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FOR INDUSTRI OG HÅNDVERK

NORSK POLARINSTITUTT

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Nr. 113

PELECYPODS FROM EAST-GREENLAND

BY
TRON SOOT-RYEN



I KOMMISJON HOS
UNIVERSITETSFORLAGET
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SKRIFTER

Skrifter 1—50, see numbers of Skrifter previous to No. 100.

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Introduction.

During the years 1929 to 1932 the "Norges Svalbard- og Ishavsundersøkelser" sent scientific expeditions to East-Greenland for purposes of exploration and mapping. Fairly extensive collections of zoological material were made by Mr. Nils Knaben (1929) and Mr. Paul Løyning (1930—1932). The pelecypods were kindly placed in my hands for determination, and the results are presented in this paper.

Of special interest in connection with the zoological samples are the hydrographical observations undertaken by Mr. Anton Jakhelln (1936) during the years 1930 to 1932. They give a fairly good picture of the bathymetrical and hydrographical conditions in the fjords and are, together with the Danish observations published by Prof. R. Spärck (1933), very valuable for the understanding of the tolerance and preference of the various species as to temperature and salinity.

The pelecypod fauna of East-Greenland is fairly well known from the papers of Posselt (1896, 1898), Hägg (1904, 1905), Jensen (1905 b), and Grieg (1916). The paper by Jensen (1905 b), especially, gives a complete account of all species with their geographical and bathymetrical distribution. Some revisional remarks are included in the work of Odhner (1915) on the mollusca of the Ice Fjord, Spitsbergen, and new records are to be found in the papers by Spärck (1933) and Thorson (1933). Jensen (1905 b) lists 41 species of which 36 have been found within the Kejser Franz Joseph Fjord area where the Norwegian expeditions did their collecting. Two of these species were not obtained by the Norwegians, but on the other hand 5 species partly listed as varieties by Jensen or mentioned by Odhner were present in the material, which contained 39 species of pelecypods. In all, 41 species have been observed in the area. This seems to be what may be expected to occur there, and new additions will be few if any. Though the material from the Norwegian expeditions does not add much to the pelecypod fauna of the Kejser Franz Joseph Fjord area, it is of value for our knowledge of the distribution of the species within the fjord system.

A complete list of stations where samples of marine benthic animals were collected is included in this paper, together with a map kindly prepared by Mr. B. Evensen. I am also indebted to Miss B. Mauritz for the two photographs and to Dr. A. Orvin, Director of the Norwegian Polar Institute, for his kind assistance.

List of stations.

The list is compiled from the journals and should comprise all stations where benthic animals were collected. Pelecypods were not found on every station, but the exceptions are few. The station numbers can be found on the accompanying map, except St. 1929: 1 and 2, and St. 1931: 9, which fall outside the map. 1931 stations with the same numbers as 1929 stations are underlined on the map.

1929

- 1 19.7 0 m. Jan Mayen.
- 2 21.7 10—12 m. Ca. 75° N. Shannon visible from the top-barrel.
- 8 28.7 20—26 m. Landing valley, Wollaston Forland. Small stones, algae.
- 9 30.7 8—10 m. Kap Herschel. Sand and mud with scattered algae.
- 10 30.7 0 m. Kap Herschel. From shore.
- 13 31.7 9 m. Between Jackson Ø and the mainland. Sand with *Laminaria*.
- 14 31.7 0 m. Jackson Ø. From shore.
- 16 2.8 30 m. Mackenzie Bugt.
- 21 5.8 30—36 m. Kap Humboldt. Stones. Strong tidal current.
- 22 5.8 20—30 m. Kap Humboldt. Mud.
- 24 6.8 ? Sofia Sund inside Robertsons Ø. Sand with algae.
- 25 7.8 25—32 m. Vega Sund, W of Scott Kelties Øer, about 200 m off Traill Ø. Mud.
- 26 7.8 14—20 m. Vega Sund, W of Scott Kelties Øer, nearer than St. 25. Mud with scattered algae.
- 30 9.8 40—50 m. Vega Sund, W of Scott Kelties Øer, off Geographical Society Ø. Clay, sand and mud.
- 33 11.8 About 40 m. Holms Bugt, Kong Oscars Fjord. Sand.
- 35 13.8 About 12 m. Kjerulfs Fjord in Kejser Franz Josephs Fjord. Mud, some algae.
- 36 14.8 0 m. Renbugten, Isfjorden. Shore collecting.
- 37 14.8 About 70 m. Blomsterbugten, NW part of Ymers Ø. Steep slope with algae.
- 39 19.8 About 34 m. Moskusoksefjord. Clay.

1930

- 1010 17.7 6—8 m. Kap Herschel, about 400 m from shore. Mud with *Laminaria*, green and red algae.
- 1011 17.7 6—8 m. Kap Herschel, about 400 m from shore. Mud with *Laminaria*, green and red algae.
- 1012 17.7 6—8 m. Kap Herschel, about 400 m from shore. Soft mud with decaying brown algae.
- 1013 18.7 6—8 m. Kap Herschel, about 400 m from shore. Soft mud, algae.
- 1014 18.7 72—78 m. Kap Herschel, about 3 km from shore. Mud, some algae.
- 1015 18.7 8 m. Kap Herschel, about 1 km from shore. Mud, algae, mainly *Laminaria*.
- 1016 19.7 43—53 m. Kap Herschel, about 1 km from shore and 2 km W of St. 1015. Sandy clay, some brown algae. Rich haul.
- 1017 19.7 78—80 m. Kap Herschel, about 2½ km from shore and 1 km W of St. 1016. Clay with some algae. Very rich fauna.
- 1018 19.7 35—83 m. Kap Herschel, about 2½ km from shore and 1 km W of St. 1017. Stones, clay.
- 1019 22.7 About 25 m. Clavering Fjord, outside reef between Clavering Fjord and
1020 Tyrolerfjord. Red-brown clay.

- 1021 23.7 ? Clavering Fjord, outside reef between Clavering Fjord and Tyrolerfjord.
- 1022 24.7 11—15 m. Clavering Fjord, outside reef between Clavering Fjord and Tyrolerfjord. Sandy clay.
- 1024 24.7 About 12 m. Clavering Fjord, about 250 m outside Kap Stosch. Greyish-brown clay.
- 1025 25.7 About 15 m. Loch Fyne, somewhat inside the mouth. Small stones overgrown with *Lithothamnium*. Strong current.
- 1038 26.7 3—14 m. Loch Fyne, the narrow sound in the outer part. Stones with red and brown algae.
- 1043 27.7 70 m. Clavering Fjord, near land opposite Kap Stosch. Red-brown clay.
- 1044 28.7 30 m. Clavering Fjord, near land opposite Kap Stosch. Clay. Many valves of pelecypods.
- 1047 28.7 34 m. Clavering Fjord, south of Finsch Øer. Grey clay. Very rich fauna.
- 1048 29.7 About 20 m. Clavering Fjord, SW of Kap Mary. Decaying algae.
- 1051 29.7 About 100 m. East of Holland Ø, north of Hold with Hope. Small stones with *Bryozoa*.
- 1057 30.7 About 15 m. Mackenzie Bugt, outside the hut. Mud with brown algae.
- 1058 31.7 About 15 m. Mackenzie Bugt, near St. 1057. Mud with brown algae.
- 1059 31.7 10 m. Mackenzie Bugt, between Terneøen and the mainland. Mud.
- 1060 1.8 10 m. Mackenzie Bugt, near St. 1058. Mud.
- 1062 1.8 ? Mackenzie Bugt, as St. 1060.
- 1063 2.8 40 m. Mackenzie Bugt, 3 km from the head of the fjord. Mud, some red algae.
- 1066 2.8 63—83 m. Mackenzie Bugt, between Hold with Hope and Kap Bennet. Mud.
- 1067 3.8 20—30 m. Kap Humboldt, outside the hut. Mud.
- 1068 3.8 35 m. Kejser Franz Josephs Fjord, near the mouth on northern side.
- 1070 4.8 About 25 m. Moskusoksefjord, near land, about 3 km inside mouth. Red clay, poor.
- 1072 5.8 235 m. Moskusoksefjord, in the middle of the fjord, farther inside than St. 1070. Clay. (Trawl.)
- 1073 5.8 About 20 m. Moskusoksefjord, outside Ankerbugten. Red-brown clay with some small stones. Poor fauna.
- 1078 7.8 235 m. Moskusoksefjord, at mouth. Clay. (Trawl.)
- 1079 7.8 About 30 m. Nordfjord, W of Walterhausen Gletscher. Viscous clay.
- 1080 8.8 16 m. Kong Oscars Fjord, at Ella Ø. Stones.
- 1081 8.8 About 70 m. Alpefjord, near the headland between Alpefjord and Forsblads Fjord. Clay with some stones. Rich fauna.
- 1083 9.8 7 m. Kong Oscars Fjord, at Kap Petersens. From *Laminaria*.
- 1086 9.8 230 m. Kong Oscars Fjord, at Kap Petersens. Viscous clay with stones. Poor. (Trawl.)
- 1087 10.8 100 m. Antarctis Havn. Chocolate coloured clay. Rich fauna. (Trawl.)
- 1092 12.8 About 300 m. Forsblads Fjord. Clay. (Trawl.)
- 1101 12.8 55—100 m. Kong Oscars Fjord. N of Ella Ø. Clay with stones. Very rich fauna. (Trawl.)
- 1106 13.8 350 m. Dicksons Fjord. head beneath glacier. Clay with numerous small stones. (Trawl.)
- 1107 14.8 42 m. Röhss Fjord, near the narrow part. Stones with algae. (Trawl.)
- 1116 15.8 250 m. Vega Sund, about 25 km from Kong Oscars Fjord. Red-brown clay. Rich fauna. (Trawl.)
- 1117 15.8 About 30 m. Vega Sund, outside Husbugten. Grey clay. (Trawl.)
- 1118 16.8 120 m. Vega Sund, about 20 km W of Husbugten. Red clay. Very rich. (Shrimp trawl.)

- 1119 17.8 190—250 m. Vega Sund, about 20 km W of Husbugten. Red-brown clay. Very rich fauna. (Shrimp trawl.)
 1124 18.8 About 200 m. Sofia Sund, in the middle. Light clay. Rich fauna. (Shrimp trawl.)
 1130 19.8 250 m. Sofia Sund, between Ymer and Robertsons Øer. Clay. (Shrimp trawl.)
 1131 20.8 290 m. Between Kap Bennet and Bontekoe Ø, very near the mainland. Clay. (Shrimp trawl.)

1931

- 9 23.7 200 m. 74° 56' N, 12° 50' W. Mud with stones. (T: 1.65°, S: 15 ‰ at 150 m.) (Trawl.)
 17 3.8 18 m. Bontekoe Ø, inside. Clay.
 18 3.8 270 m. Between Bontekoe Ø and Kap Franklin. Clay. Rich. (T: -0.06°, S: 34.54 ‰ at 260 m.) (Trawl.)
 19 4.8 18 m. Kong Oscars Fjord at Kap Petersens. Light clay. Poor. (T: 0.58°, S: 31.11 ‰ at 16 m.)
 20 4.8 60—250 m. Kong Oscars Fjord, in the middle of the fjord off Kap Petersens. Light clay. Rich.
 26 8.8 30 m. Kap Mary, Clavering Ø. Mud, algae.
 29 9.8 370—410 m. Clavering Fjord at Kap Stosch. Clay. (Trawl.)
 30 11.8 338—400 m. Clavering Fjord, at Kap Stosch. (Shrimp trawl.)
 31 11.8 338—400 m. Clavering Fjord, at Kap Stosch. (Shrimp trawl.)
 34 12.8 115 m. Clavering Fjord, at the mouth of the Grantafjord. Clay. (Trawl.) T: -1.46°, S: 34.01 ‰ at 120 m.)
 35 13.8 80—95 m. Between Jackson Ø and the mainland. Clay. (Trawl.) (T: -1.72°, S: 33.46 ‰ at 58 m.)
 36 13.8 230—250 m. Between Jackson Ø and Kap Mary. Clay. (Trawl.) (T: -1.16°, S: 34.28 ‰ at 220 m.)
 37 14.8 260—310 m. S of Hold with Hope. Clay with stones. Rich fauna. (Trawl.) (T: 0.21°, S: 34.58 ‰ at 260 m.)
 39 15.8 360—430 m. Antarctic Sund, entrance from Kong Oscars Fjord. Clay. (Trawl.) Empty! (T: 0.10°, S: 34.61 ‰ at 425 m.)
 40 16.8 657—670 m. Kejser Franz Josephs Fjord, at mouth of Kjerulfs Fjord. Clay with sand. (Trawl.) (T: -0.21°, S: 34.53 ‰ at 650 m.)
 44 16.8 700—780 m. Kejser Franz Josephs Fjord, at mouth of Isfjord. Clay with stones. (Trawl.) (T: 0.05°, S: 34.60 ‰ at 750 m.)
 47 17.8 400—462 m. Kejser Franz Josephs Fjord, at Kap Petersens. Clay with stones. (Trawl.) (T: -0.03°, S: 34.59 ‰ at 450 m.)
 48 18.8 150 m. Moskusoksefjord, outside mouth. Clay. (Shrimp trawl.)
 50 19.8 502 m. Kejser Franz Josephs Fjord. Viscous clay. (T: 1.30°, S: 34.85 ‰ at 480 m.)
 55 20.8 75—185 m. Duséns Fjord, about 250 km inside the mouth. Brown clay. Rich fauna. (Trawl.) (T: -1.20°, S: 33.32 ‰ at 70 m.)

1932

- 502 22.7 10 m. Sabine Ø, Germania Havn. Mud with *Laminaria* and green algae. (Trawl.)
 503 22.7 119 m. East of Kap Wynn. Stones. (T: -1.72°, S: 33.73 ‰ at 100 m.)
 504 22.7 7 m. NE of Kap Herschel. Mud with brown and green algae. (T: -0.73°, S: 32.47 ‰ at 7 m.)
 512 27.7 0 m. Kap Herschel. Sand. (Shore seine.)
 527 31.7 10 m. Holms Bugt. Kong Oscars Fjord. Red-brown clay. (T: -1.15°, S: 33.57 ‰ at 10 m.)

- 545 3.8 30 m. Flemings Fjord. Red clay.
 547 3.8 23 m. Nathorsts Fjord. Red clay. (T: -1.04° , S: 31.10 ‰ at 20 m.)
 548 4.8 137 m. Nathorsts Fjord, near the mouth. Red-brown clay. (T: -1.76° , S: 33.71 ‰ at 125 m.)
 549 4.8 432 m. Kong Oscars Fjord, NE of Kap Petersens. Clay. (Trawl.) T: 1.08° , S: 34.77 ‰, O₂: 92.2 ‰ at 400 m.)
 550 5.8 327 m. Kong Oscars Fjord, at entrance of Sofia Sund. Clay with stones. (Trawl.) (T: 0.61° , S: 34.69 ‰, O₂: 85.6 % at 300 m.)
 554 7.8 82 m. Grantafjord. Grey clay. (Trawl.) (T: -1.56° , S: 32.89 ‰, O₂: 93.7%.)
 562 8.8 168 m. E of Bontekoe Ø. Grey-blue clay with stones. (T: -1.40° , S: 34.14 ‰, O₂: 90.1 % at 150 m.)
 609 11.8 625—650 m. Geologfjord, near head. Grey-black clay. (Trawl.) (T: -1.64° , S: 33.63 ‰, O₂: 86.8 % at 600 m.)
 615 12.8 170 m. Kejser Franz Josephs Fjord. W of Kap Franklin. Blue clay with stones. (Trawl.) (T: -1.16° , S: 34.18 ‰ at 150 m.)
 616 14.8 20 m. N of Hold with Hope. Clay.
 617 14.8 320 m. NE of Jackson Ø. Clay and mud. (T: 1.38° , S: 34.87 ‰, O₂: 87.8 % at 300 m.)
 623 15.8 122—128 m. Tyrolerfjord, near head. Clay and sand. (Trawl.) (T: -1.40° , S: 33.30 ‰, O₂: 74.4 % at 100 m.)
 627 15.8 320 m. Tyrolerfjord near Young Sund. Sandy clay. (Trawl.) (T: -1.73° , S: 33.54 ‰, O₂: 78.2 % at 300 m.)
 639 18.8 On the beach at Walterhausen Gletscher.
 644 19.8 300 m. Duséns Fjord. Red-brown clay with mud. (Trawl.) (T: -1.59° , S: 33.79 ‰, O₂: 76.9 % at 280 m.)

Systematical part.

Ennucula tenuis (Montagu, 1808).

Arca tenuis Montagu: Testacea Britannica, Suppl., p. 56, pl. 29, fig. 1.

Material:

1929: 16	4 specimens	1063	4 specimens		
	24	3 specimens	1117	1 specimen, 1 valve	
	26	5 specimens, 2 valves	1931: 36	2 specimens	
	30	9 specimens		37	5 small specimens
	33	1 specimen		55	2 small specimens
	35	8 specimens	1932: 623	4 small living, 4 dead specimens	
1930: 1022	1 specimen		627	2 small living, 1 dead specimen	
	1024	3 specimens		644	1 small specimen
	1043	1 small specimen			
	1044	7 specimens			

Remarks: All specimens can be referred to the variety or subspecies *expansa* Reeve 1855. The lunule has one or sometimes two weak radiating folds and some faint radiating striae. Escutcheon with fine striation, dorsal margin pouting. The chondrophore very oblique, nearly parallel to the ventral margin. Anterior teeth strongest in the middle of the series, posterior teeth strongest posteriorly.

Occurrence: Found living at depths between 11 m and 310 m. The bottom consisted of mud or clay and fine sand.

Distribution: Circumarctic south to Cape Hatteras, the Mediterranean, Japan and British Columbia.

Nuculana pernula (Müller, 1779).

Arca pernula Müller: Beschäft. Berliner Ges. Natufr. Freunde, Vol. IV, p. 55.

Material:

1929:	16	5 living, 1 dead specimen	1047	1 specimen	
	22	1 specimen	1062	1 specimen	
	24	1 specimen	1063	6 specimens	
	26	1 specimen, 1 valve	1068	1 specimen	
	30	10 specimens	1101	17 specimens	
	35	3 specimens	1117	2 specimens	
1930:	1016	1 specimen, 3 valves	1931:	17	2 specimens
	1017	3 specimens		26	1 specimen
	1018	4 living, 2 dead specimens		34	2 valves
	1019	5 specimens		37	4 juv. valves
	1020		1932:	527	1 specimen
	1024	4 specimens, 1 valve		562	2 specimens
	1043	5 specimens		623	2 specimens
	1044	9 specimens		627	1 juv. specimen

Remarks: The form and the sculpture are rather variable. It may perhaps be possible to circumscribe geographical populations which may be given subspecific value.

Occurrence: Found living between 10 and 168 m in mud, clay or sand.

Distribution: Circumarctic, south to Chesapeake Bay, Denmark, the Shetland Island.

Portlandia arctica (Gray, 1824).

Nucula arctica Gray: Captain Parry's First Voyage, Suppl. to App., p. 251.

Material:

1929:	16	10½ dead specimens	1060	1 small specimen	
	39	15 living specimens, 9 valves	1062	2 dead specimens	
1930:	1019	8 living, 1 dead specimen	1070	4 specimens	
	1020		1073	1 specimen	
	1021	3 specimens	1086	4 valves	
	1022	3 specimens	1932:	545	1 large specimen
	1024	2 living, 3 small dead specimens		616	2 large specimens
				623	2 living, 1 dead specimen

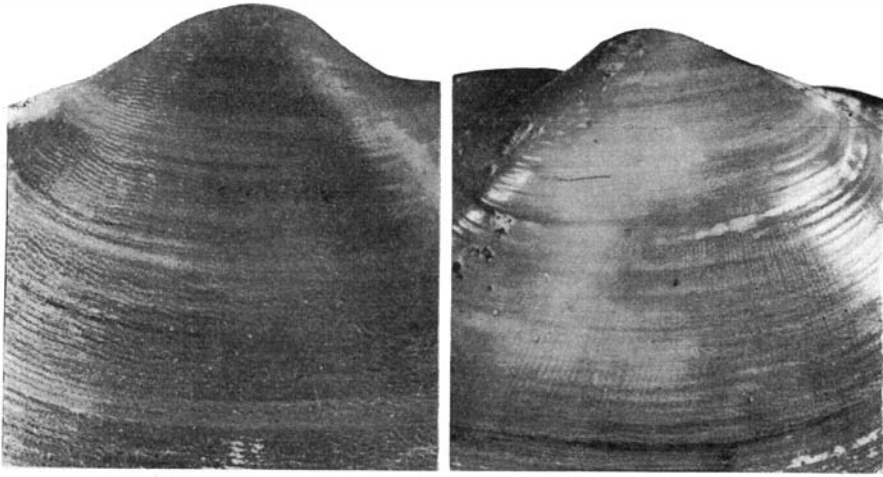


Fig. 1. *Portlandia arctica* (Gray) from St. 1930: 1086. Left: Normal sculpture of a left valve. Right: Smooth unbonal region and radiating striae of a right valve.

Remarks: Usually the form is elongate (*portlandica* Reeve 1855). Some specimens, however, are rather short, even in samples where the elongate form is dominant. Maximal length 27 mm. One valve from St. 1930: 1086 has an abnormal sculpture on the periostracum. Normally the periostracum is mat, owing to very fine wrinkling all over the valve. The valve mentioned above, however, has a shining, smooth periostracum in the upper median part of the valve, and straight radiating lines all over except for the posterior part, where normal wrinkling is predominant. Small specimens sometimes have the same kind of sculpture and may be confused with *Yoldiella intermedia* Sars. The posterior margin is, however, of the *Portlandia* type.

Occurrence: Found living between 10 m and 128 m. The bottom consisted of clay of various colours and sometimes mud.

Distribution: Circumarctic, south to Hudson Strait, the White Sea, the Bering Strait.

Yoldiella lenticula (Möller, 1842).

Nucula lenticula Möller: Index Molluscorum Groenlandiae, p. 17.

Material:

1930: 1024	1 valve	1930: 1116	1 living, 1 dead specimen
1043	1 specimen, 6 valves	1117	3 valves
1044	1 specimen	1119	1 specimen
1072	4 valves	1931: 34	1 specimen
1081	2 specimens, 1 valve	37	32 specimens
1086	6 living, 3 dead specimens	55	16 specimens, 6 valves
1101	24 living, 5 dead specimens, 6 valves	1932: 562	1 living, 1 dead specimen
		623	5 living, 2 dead specimens
		627	2 living, 3 dead specimens

Occurrence: Taken living between 12 m and 320 m in clay.

Distribution: Greenland south to N of Cape Cod (var. *amblia* Verrill and Bush, 1898), Siberian Sea western part, Norwegian west coast, the Farøe Islands, the Shetland Islands.

Yoldiella fraterna Verrill and Bush, 1898.

Yoldiella fraterna Verrill and Bush 1898: Proc. U. S. Nat. Museum, Vol. XX, p. 867, pl. LXXX, fig. 5, LXXXII, fig. 8.

Syn.: *Yoldia frigida* auct. non Torell 1859.

Portlandia frigida var. *nana* Jensen 1905.

Material:

1931: 37	2 specimens	1932: 562	1 specimen
55	Many specimens	623	1 specimen

Remarks: Jensen (1905 b) has listed this species as a variety of *frigida* Torell. Verrill and Bush (1898) described *Yoldiella fraterna* from the North West Atlantic. The populations from East-Greenland are very distinct and easy to distinguish from samples of *frigida*.

Occurrence: Found living at depths from 75 m to 310 m in clay.

Distribution: Greenland, New England, Spitsbergen, Norway south to west coast.

Yoldiella frigida (Torell, 1859).

Yoldia frigida Torell: Bidrag til Spitzbergens Molluskfauna, p. 148, pl. 1, fig. 3.

Material:

1930: 1081	2 valves	1931: 55	13 living, 4 dead specimens
1101	2 specimens	1932: 562	1 dead specimen
1931: 26	1 specimen		

Occurrence: Taken living between 30 and 185 m in clay and mud.

Distribution: Recorded from Greenland south to Martha's Vineyard, Spitsbergen (type locality) east to the Kara Sea, south to the Mediterranean. Japan? A revision is, however, necessary.

Yoldiella intermedia (M. Sars, 1858).

Yoldia intermedia M. Sars: Videnskabselskabets Forhandling, p. 57.

Material:

1929: 30	1 specimen	1931: 20	1 valve
1930: 1072	4 valves	55	42 living, 5 dead specimens, 6 valves
1081	4 living, 4 dead specimens 1 valve	1932: 527	2 valves
1101	5 specimens, 7 valves	562	1 specimen
1116	1 specimen	644	4 specimens
1119	9 valves		

Remarks: Maximal length 13 mm.

Occurrence: Taken living between 40 m and 300 m in clay of various consistencies.

Distribution: Arctic south to West-Greenland, Finnmark, the Bering Strait. (The Shetland Islands? — perhaps valves only.)

Bathyarca glacialis (Gray, 1824).

Arca glacialis Gray: Captain Parry's First Voyage, Suppl. to App., p.244.

Material:

1929: 26	2 specimens	1930: 1117	1 large, 4 small specimens
30	21 specimens	1118	2 valves
35	6 specimens	1119	8 specimens, 1 valve
1930: $\frac{1019}{1020}$	14 specimens, 1 valve	1931: 17	3 large specimens
1021	1 large specimen	20	1 specimen, 3 valves
1024	1 large specimen	34	4 specimens, 2 valves
1043	Several large and 1 small specimen	35	1 large specimen
1044	1 large specimen	55	30 specimens, 6 valves
1051	1 specimen	1932: 527	1 specimen
1063	2 large specimens	545	5 specimens
1072	1 small specimen	547	2 specimens
1081	21 specimens, 8 valves	548	4 specimens, 1 valve
1086	2 large specimens	623	4 large, 22 small specimens
1087	4 large specimens	627	1 small living, 4 dead specimens
1101	25 specimens, 2 valves	644	5 specimens
1116	2 specimens		

Remarks: The form is very variable and small specimens may often resemble *pectunculoides* Scacchi, 1834, in outline, but the hinge characters are those of *glacialis*. Largest specimen measured 24 mm in length.

Occurrence: Taken living between 12 m and 320 m. The bottom consisted of mud or clay, sometimes with stones.

Distribution: Arctic south to Bay of Fundy, the Shetland Islands, Finnmark. (Mediterranean?)

Chlamys islandica (Müller, 1776).

Pecten islandicus Müller: Zoologiae Danicae. Prodromus, p. 248.

Material:

1930: 1083	2 small specimens	1107	2 large specimens
	1101	4 large specimens	

Remarks: The colour is mainly red with whitish radiating striae and 9—11 more or less distinct radiating ribs, sometimes rather sharp. Left valves with hydroids and bryozoans.

C. islandica is mentioned as taken in a living state by Spärck (1933) and Thorson (1933).

Occurrence: Small specimens were taken at a depth of 7 m on *Laminaria*, while the large ones were found between 42 m and 100 m. The bottom consisted of stones with algae or clay with stones.

Distribution: Greenland and Spitsbergen east to Novaya Zemlya, south to Bergen and south to Cape Cod, north of America to the Bering Strait and southwards to Japan and British Columbia.

Arctinula groenlandica (Sowerby, 1842).

Pecten groenlandicus Sowerby: Thesaurus Conchyliorum, I, p. 57, pl. XIII, fig. 40.

Material.

1929: 21	1 specimen	1018	6 specimens	
	22	3 valves	1024	7 dead specimens
	30	1 specimen	1047	2 specimens
	33	11 specimens	1063	2 specimens
	35	2 specimens, 1 valve	1068	1 small specimen
	37	3 specimens, 1 valve	1087	3 specimens, 2 valves
	39	1 specimen	1101	4 specimens
1930: 1014	5 specimens	1107	1 dead specimen	
	1016	Many specimens	1931: 55	3 specimens, 1 valve
	1017	Many large specimens		

Remarks: Some specimens have a tendency to develop radial folds on the anterior and posterior ends, and other specimens show a fine radial striation on parts of the valves.

Occurrence: Found living between 12 m and 100 m in mud or clay with sand and stones.

Distribution: Greenland, Spitsbergen east to 167° 30' E, west to N of America, south to Gulf of St. Lawrence and W of Sudan.

Cyclopecten imbrifer (Lovén, 1846).

Pecten imbrifer Lovén: Index Molluscorum litora Skandinaviae, p. 31.

Syn: *Pecten hoskynsi* Forbes, G. O. Sars.

Cyclopecten pustulosus Verrill 1873.

Material:

1930: 1087	6 specimens, 2 valves	1931: 55	Many specimens
1119	1 specimen, 1 valve	1932: 548	3 specimens
1931: 20	2 valves		

Remarks: All specimens belong to the larger arctic subspecies *major* Leche 1878. The specimen from St. 1930: 1119 agrees with fig. 1 e, plate II, Jensen 1912.

The type of the genus, *C. pustulosus* Verrill 1873, is supposed to be synonymous with *P. imbrifer* Lovén 1846 (cfr. Jensen 1912). Some notes about the shell and the soft parts will perhaps give a better foundation for the understanding of the genus.

The umbones are situated in the posterior third of the hinge margin. The left valve with the "pustules" is more convex than the right valve and has a larger, more inflated and projecting umbo. The pustules and the part of the valve just beneath them have pittings on the dorsal side. These pittings are formed as hollow cones, and when the apex is broken off the cone, they form real holes. The microstructure of the valve consists of fine concentric lines. The right valve is furnished with raised concentric lines. The microstructure between these consists of an irregular network in the upper half, changing into elongate elements in the lower half. Except for a median part, there seems to be only one shelly layer in both valves. The prodissoconch is smooth. The resilium is triangular with a curved ventral part projecting ventralwards inside the hinge plate. The adductor is large, elongate, and placed rather high in the shell and near the posterior margin. The foot is rather solid with a ventral furrow; labial palps small. Rectum long, free.

The outer demibranch of the gills has a nearly vertical posterior border, and the inner demibranch reaches slightly farther backwards, especially in the ventral part. The descending parts of both demibranchs are fastened to each other, and the descending part of the inner pair of demibranchs are also fastened to each other ventrally, forming a sort of pouch. The ascending parts of both demibranchs are free. The velum and the proximal primary and secondary papillae are well developed. Between the primary papillae are 2 to 3 secondary ones; usually all are uncoloured, but on the right velum some of the secondary papillae are dark coloured. Left velum has dark distal blotches on the ventral part, and one posterior blotch. One well developed posterior eye is present where the mantel edges are grown together; 6 to 11 eyes on the ventral part of the velum. Right velum is usually darker coloured than the left and without eyes.

Occurrence: Living specimens were taken at depths from 75 m to 250 m. The bottom consisted of brownish clay.

Distribution: Greenland, Spitsbergen east to the Kara Sea, south to S. of Ireland. Bering Sea.

Limatula hyperborea (Jensen, 1905).

Lima hyperborea Jensen: Meddelelser om Grønland, Vol. XXIX, p. 329, fig. 1.

Material:

1931:	20 19 valves	1932:	548 2 valves
	55 4 small specimens, 6 valves		562 1 specimen

Remarks: Maximal length 16 mm.

Occurrence: Taken living at depths between 75 m and 185 m in clay with stones.

Distribution: Greenland east to the Kara Sea, Norwegian Sea in the cold area.

Dacrydium vitreum (Møller, 1842).

Modiola vitrea Møller: Index Molluscorum Groenlandiae, p. 19.

Material:

1930:	1081 4 living, 1 dead specimen	1931:	55 38 living, 3 dead specimens,
	1101 2 specimens, 2 valves		1 valve
	1107 1 specimen	1932:	562 1 specimen
	1116 2 valves		623 5 specimens
	1119 1 specimen		627 3 specimens
			644 1 specimen

Remarks: This species reaches a considerable size in East Greenland. One specimen from St. 1930: 1081 has a length of 6.1 mm.

Occurrence: Found living between 42 m and 320 m.

Distribution: Greenland south to Campeche, east to the Kara Sea, and south to the Mediterranean and the Azores.

Genus Musculus Röding, 1798.

Museum Boltenianum, Pt. II, p. 156.

Syn.: *Modiolaria* Bech in Robert 1838, 1840.

The arctic species of this genus have been treated differently by various students. Jensen (1912) considers *niger* Gray, 1824 and *corrugatus* Stimpson, 1851 as easily recognizable species, while *laevigatus* Gray, 1824, and *substriatus* Gray, 1824, are supposed to be arctic representatives of *discors* Linné, 1767. In fact there are no reliable taxonomic characters separating these

three entities except the smaller size of *discors* and the geographical distribution. Jensen considers *laevigatus* and *substriatus* as subspecies, though he terms them varieties. Both forms occur together and can therefore not be given subspecific range. I am at present inclined to consider *laevigatus* a valid species considering the form *substriatus* to be an extreme within the limits of variation of the species. This question needs, however, a more detailed study.

Musculus niger (Gray, 1824).

Modiola nigra Gray: Captain Parry's First Voyage, Suppl. to App., p. 244.

M a t e r i a l :

1929: 16	2 small specimens	1022	4 specimens
21	7 living, 3 dead specimens	1024	2 specimens
24	2 specimens	1025	3 valves
25	5 specimens	1044	7 specimens, 2 valves
26	1 specimen	1047	2 small specimens, 2 valves
30	1 specimen	1068	1 specimen
33	1 specimen	1070	1 specimen
1930: 1015	1 specimen	1072	1 juvenile specimen
1016	3 specimens	1080	1 specimen
1018	1 small specimen, 2 valves	1931: 17	2 specimens
1019	6 living specimens, 3 valves	19	4 specimens
1020		1932: 616	2 specimens

R e m a r k s: The colour is mainly yellowish-brown. Dead shells may have the characteristic black periostracum. The East Greenland specimens are also more inflated than usual. Maximal length, St. 1930: 1019—1020, 42 mm.

O c c u r r e n c e: Living specimens were taken at depths from 8 m to 83 m, and one juvenile specimen at a depth of 235 m. The bottom consisted usually of clay often mixed with stones, sometimes of sand or mud.

D i s t r i b u t i o n: Circumarctic south to Cape Hatteras, Holland, Tatar Strait and Oregon.

Musculus laevigatus (Gray, 1824).

Modiola laevigata Gray: Captain Parry's First Voyage, Suppl. to App., p. 244.

M a t e r i a l :

1929: 8	3 juvenile specimens	30	1 specimen
10	3 valves	35	1 specimen
13	1 specimen	37	2 specimens
16	8 specimens, 4 valves	1930: 1012	1 specimen
21	7 specimens	1014	3 specimens
22	1 valve	1015	4 specimens, 1 valve
25	2 specimens	1016	Numerous specimens
26	11 specimens	1017	8 specimens

1018	27 specimens	1047	2 specimens
1019		1048	2 specimens
1020	2 specimens, 1 valve	1057	4 specimens, 1 valve
1022	1 juvenile specimen	1058	1 specimen
1024	10 specimens, 1 valve	1083	1 specimen
1025	18 living, 1 dead specimen	1931:	19 2 specimens
1038	5 specimens	1932:	502 4 specimens
1044	2 specimens		

Remarks: Smooth and striated (*substriata*), high and more elongate specimens occur together, sometimes in the same cluster.

Occurrence: Living specimens were taken between 3 and 83 m in varying bottoms, usually with algae or stones.

Distribution: Circumarctic south to St. Georges Bank, and the Lofoten Islands; Japan and Oregon.

Lyonsia arenosa (Møller, 1842).

Pandorina arenosa Møller: Index Molluscorum Groenlandiae, p. 20.

Material:

1929:	21 5 specimens	1047	8 specimens
	24 1 specimen	1062	2 specimens
	33 1 specimen	1068	3 specimens
1930:	1016 2 specimens	1070	2 specimens
	1018 3 valves	1931:	17 2 specimens
	1024 2 specimens	26	2 specimens, 2 valves
	1044 9 specimens		

Remarks: The outline is variable, but the specimens are usually rather elongate. Maximal length 25 mm.

Occurrence: *L. arenosa* was obtained at depths from 12 m to 53 m. The bottom consisted of sand, clay or sometimes mud.

Distribution: Greenland south to Bay of Fundy, Spitsbergen, east to western part of Siberian Sea, Tromsø. Arctic America, Bering Sea.

Lyonsiella abyssicola (G. O. Sars, 1872).

Lyonsiella abyssicola M. Sars: Videnskabselskabets Forhandling 1868, p. 257, *nomen nudum*.

Pecchiolia abyssicola G. O. Sars: University-Program 1869, p. 25—30.

Material:

1930:	1119 1 specimen	1932:	562 1 specimen
1931:	55 47 specimens		

Remarks: Maximal length 6 mm.

Occurrence: Found at depths between 75 m and 250 m.

Distribution: Davis Strait, Greenland, West-Finmark, Bay of Biscay.

Thracia myopsis Møller, 1842.

Thracia myopsis Møller: Index Molluscorum Groenlandiae, p. 94.

Material:

1929: 22	1 valve	1087	1 valve
1930: 1024	1 small specimen	1932: 627	1 specimen
1066	1 specimen		

Remarks: *T. myopsis* is more elongate and has a much more indistinct keel than *T. deveva* G. O. Sars and, further, the sculpture is different.

Occurrence: This species was found living at depths from 12 m downwards to 320 m, in mud, brownish clay and sandy clay. The temperature in 300 m was -1.73° C.

Distribution: Novaya Zemlya, Spitsbergen, Jan Mayen, Iceland, Greenland to Massachusetts.

Thracia deveva G. O. Sars, 1878.

Thracia truncata var. *deveva* G. O. Sars: Mollusca Regionis Arcticae Norvegiae, p. 84, pl. 6, fig. 11 a, b.

Material:

1930: 1081	3 small valves	1931: 37	1 small specimen
1101	4 small valves		

Remarks: *T. deveva*, described as variety of *T. myopsis*, is shorter, has a distinct keel and a different sculpture. Small specimens may often be difficult to distinguish from *T. myopsis*.

Occurrence: Only one small living specimen was taken at a depth of 260—310 m, in a bottom consisting of clay with stones.

Distribution: Novaya Zemlya, Spitsbergen, East Greenland, Iceland.

Kennerlia glacialis (Leach, 1819).

Pandora glacialis Leach: Descriptions of the New Species of Animals. App. IV, p. 174. In John Ross: Voyage of Discovery.

Material:

1929: 21	7 specimens, 1 valve	1060	3 specimens	
	24	1 specimen	1068	1 specimen
1930: 1024	2 specimens	1931: 26	2 specimens	
1047	4 specimens			

Occurrence: All samples were taken at depths from 10 to 35 m. The bottom consisted mainly of mud or clay but also of sand and stones.

Distribution: Greenland south to Jones Sound, Spitsbergen, Murman coast, Pacific south to Fuca Straits.

Cuspidaria glacialis (G. O. Sars, 1878).

Neera glacialis G. O. Sars: Mollusca Regionis Arcticae Norvegiae, p. 88, tab. 6, fig. 8 a—c.

M a t e r i a l:

1930: 1081	2 small specimens	55	6 valves
1101	2 small specimens, 1 valve	1932: 548	1 valve
1116	1 dead specimen	549	1 valve
1119	5 specimens, 1 valve	617	1 large, dead specimen
1931: 18	2 valves	623	2 dead specimens
29	1 dead specimen		

R e m a r k s: Rostrum is usually slightly larger than shown on the drawing of G. O. Sars. Largest specimen (St. 1932: 617) has a length of 28 mm.

O c c u r r e n c e: Living specimens taken between 70 m and 250 m in clay, often with stones.

D i s t r i b u t i o n: Greenland to Chesapeake Bay, Spitsbergen east to the Siberian Sea, south to West-Finmark, North Atlantic deep sea.

Cuspidaria arctica (M. Sars, 1858).

Neera arctica M. Sars: Videnskabselskabets Forhandling, p. 62.

M a t e r i a l:

1930: 1101	2 valves	1931: 55	3 small specimens
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R e m a r k s: These specimens may certainly be referred to *C. arctica* M. Sars. The angle between the anterior and posterior dorsal margin, the short rostrum and the posterior adductor scar and pallial sinus agree completely with the holotype. The small specimens, however, are more difficult to determine with certainty but the dorsal angle and the rostrum make it rather probable that they represent young specimens of this species.

O c c u r r e n c e: Living specimens were taken at depths between 75 m and 185 m in brown clay.

D i s t r i b u t i o n: Greenland to Chesapeake Bay, Spitsbergen east to Siberian Sea south to Nordland.

Cuspidaria subtorta (G. O. Sars, 1878).

Neera subtorta G. O. Sars: Mollusca Regionis Arcticae Norvegiae, p. 87, tab. 6, fig. 6 a—c.

M a t e r i a l:

1930: 1087	1 dead specimen	55	51 specimens, 5 valves
1116	3 valves	1932: 562	1 dead specimen
1931: 20	1 dead specimen	627	11 specimen

Remarks: This species has not been recorded from East Greenland previously. The twisted posterior ventral margin of the left valve and the hinge are, however, typical of *C. subtorta*.

Occurrence: Living specimens were obtained at depths from 75 to 320 m in brown or sandy clay.

Distribution: Greenland south to New England, Spitsbergen east to the Kara Sea, south to between the Hebrides and the Faeroes.

Astarte borealis (Schumacher, 1817).

Tridonta borealis Schumacher: Essai d'un Nouveau Système, p. 147, pl. XVII, fig. 1 a, b.

Material:

1929:	8	2 specimens, 10 valves	1930:	1014	1 specimen
	9	2 specimens		1016	7 specimens
	13	1 living, 1 dead specimen		1017	7 specimens
	16	8 specimens		1018	10 specimens
	21	3 specimens		1025	3 specimens, 2 valves
	26	5 specimens		1044	2 specimens
	30	3 specimens		1047	1 specimen
	35	1 specimen	1931:	19	1 specimen

Remarks: All specimens can be referred to the variety or perhaps subspecies *placenta* Mörch 1869.

Occurrence: Living specimens were taken between 8 m and 83 m. The bottom conditions were varying; mud, clay, sand, usually with algae.

Distribution: Circumarctic south to Nova Scotia, the North Sea, Ochotsk Sea and Aleutian Islands.

Astarte montagui (Dillwyn, 1817).

Venus Montagui Dillwyn: A Descriptive Catalogue of Recent Shells, I, p. 167.

Material:

1929:	8	25 specimens	1019	1 specimen	
	13	8 specimens	1020		
	16	43 specimens	1021	1 specimen	
	21	12 specimens	1025	18 specimens	
	22	1 specimen	1044	4 specimens	
	24	3 specimens	1047	26 specimens	
	25	3 specimens	1058	5 specimens	
	26	14 specimens	1059	2 specimens	
	30	5 specimens	1060	5 specimens	
	35	1 specimen	1062	2 specimens	
1930:	1014	2 specimens	1063	9 specimens	
	1016	74 living, 3 dead specimens	1070	4 specimens	
	1017	9 specimens	1080	2 specimens	
	1018	64 living specimens, 3 valves	1931:	19	3 specimens
				26	6 specimens, 2 valves

Remarks: Nearly all specimens are typical *warhami* Hancock 1846. Some are, however, shorter and more like *striata* Leach 1819, and a few specimens have the irregularity in the concentric sculpture typical of *vernica* Dall 1903. Maximal length 23 mm. Usually the samples consist of specimens measuring between 5 mm and 22 mm.

Occurrence: Living specimens were found at depths between 10 m and 83 m in varying bottoms consisting of mud, clay or sand, usually with stones or algae.

Distribution: Circumarctic south to Le Havre Bank, France, British Columbia.

Astarte elliptica (Brown, 1827).

Crassina elliptica Brown: Illustrations of the Conchology of Great Britain and Ireland, pl. XVIII, fig. 3.

Material:

1929:	14	3 valves	1021	1 specimen	
	16	3 specimens	1025	34 specimens, 10 valves	
	21	9 specimens, 1 valve	1038	1 specimen	
	24	2 specimens	1044	11 specimens, 2 valves	
	30	8 specimens	1047	4 specimens	
	33	4 specimens	1063	1 specimen	
	35	1 specimen	1080	5 specimens	
	37	1 specimen, 1 valve	1101	10 specimens	
1930:	1016	11 specimens	1931:	19	2 specimens
	1018	5 specimens, 4 valves		26	3 specimens
	1019	7 specimens	1932:	527	4 specimens
	1020				

Remarks: Nearly all specimens are of the elongated form named *var. depressa* by Posselt 1895, a few specimens have only concentric folds in the dorsal part of the valve, and one specimen is nearly smooth.

Occurrence: Living specimens were found between 3 m and 100 m. The bottom consisted of mud, clay or sand with algae and small stones.

Distribution: Greenland south to New England, east to the Kara Sea, south to the British Isles.

Astarte crenata (Gray, 1824).

Nicania crenata Gray: Captain Parry's First Voyage, Suppl. to App., p. 242.

Material:

1929:	10	1 valve	1047	2 small specimens
	30	3 specimens	1051	1 dead specimen
	39	1 valve	1066	10 specimens
1930:	1016	1 small specimen	1081	36 specimens, 2 valves
	1044	2 small specimens, 2 valves	1087	4 specimens

	1101	113 specimens, 7 valves		37	1 small specimen
	1116	2 specimens		47	2 small specimens
	1118	3 specimens		55	29 specimens, 2 valves
	1119	17 specimens, 1 valve		527	3 specimens
1931:	18	7 specimens, 3 valves	1932:	547	4 dead specimens
	20	4 specimens, 4 valves		548	15 specimens, 2 valves
	29	1 specimen		562	8 specimens, 2 valves
	34	4 specimens		615	11 specimens
	35	2 specimens		644	1 small specimen
	36	1 specimen			

Remarks: I have followed the classification proposed by Jensen (1912) and included all varieties or species as forms of *crenata*. There seem, however, to be two more or less distinct groups of species, viz. *crenata* including *subaequilatera* Sowerby 1855 and *crebricostata* Forbes and Mc Andrew 1847, and another comprising *inflata* Hägg 1904 and *acuticostata* (Jeffreys) Friele 1877. The last group was collected on stations 1929: 55 and 132: 548. Small specimens are often of the short, squarish form of *acuticostata*, but are apparently young ones of the other group.

Occurrence: Living specimens were obtained at depths between 10 m and 462 m. The majority, however, were taken between 55 m and 250 m. Bottom conditions were varying, but the bottom consisted mainly of clay and mud mixed with stones.

Distribution: Arctic regions eastwards to the western part of the sea north of Siberia and westwards to the sea north of America, south to Maine, and Lofoten and north of the Hebrides.

Serripes groenlandicus (Gmelin, 1790).

Cardium groenlandicum Gmelin: Systema Naturae, Ed. XIII, p. 3252.

Material:

	Myggbukta:	9 valves (1929)		1022	6 small specimens
1929:	8	1 small specimen		1024	3 specimens, 2 valves
	9	1 small specimen		1025	2 valves
	21	3 specimens		1044	3 valves
1930:	1013	1 specimen		1047	3 valves
	1015	1 specimen	1931:	26	2 valves
	1016	1 small specimen	1932:	504	1 dead specimen
	1018	1 valve		644	1 valve

Remarks: One specimen from St. 1930: 1024 was extremely elongate and unlike typical specimens (fig. 2). The measurements of this specimen are: Length 47.5 mm, height 37.5 mm, diameter 23.5 mm.

Occurrence: Living specimens were found between 8 m and 53 m on mud or clay with sand, stones and algae.

Distribution: Circumarctic south to Stonington, USA, East Finnmark, Japan and British Columbia.



Fig. 2. *Serripes groenlandicus* (Gmelin) from St. 1930: 1024. Elongate and oblique form.

Clinocardium ciliatum (Fabricius, 1780).

Cardium ciliatum Fabricius: Fauna Groenlandica, p. 410.

Material:

1929:	?	2 specimens	1044	2 valves
	16	1 dead specimen	1047	4 specimens, 5 valves
	21	Some large living specimens and valves	1068	3 specimens
	24	1 specimen	1070	2 small specimens
	25	1 specimen, 1 valve	1080	1 specimen
	35	1 specimen	1101	1 small specimen, 1 small valve
1930:	1018	1 specimen	1117	1 specimen
	1019	7 specimens	1931:	17 Many specimens of medium size
	1020			19 5 specimens, 2 valves
	1022	2 specimens		26 2 valves
	1024	6 specimens		

Occurrence: Living specimens were taken at depths from 11 m to 100 m, but the largest specimens were usually found between 12 m and 35 m. The bottom usually consisted of clay more or less mixed with mud, sand or stones.

Distribution: Arctic south to N of Cape Cod, East Finnmark, Japan, and British Columbia.

Thyasira flexuosa (Montagu, 1803).

Tellina flexuosa Montagu: Testacea Britannica, Part I, p. 72.

Material:

1930:	1068	1 living, 1 dead specimen	55	1 living, 1 dead specimen
	1101	2 specimens (5.25 mm)	1932:	527 1 specimen
	1119	1 dead specimen		562 3 specimens
1931:	36	6 specimens		623 2 living, 1 dead specimen
	37	23 living, 2 dead specimens		627 8 specimens

Occurrence: Living specimens were taken at depths between 23 m and 320 m, most frequently at the greater depths, in clay, sometimes with sand or stones.

Distribution: From Greenland southwards to the West Indies and the Mediterranean, east to the Eastern Siberian Sea, Bering Sea.

Thyasira gouldi (Philippi, 1845).

Lucina Gouldi Philippi: Zeitschrift für Malakozoologie, p. 75.

Material:

1929: 21 2 dead specimens 1931: 37 1 specimen
 26 1 specimen

Remarks: The form of *gouldi* is distinctly different from *flexuosa* in the samples from East-Greenland.

Occurrence: Living specimens were taken at depths of 15 m and of 260 m to 310 m in mud or clay with stones.

Distribution: From Greenland south to Stonington, New England and Gulf of Biscay, east to Novaja Zemlya; Bering Strait south to British Columbia.

Axinopsis orbiculata G. O. Sars, 1878.

Axinopsis orbiculata G. O. Sars: Mollusca Regionis Arcticae Norvegiae, p. 63—64, pl. 19, fig. 11 a—d.

Material:

1929: 9 1 specimen 1066 1 valve
 36 1 dead specimen 1070 2 specimens
1930: 1024 22 living, 27 dead specimens 1932: 504 11 living, 2 dead specimens

Remarks: The East Greenland specimens resemble the var. *inequalis* Verrill and Bush 1898.

Occurrence: Living specimens were taken at depths from 7 m to 25 m on a bottom consisting of sandy clay or mud.

Distribution: Arctic south to Cape Cod and to Nordland, east to the Siberian Sea.

Liocyma fluctuosa (Gould, 1841).

Venus fluctuosa Gould: Invertebrates of Massachusetts, p. 87, fig. 50.

Material:

1929: 8 1 juvenile specimen 1047 1 valve
 9 2 specimens 1058 6 specimens
 13 1 small specimen 1060 6 specimens
 16 2 specimens 1062 3 specimens
 21 32 specimens, 2 valves 1931: 20 3 valves
1930: 1012 1 small specimen 1932: 504 3 large, many small speci-
 1015 2 specimens mens
 1024 1 small specimen 644 1 juvenile specimen
 1044 1 specimen, 1 valve

Occurrence: Found living between 7 m and 36 m on mud, clay or sand. One juvenile specimen, St. 1932: 644, was taken at a depth of 300 m.

Distribution: Arctic south to Massachusetts and the White Sea, east to the Siberian Sea, Arctic America south to the Bering Strait and Japan.

Genus Macoma Leach, 1819.

Ross' Voy. of Discovery in H. M. S. Isabella and Alexander, Appendix 2, p. lxii.

Ad. S. Jensen has published a very thorough study of the arctic species of this genus, first in Danish (1905 a), while later in the same year (1905 b) the diagnoses were given in English. Two of the species, viz. *M. torelli* and *M. loveni* are here introduced in the literature, with diagnoses and figures; these two species had been recognized earlier by Jap. Stenstrup, who had labelled the samples in the University Museum, Copenhagen, with these names, but had never published the diagnoses. Johnstrup (1882) mentioned the names as forms of *Tellina crassula* and *moesta* Deshayes, but in his list they are just *nomina nuda*. As far I can see, Jensen must be considered the author, and the year of description should be 1905. The types are apparently the samples labelled by Jap. Stenstrup.

Macoma calcarea (Gmelin, 1790).

Tellina calcarea Gmelin: Systema Naturae, Ed. XII, p. 3236.

Material:

1929: 26 36 specimens, 3 valves	1024 11 large specimens
33 7 large specimens	1044 1 specimen, 2 valves
1930: 1016 6 specimens, 1 valve	1070 4 specimens
1017 1 valve	1080 1 valve
1018 2 specimens, 9 valves	1931: 17 2 valves
<u>1019</u> 1 specimen	19 5 specimens
1020	26 1 specimen
1021 1 large specimen	1932: 627 3 specimens

Remarks: The largest specimens, with lengths of up to 40 mm, were found on St. 1929: 33 and St. 1930: 1024.

Occurrence: The majority of the living species were taken between 2 and 83 m in sandy clay or mud, but 3 specimens from St. 1932: 627 were taken at a depth of 320 m in sandy clay.

Distribution: Circumarctic south to Long Island Sound and Denmark, Oregon and North Japan.

Macoma moesta (Deshayes, 1854).

Tellina moesta Deshayes: Proc. Zool. Soc. London, p. 361.

Material:

1929:	16	26 specimens, 1 dead	1021	3 specimens
	22	2 specimens	1022	4 specimens
	24	1 specimen	1024	12 specimens
	26	2 specimens	1047	4 valves
	30	1 specimen	1059	3 specimens
	33	5 specimens	1068	2 valves
	35	3 specimens	1070	16 specimens
1930:	1016	2 valves	1931:	19 1 living, 1 dead specimen
	1018	2 valves		36 3 valves
	1019	2 specimens	1932:	547 1 valve
	1020			616 1 specimen

Remarks: Two specimens from St. 1929: 16 have a light brown periostracum with normal sculpture on the older parts of the valves but with oblique striae on the newest parts, resembling *calcarca*. The length is 24 mm, and the pallial sinus is normal for the species.

Occurrence: Living specimens were taken between 6 m and 35 m in clay or mud often mixed with sand.

Distribution: Circumarctic (?) south to West-Greenland, the Kara Sea and Alaska.

Macoma loveni Jensen, 1905.

Tellina (Macoma) loveni Jensen: Meddelelser om Grønland, Vol. XXIX, p. 349, fig. 5.

Material:

1929:	16	1 specimen	1101	2 living, 3 dead specimens,
1930:	1022	1 specimen		3 valves
	1024	1 dead specimen, 1 valve	1119	6 specimens, 3 valves
	1044	3 specimens, 1 valve	1931:	17 2 large specimens
	1058	1 specimen		19 1 valve
	1068	1 specimen		55 3 dead specimens
	1070	4 specimens		

Remarks: The largest specimen, St. 1931: 17, has a length of 17 mm and is furnished with a blackish periostracum on the marginal part of the shell.

Occurrence: *M. loveni* was taken from depths of 11 m down to 190—250 m in clay or mud of various consistencies and colours.

Distribution: Greenland, east coast of Canada, Spitsbergen, and the Kara Sea.

Mya truncata Linné, 1758.

Mya truncata Linné: Systema Naturae, Ed. X, p. 670.

Material:

Ymerøy	3 valves	1024	2 living, 2 dead specimens, all juvenile
Sofiesund	2 valves		
1929:	9 4 juvenile specimens	1025	2 dead juvenile specimens, 9 valves
	13 3 juvenile specimens		
	21 9 living, 1 dead juvenile specimen, 1 valve	1044	5 living, 1 dead juvenile specimen
	22 2 valves	1047	5 juvenile specimens, 1 valve
	24 1 juvenile specimen	1048	1 large specimen
	37 1 valve	1059	1 valve
1930:	$\frac{1010}{1011}$ 1 juvenile specimen	1070	9 living, 1 dead juvenile specimen
	1016 4 living, 2 dead specimen, 1 valve, all juvenile	1080	3 juvenile specimens, 1 valve
	1017 1 valve	1107	1 specimen, 1 valve
	1018 3 living, 2 dead specimens, all juvenile, 5 valves	1931: 19	1 dead juvenile specimen
		1932: 504	1 specimen

Remarks: All specimens except one are juvenile or small, usually with a rounded posterior margin. Some may therefore belong to *M. pseudoarenaria* Schlesch, 1931.

Occurrence: Found living between 6 m to 185 m in various bottoms.

Distribution: Arctic south to Cape Cod and western Europe, British Columbia and Japan. Perhaps circumarctic.

Cyrtodaria kurriana Dunker, 1862.

Cyrtodaria kurriana Dunker: Malakozoologische Blätter, VIII, p. 38.

Material:

1932: 504 1 small specimen

Remarks: The specimen has a length of 5 mm, and is whitish yellow with irregular concentric lines; umbones and ligament are prominent, the anterior part the longest and the posterior margin truncate. Whether this species is merely a synonym of *C. siliqua* Spengler 1793, seems not to have been settled.

Occurrence: The specimen was taken at a depth of 7 m in mud.

Distribution: Circumarctic (?) south to Nova Scotia, the Kara Sea and the Aleutian Islands.

Hiatella arctica (Linné, 1767).

Mya arctica Linné: Systema Naturae, Ed. XII, p. 1113.

Material:

1929:	1	Some small specimens among algae.	1024	7 specimens
	8	2 small specimens	1025	11 valves
	9	1 small specimen	1038	7 small specimens
	10	3 dead specimens, 1 valve	1043	1 large specimen
	13	1 juvenile specimen	1047	2 specimens, 1 valve
	14	7 valves	1048	1 dead specimen
	16	Many specimens	1051	1 specimen
	21	Many specimens	1057	1 small specimen
	22	1 specimen	1058	2 specimens
	24	3 specimens	1059	1 specimen
	26	1 specimen	1060	4 small specimens
	36	2 specimens	1063	3 specimens
	37	3 specimens, 2 valves	1066	4 specimens
1930:	1014	5 specimens	1080	1 specimen
	1016	Many small and 5 large specimens, 1 valve	1101	3 small specimens
	1017	Several specimens	1107	2 dead specimens
	1018	Several specimens	1931:	17 4 large specimen
	1019	9 specimens, one valve		19 2 specimens
	1020	7 specimens		26 7 specimens, 2 large valves
	1022	7 specimens		55 1 dead juvenile specimen
			1932:	623 2 juvenile specimens

Remarks: This variable species occurs usually in the *forma pholadis*. Some specimens, however, even large ones, have distinct thorny crests. Normally the valves are thick. In some samples 3 to 4 layers of shell are superimposed on each other.

Occurrence: *H. arctica* is found from the shore downwards to 250 m in all kinds of bottom.

Distribution: Arctic south to Long Island and western Europe, California and Japan. Perhaps circumarctic.

Concluding remarks.

The pelecypod fauna of the Kejser Franz Joseph Fjord area is today known to contain 41 species. *Bathyarca pectunculoides septentrionalis* Monterosato and *Crenella decussata* Montagu were not obtained by the Norwegian expeditions. Further empty valves of *Macoma torelli* Jensen have been found S. of Sabine Island and this species may perhaps occur living in the area. An analysis of the distribution of these 41 species gives the following picture:

	Species	True circumarctic	Perhaps true circumarctic	Not circumarctic
Total fauna	41	8	5	28
Occurring in the Pacific (incl. the Bering Strait)	24	8	5	11
Occurring in the East Siberian Sea	20	8	4	8
Occurring in boreal seas	36	7	3	26
Not recorded from boreal seas . .	5	1	2	2

6 species calculated as occurring in the Pacific may perhaps be considered as separate species closely related to Atlantic forms; one of them viz. *Liocyma fluctuosa* Gould (as *viridis* Dall) is also recorded from the East Siberian Sea but is not considered to be true circumarctic (cfr. Soot-Ryen 1932). The same holds true of *Lyonsia arenosa* Möller. 6 species also occurring in the East Siberian Sea are true Atlantic species, and are not recorded from the Pacific. The 5 species not found living in boreal seas are: *Portlandia arctica* Gray, *Limatula hyperborca* Jensen, *Macoma moesta* Deshayes, *Macoma loveni* Jensen, and *Cyrtodaria kurriana* Dunker.

The fauna as a whole agrees with the northern fauna of the Scandinavian peninsula (including Spitsbergen) and belongs to the same faunal assemblage, with the same historical development during the last geological ages. The order *Prionodesmacca* is predominant, as usual in arctic zones, with 17 species, and *Anomalodesmacca* with 8 species, while the *Teleodesmacea* is represented by 16 species only.

Pelecypods were obtained on 85 stations, of which no. 1 is at Jan Mayen. The remaining 84 stations may be arranged according to depth and position as in the following table, though some stations overlap the various depth-intervals.

	Total	0—20 m	20—75 m	75—150 m	150—250 m	260—462 m
Total	84	30	28	10	8	8
Inner fjords	16	4	7	2	1	2
Sounds	33	7	15	3	5	3
Outer coast	35	19	6	5	2	3

The number of stations is too low to allow of a real analysis. However, the number of species is higher along the outer coast and in the sounds, i. e. 37 species, of which 35 were taken living, whereas in the real fjords the corresponding figures are 31 and 28.

The species which have not been found in the fjords proper are: *Lyonsia arenosa*, the two *Thracia* species, *Thyasira gouldi*, *Axinopsis orbiculata*, *Liocyma fluctuosa*, *Macoma calcarca*, and *Cyrtodaria kurriana*.

Chlamys islandica has not been observed on the outer coast, as it prefers the more or less strong currents in the sounds or narrow fjords.

Species which are common in the fjords and become rarer farther out are: *Yoldiella lenticula*, *Yoldiella intermedia*, *Bathyarca glacialis* and, especially, *Dacrydium vitreum*. Species most common along the outer coast, but diminishing in number towards the fjords are: *Nuculana pernula*, *Musculus niger*, *Musculus laevigatus*, the four *Astarte* species, *Serripes groenlandicus*, *Clinocardium ciliatum*, *Macoma moesta* and *loveni*, and *Hiatella arctica*. It should be borne in mind that these conclusions are based only on the stations taken by the Norwegian expeditions, and must be considered as preliminary.

In deep water, from about 250 to 462 m, 22 living and 3 dead species were taken. All of them were also found at lesser depths. The most numerous species were: *Bathyarca glacialis* and *Astarte crenata*, with *Ennucula tenuis*, *Yoldiella lenticula*, *Dacrydium vitreum*, and *Cuspidaria glacialis* coming next in importance. The other species were taken more sporadically. There seems to be little difference between the composition of the deep-water fauna in the fjords and that on the outer coast. Only 8 species were taken exclusively in depths exceeding 75 m (70 m), viz.:

<i>Yoldiella fraterna</i>	75—310 m	<i>Thracia deveva</i>	260—310 m
<i>Cyclopecten imbrifer</i>	75—250 m	<i>Cuspidaria glacialis</i>	70—250 m
<i>Limatula hyperborea</i>	75—185 m	<i>Cuspidaria arctica</i>	75—185 m
<i>Lyonsiella abyssicola</i>	75—250 m	<i>Cuspidaria subtorta</i>	75—320 m

These 8 species, perhaps with one or two exceptions, represent a deep-water fauna, which in East-Greenland survives in shallower water than usual.

No living specimens were obtained above a depth of 6 m, though the Danish expeditions have found living pelecypods from 2 m downwards. (Thorson 1933.)

The following 10 species were taken alive between 6 m and 10 m:

<i>Chlamys islandica</i>	<i>Axinopsis orbiculata</i>
<i>Musculus niger</i>	<i>Liocyma fluctuosa</i>
<i>Musculus laevigatus</i>	<i>Mya truncata</i>
<i>Astarte borealis</i>	<i>Cyrtodaria kurriana</i>
<i>Serripes groenlandicus</i>	<i>Hiatella arctica</i>

The most astonishing occurrence in shallow water is that of *A. orbiculata*, considered to be a deep-water species.

Spärck (1933) and Thorson (1933) have studied the animal communities in the region. The *Macoma calcarea* community with its subzones occur in depths between 2 m and 45 m and all samples from these depths taken by the Norwegian expeditions can be referred to this community. The deeper water fauna can be referred to the *Arca — Astarte crenata* community with *Bathyarca* and *A. crenata* as typical species. Many of the samples, however, form a mixture of both communities and of epifaunal elements.

The hydrographical conditions of the water layers are very variable. The main source of the water along the coast, in the sounds and the fjords, is the East-Greenland Polar current, with water cooled to the freezing point — 1.8° C. This water penetrates into the fjords according to the depths of the thresholds. Along the coast the deeper parts of the shelf may be washed by water which is mixed with the underlying Atlantic water and therefore has positive temperatures. The water filling the deeper parts of the sounds and fjords usually has negative temperatures below 20—25 m, with minima as low as — 1.80° C. The coldest water is generally met with at depths between 75 m and 100 m, while the temperatures rise again towards the bottom, sometimes even reaching small positive values of up to 1° C. The temperature amplitude in depths exceeding 25 m is therefore extremely small, generally less than 2° C, and the conditions are favourable for cold stenotherme animals. The salinities are normally above 33 ‰ and up to 35 ‰, and are lowest in the innermost or most effectively barred fjords. There seems to be no preference as to habitat for species living in deep water.

The surface layers above 20—25 m, and especially the topmost layers, have a wide yearly amplitude and vary considerably through the area. The temperatures may sometimes be fairly high, up to 11° C, while the winter-cooling gives the water negative temperatures. The salinities are low in summer time, when large quantities of melt-water are poured into the fjords, and the uppermost surface-layer, especially, may become brackish. Salinities as low as 6.87 ‰ have been observed in the Kejser Franz Joseph Fjord in August 1931. However, the lack or scarcity of living animals in the upper 2—3 m is caused not only by the brackish water, but also by the ice-floes or ice-bergs in summer.

The species living in shallower water are more eurytherme and have the advantage of a higher temperature during the short summertime, which may be essential for the ripening of the gonads or for the development of the young.

In a very interesting paper Thorson (1936) has shown that the majority of the pelecypods inhabiting East-Greenland waters have a very short pelagical larval stage or lack this entirely. All these species have large eggs rich in nutritive contents. He has also given fairly convincing proof of the fact that the production of large ova is typical of the species, and not a phenotypically created condition in arctic regions. Many of the species investigated were hermaphrodites, viz. *Thracia myopsis*, *Kennerlia glacialis*, *Lyonsia*

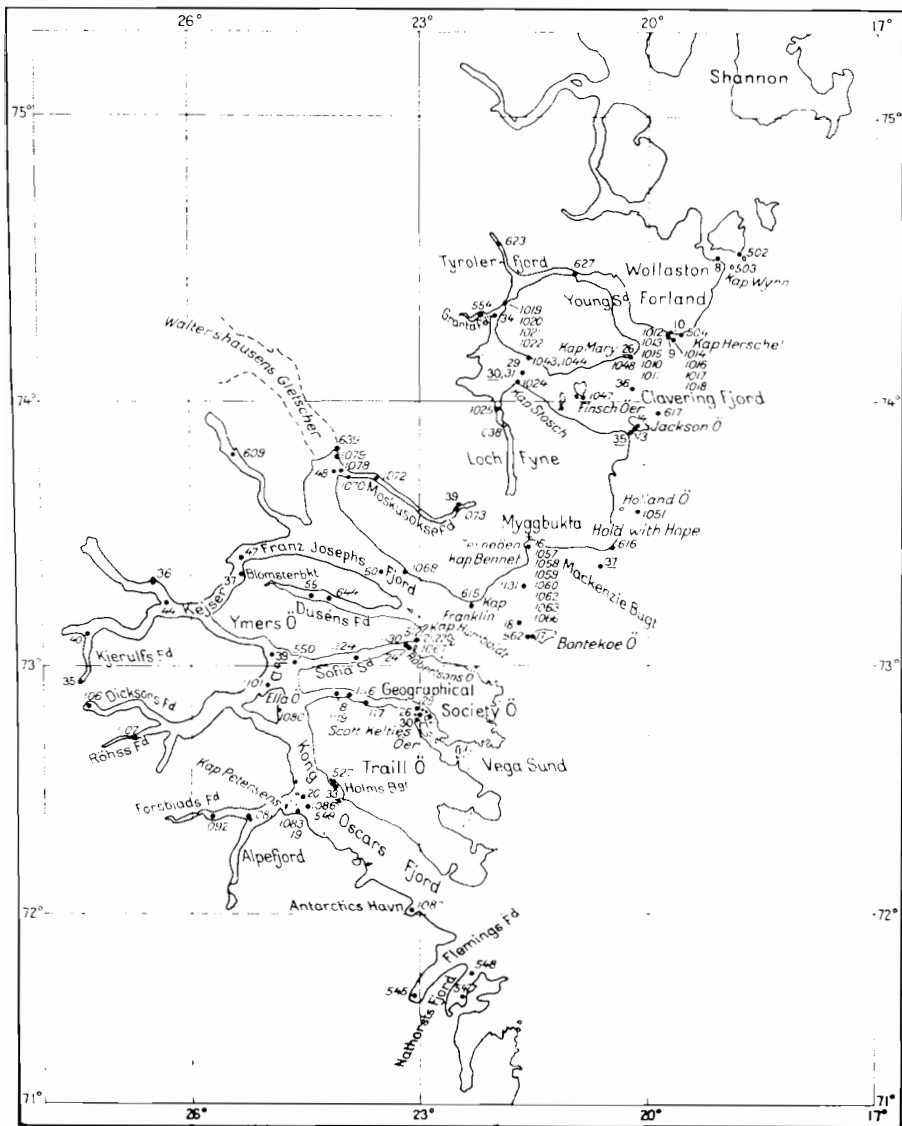
arenosa, and *Lyonsiella abyssicola*, or protandric hermaphrodites viz. *Musculus niger* and *laevigatus*, *Clinocardium ciliatum*, and *Serripes groenlandicus*. Hermaphroditic specimens were also met with in other genera, viz. *Arctinula groenlandica*, *Astarte* and *Thyasira*. Two species only, *Hiatella arctica* and *Mya truncata*, were found with small eggs and had a long pelagical larval stage, while no fewer than 20 species were found to produce large-size eggs.

These facts are very interesting in connection with studies of the individual variation, local populations, distribution and migrations. But some important questions seems not to have been studied or solved hitherto. How does the fecundation of the ova take place? How long will the spermatozoa live after being discharged into the water, and how far can they be transported in a virile state? In any case one must suppose the gene-flow to be very slow. Several pelecypod species seem to live in small populations scattered over a fjord-system. In such populations the variability will tend to be high, while noticeable taxonomic differences may develop between the various populations. Such differences are often found among local populations of the *Astarte*-species and may also be observed in several other species, sometimes in connection with an extremely high variability.

In species without, or with a very short, pelagical larval stage the passive transport will be minimal. The young individuals will settle in the neighbourhood of the mother. The migration of such species will mainly be the result of the wanderings of individuals. It is hard to understand how now widespread species can have reached all the places where they occur today. However, if we suppose that one species (or a part of a population) is able to move one metre each year in a certain direction, it will take some 10 million years to move e. g. from the Bering Strait via Greenland to Northern Norway, assuming geographical conditions to be the same as today. Littoral or shallow-water species without, or with a very short, pelagical larval stage will be absolutely unable to cross stretches of deep sea. That such species occur on both sides of the northern parts of the Atlantic strongly supports the theory of geographical changes in this area in relatively recent times.

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Map of the Kejsers Franz Joseph Fjord arca, East-Greenland.

Stations where benthic animals were collected. Underlined numbers denote stations taken in 1931 and which have the same numbers as some of the stations taken in 1929.

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MAPS AND CHARTS

The following topographical maps and charts have been published separately:

Maps:

- Bjørnøya. 1:25 000. 1925. New edition 1944. Kr. 4,00.
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Preliminary topographical maps [1:50 000] covering claims to land in Svalbard and a preliminary map of Hopen 1:100 000 may be obtained separately.

In addition, Norsk Polarinstittutt has prepared a wall map: Norden og Norskehavet in 4 sheets. This map is to be obtained through H. Aschehoug & Co. (W. Nygaard), Oslo, at a price of kr. 27,80.

Charts

- No. 501. Bjørnøya. 1:40 000. 1932. Kr. 10,00.
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Prices above do not include purchase tax.