

EMERGED PLEISTOCENE
MARINE DEPOSITS OF PEARY LAND
(NORTH GREENLAND)

By DAN LAURSEN

CONTENTS

	Page
Abstract	4
Introduction	5
Earlier investigations.....	7
Recent investigations	11
List of species found.....	22
Conclusion	24
Index of place names.....	25
Literature.....	26
Explanation of the plate	27

Abstract.

Based on investigations already published and recent field work on Peary Land, North Greenland, the writer gives an account of the emerged marine deposits and the shells found in them. Measurements showing the emergence and in this connection some reflections concerning the upper marine limit are given. The fauna is typical of the Arctic but the presence of *Lima subauriculata* (MONT.) on the north coast of Peary Land makes an earlier milder climate possible; most likely the upper marine limit is to be found at a higher level than previously supposed.

INTRODUCTION

The present paper is based on the field work and the collections made by the "Dansk Pearyland Ekspedition 1948—50" (Danish Pearyland Expedition 1948—50). The material is derived from the whole area in which the members of the expedition did field work. Most of the members have contributed to the collections. In addition, the material has been supplemented with a collection made by Count EIGIL KNUTH, the leader of the expedition, on his summer trip to the area in 1952.

I want here to express my cordial thanks to Count EIGIL KNUTH for placing the collections at my disposal, and for many instructive conversations during the preparation of this paper. I am also indebted to KNUD ELLITSGAARD RASMUSSEN M. Sc. and JOHS. TROELSEN Ph. D., my two old co-expeditionists, as well as to Mr. THORKILD NIELSEN and the other members of the expedition, for help of various kinds.

Since 1917, when AD. S. JENSEN (2) published the material concerning the quaternary marine shells collected during the "Danmark-Ekspeditionen 1906—08", no special report has been issued for the present area. The succeeding expeditions covering these little accessible part of the globe have not brought home any material. On the other hand some scattered information is to be found in the literature about the presence of emerged shell-layers and marine terraces. In this connexion it is worth stressing the influence which the aeroplanes will exert as a means of transport on arctic expeditions. The possibility has been created for much better field work and for bringing much greater quantities of scientific material home. Earlier it was not possible to place stations for wintering in the areas here dealt with, so observations and collections had to be made on long sledge journeys in seasons when frost and snow impeded the examination of many things, and among these the pleistocene marine deposits. Conditions still require that such remote localities may only be covered on sledge journeys in spring and autumn; but in the summer time one now has within the limits of possibility the use of motor-boats by means of which much territory may be covered in a short season.

Though the Danish Pearyland Expedition, by wintering on the south coast of Peary Land, had a good possibility for the investigations of and collecting from the emerged marine layers, it proved impossible to obtain better results than those presently stated because the soil was frozen most of the year. In any case the sledge journeys took place when frost was binding land and sea. In the short summer the uppermost centimetres of the surface thaw, permitting the digging out of the shells; during the rest of the year it is only practicable to collect the shells lying on the surface, and these may indicate another level than the primary deposit.

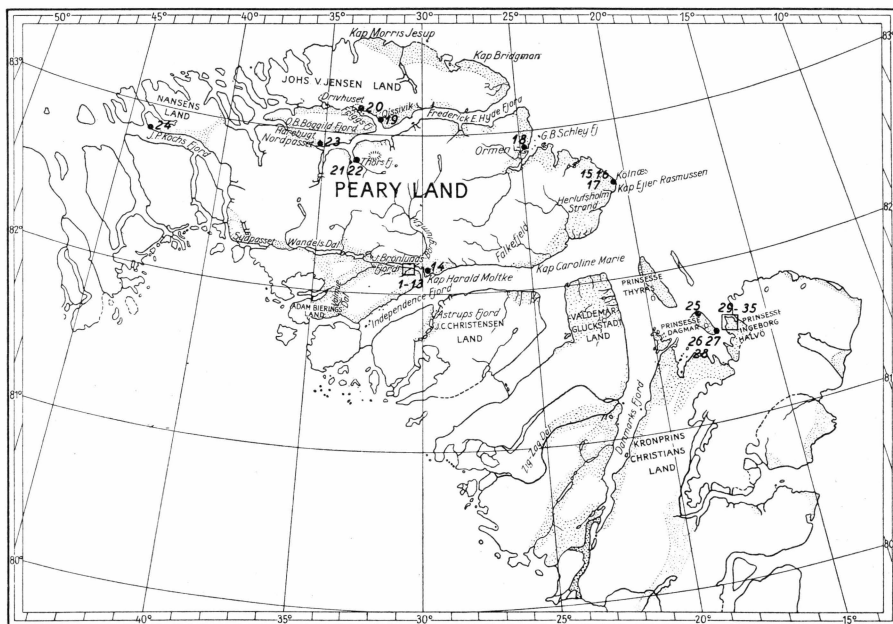


Fig. 1. Map showing the localities of which shells have been collected. The two squares (nos. 1—13 and 29—35) refer to the two special maps fig. 2 and fig. 3. The stippled area indicates the supposed and known extension of the emerged strata. Compiled by the author from earlier and recent investigations.

EARLIER INVESTIGATIONS

The "Danmark" Expedition. (2). The material comprises in all 18 species of molluscs, besides one serpulid, one *Balanus* species and one echinoderm. The shells were collected throughout the whole of the low coast region from Bessels Fjord to the north side of Frederick E. Hyde Fjord (lat. $83^{\circ}15' N.$; long. $27^{\circ} W.$). The formation is mainly gravel and sand, only certain patches, with more abundant shells, being clay. Among the shells found *Pecten islandicus* MÜLL. must be mentioned. This species was collected north of Kap Bismarck about 10 m above sea-level. In East Greenland the species has been dredged in the Kejser Franz Josephs Fjord area only; however it must be considered here as a relict.

The "First Thule Ekspedition". PETER FREUCHEN (1), who described the general features observed during the expedition mentions a number of localities, which bear testimony to a previously higher sea-level.

In Zig-Zag Dal (valley), west of Danmarks Fjord FREUCHEN states (*op. cit.* p. 352), that the bottom of the valley is terrace-like, consisting of raised sea-bottom. No altitude is mentioned for the place quoted, but about 20 km eastwards in the bottom of the valley the level is determined as 290 m above sea-level. This indicates a greater elevation for the raised sea-bottom farther up the valley than registered at any other locality in Greenland. A lake in the valley, indicated as "No. 3" and at a little higher level than the emerged sea-bottom, is found to be 350 m above sea-level. The upper marine limit may therefore here be fixed to between 300—350 m above sea-level, if the determination of the deposits is correct. From the last mentioned locality FREUCHEN quotes nothing about the presence of shells.

On Kap Harald Moltke emerged beaches are to be found with a slope about 10 m high. The remains of a whale skeleton were found lying loose on the slope. Behind this terrace lies another about 40 m above sea-level, its horizontal gravel surface merging into the general hilly formation about a couple of meters further inland. Kap Harald Moltke itself is formed by the terrace referred to above.

Valmuedal. FREUCHEN writes about Valmuedal (Poppy Valley) on Adam Biering Land (*op. cit.* p. 364): "It is very fertile here, plains of clay alternating with level raised beaches of gravel and pebbles. These were found up to a height of 400 m. At Bierings Varde (cairn), also we found similar stones at the foot of the rocks. These pebbles, together with polished fragments of solid rock, were found up to a certain sharply defined level, above which the rock was rugged and pointed. Owing to continual rain, the actual height was not measured." Here too the elevations are so considerable for marine strata, that it would have been nice if the marine origin of the deposit had been established by means of shells. Regarding the polished pebbles, the prevailing wind-erosion, as shown by TROELSEN (9, p. 21; 10, p. 221—222) must be pointed out as the possible cause.

Bicentenary Jubilee Expedition. KOCH (4, p. 80) writes about his investigations of Peary Land: "... north and south of the fjord (Frederick E. Hyde Fjord) the coast was made of clayey detrital plains with occasional stones but numerous mussel shells, most likely being mold moraines re-deposited by the water." KOCH estimates (6, p. 517) the submergence after the great glacial epoch to 210 m. Shells are found up to 135 m above sea-level, and it is stated, that they are common, but they are all species living recently in the waters of North Greenland. Drift wood has been found up to 165 m above sea-level. KOCH cites evidence of marine deposits higher than 210 m above sea-level, as suggestions of shore lines are found above this level. As high as 200 m

Table I. Showing the emerged terraces on Peary Land.

m above sea-level	I	II	III	IV	V	VI	VII	VIII	IX
140.....
130.....
120.....	123	..	121	..
110.....	..	112	..	..	..	110	111	..	..
100.....
90.....	97	90	..
80.....	81	..	73-82.5	..	..	89	..	..	..
70.....
60.....	..	64; 69	..	..	..	..	..	..	..
50.....	..	61; 62	..	63	65	..	..	..	67
40.....	48.4	..	..	..	..	..	..
30.....	44	49	42.5	..	..	46	..	..	..
20.....	..	27	..	..	..	..	36	..	..
10.....	..	21	..	..	..	..	21	..	..
0.....	..	16	..	..	..	..	..	..	..

I. At the head of Jørgen Brønlunds Fjord; II. At the mouth of Jørgen Brønlunds Fjord (10, p. 217); III. About 5 km from the head of Jørgen Brønlunds Fjord; IV. South coast of Jørgen Brønlunds Fjord, measured by hand level; V. The same point measured by theodolite; VI. Near Falkefjeld; VII. Immediately east of Kap Caroline Marie; VIII. The west coast of Astrups Fjord; IX. The south coast of G. B. Schley Fjord.

above sea-level KOCH has found clay crushed in the characteristic way of clay deposits along the North Greenland coast; the crushing being due to ice action. Perhaps it is the absence of this crushing higher than 200 m above sea-level, which makes KOCH to fix the upper marine limit at this altitude. After the submergence the land emerged again. Especially along the north coast of Peary Land, two distinct strand-lines can be observed, viz. one at an altitude of 65 m another at 105 m above sea-level.

On the map accompanying the paper, KOCH has shown emerged postglacial marine beds along the coast from Kap Morris Jesup on the north coast via Kap Bridgman and Kap Eiler Rasmussen to Falkefjeld on the south coast of Peary Land. After a little gap, where the beds are lacking, they are again indicated from the area of Kap Harald Moltke, on either side of Jørgen Brønlunds Fjord, through Wandels Dal northwestwards to J. P. Kochs Fjord. Furthermore the northern part of J. C. Christensen Land, the northern part of Valdemar Glückstadt Land, Prinsesse Thyra Ø (island) and the northern part of Kronprins Christians Land are shown as emerged marine deposits.

Dansk Pearyland Ekspedition. TROELSEN (9, 10) has also investigated the post-glacial marine deposits along some of the fjord coasts in the area. On the south coast of Jørgen Brønlunds Fjord the terraces are well developed, while on the north coast they are but poorly developed. According to TROELSEN (10, p. 219) the terraces are built up of laminated marine silt and clay containing scattered, ice-rafted boulders and pebbles. The altitudes of the terraces were measured by hand level, theodolite or Paulin aneroid readings. Furthermore, terraces were observed along the coasts of Independence Fjord and in G. B. Schley Fjord. The results are shown in table I.

Most of the terraces consist of gravel and coarse sand. At Herlufsholm Strand great areas are covered by marine deposits.

Judging from the altitudes shown in the table, three distinct terrace levels are to be found, viz. about the 45 meter line, about the 65 meter line and about the 110 meter line, while narrow terraces are indicated at several other levels. The 65 and 110 meter levels coincide well with the altitudes measured by LAUGE KOCH on the north coast of Peary Land, where distinct terraces were found at 65 and 105 m above sea-level.

Recent investigations as to former glaciation, erratics, striae, etc., are treated by TROELSEN (10).

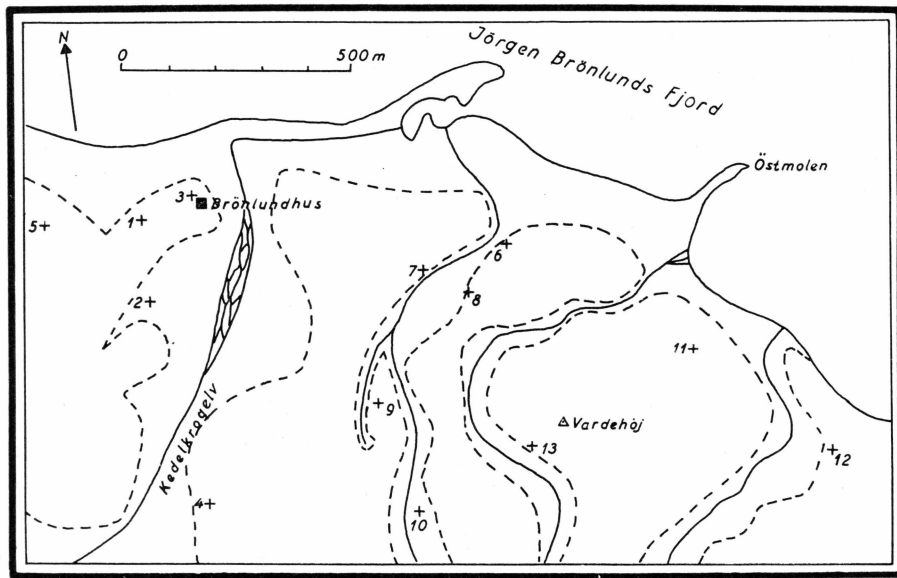


Fig. 2. Sketch-map showing the area near the wintering station Brønlundhus. Drawn by the author on the basis of surveying by Knud Ellitsgaard Rasmussen. The numbers indicate the localities where shells have been collected.

RECENT INVESTIGATIONS

Various members of the expedition have collected shells on the marine terraces in the neighbourhood of the wintering station "Brønlundhus" during the period 1948—1950. The terraces are built up of silt and clay, and the 65 meter terrace is covered by a layer of boulders, pebbles and coarse sand. TROELSEN (10, p. 220) interprets this terrace as a kame terrace formed after the deposition of the marine strata and overlying these.

The leader of the expedition EIGIL KNUTH collected numerous shells on his great sledge journey in the spring 1950 to the south and east coasts of Peary Land, and throughout Frederick E. Hyde Fjord to the central part of this little known area. The material from which the shells were collected, was mostly sand, but in some places clay. KNUD ELLITSGAARD RASMUSSEN, who, in the spring 1950, investigated the western areas of Peary Land, collected but a single sample, the permafrozen soil not allowing further collections. As mentioned in the introduction, the material has been supplemented with samples collected in the summer of 1952, partly on the east coast of Peary Land and partly on the north coast of Kronprins Christians Land and the islands to the north. The deposits were mostly clay with sand.

In the following, the localities at which samples were taken are mentioned together with an account of the shells collected. The numbers in front of the localities corresponds to the numbers on the map (fig. 2)

1. The slopes west of Kedelkrogelv. Alt. about 55 m above sea-level.

Leg. E. KNUTH. Sept. 1949.

Mya truncata (L.)

3 shells.

Height	Length	Index ¹⁾
41.7 mm	53.8 mm	77.52
46.0 —	55.7 —	82.59
46.3 —	64.3 —	72.01

2. A terrace about two hundred meters southwest of Brønlundhus. Alt. about 24 m above sea-level.

Leg. ELLITSGAARD RASMUSSEN. 5-7-1950.

Astarte borealis (CHEMN.)

1 shell of a medium size.

Saxicava arctica (L.)

5 large shells and many fragments.

Mya truncata (L.)

8 large shells, slightly damaged, and many fragments.

3. Brønlundhus.

Leg. E. KNUTH. Sept. 1949.

Saxicava arctica (L.)

3 large shells.

Mya truncata uddevallensis (HANC.)

5 shells.

Height	Length	Index
36.2 mm	46.5 mm	77.86
38.0 —	43.45 —	87.46
44.5 —	57.7 —	77.11
47.1 —	58.9 —	79.99
58.5 —	63.8 —	91.68

4. A little south of Brønlundhus upstream from the Kedelkrogelv. Alt. 18—20 m.

Leg. ELLITSGAARD RASMUSSEN. 6-6-1950.

Arca glacialis GRAY

1 specimen and 1 shell.

¹⁾ Index = $\frac{\text{Height} \times 100}{\text{Length}}$.

Saxicava arctica (L.)

1 large specimen, 2 shells, respectively of large and of medium size, and some fragments.

Mya truncata (L.)

1 specimen and 1 shell, slightly damaged, and some fragments.

Mya truncata uddevallensis HANC.

2 damaged shells.

Thracia myopsis (BECH) MØLLER

1 somewhat crushed specimen, 3 shells, one a little damaged, and some fragments. The dimensions of the two unbroken shells:

Height	Length
25 mm	31.5 mm
24.5 —	30.5 —

5. Jørgen Brønlunds Fjord. Lying loose on the lower part of the strand terrace. Brown tuff-like clay.

Leg. JOHS. TROELSEN. June 1949.

Portlandia arctica (GRAY)

1 specimen.

? *Buccinum* sp.

1 damaged and corroded specimen.

Leg. K. HOLMEN. August 1949.

Arca glacialis GRAY

2 shells.

Leg. P. JOHNSEN. June 1949.

Arca glacialis GRAY

1 somewhat crushed shell.

6. Little river east of Kedelkrogelv. Alt. 2—6 m above sea-level.

Leg. ELLITSGAARD RASMUSSEN. 29-6-1950.

Astarte borealis (CHEMN.)

68 shells and some fragments. Both shells and fragments have the periostracum preserved; some of the shells also have the ligaments preserved. The shells are relatively small, the greater measure:

Height	Length
22.9 mm	29.0 mm
22.5 —	28.9 —
22.5 —	28.9 —
19.1 —	29.7 —

Saxicava arctica (L.)

1 shell and 3 fragments of medium sized specimens with thin shells.

Mya truncata (L.)

5 shells and many fragments, some of which are rather large. The shells are remarkably small, with a thin shell and with the periostracum partly preserved.

7. Little river east of Kedelkrogelv. The western bank 8 m above sea-level.

Leg. ELLITSGAARD RASMUSSEN. 5-7-1950.

Arca glacialis GRAY

1 shell.

Saxicava arctica (L.)

1 fragment.

Mya truncata (L.)

Some fragments.

From brown tuff-like clay. Alt. between 8 and 14 meters.

Astarte borealis (CHEMN.)

1 small shell.

Saxicava arctica (L.)

Some crushed shells.

8. Little river east of Kedelkrogelv. Eastern bank. Alt. 16 m above sea-level.

Leg. ELLITSGAARD RASMUSSEN. 5-7-1950.

Mya truncata (L.)

3 fragments.

9. Little river east of Kedelkrogelv. Western bank. Alt. 30 m above sea-level.

Leg. ELLITSGAARD RASMUSSEN. 7-7-1950.

Saxicava arctica (L.)

2 specimens and 11 shells, some slightly damaged. Very large and robust shells, as will seldom be found even in arctic regions.

	Height	Length
	23.5 mm	42.7 mm
	22.5 —	48.5 —
	19.5 —	39.3 —
	18.6 —	39.0 —
	17.5 —	36.9 —
	16.9 —	37.5 —
	16.9 —	35.0 —
	15.5 —	39.5 —
right shell	19.1 —	41.4 —
left shell	19.2 —	40.9 —

Mya truncata (L.)

1 specimen, 9 shells and some large fragments. Very large and robust, thick shells.

	Height	Length	Index
	48.1 mm	61.0 mm	76.49
	44.9 —	58.0 —	77.14
	43.8 —	61.0 —	71.68
	43.3 —	56.9 —	76.10
	43.2 —	54.8 —	78.83
	41.3 —	56.7 —	72.85
	33.9 —	41.5 —	81.67
	33.7 —	45.3 —	74.39
right shell	39.0 —	51.0 —	76.49
left shell	41.0 —	52.2 —	78.63

Mya truncata uddevallensis HANC.

2 shells and 1 fragment.

	Height	Length	Index
	46.15 mm	51.1 mm	90.32
	43.85 —	51.6 —	85.00

10. Little river east of Kedelkrogelv. Eastern bank. Alt. about 45 m above sea-level.

Leg. E. KNUTH. Sept. 1949.

Mya truncata uddevallensis HANC.

1 large specimen.

	Height	Length	Index
right shell	54.0 mm	63.0 mm	85.72
left shell	56.0 —	63.0 —	88.90

11. Clay terrace between the small rivers east of Kedelkrogelv. Alt. about 14 m above sea-level.

Leg. ELLITSGAARD RASMUSSEN. 21-7-1950.

Arca glacialis GRAY

5 specimens, 8 shells and some fragments.

Astarte borealis (CHEMN.)

1 specimen, 10 shells and some fragments.

Saxicava arctica (L.)

1 shell, large but thin.

Siphonodentalium lobatum Sow.

1 large fragment.

12. A few hundred meters inland from the bay at Østmolen.
Alt. 20 m above sea-level.

Leg. ELLITSGAARD RASMUSSEN. 20-7-1950.

Portlandia arctica (GRAY)

1 fragment with umbo.

Arca glacialis GRAY

4 shells.

Astarte borealis (CHEMN.)

4 shells, of which one is very large

Height	Length
29.0 mm	37.0 mm

Saxicava arctica (L.)

9 large shells.

Mya truncata (L.)

2 crushed specimens and some fragments.

Thracia myopsis (BECK) MØLLER

2 crushed specimens and some fragments.

13. Vardehøj. Alt. 40 m above sea-level.

Leg. ELLITSGAARD RASMUSSEN. 20-7-1950.

Mya truncata (L.)

2 fragments.

14. Kap Harald Moltke. South side of the dried-out lake behind the cape. Alt. about 2 m above sea-level.

Leg. E. KNUTH. 7-6-1950.

Saxicava arctica (L.)

Some fragments.

Mya truncata (L.)

2 shells and 2 large fragments; all of them large and with thick shells.

Height	Length	Index
41.2 mm	53.0 mm	77.73
39.2 —	53.4 —	73.26

Mya truncata uddevallensis (HANC.)

1 shell.

Height	Length	Index
41.6 mm	49.5 mm	84.04

15. Kølneæs, Herlufsholm Strand. Loose on the surface.
Leg. E. KNUTH. 13-6-1952.
Astarte borealis (CHEMN.)
1 specimen and 1 shell, both of them rather small.
Saxicava arctica (L.)
7 shells.
16. Kølneæs, Herlufsholm Strand. Loc. 1. Samples taken by digging.
Leg. E. KNUTH. 13-6-1950.
10—12 cm below the surface
Mya truncata (L.)
Some fragments.
Saxicava arctica (L.)
Some fragments.
14—15 cm below the surface
Saxicava arctica (L.)
1 fragment.
18 cm below the surface
Saxicava arctica (L.)
1 fragment.
27 cm below the surface
Saxicava arctica (L.)
17. Kølneæs, Herlufsholm Strand. Loc. 2. Sample taken by digging.
Leg. E. KNUTH. 13-6-1952.
7—8 cm below the surface
Mya truncata (L.)
1 shell.
10 cm below the surface
Saxicava arctica (L.)
2 fragments.
20—22 cm below the surface
Mya truncata (L.)
1 fragment.
25—27 cm below the surface
Cardium ciliatum (CHEMN.)
1 fragment.
Astarte borealis (CHEMN.)
1 shell.
Saxicava arctica (L.)
2 fragments.

18. Ormen. The delta. Clay.

Leg. E. KNUTH. 15-5-1950

Astarte borealis (CHEMN.)

1 specimen and 2 large shells partly with the periostracum preserved.

Saxicava arctica (L.)

1 shell.

Mya truncata (L.)1 specimen, possibly of the *uddevallensis* type

	Height	Length	Index
right shell	40.0 mm	47.0 mm	85.11
left shell	38.7 —	46.9 —	82.53

19. The ruin site Qíssivik, Friggs Fjord. Marine terrace, partly soliflucting.

Leg. E. KNUTH. 5-5-1950.

All the shells from this locality are strongly worn by erosion.

Astarte borealis (CHEMN.)

7 shells and 1 fragment.

Saxicava arctica (L.)

3 shells.

Mya truncata (L.)

3 fragments.

20. Drivhuset, Friggs Fjord. Slope on the east side. Alt. 6 m above sea-level.

Leg. E. KNUTH. 17-4-1950.

Astarte borealis (CHEMN.)

1 shell and 2 fragments.

Saxicava arctica (L.)

5 shells and some fragments.

21. Thors Fjord. Corner cape at the first lateral valley towards east. Alt. about 1.5 m above sea-level.

Leg. E. KNUTH. 21-4-1950.

Astarte borealis (CHEMN.)

1 shell and some fragments.

22. Thors Fjord. Corner cape north of the great lateral valley towards east. Slope with landslide. Grey clay. Alt. 1 m above sea-level.

Leg. E. KNUTH. April 1950.

Astarte borealis (CHEMN.)

2 shells.

23. Harebugt.

Leg. E. KNUTH. 24-4-1950.

Astarte borealis (CHEMN.)

3 shells.

Saxicava arctica (L.)

2 shells.

24. South west point of Nansen Land.

Leg. ELLITSGAARD RASMUSSEN. 13-4-1950.

Apart from the shells the sample, taken in black sand, contained many in-determinable plant remains. The shells were collected in situ.

Portlandia arctica (GRAY)

2 shells; one of length 9 mm, the other of 8 mm; both of them have the periostracum completely preserved.

Pecten groenlandicus var. *major* COLLIN

1 nearly unbroken shell.

Lima subauriculata (MONT.)

1 shell.

Saxicava arctica (L.)

1 specimen with the periostracum preserved.

Operculum

1 piece.

25. Prinsesse Dagmar Ø. Northeast point.

Leg. E. KNUTH. 18-6-1952.

Astarte borealis (CHEMN.)

3 shells and some fragments.

Saxicava arctica (L.)

Some fragments.

26. Prinsesse Dagmar Ø. South point.

Leg. E. KNUTH. June 1952.

Astarte borealis (CHEMN.)

7 shells.

Mya truncata (L.)

3 large shells and 1 fragment.

27. Prinsesse Dagmar Ø. At a river bed near the south point. Alt.

1—1¹/₂ m above sea-level.

Leg. E. KNUTH. 20-5-1952.

Astarte borealis (CHEMN.)

2 shells, one with the periostracum preserved.

28. Prinsesse Dagmar Ø. River a little west of the south point.
Alt. 30 m above sea-level.
Leg. E. KNUTH. 20-5-1952.
Saxicava arctica (L.)
2 shells and 1 fragment.
Mya truncata (L.)
2 fragments.
29. Prinsesse Ingeborg Halvø. "Pilehøjen". Alt. about 15 m
above sea-level.
Leg. E. KNUTH. 16-7-1952.
Saxicava arctica (L.)
1 shell.
Mya truncata (L.)
1 fragment.
30. Prinsesse Ingeborg Halvø. Air-strip from the landing, in June
1952. About 200 m inland. Alt. about 5 m above sea-level.
Leg. E. KNUTH. June 1952.
Astarte borealis (CHEMN.)
1 specimen.
31. Prinsesse Ingeborg Halvø. The beach at the Atwell Huts.
Leg. E. KNUTH. June 1952.
Astarte borealis (CHEMN.)
1 shell.
Saxicava arctica (L.)
1 shell.
32. Prinsesse Ingeborg Halvø. In front of "Dorsethøjen".
Leg. E. KNUTH. 25-7-1952.
Astarte borealis (CHEMN.)
Some fragments.
33. Prinsesse Ingeborg Halvø. Half way between "Pilehøjen" and
the meteorological station. 2 km inland. Alt. about 16 m above
sea-level.
Leg. E. KNUTH. 22-7-1952.
Astarte borealis (CHEMN.)
7 shells.

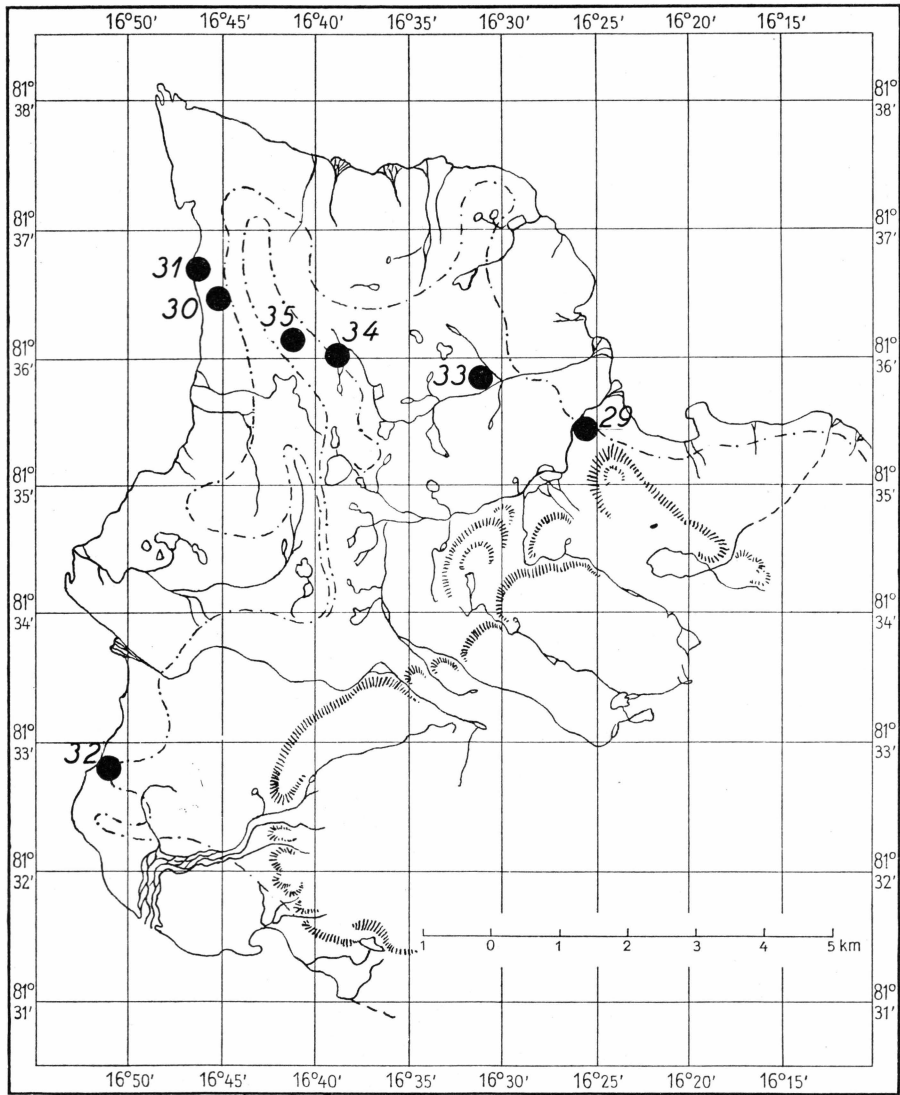


Fig. 3. Map showing the localities on Prinsesse Ingeborg Halvø. The contour interval is 15 m. (1 m = 3.281 feet).

Table II. The distribution of the

Loc....	1	2	3	4	5	6	7	8	9
<i>Portlandia arctica</i> (GRAY)	×
<i>Arca glacialis</i> GRAY	×	×	..	×
<i>Pecten groenlandicus major</i> COLLIN
<i>Lima subauriculata</i> (MONT.)
<i>Astarte borealis</i> (CHEMN.)	×	×	×
<i>Cardium ciliatum</i> (CHEMN.)
<i>Saxicava arctica</i> (L.)	×	×	×	..	×	×	×	×
<i>Mya truncata</i> (L.)	×	×	..	×	..	×	×	..	×
<i>Mya truncata uddevallensis</i> HANC.	×	×	×
<i>Thracia myopsis</i> (BECH) MÖLLER.	×
? <i>Buccinum</i> sp.	×
<i>Operculum</i>
<i>Siphonodentalium lobatum</i> SOW.

34. Prinsesse Ingeborg Halvø. By the whale skeleton. Alt. about 28 m above sea-level.

Leg. E. KNUTH. 22-7-1952.

Saxicava arctica (L.)

4 shells and some fragments.

35. Prinsesse Ingeborg Halvø. Top of the plateau. Alt. about 35 m above sea-level.

Leg. E. KNUTH. 22-7-1952.

Astarte borealis (CHEMN.)

1 shell and 1 fragment.

Saxicava arctica (L.)

Many fragments.

Mya truncata (L.)

1 fragment.

Of the molluscs mentioned above, *Lima subauriculata* (MONT.) is the only one not previously recorded from East Greenland, either living or in elevated beds. The recent distribution ranges from West Finmark to the Canary Islands, off the Faroe Islands, Northeast- and East Iceland. Off America it is known from Labrador to Nova Scotia; off West Greenland from the southern area to Upernavik. Sub-fossil, it occurs in West Greenland in horizons E and F (8). Horizon E is an arctic horizon (*op. cit.* p. 106) with a mollusc community, like that presently found off West Greenland. Horizon F is characterized by the presence of *Zirphaea crispata* (L.), indicating a more thermophile community, than that of horizon E. *Lima subauriculata* (MONT.) is scarcely a high-arctic

species according to locality.

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
..	..	×	×
..	×	×
..	×
..	×
..	×	×	×	..	×	×	×	×	×	×	×	×	×	..	×	×	×	×	×	×	..	×
..	×
..	×	×	..	×	×	×	×	×	×	×	×	×	×	×	×	×	..	×	×	×	×	×	×	×	×	×
..	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
×	×
..	..	×
..
..	×
..	×

species, although at the locality on J. P. Kochs Fjord it occurs together with typical high-arctic species such as *Portlandia arctica* (GRAY) and *Pecten groenlandicus var. major* COLLIN. In the East Greenland waters *Lima hyperborea* JENSEN occurs as the only species of *Lima*, but confusion with this species is out of question, because the radiating ribs of the specimen in hand are not sharp, but a little ragged. The presence of *Lima subauriculata* (MONT.) at J. P. Kochs Fjord, which faces the Arctic Ocean on Nansen Land, together with a recent high-arctic community, indicates probably that the Post-glacial heat-maximum affected the coast of the Arctic Ocean at the time the beds mentioned were deposited. There is hardly any doubt that the temperature of the Peary Land region has risen during Post-glacial time. That this rise has been so appreciable that non-high-arctic species have been able to live in the Arctic Ocean is surprising. Until the lamellibranchs which have been collected during recent years off East Greenland have been studied, it will be premature to draw a final conclusion from the single finding of a *Lima subauriculata* (MONT.)

The remainder of the fauna is typical of the Arctic. Most of the species are circum-polar in distribution and occur most likely off Peary Land to-day.

CONCLUSION

With the observations of the "Dansk Pearyland Ekspedition" our knowledge of the distribution of emerged post-glacial beds in Greenland is extended considerably. The results of the "Danmark Ekspedition" indicated emerged shell-layers on the north coast of Frederick E. Hyde Fjord and Herlufsholm Strand. The "First Thule Expedition" discovered the deposits in Zig-Zag Dal, at Kap Harald Moltke and in Valmuedal. LAUGE KOCH, as mentioned above (p. 9), has indicated the Quaternary marine deposits on a map for great distances along the coasts of the area. However, he had no knowledge of the interior of Frederick E. Hyde Fjord, where the beds have, by the present investigation, been demonstrated as extending via Nordpasset to O. B. Bøggilds Fjord. The "Dansk Pearyland Expedition" has furthermore revised KOCH's statements concerning the Wandels Dal—Sydpasset area, and also the deposits at the southwest point of Nansen Land have been discovered. Last but not least the expedition has brought home a valuable collection of shells.

Regarding the altitudes at which emerged marine beds have previously been found, there is a reason to believe, that the upper marine limit is to be found in an altitude higher than that estimated by KOCH (viz. about 210 m above sea-level), as KOCH himself has suggested. I base this on the conditions in West Greenland, where, as demonstrated, the upper marine limit rises from south to north (7, p. 98). FREUCHEN's observations in Zig-Zag Dal, where he estimates the altitude of the highest Quaternary marine beds as about 400 m, point in the same direction. However, as previously mentioned (p. 36) the marine nature of these deposits has not been fully demonstrated.

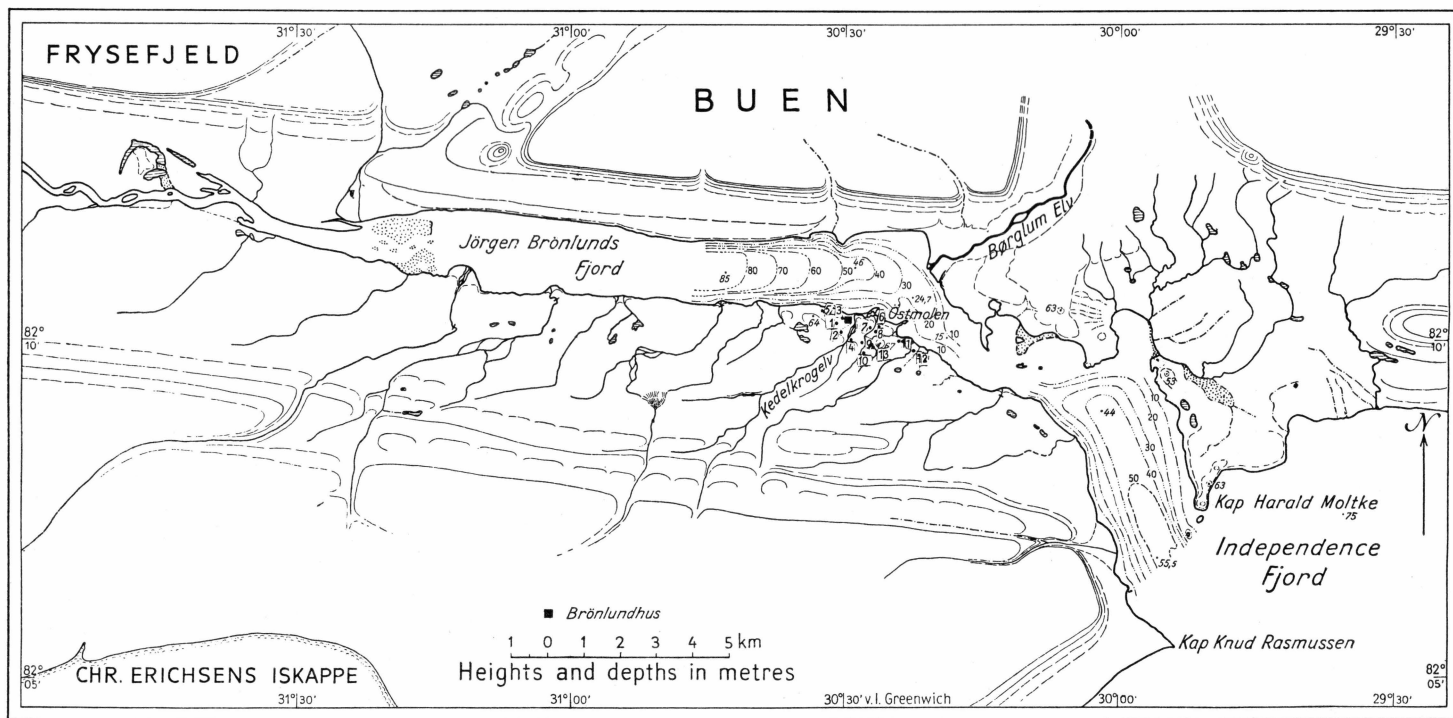
On the map showing the localities (fig. 1) the extension of the emerged marine layers is shown according to the results of both the earlier and more recent investigations.

INDEX OF PLACE NAMES

Adam Biering Land.
Astrups Fjord.
"Atwell Huts".
Bessels Fjord, E. Gr.
Brønlundhus.
Buen
Børglum Elv.
Chr. Erichsens Iskappe
Danmarks Fjord.
"Dorsethøjen".
Drivhuset.
Falkefjeld.
Frederick E. Hyde Fjord.
Friggs Fjord.
Frysefjeld
G. B. Schley Fjord.
Harebugt.
Herlufsholm Strand.
Independence Fjord.
J. C. Christensen Land.
Johs. V. Jensen Land
J. P. Kochs Fjord.
Jørgen Brønlunds Fjord.
Kap Bismarck.
Kap Bridgman.
Kap Caroline Marie.
Kap Ejler Rasmussen.
Kap Knud Rasmussen
Kap Harald Moltke.
Kap Morris Jesup.
Kedelkrogeelv.
Kejser Franz Josephs Fjord.
Kronprins Christians Land.
Kølnæs.
Nansen Land.
Nordpasset.
O. B. Bøggild Fjord.
Ormen.
Peary Land.
"Pilehøjen".
Prinsesse Dagmar Ø.
Prinsesse Ingeborg Halvø.
Prinsesse Thyras Ø.
Qissivik.
Sydpasset.
Thors Fjord.
Valdemar Glückstadt Land.
Valmuedal.
Vardehøj.
Wandels Dal.
Zig-Zag Dal.
Østmolen.

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Map showing the area round Jørgen Brønlunds Fjord. The numbers round the lower Kedelkrogely indicate the localities where shells have been collected.