has been able to make its way south as far as Kangerdlugssuaq and Lindenowfjord. In Lindenowfjord it is not found outside along the open coast but in deeper water in the fjord, where only the temperature of the surface water is raised during the summer, whereas the water in the inner fjord in depths of more than 50 m in August 1933 was between -0.40 and +1° C. (2°.49 C.). Consequently, in spite of its southern position, the fjord has arctic conditions at these depths. Also at Kangerdlugssuaq where *S. septemcarinata* is frequent, and in Uttentals Sund, the localities have an arctic character. (BERTELSEN 1937).

Distribution: West Greenland southwards to Holsteinsborg, north east Iceland — the Faroes. — On the west coast of Norway it occurs from Lofoten and the coast of Finnmark through the whole of the Murman and Barent's Seas, the White Sea and the Kara Sea, and eastwards in the Siberian Sea to Wrangel Island, 180° E. In Eastern America it is found southwards to Cape Cod. North of America in Ungava Bay, Elsmere Land and West to Alaska at above 150° W.; — between 150° and 180°, that is to say that it has never been recorded, from the Bering Strait and Bering Sea, but this may be due to the fact that this area north of Bering Strait has never been carefully examined by any expedition.

In the Bering Sea conditions are too boreal to make it likely that *Sabinea septemcarinata* lives here, but it may one day be found further north in Bering straits so giving it a circumpolar panarctic distribution.

Biology: This species in particular is found on muddy bottoms, either on loose mud or on small stones or gravel, but it is never found on a hard bottom. Its bathymetric distribution ranges from 30 m to 300 m. Farther north it appears to move into more shallow water, as it has been dredged in depths from 0-10 m, but is most frequent in depths between 80 and 200 m. ♀♀ with eggs can be found throughout the year, from which WOLLEBÆK (1908) deduces a half yearly "Cyklus"

so that *Sabinea septemcarinata* breeds both in spring and autumn. This is hardly probable; it is more likely that the breeding period stretches over most of the year. The larval stage was first described by KROYER as *Myto Gaimardii* and by STEPHENSEN 1916 (*Sabinea septemcarinata*?). Along the East Greenland coast these larvae have been found several times, amongst others by the Duc d'Orleans along the Northeast coast, but all in stages transitional to the adult shrimp. The larva may leave the egg on a *Mysis*-stage? Judging from the small size of the eggs this is most likely although nothing definite can be said at present.

9. *Pontophilus norvegicus*, (M. SARS).

Crangon norvegicus, M. SARS 1861, p. 248.

Pontophilus norvegicus, M. SARS 1868, p. 248 (separate copy p. 2), Pl. 1, figs. 1—25; Pl. 2, figs. 17—37.

Pontophilus norvegicus, STANLEY KEMP 1910, p. 162: Pl. 21, fig. 9.

Larval stage: *Pontophilus norvegicus*, G. O. SARS 1890, p. 160 with figs.

East Greenland records:

Pontophilus norvegicus, HANSEN 1908, p. 53.

Pontophilus norvegicus, STEPHENSEN 1913, p. 20.

Occurrence at East Greenland (fig. 13): Danmarks Strait and Sermilik, Angmagssalik — 64°12' N., 39°15' W. Depths 330—1200 m.

Distribution: This species has been found in a number of places in the Skagerrak at 110—450 m and at Bohuslän. In the Bay of Gascony the species has been taken in 850 and 1270 m; also southwest of Ireland; in the deep fjords along the whole coast of Norway and along the Kola peninsula in the Murman Sea, but not near to the White Sea. From the Murman Sea it is found further north towards Spitzbergen in 75°58' N., 13°18' E. Off the east coast of North America it goes from Cape Halifax (ca. 44° N.) to 38°37' N. from 200 to 1050 m. This species belongs to the Atlantic boreal deep-water fauna as it ranges from (60 m—) 400 to 1000 m—(1350 m). It has never been found in water with a bottom temperature below zero. The lowest certain observation is 1°.5 C. but the species is usually found in water between 3° and 7° C.

Glyphocrangon sculptus (S. I. SMITH).

Rhachocaris sculpta, S. I. SMITH 1882, p. 49, Pl. 5, fig. 3; Pl. 6, fig. 3.

Glyphocrangon sculptus, S. I. SMITH 1887, p. 655, Pl. 8, fig. 3; Pl. 9, figs. 1—2.

East Greenland records:

Glyphocrangon sculptus, H. J. HANSEN 1908, p. 55.

Occurrence at East Greenland (fig. 13): 64°34' N., 31°12' W., 2600 m, 1°.6 C. (HANSEN 1908).

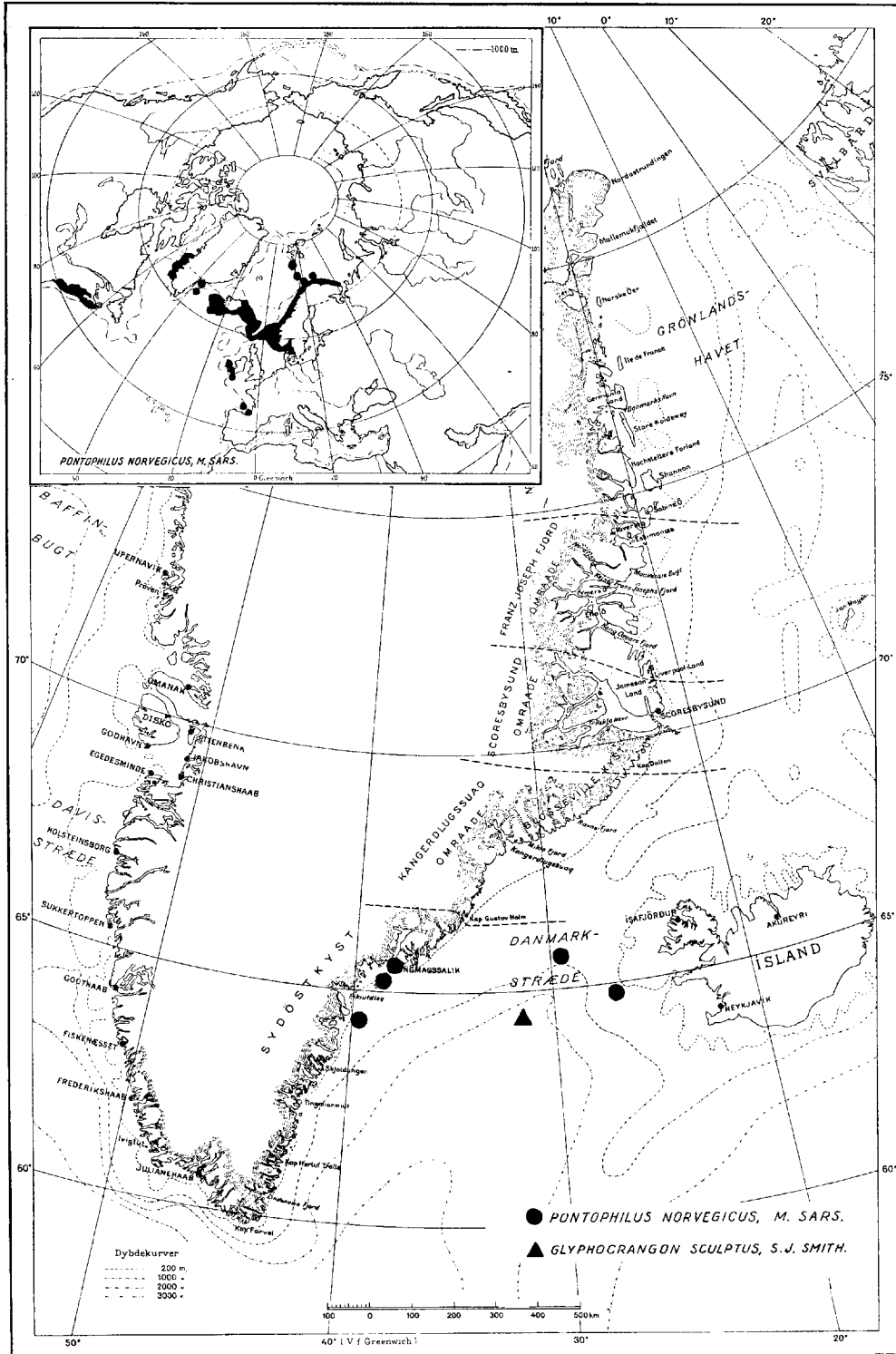


Fig. 13.

Distribution: *Glyphocrangon sculptus* has only been found a few times at some stations on the east coast of North America between 41°10' N. and 37°50' N. in depths from 2200—2800 m and from South Africa near Cape Point at 1500—1600 m. *Glyphocrangon sculptus* belongs to the Atlantic (boreal) deep-water fauna.

Larval stage: unknown.

10. *Spirontocaris Gaimardii*, (H. MILNE-EDW.)

(including *forma typica*, *f. gibba*, *f. belcheri*.)

Hippolyte Gaimardii, H. MILNE-EDW. 1837, vol. II, p. 378.

Hippolyte Gaimardii, A. APPELLOF 1906, p. 122, Pl. 2, fig. 4.

Spirontocaris Gaimardii, C. DONS 1915, p. 39.

East Greenland records:

Hippolyte Gaimardii, OHLIN 1901, p. 44.

Spirontocaris gaimardii, HANSEN 1908, p. 56.

Spirontocaris gaimardii, KOEFOED 1909.

Spirontocaris gaimardii, STEPHENSEN 1912, p. 519.

Spirontocaris gaimardii, WINKLE & SCHMITT 1936, p. 328.

Occurrence at East Greenland (fig. 14): From Lindenowfjord in South to North of Ile de France in North.

Sydøstkyst Area: Lindenowfjord: Throughout the fjord in 9 localities, 20 dredgings, 15–175 m (61 specimens) all *forma typica*. Round Angmasalik both *forma typica* and *forma gibba* occur (0–30 m). 5 localities, 12 dredgings, 162 specimens (37 *gibba*, 116 *typica*). These finds are unpublished except for the record of a single specimen from the “Ingolf”-Expedition and that recorded by WINKLE and SCHMITT 1936.

Kangerdlugssuaq Area: In 2 localities at the mouth of the Kangerdlugssuaq Fjord in Uttentals Sound (6 dredge-hauls), depth 6–15 m, 61 individuals (13 *gibba*, 48 *typica*).

Scoresby Sound Area: Hurry Fjord 30 m, 1 specimen. — Danmarks Ø, 10–17 m, 10 specimens. — Scoresby Sound, Cape Stuart, 13–18 m, 2 spec. (OHLIN 1901).

This author does not differentiate between *f. typica* and *f. gibba* as he supposes *f. gibba* to be developed ♂♂ of *f. typica*.

Franz Joseph Fjord Area: Mouth of Vega Sound—Kong Oscars Fjord, near Ella Ø—Solitær Bugt—Dusenfjord—Moskusoksefjord—Franz Joseph Fjord—W. of Bontekoe Island—Mackenzie Bugt—Eskimonæs—Herschelhus—Wollaston Forland. Depth 12–100 m (250 m) (OHLIN 1901, WINKLE & SCHMITT 1936).

The literature does not mention which form is meant but comparison with corresponding localities makes it likely to be *f. gibba*. In West Greenland *f. gibba* absolutely dominates from Holsteinsborg and

to the North. Futhermore North of 70° N. only *f. gibba* as well as *f. belcheri* occur.

The Nordøstkyst Area: Sabine Ø $75^{\circ}59'$ N., $14^{\circ}12'$ W. — Danmarks Havn—Stormbugt— $77^{\circ}36'$ N., $18^{\circ}12'$ W. — North of Ile de France. Depths 8—20 m (300 m) (OHLIN 1901, KOEFOED 1909, STEPHENSEN 1912).

Distribution: *Spirontocaris gaimardi* occurs in 3 forms:

forma typica with boreal distribution —

forma gibba with lower arctic distribution —

and *forma belcheri* with high arctic distribution.

(See under biological remarks). Taken as one they have the following circumpolar distribution. The species occur at the Shetlands and Hebrides, off the West coast of Scotland to 56° N. and in the Firth of Forth. It is common in the Kattegat and along the whole coast of Norway, in the White Sea and Murman Sea to Novaja Zelmya and in the Northern part of the Barents Sea to Spitzbergen. Further it has also been taken several times in the Kara Sea, the Siberian Ice Sea as in the Bering Strait and Bering Sea. Along the West Coast of North America it is found at 57° N., and it is common on the northeastern coast where it goes as far south as Boston. It is a circumpolar, boreo-arctic or pan-arctic species.

Biological remarks: *S. gaimardii* occurs in preference on harder mud bottoms with stones and coarse gravel, although it is found on softer bottom. As regards distribution by depth, HOFSTEN (1916) finds that at Spitzbergen it occurs sporadically in shallow water right in under the coast where it is the most frequent decapod, but becomes abundant at 20—30 m. Similarly in the most southerly E. Greenland locality eg. in Lindenowljorden, where the species is generally found between 15—175 m, most abundantly at 30—40 m. Further North in East Greenland it appears to live in more shallow water at 6—40 m, although it has here been taken at depths up to 300 m.

It is well known that many authors have divided the species into the above mentioned 3 subspecies. By others this division is denied. By examining the material at the Zoological Museum I think I am safe in saying that *typica* and *gibba* are well defined morphological forms, among which — in spite of the fact that their distribution areas overlaps a good deal — surprisingly few transition forms are found, although they do occur. The presumption that *gibba* only are old specimens of *typica*, in preference males, does not agree with the material examined by me, as this material shows young specimens of the *gibba* type of 25 mm, while the largest *typica* individuals from Danish waters, where *gibba* has never been found, measures more than 40 mm, and in Green-

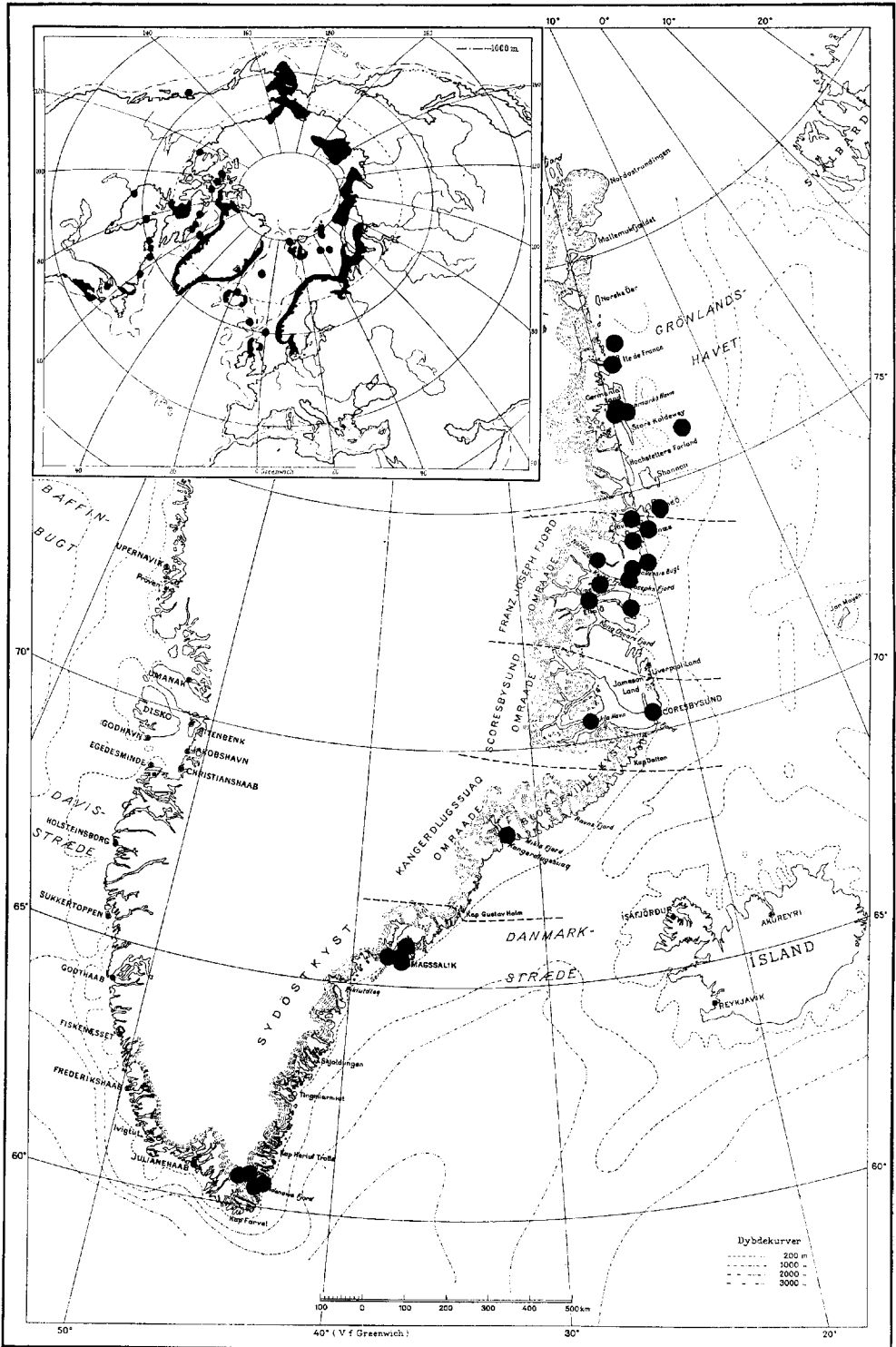


Fig. 14. *Spirontocaris gaimardii*, H. MILNE-EDW.

land *typica* is found of all sizes up to 92 mm. Consequently there is no question of difference in age¹). The only thing left to decide upon is whether it is a phenotypical or a genotypical divergence.

Forma *typica* and forma *gibba* have, as mentioned before, an very large common area of distribution, the boreo-arctic coastal area where both occur in great numbers side by side, and in the same dredge both forms are represented, never one alone. This shows, that in their "common area" they occur under exactly the same biological conditions. Not even the proportion in which they occur in any given locality seems to alter whether one is dredging in shallow or deeper waters. This is a quite serious attack on the biological explanations and there must be a genetic difference.

The differences between the forms are too small to define the species; they can hardly be divided into more than races. It must be presumed as likely that crossing between these is possible, as they are very closely related.

Practically the only difference is the spine on the 3rd abdominal joint, which rises from a thickened plate, dorsally situated; the plate without the spine is present also in forma *typica*. If crossing is possible one must presume that the spine is hereditarily connected with a dominating gene and that the whole brood in the first generation gets spines, which in later generations appears in MENDEL'S proportions. If this is right, it explains why *f. gibba* always occurs many times more frequently than *f. typica* in their general distribution area except for the most southern part of it. Whether this presumption is correct can not be ascertained with museum material but it will be an interesting subject for experiment in the future.

Larval stage: not definitely known. (See STEPHENSEN 1935, p. 52—54).

11. *Spirontocaris spinus*, (Sow.).

Cancer spinus, SOWERBY 1806 p. 47. Pl. 21.

Spirontocaris spinus, ST. KEMP 1910 p. 103—106; Pl. 14, fig. 1.

East Greenland records:

Hippolyte spinus, OHLIN 1901, p. 47.

Spirontocaris spinus, HANSEN 1908, p. 58.

Spirontocaris spinus, STEPHENSEN 1912, p. 509.

Spirontocaris spinus, NOUVEL 1932, p. 888.

Spirontocaris spina, WINKLE and SCHMITT 1936, p. 328.

Occurrence at East Greenland (fig. 15):

Sydøstkyst Area: Kekertatsiak, south of Lindenowfjord on 60—70 m, 1 spec. — In the mouth of Lindenowfjord at a depth of 125—150 m,

¹) Furthermore is shown by THORSON (1936) that the eggs of forma *gibba* are districtly larger than those of forma *typica*.

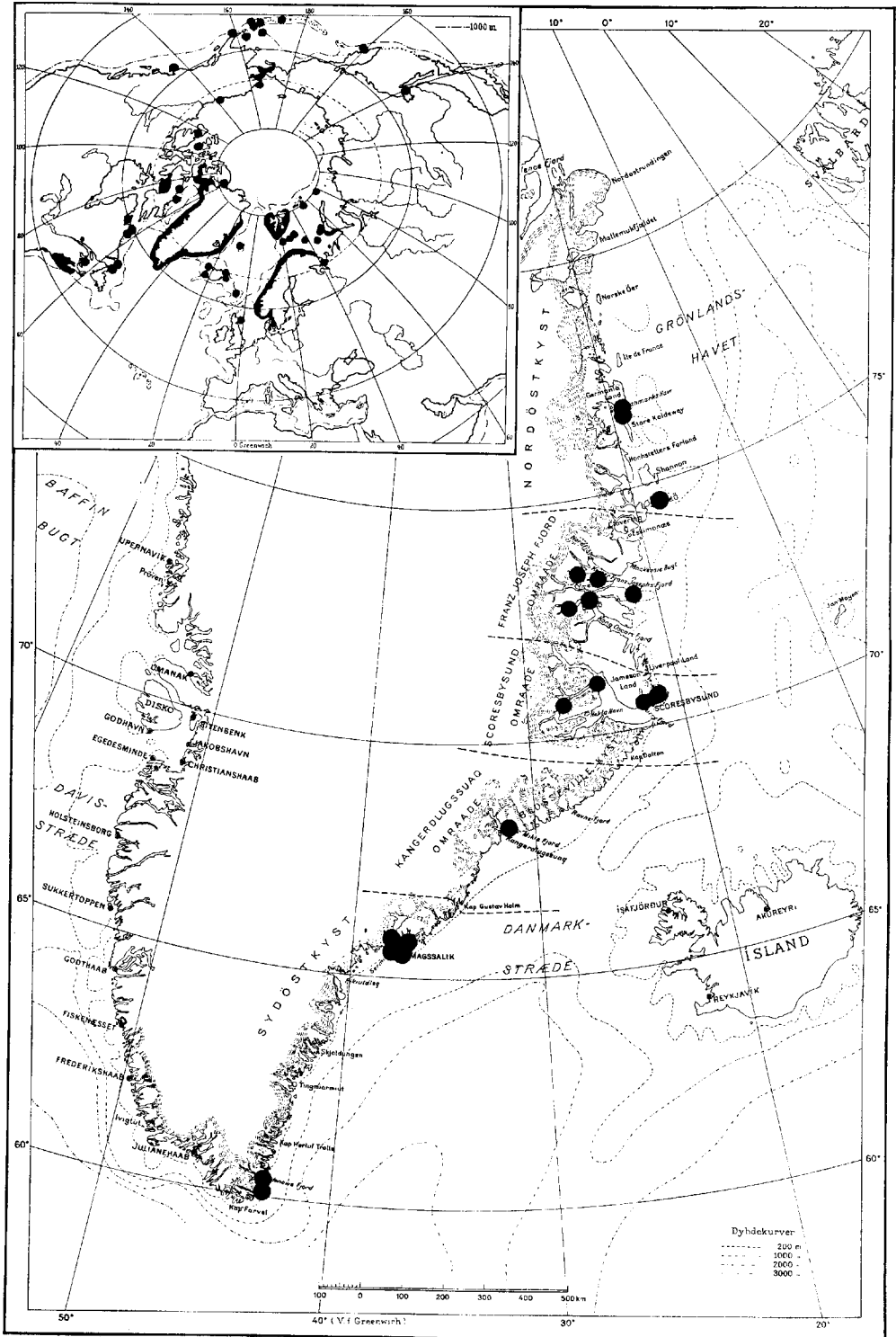


Fig. 15. *Spirontocaris spinus*, Sow.

1 spec. — Round Angmasalik it has been found in 7 localities, 18 dredgings with 78 specimens in all. Depths 5—125 m, most numerous in 12—50 m. (Only one of this spec. has been recorded before by HANSEN 1908, and an unknown number by WINKLE & SCHMITT 1936).

Kangerdlugssuaq Area: Kangerdlugssuaq, two stations with 9 dredgings altogether in Uttendahl Sound in depths of 8—40 m, 26 specimens.

Scoresbysund Area: Bjørne Ø, 18—28 m, 4 specimens. — Røde Fjord, 13—18 m, 4 spec. — Rosenvinge Bugt, depth 60 m, 1 spec.

Franz Joseph Fjord Area: Solitærbugt, Ella Ø, depth 15 m, 2 spec. and recorded by OHLIN 1901 at 72°45' N., 22°56' W., 35—60 m, 4 specimens. — Outside Rhedinfjord 1 spec. — Dusenfjord 15—20 m, 2 spec. — Eleonora Bay, 15—27 m, 7 spec.

Nordøstkyst Area: East of Sabine Island (number of specimens unknown). — Near Koldewey Island, 1 spec. — Danmarks Havn, 1 spec., depths 20—100 m. (OHLIN 1901, STEPHENSEN 1912).

Distribution: Along the coast of west Greenland and a few places on the East and West coasts of Iceland. Off Jan Mayen and along the whole west coast of Norway. It has been found a few times in the Kattegat as far south as Samsø. From Norway it goes north to Spitzbergen, east to Novaja Zemlya. It has never been found in the North Siberian Polar Sea between 80° E. and 180° E. As *S. spinus* occurs in small numbers at Spitzbergen, Franz Joseph Land and Elsemere Land and reaches up as far as high arctic areas, one can not for certain cut out the possibility of its occurrence North of Siberia. Off America it goes as far South as Cap Cod and from here north and west to the Berings Strait. In the Pacific Ocean it is found southwards to Vancouver, 50° N. It has a boreo-arctic distribution.

Biological remarks: At Spitzbergen HOFSTEN (1916) found that *S. spinus* occurred at 25—400 m, frequently between 40—400 m. In the southern area of E. Greenland, its depths are differing from 5—125 m the species being most frequent between 12—50 m, where 78 specimens have been caught, a very high number for this species, as most records are of only 2—3 specimens at a time. Also in Kangerdlugssuaq it occurs in shallow water. Here 26 specimens have been caught in depths between 8 and 40 m and none in greater depths though the area has been explored down to 100 m. Further north the number of dredgings and of individuals taken are so small that one can not make definite deductions, but also here the finds are from more shallow water than at Spitzbergen. This seems to show that *S. spinus* in East Greenland occurs in preference between 12 and 50 m, i. e. in considerably less depths than at Spitzbergen. This is possibly due to the fact, that *Balanus porcatus*, among

which *Spirontocaris spinus* likes to hide, at Spitzbergen is often found in greater depths than in East Greenland. In shallow water as well as in the deeper part *Spirontocaris spinus* is always in connection with the *Balanus* biotop.

As mentioned before it is a comparatively rare animal as regards numbers found, and it must be reckoned as the East Greenland species of *Spirontocaris* of which the smallest number of individuals has been found.

The consistence of the bottom does not appear to have any great effect upon its distribution apart from the presence of *Balanus porcatus* (HOFSTEN 1916). It does not appear to be very sensitive to temperature as it has been found in water from $-1^{\circ}.67$ C. to some degrees above zero. In its southern distribution areas already mentioned it has often been confused with *S. lilljeborgii*.

Larval stage: not definitely known. (See STEPHENSEN 1935, p. 54).

Spirontocaris lilljeborgii, (DANIELSEN).

Hippolyte Lilljeborgii, DANIELSEN 1861, p. 5.

Spirontocaris spinus, var. Lilljeborgii, KEMP 1910, p. 103, Pl. 14, figs. 2—10.

Larval stage: *Spirontocaris spinus* var. Lilljeborgii, LEBOUR 1937, p. 101, fig. 1.

East Greenland records:

Spirontocaris Lilljeborgii, STEPHENSEN 1912, p. 510.

Occurrence in East Greenland: Danmarks Havn 12—16 m, (STEPHENSEN 1912) 1 specimen, which was so badly preserved that, in STEPHENSEN'S opinion, its identification is very doubtful. Judging from the almost boreal distribution of the species it looks as if it is a *Spirontocaris spinus*.

Distribution: Davis Strait, $66^{\circ}35'$ N. On the east American coast it occurs from Nova Scotia to 37° N. In Europe it goes southwards to the Firth of Forth and the Kattegat. It is very common in the Skagerrak and along the south and west coasts of Norway. It is found as far East as the Western part of the Murman Sea.

12. *Spirontocaris turgida*, (KRØYER).

Hippolyte turgida + H. phippsii, KRØYER 1841, p. 575.

Hippolyte turgida + H. phippsii, KRØYER 1842, p. 308, 314, Pl. 2, figs. 57—58; Pl. 3, figs. 59—68.

Spirontocaris turgida, DONS 1915, p. 33, fig. 3.

Larval stage: *Spirontocaris*-larva Nr. 2 (? Sp. turgida), STEPHENSEN 1935, p. 54.

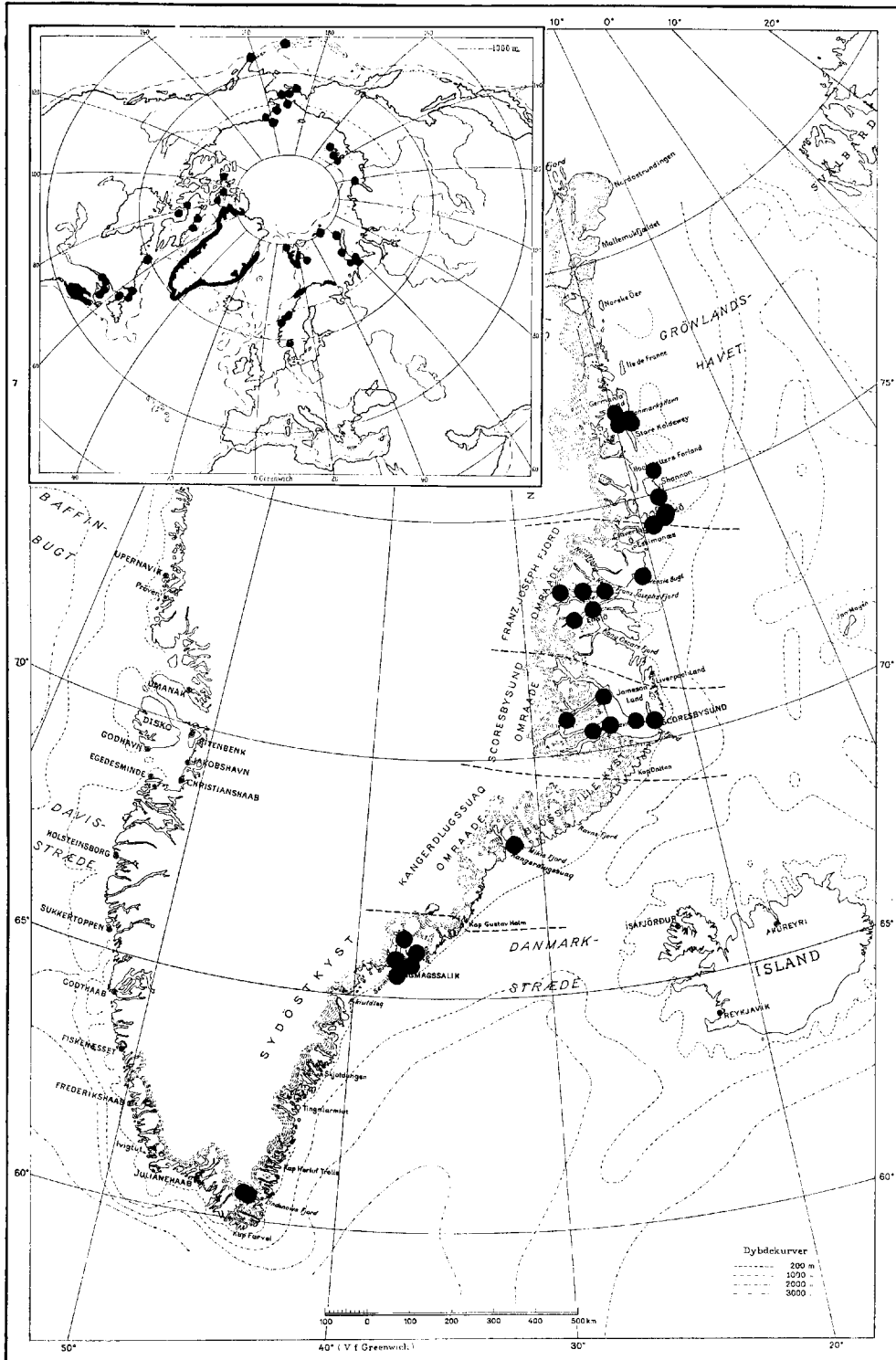


Fig. 16. *Spirontocaris turgida*. KRÖYER.

East Greenland records:

- Hippolyte phippsii, BUCHHOLZ 1874, p. 272.
 Hippolyte phippsii, H. I. HANSEN 1896, p. 125.
 Hippolyte turgida, OHLIN 1901, p. 50.
 Spirontocaris turgida, HANSEN 1908, p. 61.
 Spirontocaris turgida, STEPHENSEN 1912, p. 510.
 Spirontocaris turgida, SIVERTSEN 1935, p. 42.
 Spirontocaris phippsii, WINKLE & SCHMITT 1936, p. 328.

Occurrence at East Greenland (fig. 16):

Sydøstkyst Area: Lindenowfjord, 2 localities in the inner part of the fjord in depths of 25—30 m (2 dredgings) 13 specimens. Round Angmagssalik it has been taken in 8 localities of which 6 are new records. In these 27 specimens were caught in 9 dredgings on depths of 5—30 m, (further records: HANSEN 1908, WINKLE & SCHMITT 1936).

Kangerdlugssuaq Area: 3 localities in Uttendahl Sund, 13 specimens caught in 6 dredgings, depth 4—25 m.

Scoresbysund Area: Hekla Havn, depth 18—22 m. Scoresby Sund, Cape Stewart, depth 13—18 m, 1 specimen. (HANSEN 1896, OHLIN 1901). — Danmarks Ø, 10—17 m and 19 m, 11 species. — Røde Fjord, 13—18 m, 2 specimens. — Hurry Inlet, 22—25 m, 5 specimens. — Amdrup Havn, 22—26 m, 1 spec. — Bjørne Ø, 6—13 m, 2 specimens.

Franz Joseph Fjord Area: Kap Hedlund. — Kempe Fjord, 11—12 m, 5 specimens. — Solitærbugt, Ella Ø, 4—8 m and 11—14 m, 25 specimens. — Haredal, Isfjord, 9—15 m, 2 specimens. — Dusenfjord, 15—20 m, 2 specimens. — Warg Bugt, Ymerø, depths 70 m. — Eleanora Bugt, 12—13½ and 15—27 m, 17 specimens. — Mackensie Bugt, 15 m (SIVERTSEN 1935).

Nordøstkyst Area: Cap Wynn—Sabine Island—Shannon Island—North of Shannon—Danmarks Havn (5 localities)—Stormbugt, depth 3—60 m.

Distribution: This species has lately been found in so many arctic localities, that it may be said to have a circumpolar distribution. It is known along the whole coast of east and west Greenland—Spitzbergen and west and north of Norway, as it has been found as southerly as in Oslofjord—Franz Joseph Land—Novaja Zemlya and in the North Siberian Polar Sea. On the East coast of North America it goes a little South of Cape Cod. From here it goes towards the north to St. Lawrence and Labrador, east of Baffins Land and Fox Channel, Elsmere Land and Melville Island. It has not been found between 115° W. and 150° W. But as it can live under arctic conditions in the Siberian Polar Sea there is no reason against its occurrence North of America. It occurs again at Point Barrow and from there through the Bering Strait and among the Aleutian Islands. It has a Panarctic-circumpolar distribution.

Biological remarks: This is a particularly shallow water species which has not been found for certain in East Greenland in depths over 70 m but mostly in depths of 10—30 m. The greatest depth in which it has previously been found is in the White Sea in 290 m. Like *S. spinus* it occurs commonly along the east coast of Greenland, and like it in very small numbers. Its vertical distribution is rather restricted. It lives chiefly on a firm bottom amongst algae in the areas of *Delesseria*, *Lithothamnion* and *Laminaria*, where it prefers to hide, like most *Spirontocaris* species, under the prevalent cirripedes. As usual among pan-arctic species it is stenotherm found in water from $-1^{\circ}.67$ C. to 5° C., most frequently at a low positive temperature.

13. *Spirontocaris polaris*, (SABINE).

Alpheus polaris, SABINE 1824, p. 238, Pl. 2, figs. 5—8.

Hippolyte polaris + *Hippolyte borealis*, KRØYER 1842, p. 324, 330, Pl. 3, figs. 74—81; Pl. 4, fig. 82.

Hippolyte polaris, APPELLOF 1906, p. 121.

Larval stage: *Spirontocaris*-larva Nr. 1 (? *Sp. polaris*), STEPHENSEN 1935, p. 53.

East Greenland records:

Hippolyte polaris + *H. borealis*, BUCHHOLZ 1874, p. 275, 276.

Hippolyte polaris, HANSEN 1896, p. 125.

Hippolyte polaris, OHLIN 1901, p. 53.

Spirontocaris polaris, HANSEN 1908, p. 63.

Spirontocaris polaris, KOEFOED 1909.

Spirontocaris polaris, STEPHENSEN 1912, p. 511.

Spirontocaris polaris, NOUVEL 1932, p. 888.

Spirontocaris polaris, SIVERTSEN 1935, p. 41.

Spirontocaris polaris, WINKLE and SCHMITT 1936, p. 327.

Occurrence at East Greenland (fig. 17):

Sydøstkyst Area: At Lindenowfjord throughout the whole fjord, 10 stations, 41 dredgings, depth 5—350 m, 211 specimens. — Naparsarsuak $61^{\circ}40'$ N., 3 dredgings, depth 5—36 m, 18 specimens — $64^{\circ}56'$ N., $36^{\circ}19'$ W., 408 m. — Round Angmasalik 8 localities, 17 dredgings in 5—100 m, 109 specimens (mostly new localities, older records: HANSEN 1896 and 1908, WINKLE and SCHMITT 1936).

Kangerdlugssuaq Area: 5 localities in the Kangerdlugssuaq fjord with 36 dredgings, 147 specimens, depth 4—90 m.

Scoresbysund Area: Hekla Havn 1—22 m. Rosenvinge Bugt depth 60 m. Danmarks Ø 10—17 m, 3 specimens. — Røde Fjord 13—18 m, 5 specimens. — Bjørne Ø—Hurry Fjord (HANSEN 1896, NOUVEL 1932).

Franz Joseph Fjord Area. $71^{\circ}35'$ N., $21^{\circ}10'$ W. — Nathorstfjord—Kong Oscars Fjord—Ella Ø—Dicksonfjord—Kempelfjord—Vega Sund—Sofia Sund—Dusenfjord—Eleonora Bugt—Franz Joseph Fjord—Moskus-

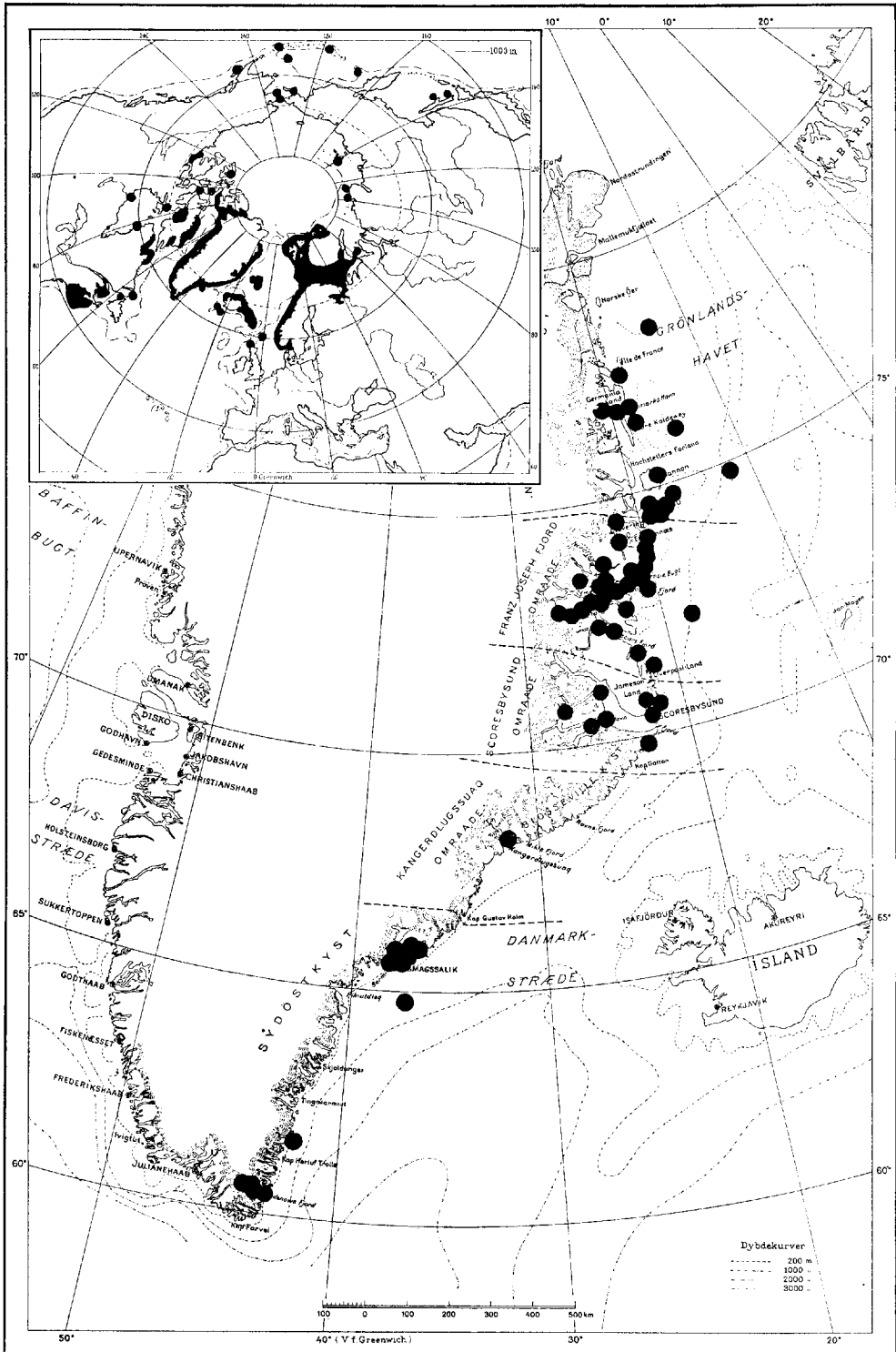


Fig. 17. *Spirontocaris polaris*, SABINE.

oksefjord. — Several localities East and North of Bontekoe Island and Mackensie Bugt—Kap Stosch to Clavering Island and Tyrolerfjord, depth 10—300 m (OHLIN 1901, SIVERTSEN 1935, WINKLE and SCHMITT 1936).

Nordøstkyst Area: Sabine Island—Shannon Island — 74°52' N., 17°16' W.—75°58' N., 14°12' W. — East of Store-Koldewey—Hvalrosodden—Danmarks Havn, 22 localities, depths 6—40 m — Stormbugt, 8 localities, depths 15—100 m—77°31' N., 18°24' W., 275 m—78°09' W., 14°01' W., 75 m (BUCHHOLZ 1874, OHLIN 1901, KOEFOED 1909, STEPHEN-SEN 1912, SIVERTSEN 1935, WINKLE and SCHMITT 1936).

Distribution: Circumpolar boreo-arctic. The southern boundary is eastern N. America, 41°34' N. In European waters it has been found southwards to the Skagerrak, Shetlands and the Hebrides. In the Barents Sea between Norway, Kola peninsula, Novaja Zelmya and Spitzbergen it is very abundant and found in numerous localities, also in the White Sea and the Kara Sea. In the North Siberian Polar Sea it has only been found in 3 localities. It has been found north and south of the Bering Strait and along the north coast of North America. It occurs on all depths from 0—6 m and down to 950—1100 m.

Biological remarks: At Spitzbergen the size of the specimens increases with the depth in which they live (HOFSTEN 1916). This can not be said entirely to be the case in East Greenland. Here specimens of more than 40 mm appear to be evenly distributed from 4—5 m to 150, and to occur further out to a depth of 350 m. Hitherto the largest known specimens, 89 mm, have been found in East Greenland in depths of 100—200 m. The younger individuals on 25—35 mm seem to prefer the area from the shore to a depth of 50 m, but they can also be found in small numbers in depths up to 100 m. the bigger spawn-bearing females appear to be most numerous inside the 50 m line although they are commonly found in greater depths.

Egg-carrying females have been found in East Greenland in the following months: January, February, April, June, July, August and December. From this we conclude that the species, at least in East Greenland has no definite spawning period, but is able to spawn throughout the whole year.

14. *Spirontocaris groenlandica* (FABRICIUS).

Astacus groenlandicus, L. C. FABRICIUS 1775, p. 416.

Hippolyte aculeata, KROYER 1842, p. 334, Pl. 4, figs. 83—98; Pl. 5, figs. 99—104.

East Greenland records:

Hippolyte aculeata, BUCHHOLZ 1874, p. 276.

Hippolyte groenlandica, OHLIN 1901, p. 57.

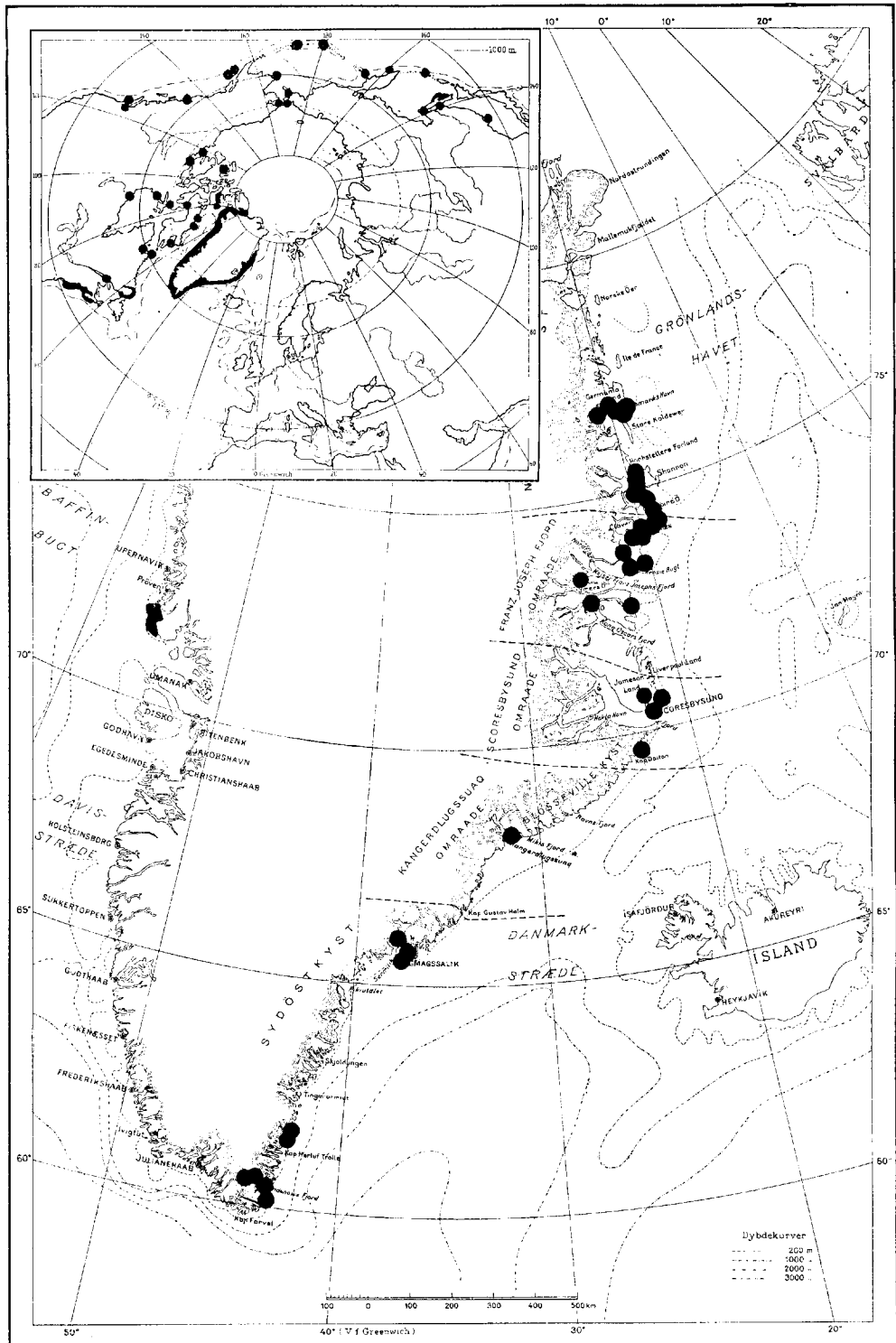


Fig. 18. *Spirontocaris groenlandica*. I. C. FABR.

Spirontocaris groenlandica, HANSEN 1908, p. 64.

Spirontocaris groenlandica, STEPHENSEN 1912, p. 513.

Spirontocaris groenlandica, REMY 1928, p. 237.

Spirontocaris groenlandica, SIVERTSEN 1935, p. 41.

Spirontocaris groenlandica, WINKLE and SCHMITT 1936, p. 327.

Occurrence at East Greenland (fig. 18):

Sydøstkyst Area: The Lindenowfjord, 9 localities, depth 10—175 m, most localities between 10—50 m, 25 dredgings, 168 spec. (greatest number in one dredge in 5—8 m 47 spec.).

Naparsarsuak, 61°30' N., depth 2—35 m, 5 dredgings, 15 spec. — Round Angmagssalik, 4 localities, depth 5—35 m (also 4 localities recorded by WINKLE and SCHMITT 1936).

Kangerdlugssuaq Area: Uttentahl Sund, 20—25 m.

Scoresbysund Area: 69°44' N., 23°30' W. — near Scoresbysund, Hurry Fjord. — Rosenvinge Bugt, depth 5—60 m. (HANSEN 1908, REMY 1928).

Franz Joseph Fjord Area. Kong Oscars fjord—Ella Ø.—Vegasund—Kap Tobin—Eleonora Bugt—Mackensie Bugt—Eskimonæs—Clavering fjord—Loch fine—Herschellus; depth 5—60 m (OHLIN 1901, HANSEN 1908, SIVERTSEN 1935).

Nordøstkyst Area: Sabine Island—W. of Shannon Island—Danmarks Havn, 20 localities in 0—20 m. — Koldewey Island—Hvalrosodden—Cape Bismarek; depth 5—40 m (BUCHHOLZ 1874, STEPHENSEN 1912, SIVERTSEN 1935).

Distribution: East and West Greenland. American east coast to Rhode Island close to the south of Cape Cod. — Arctic America: Port Burwell, Ungava, Fullerton, N.W. side of Hudson Bay, Cumberland Sound and Baffin Bay; Jones Sound south of Ellesmere Land, Melville Island, Winter Harbour, Dolphin and Union Strait, from Bering Strait to Puget Sound and to Saline.

It is a boreo-arctic-pacific species which on its way eastwards has reached Greenland. As will be seen from the maps *Spirontocaris groenlandica* and *Nectocrangon lar* have the same areas of distribution although *N. lar* has not been found in so many North American localities. What has already been said in the zoogeographical remarks concerning *Nectocrangon lar* holds good also as regards *Spirontocaris groenlandica*, as both these species are coastal forms living in shallow water. The species have been distributed from a Pacific origin along the littoral zone to the north Siberian high arctic area, which has prevented them going further west, whereas the Greenland Sea and the Danmarks Strait have become their Eastern boundary, a barrier or basin, the depth of which they have not been able to cross owing to their littoral habitat.

Larval stage: not definitely known. (See STEPHENSEN 1935, p. 54).

15. *Bythocaris payeri*, (HELLER).

Hippolyte Payeri, HELLER 1875, p. 26, Pl. 1, figs. 1—4.

Bythocaris Payeri, KEMP 1910, p. 118, Pl. 18, figs. 4—6.

East Greenland records:

Bythocaris Payeri + *B. leucopsis*, OHLIN 1901, pp. 40, 41.

Bythocaris Payeri, KOEFOED 1909.

Bythocaris Payeri, SIVERTSEN 1935, p. 44.

The two species *B. Payeri* and *B. leucopsis* are nearly related and both belong to the Atlantic part of the Polar Ocean. *B. payeri* is found in depths of 200—2000 m. *B. leucopsis* is found in relatively greater depths, 1000—2600 m. These facts of distribution are founded mostly on records by SARS 1885, OHLIN 1901, HANSEN 1908, but SIVERTSEN 1935, thinks revision is necessary.

His material, collected in East Greenland was found in depths of 135—502 m, but he believes that there is a correlation between depth and a change from the typical *B. payeri* (135—300 m) to the *B. leucopsis*-form (250—502 m). Consequently he considers that he is justified in regarding *B. payeri* and *B. leucopsis* as the same species. I have studied the characteristics of the species, for the part material from the S/S "Ingolf" found in the Zoological Museum in Copenhagen. Unfortunately the material from several stations is stored together in the same jar, without separate labelling for each locality, so that it is now unknown from which station or depths any single individual originates. Furthermore, amongst the new material I have found two *B. leucopsis* from Kap Franklin, Franz Joseph Fjord, 320 m, together with two *B. payeri*. The material shows, however, that forms are found which differ slightly from the typical *B. payeri* and *B. leucopsis*, but whether real transition forms exist between the two species it is impossible to ascertain from the material available. In this paper all SIVERTSEN's specimens will be classified as *B. payeri* (which he himself does for reasons of nomenclatural priority) while all earlier animals from East Greenland specified as *B. leucopsis* will, till further notice, remain in this category.

Occurrence at East Greenland (fig. 19):

The species has not been found in East Greenland South of 72°55' N.

Franz Joseph Fjord Area: Vega Sund—Dusenfjord—Franz Joseph Fjord—Moskusokse Fjord—Mackensie Bugt, 6 localities—Clavering Fjord, — depth 135—502 m (OHLIN 1901, KOEFOED 1909, SIVERTSEN 1935).

Nordøstkyst Area: South East of Shannon Island. — 75°59' N., 14°12' W. — 77°31' N., 18°24' W. — depth 275—350 m (OHLIN 1901, KOEFOED 1909).

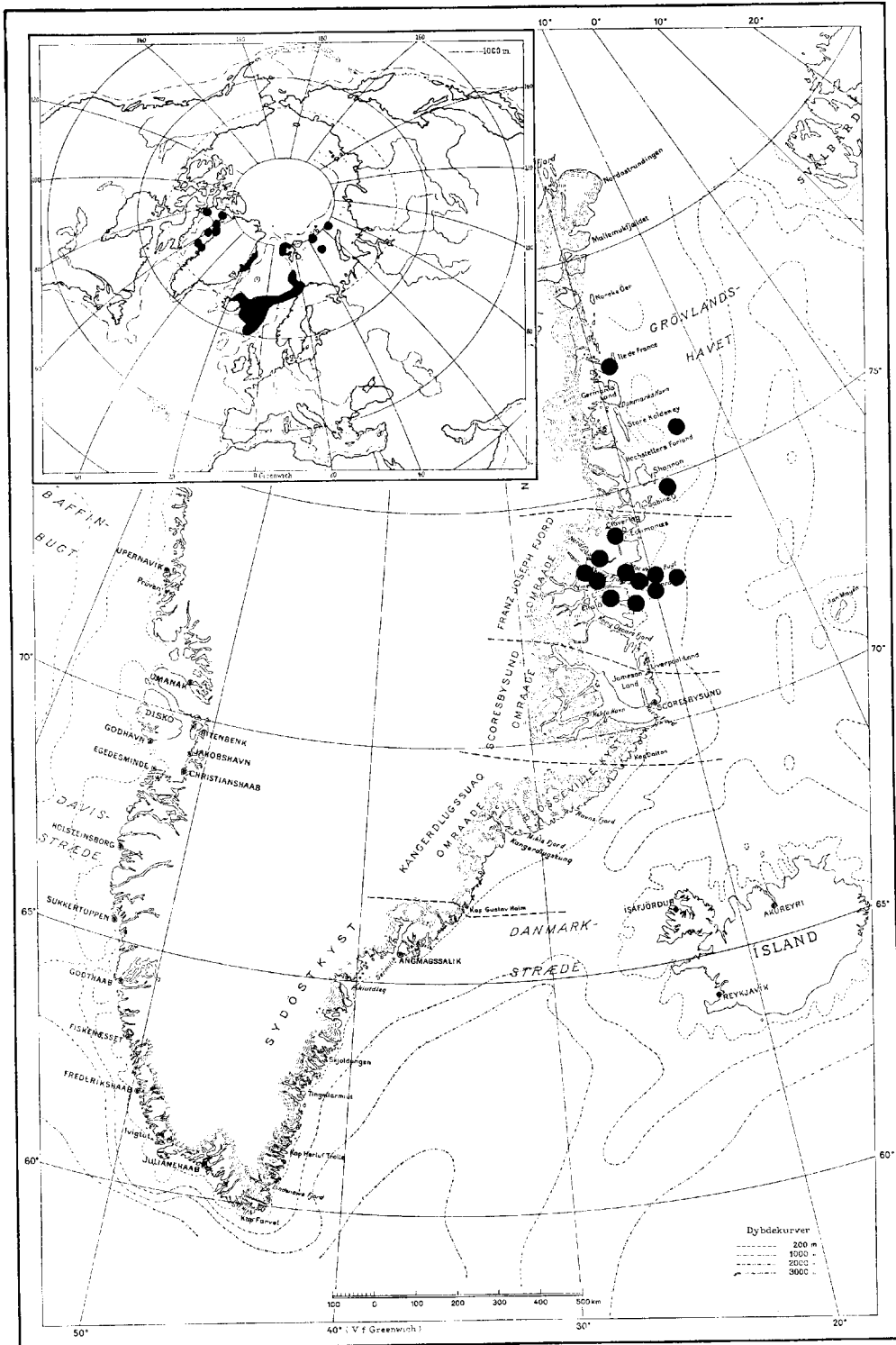


Fig. 19. *Bythocaris payeri*, HELLER.

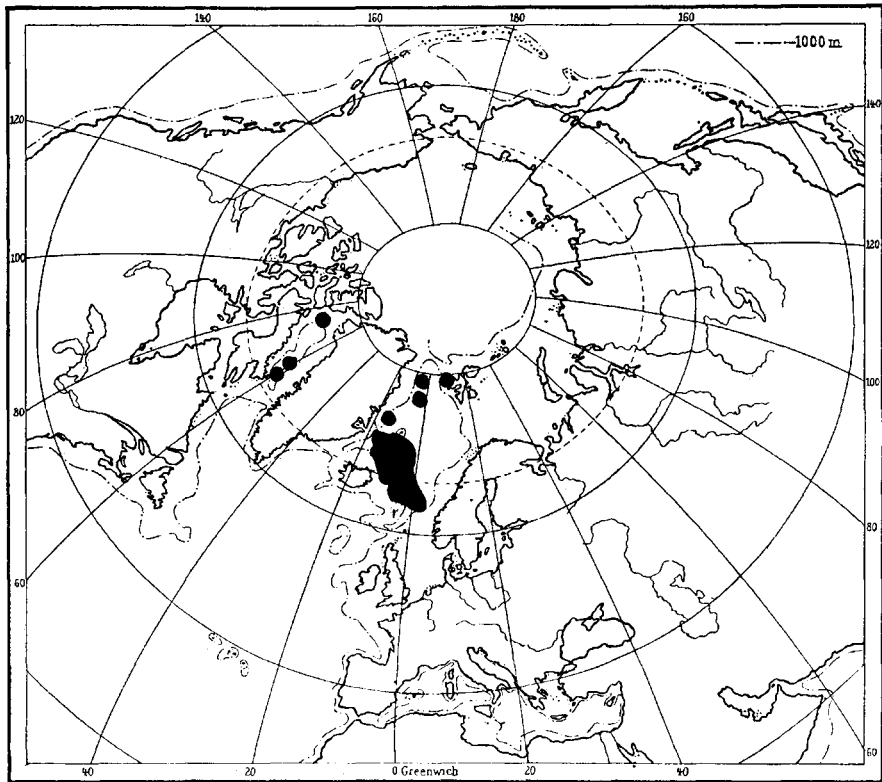


Fig. 20. *Bythocaris leucopsis*, G. O. SARS.

Distribution: In West Greenland between $70^{\circ}51'$ N. and $77^{\circ}05'$ N., Jan Mayen, north and east of Iceland to the Faroes from there north of the Faroe—Shetland ridge to the coast of Finmarken and Spitzbergen and further east to the Barents Sea and northern Kara Sea. It is an arctic species.

Larval stage: unknown.

16. *Bythocaris leucopsis*, G. O. SARS.

Bythocaris leucopsis, G. O. SARS 1885, p. 27, Pl. 3, figs. 1—26.

Larval Stage: *Bythocaris leucopsis*, G. O. SARS 1885, p. 32, Pl. 3, figs. 24—26.

East Greenland records:

Bythocaris leucopsis, OHLIN 1901, p. 40.

Occurrence in East Greenland (fig. 22):

$72^{\circ}42'$ N., $14^{\circ}49'$ W., depth 2000 m (OHLIN 1901). Franz Joseph Fjord, Kap Franklin, 320 m, 2 spec.

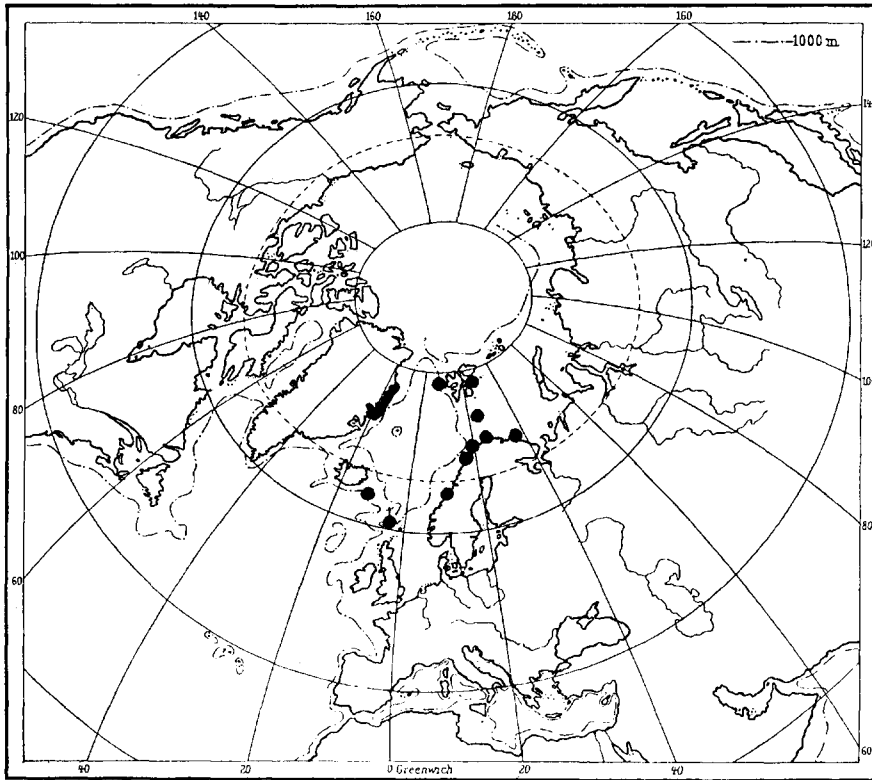


Fig. 21. *Bythocaris simplicirostris*, G. O. Sars.

Distribution (fig. 20): Baffins Bay and the deep arctic basin between Greenland, Iceland, Norway and Spitzbergen. Depths (670) 1100—2857 m. It is an arctic deep water species.

Larval stage: unknown.

17. *Bythocaris simplicirostris*, G. O. Sars.

Bythocaris simplicirostris, G. O. Sars 1869, p. 149.

Bythocaris simplicirostris, Ohlin 1901, p. 39, fig. 1.

East Greenland records:

Hippolyte panchii, Buchholz 1874, p. 277.

Bythocaris simplicirostris, Ohlin 1901, p. 39.

Bythocaris simplicirostris, Hansen 1908, p. 69.

Bythocaris simplicirostris, Sivertsen 1935, p. 44.

There has been some controversy as to whether *B. panchii* and *B. simplicirostris* are one or two different species. Hansen (1908)

considers them synonymions. APPELLØFF (1906) and G. O. SARS 1912 define them as 2 species. As the species has been known hitherto only from very few specimens, it has not yet been possible to make this question clear. In this publication HANSEN's definition has been chosen and they are looked upon as one species.

Occurrence at East Greenland (fig. 22):

Franz Joseph Fjord Area: The most southern place where it has been found in East Greenland is in Nathorst Fjord. It has also been found in the Franz Joseph Fjord—Dusenfjord—North of Bontekoe Island—South of Mackensie Bugt. Depths 137—300 m. (OHLIN 1901, SIVERTSEN 1935).

Nordøstkyst Area: Sabine Island—North of Shannon Island. Depths 60—220 m. (BUCHHOLZ 1874, HANSEN 1908).

Distribution (fig. 21): An Arctic Atlantic coastal form which occurs from East Greenland to Spitzbergen and the Murman coast, southwards to the Faroe Islands and Ireland.

Larval stage: unknown.

18. *Pandalus borealis*, KRØYER.

Pandalus borealis, KRØYER 1845, p. 461.

Pandalus borealis, BERKELEY 1930, p. 81.

Larval stages: *Pandalus borealis*, BERKELEY 1930, p. 81 with figs.

East Greenland records:

Pandalus borealis, HANSEN 1908, p. 70.

Occurrence at East Greenland (fig. 22): Two localities near Angmagssalik (HANSEN 1908), depth 280 and 400 m.

Distribution (fig. 23): *Pandalus borealis* has both an Atlantic and a Pacific distribution area. In its Atlantic distribution it occurs as far south as the Skagerrak and in the fjords at Bohuslän. Also along the east coast of Scotland from where it goes as far north as Spitzbergen and in an easterly direction to the Barents Sea. — On the east coast of America it has been found from Massachusetts Bay to Nova Scotia. — In its Pacific distribution it is found in the Bering Sea and in the Ochotsk Sea, southwards to 46° N. on both sides of the Pacific Ocean.

RATHBUN (1904) and afterwards BERKELEY (1930) say that *P. borealis* has a circumpolar distribution, but this seems not to be correct as the species may be looked upon as a boreal—lower arctic form, which has never been found under high arctic conditions such as in North East Greenland or north of America, and in particular not in the Siberian Polar Sea. Furthermore the species has never been found

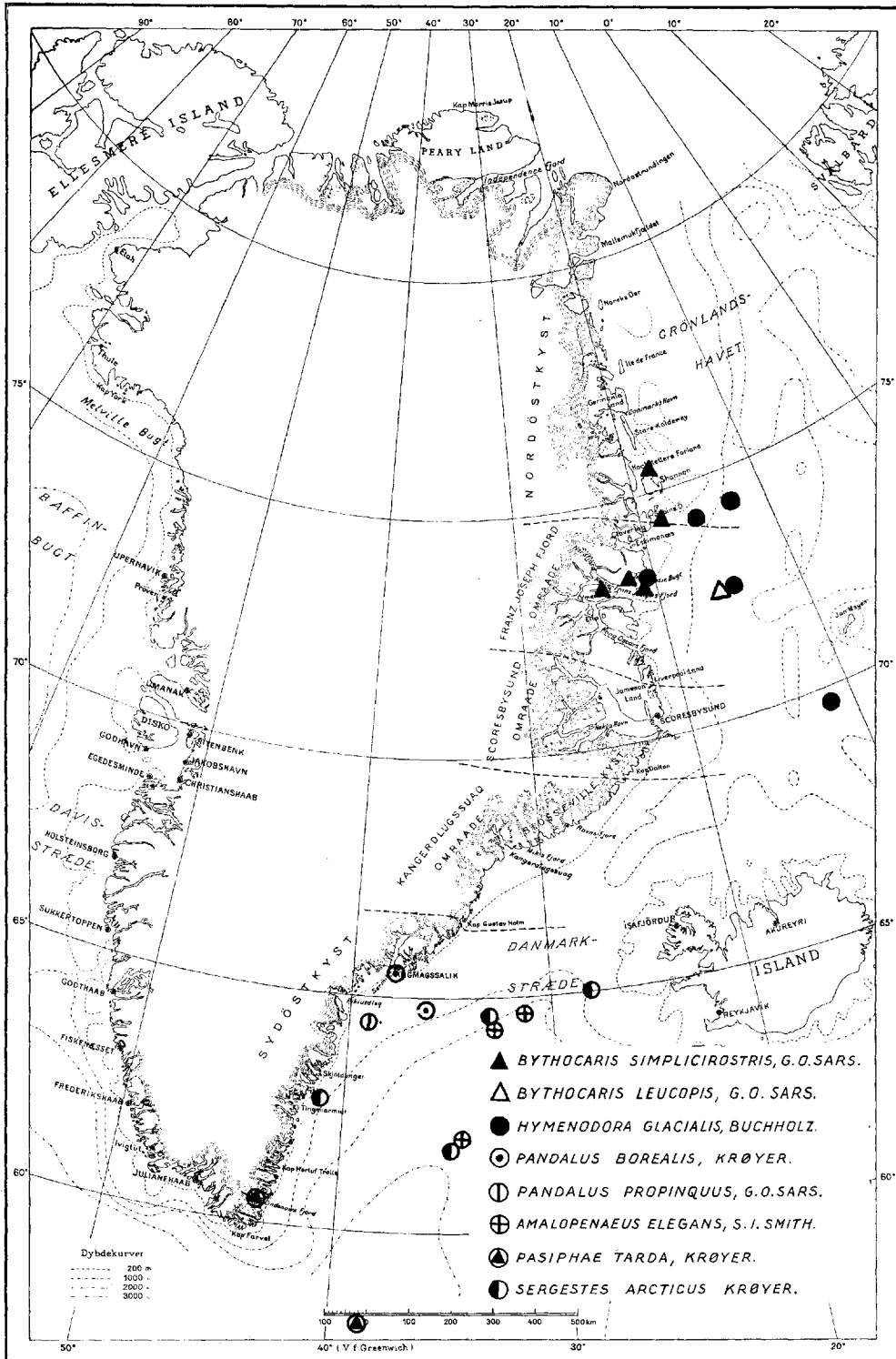


Fig. 22.

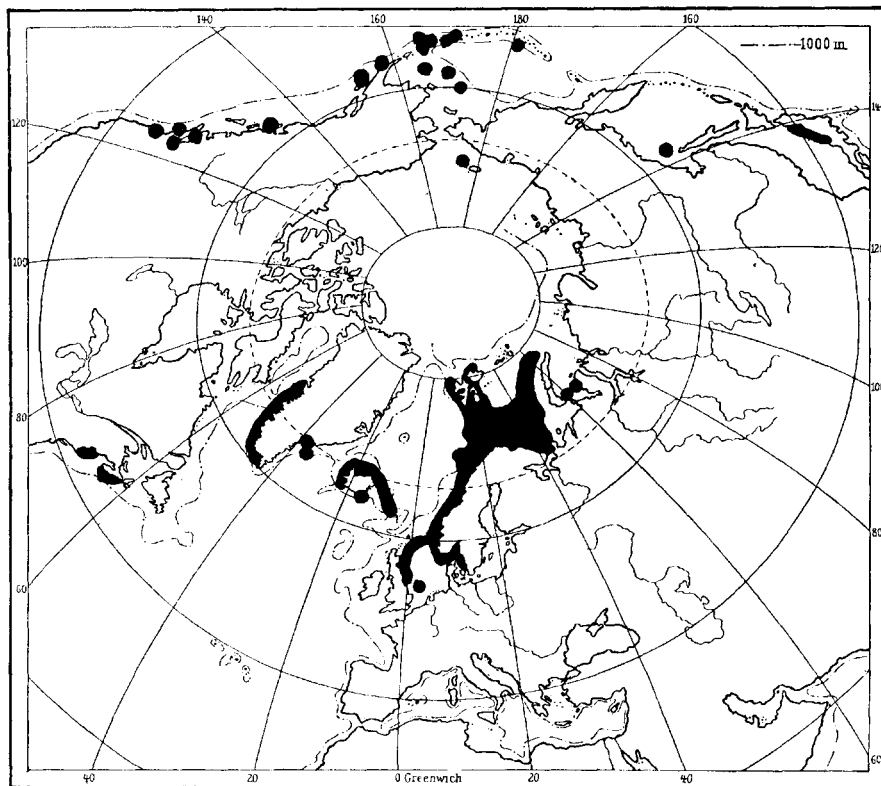


Fig. 23. *Pandalus borealis*, KRÖYER.

in the most shallow part of the littoral zone. It is found in fjords in depths from 50—100 m, but outside these it usually lives in depths of 150—700 m.

P. borealis is usually found in positive bottom temperatures, According to both OHLIN and HANSEN it can also occur in cold water as low as $-1^{\circ}.8\text{C.}$, but this may be regarded as quite out of the normal.

19. *Pandalus propinquus*, G. O. SARS.

Pandalus propinquus, G. O. SARS 1870, p. 148.

Pandalus propinquus, KEMP 1910, p. 89, Pl. 11, figs. 1—4.

Larval stage: *Pandalus propinquus*, STEPHENSEN 1935, p. 60, figs. 21—22.

East Greenland records:

Pandalus propinquus, HANSEN 1908, p. 72.

Occurrence at East Greenland (fig. 22): The species has been found only once in East Greenland by the S.S. "Ingolf" at $64^{\circ}45' \text{N.}$, $29^{\circ}06' \text{W.}$, 1125 m.

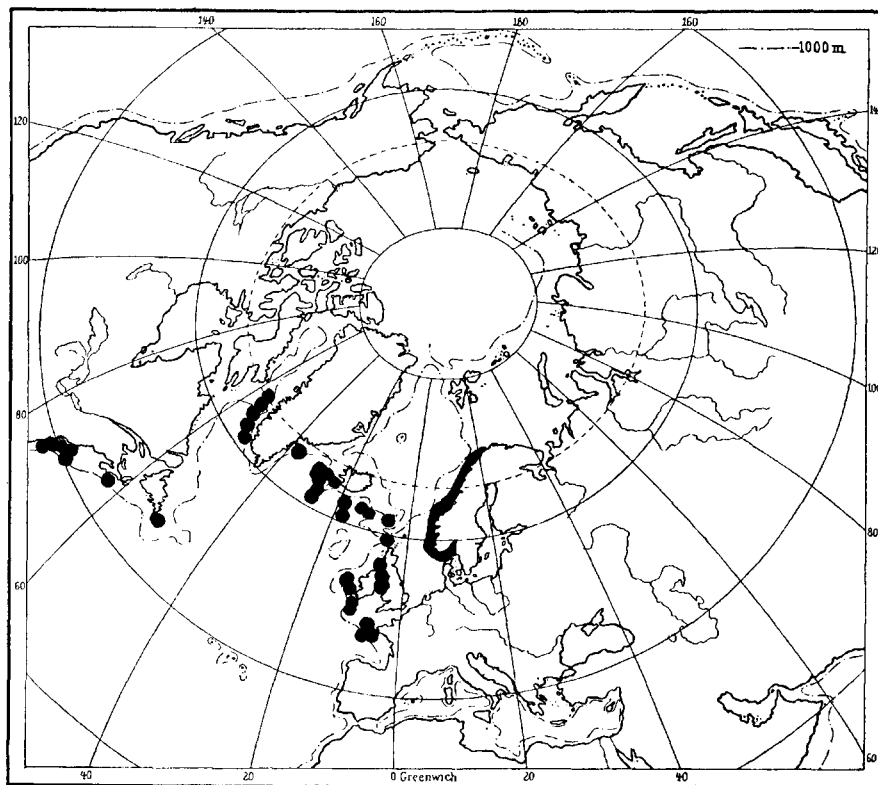


Fig. 24. *Pandalus propinquus*, G. O. SARRS.

Distribution (fig. 24): West Greenland to 65°38' N., West Norway to 69°30' N. West coast of Scotland and Ireland, off Iceland and off the Faroe Islands. On the East coast of the United States it occurs between Boston and New York. Depths 72 to 2180 m.

An North Atlantic boreal deep-sea form.

Pasiphae tarda, KRØYER.

Pasiphae tarda, KRØYER 1845, p. 434.

Pasiphae tarda, SUND 1912, p. 14, Pl. 1—3.

Larval stage: *Pasiphae tarda*, BJÖRK 1911.

East Greenland records:

Pasiphae tarda, STEPHENSEN 1912, p. 65, fig. 1.

Occurrence at East Greenland (fig. 22): 58°08' N., 39°24' W., 500 m Wire (STEPHENSEN 1912). — Lindenowfjord outside Narssok, depths 500 m, 2 spec. in stomach of *Macrurus fabricii*.

Distribution: Davis Strait, round Iceland and at Jan Mayen, Skagerrak and commonly along the south and west coast of Norway to Lofoten and in the Norwegian Sea. In East America it is found along the coast from Massachusetts in the south and to Cape Cod. Probably it has also been found in the Mediterranean west of Italy. It is a pelagic species usually found in depths between 300—600 m. Very little is known about the larval stage.

20. *Hymenodora glacialis*, (BUCHHOLZ).

Pasiphae glacialis, BUCHHOLZ 1874, vol. II, p. 279, Pl. 1, fig. 2.

Hymenodora glacialis, KEMP 1910, p. 72, Pl. 8.

Larval stage: *Hymenodora glacialis*, STEPHENSEN 1935, p. 68, figs. 26—30.

East Greenland records:

Pasiphae glacialis, BUCHHOLZ 1874, p. 279.

Hymenodora glacialis, HANSEN 1896, p. 126.

Hymenodora glacialis, OHLIN 1901, p. 62.

Hymenodora glacialis, HANSEN 1908, p. 79.

Occurrence at East Greenland (fig. 22): Out at sea *H. glacialis* is found in the Scoresbysund area in 69°51' N., 11°18' W. Some specimens have been found in the stomach of a *Procellaria glacialis* (HANSEN 1895). With the exception of this case it has only been found in East Greenland in the Franz Joseph Fjord area and further north.

Franz Joseph Fjord Area: 72°42' N., 14°49' W., 2000 m. — Between Bontekoe Island and Mackensie Bugt, depth 250 m. (OHLIN 1901).

Nordøstkyst Area: 74° N. near the surface of the sea. — 74°12' N., 12°00' W., between pack-ice. (BUCHHOLZ 1874, HANSEN 1908).

Distribution (fig. 25): *H. glacialis* has been found at several localities in the cold area of the Norwegian Sea between 63°05' N. and 79°59' N., depth 900—3700 m. On the east coast of America it has been found 4 times, between 37°12' N. and 42°48' N., depth 1650—6000 m. It is also known in the Bering Sea and near Prince of Wales Island, Alaska; it has also been found in the Gulf of California, the Gulf of Panama and off Ecuador. This geographical distribution is so remarkable that it is not possible with our present knowledge to give any reasonable explanation of it, but it can be stated that the species must be pelagic with a central region of distribution in the cold area of the Norwegian Sea. In its most arctic distribution area it may appear near the surface. — It has been found embedded in pack-ice and twice in the stomach of birds. Also it has been found living near the coast (Mackensie Bugt, 250 m). The specimens found in tropical seas have always been in depths greater than 1700 m.

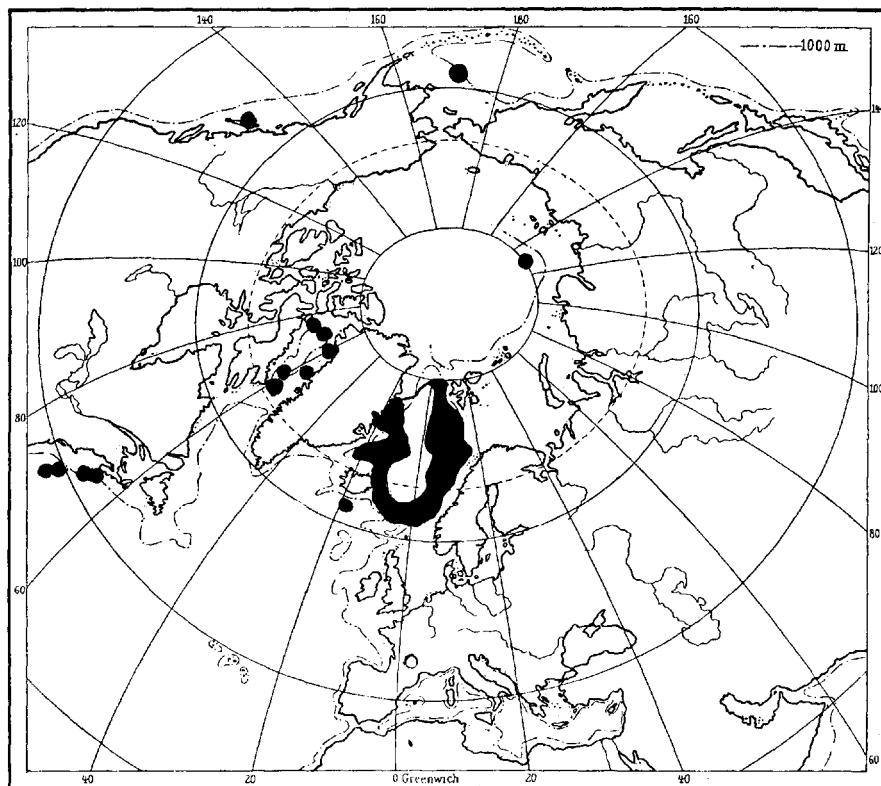


Fig. 25. *Hymenodora glacialis*, BUCHHOLZ.

Amalopenæus elegans, S. I. SMITH.

(Syn.: *Gennadas elegans*.)

Amalopenæus elegans, S. I. SMITH 1882, p. 87, Pl. 14, figs. 8—14; Pl. 15, figs. 1—5.

Amalopenæus elegans, KEMP 1910, p. 14, Pl. 1, figs. 1—16.

Amalopenæus elegans, PESTA 1918, p. 33.

Larval stage: *Gennadas elegans*, WILLIAMSON 1915, p. 343.

East Greenland records:

Gennadas elegans, HANSEN 1908, p. 81.

Occurrence at East Greenland (fig. 22): This species has not yet been found on the shelf of East Greenland but it has been found some distance away from the south coast as well as along the coast of West Greenland, so it may also some day be found at the most southern part of South East Greenland. For this reason it is also included in this paper.

Sydøstkyst Area: 61°57' N., 35°15' W., 2860 m, 600 m Wire. — 64°34' N., 31°12' W., 1300 m. — 64°38' N., 37°37' W., 2080 m (the last two localities from HANSEN 1908).

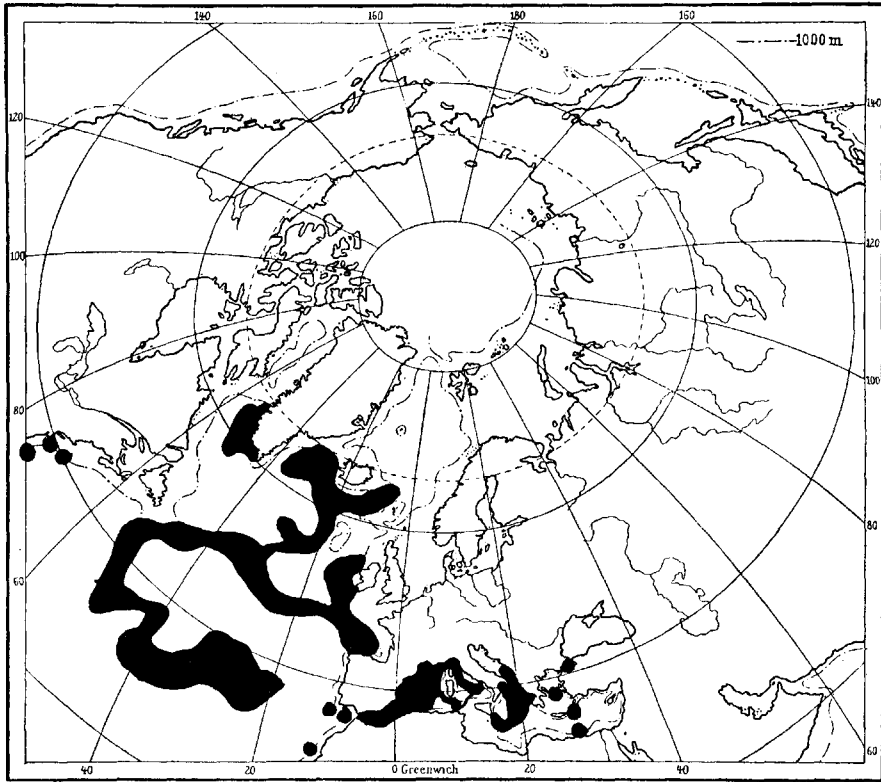


Fig. 26. *Amalopenæus elegans*, S. I. SMITH.

Distribution (fig. 26): The northern border is south west Greenland. It is one of the most common Atlantic pelagic decapod crustaceans, which has been found off the East coast of America at localities lying between $41^{\circ}13'$ and $31^{\circ}41'$ N. It has been recorded from West Greenland and the Davis Strait up to $65^{\circ}25'$ N., from the neighbourhood of Iceland, south of the ridge; from the Sargasso Sea and near the Cape Verde Islands. In several places throughout the Atlantic Ocean to South of the Equator and also close to the South of Cape Point, South Africa. In the Mediterranean it has been found in several localities. *Amalopenæus elegans* is a shrimp with a partly bathy-pelagic distribution.

21. *Sergestes arcticus*, KRØYER.

Sergestes arcticus, KRØYER 1856, p. 240, Pl. 3, fig. 7; Pl. 5, fig. 16.

Sergestes arcticus, KEMP 1910, p. 30, Pl. 3, figs. 13—19.

Larval stage: *Sergestes arcticus*, WASSERLOOS 1908, p. 327 with figs.

East Greenland records:

Sergestes arcticus, HANSEN 1908, p. 82.

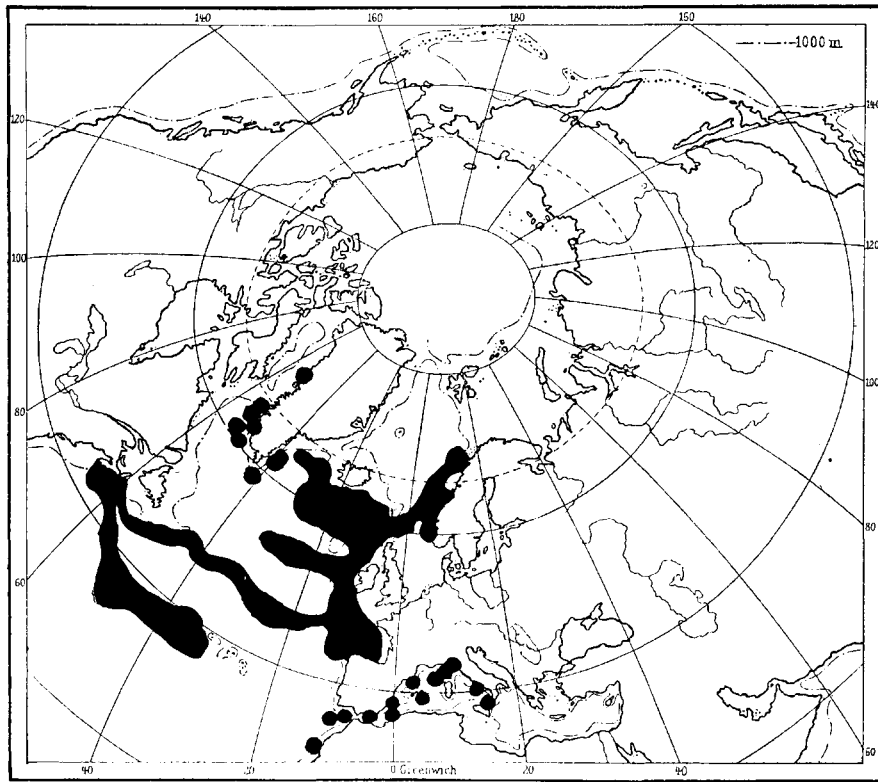


Fig. 27. *Sergestes arcticus*, KROYER.

Occurrence at East Greenland (fig. 22): $61^{\circ}57' N.$, $40^{\circ}41' W.$, 1675 m, 150 m wire (15 spec.) — $64^{\circ}38' N.$, $32^{\circ}37' W.$, 2080 m. — $65^{\circ}00' N.$, $28^{\circ}10' W.$, 1000 m wire (the last two are from HANSEN 1908).

Distribution (fig. 27):

In the Atlantic Ocean *Sergestes arcticus* is commonly and widely distributed; from West Greenland it is known as far north as $65^{\circ}20' N.$ except for one taken by the S.S. "Godthaab" 1928 at Waigat, $70^{\circ}20' N.$ (STEPHENSEN 1935). Along the coast of Norway to $69^{\circ}13' N.$ In the south it is found 40 miles off Table Mt. and in Lat. $38^{\circ}05' S.$ It has also been recorded from the Western part of the Mediterranean, where it is rather abundant. 3 specimens were found by the "Challenger" to the South of Australia. It is a pelagic deep-sea form.

GENERAL REMARKS

The comparatively large number of marine investigations which have been carried out in the northern part of the Atlantic, especially by the Scandinavians, Russians, and French, make a comparison between the fauna of East Greenland and that of the northern coast of Eurasia possible. The waters round Spitzbergen were specially investigated by the Swedish Expedition in 1908. From material collected by this expedition v. HOFSTEN (1916) has given us the first real zoogeographical account of the *Decapoda* in a certain area, a work, which has given an excellent comparative foundation for the conditions in East Greenland. nine species of *Decapoda* are dealt with in detail in his paper, 8 of which occur also in East Greenland. The hydrographic and climatic conditions of the sea round the southern part of Spitzbergen, Barents Sea and the White Sea bear great resemblance to those of Northeast Greenland in spite of the northern branch of the Gulf stream extending into the southern parts of these waters. Thirtyone species of Crustacean decapods are known from East Greenland waters. On table I these species are tabulated to show their further distribution both geographical and vertical, to compare the depths in which they live in East Greenland with the greatest depths on which they have yet been found. It shows us that the species, which in boreal and tropic seas always occurs in considerable depths, up to 3000—4000 meters — in one case in a depth of more than 5000 m —, in colder areas as along the coast of East Greenland can be found only in a few hundred meters (see table I).

This is also true for several other species which live in shallow water, it shows that the same species lives in shallower water in East Greenland than at Spitzbergen. Other animal forms are influenced in the same way, so that, under more arctic conditions, they are frequently found in shallower water. Whether this is also the reason as regards the decapod crustacea is difficult to say, but in any case it is not the only reason. All the East Greenland shallow water decapods are somewhat isothermic: The following 10 species belong to this category:

1. (*Eupagurus pubescens*).
2. *Sclerocrangon boreas*.
3. *Nectocrangon lar*.
4. *Sabinea septemcarinata*.
5. *Spirontocaris gaimardii*.
6. *Spirontocaris spinus*.
7. (*Spirontocaris lilljeborgii*).
8. *Spirontocaris turgida*.
9. *Spirontocaris polaris*.
10. *Spirontocaris groenlandica*.

All of these except 3, 7, and 10 are also known from Spitzbergen. If they were stenothermic one might expect to find them along the coast southwards following outposts of the colder streams to the south into more boreal areas, where the other watermasses were outside their ordinary temperature areas, but this never seems to be the case. However, the bottom conditions seem to play a greater part in distribution of the crangonids and the species *Spirontocaris* than for the more pelagic forms. As regards the crangonids they prefer in particular to hide on bottom areas with cirripeds. According to their distribution the East Greenland decapods are divided in the following 6 zoogeographical zones: boreal, boreal-lower arctic, higher arctic, pan-arctic, bathy-pelagic and deep-water.

I. Boreal.

Lithodes maja, L.

Spirontocaris lilljeborgii, DAN.

The finding of *Spirontocaris lilljeborgii* in East Greenland is doubtful, as has previously been said.

Lithodes maja has been found in East Greenland only once near Angmagssalik, but it is also known from West Greenland, Iceland and Spitzbergen. It may therefore be described as belonging to the East Greenland fauna, but from a zoogeographical point of view it stands in transition to the following group so that no purely boreal fauna-element occurs in East Greenland.

II. Boreal-lower arctic.

Hyas coarctatus, LEACH.

Eupagurus pubescens, KR.

Nectocrangon lar, OWEN.

Baffin Bay and Smiths Sound Labrador and East coast of North America		Circumpolar	Zoogeographical distribution	depths in East-Greenland	Greatest known depth for the species
—	+	—	boreo-arctic	125—150 m	E. America 1800 m
—	+	—	boreal	280 m	E. America 580 m
—	+	—	deep-water (boreal)	< less than a few m	E. America 2500 m
—	—	—	deep-water (boreal)	1470—1950 m	E. Greenland 1950 m
—	—	—	deep-water (boreal)	1470 m	S. W. Iceland 1590 m
+	+	—	boreo-arctic	18—22 m	E. America 1280 m
—	—	—	deep-water (boreal)	500—1130 m	S. W. Iceland 1600 m
—	+	—	deep-water (cosmopolitan)	2600 m	Antilles 3180 m
—	+	—	deep-water (lower-arctic)	425—700 m	E. America 2450 m
—	+	—	deep-water (cosmopolitan)	2600 m	E. America 5145 m
—	—	—	deep-water (cosmopolitan)	1575 m	E. America 3830 m
+	—	?	higher-arctic	200—1000 m	Spitzbergen 1060 m
—	+	—	pan-arctic	0—150 m	Spitzbergen 400 m
+	+	—	boreo-arctic (Pacific littoral)	0—400 m (—200 m)	W. Greenland 240 m
—	+	—	deep-water	3820 m	E. Greenland 3820 m
+	+	+	panarctic (circumpolar)	30—200 m (—350 m)	E. Greenland 350 m
—	+	—	deep-water (Atlantic-boreal)	330—1200 m	Norway 1350 m
—	+	—	deep-water (Atlantic-boreal)	2600 m	E. America 2800 m
+	+	+	boreo-panarctic (circumpolar)	12—100 m (—300 m)	W. Greenland 350 m (500 m?)
+	+	—	boreo-arctic	8—50 m (—125 m)	Murman Sea 400 m
—	+	—	boreal	12—16 m	E. America 1280 m
+	+	+	panarctic (circumpolar)	4—70 m	White Sea 290 m
+	+	+	panarctic (to boreo-arctic) (circumpolar)	4—350 m	N. Iceland 1100 m
+	+	—	boreo-arctic (Pacific littoral)	0—50 m (—175 m)	E. Greenland 175 m
+	—	—	panarctic	135—502 m	Spitzbergen 1160 m
+	—	—	panarctic (deep-water)	2000 m	Spitzbergen to Greenland 2850 m
—	—	—	boreo-arctic (Atlantic coastal form)	60—300 m	Spitzbergen to E. Greenland 830 m
—	+	—	boreo-arctic (never littoral)	280—400 m	Pacific 700 m
—	+	—	deep-water (North-Atlantic; boreal)	1125 m	E. America 2180 m
—	+	—	boreo-arctic pelagic (never below zero)	500 m	S. W. Iceland 970 m
+	+	?	panarctic or bathy-pelagic	250—2000 m	Panama 3650 m
—	+	—	bathy-pelagic	1300—2860 m	E. Greenland 2860 m
—	+	—	bathy-pelagic	1675—2080 m	E. America 5030 m

Bythocaris simplicirostris, G. O. SARS.

Pandalus borealis, KR.

Spirontocaris spinus, SOW.

Spirontocaris groenlandica, FABR.

Spirontocaris gaimardii, H. M. EDW.

Pasiphae tarda, KR.

Hyas coarctatus. This species although new in East Greenland, is commonly known in South West Greenland. Its occurrence in South East Greenland therefore only shows a slight widening of its distribution area to a locality where the species might be expected.

Eupagurus pubescens, of which only one specimen is known from Hekla Havn, must, together with *Spirontocaris lilljeborgii* be regarded the most doubtful decapod in East Greenland. However, *E. pubescens* in contrast to *S. lilljeborgii* is found both in West Greenland, Iceland and Spitzbergen. *Pandalus borealis* has also both a Pacific and Atlantic distribution area, but it is not such a pronounced shallow water form as the previous. It is never entirely littoral but it is found in 60—300 m and occasionally at 830 m. It is excluded from the higher-arctic areas north of America and Asia, which divide its occurrence into 2 areas of distribution.

Bythocaris simplicirostris is littoral in contrast to the other two East Greenland species of *Bythocaris*. It is found in rather shallow water (60—300 m). In Greenland its distribution is purely arctic, but the species is also found near the Faroes and western Norway.

Nectocrangon lar and *Spirontocaris groenlandica* are both Pacific species of the shallow water which have reached East Greenland by easterly migration. Neither as fully grown nor as the larval stage have they been able to cross Danmarks Strait or the Greenland Sea, and the Siberian Polar Sea forms a cold-barrier, which they are unable to cross in the westerly direction.

Spirontocaris gaimardii and *S. spinus* both occur in shallow water (8—100 m) along most of East Greenland. They both have a boreal and pan-arctic distribution. *S. spinus* does not occur under the high-arctic conditions in the Siberian Polar Sea, while *S. gaimardii* is circumpolar.

III. High arctic.

Sclerocrangon ferox G. O. SARS.

Only one East Greenland decapod: *Sclerocrangon ferox*, G. O. SARS is found which has a constitution fitted for high arctic conditions. This crangonid takes the place of *Sclerocrangon boreas* in deeper water

and under more arctic conditions, so that *S. boreas* is found only from the coast out to 150 m (400 m), *S. ferox* from 200—1000 m. In arctic seas *S. ferox* is missing only to the north of America, but it may have been overlooked in this area, which has not been examined very carefully. Judging from its known distribution one may expect that it will turn out to be circumpolar.

IV. Panarctic.

- Sclerocrangon boreas*, PHIPPS.
Sabinea septemcarinata, SAB.
Spirontocaris gaimardii, H. M. EDW.
Spirontocaris turgida, KR.
Spirontocaris polaris, SAB.
Bythocaris payeri, HELL.
Bythocaris leucopis, G. O. SARS.

This group of species is found along the whole coast of East Greenland with exception of the two species *Bythocaris*.

Sclerocrangon boreas is, as already mentioned, a shallow water form which takes the place of *S. ferox* in shallow water as well as further south where the higher arctic *S. ferox* does not occur. Like *Sabinea septemcarinata* and the three species of *Spirontocaris* of this group: *S. turgida*, *S. polaris* and *S. gaimardii* it occurs along the whole East Greenland coast from the shore and as far out as to a depth of 200—300 m. Only *S. turgida* is not found in more than 70 m. *S. gaimardii* continues down to the boreal zone. With exception of *Sclerocrangon boreas* they all have a circumpolar distribution.

The two species of *Bythocaris*, viz. *B. payeri* and *B. leucopis* form together with the littoral form *B. simplicirostris*, a smooth transition to the deep Sea. Thus *B. payeri* in East Greenland goes to a depth of 500 m while *B. leucopis* is a real deep sea form, which, off East Greenland, has been found only at a depth of 2000 m.

V. Deep Water.

- Lithodes grimaldii*, A. M. EDW. et BOUV.
Paralomis spectabilis, HANS.
Paralomis bouvieri, HANS.
Munida tenuimana, G. O. SARS.
Galacantha rostrata, A. M. EDW.
Munidopsis curvirostra, WHITEAV.

Munidopsis similis, SMITH.
Polychelus nanus, SMITH.
Sabinea hystrix, A. M. EDW.
Pontophilus norvegicus, G. O. SARS.
Glyphocrangon sculptus, SMITH.
Pandalus propinquus, G. O. SARS.

The greater proportion of the *Anomura* and the two *Macrura*, viz. *Sabinea hystrix* and *Glyphocrangon sculptus*, in this group, cannot be classified as belonging to the real East Greenland fauna, but it has been discovered that several of these deep-water species, under arctic conditions, can extend their area to the more shallow water of the coastal zone.

This is the case with *Munidopsis curvirostra*, which has previously been known only from deep water. In 1935 it was found by the S.S. "Thor" in two localities in Lindenowfjord in depths of 425 and 700 m. All the other *Anomura* included were found in deeper water in the Danmarkstrait or just off the East Greenland coast, and it may reasonably be expected that they may be found also inside certain of the East Greenland fjords. Thus a second example of *Munida tenuimana* has been found in depths of 500 m in East Greenland. The pelagic *Macrura*: *Pontophilus norvegicus* and *Pandalus propinquus*, have been found in deep water close to the East Greenland coast, and for this reason alone they ought to be reckoned as belonging to the fauna, *Pontophilus norvegicus* also occurred in shallower water down to 330 m.

VI. Bathy-pelagic.

Hymenodora glacialis, BUCH.
Amalopenus elegans, SMITH.
Sergestes arcticus, KR.

Hymenodora glacialis is the most arctic of these three and it has a Panarctic distribution. We may presume that it is also circumpolar as it is known in the Siberian Polar Sea, although only a single specimen has been found. So far it has not been found north of America but as it occurs in both directions from here east and west in Baffins Bay and at Ellesmere Land as well as in the Beringsea, it may probably also occur in the Melville area.

Amalopenus elegans and *Sergestes arcticus* are purely Atlantic forms which are not known from the Pacific area. On the East coast of Greenland they only occur in the southernmost part. They may be classified as boreo-bathy-pelagic in their distribution.

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