ARCTIC INSTITUTE OF NORTH AMERICA

TECHNICAL PAPER NO. 5

# MARINE INFAUNAL BENTHOS IN ARCTIC NORTH AMERICA

*By*

Derek V. Ellis

Published September 1960

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**Fig. 1.** Arctic North America.

# MARINE INFAUNAL BENTHOS IN ARCTIC NORTH AMERICA

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## I. Introduction

THERE have been many attempts to measure the crop of animals on the sea bottom in north European waters, where much of the benthos is important as a stock of food for commercial fish. Although benthic crops have also been estimated in a few arctic localities, notably the Barents Sea and Greenland, no data have previously been available from arctic Canada. In this region the marine benthos is eaten by several species of mammals, sea birds, and fish, for example, walrus, bearded seals, eider ducks, flounders, and rock cod, which are either of potential commercial value or of actual economic importance to the native Eskimo. A knowledge of the food supply available to these benthic predators is part of the information required for their efficient management.

In order to estimate standing crops of benthos in arctic Canada, and to demonstrate general features of benthic distribution and abundance in the North American Arctic, quantitative surveys were made over a period of four years, 1954–7, in northern Baffin Island, west Greenland, and northwest Foxe Basin (Figs. 1 and 2). The general term "arctic North America" when used in this paper refers to east and west Greenland, arctic Canada, and also arctic Alaska.

The marine benthos can be arbitrarily separated into infauna, animals living on or in level (soft) sea bottom, and epifauna, animals living on or attached to hard surfaces. The distribution and standing crops of infaunal species are described here, using the concept of marine level-bottom communities (Thorson, 1957), which is a particularly useful way of summarizing the infauna of arctic regions. The distribution of epifaunal species collected is shown in the appendix.

## II. Methods and Materials

The surveys were started near Arctic Bay and Pond Inlet settlements, north Baffin Island, during 1954 and 1955 (Fig. 2). They were continued during 1956 at two laboratories in Greenland to obtain increased accuracy by working with facilities adequate for examination of fresh specimens. These were the Fishery Biology Laboratory, Godthaab, and the Arctic Station of the University of Copenhagen, Godhavn (Fig. 2). During 1956 Greenland's Fisheries Investigations permitted me to examine some of their benthos collections from the prawn grounds in Disko Bugt.

The Arctic Unit of the Fisheries Research Board of Canada turned over to me for examination benthos collected by dredges near Igloolik, Foxe Basin, in 1955 and 1956, and in 1957 the same unit provided me with the opportunity to collect more benthos in Frustration Bay, Rowley Island (Fig. 2), while I was

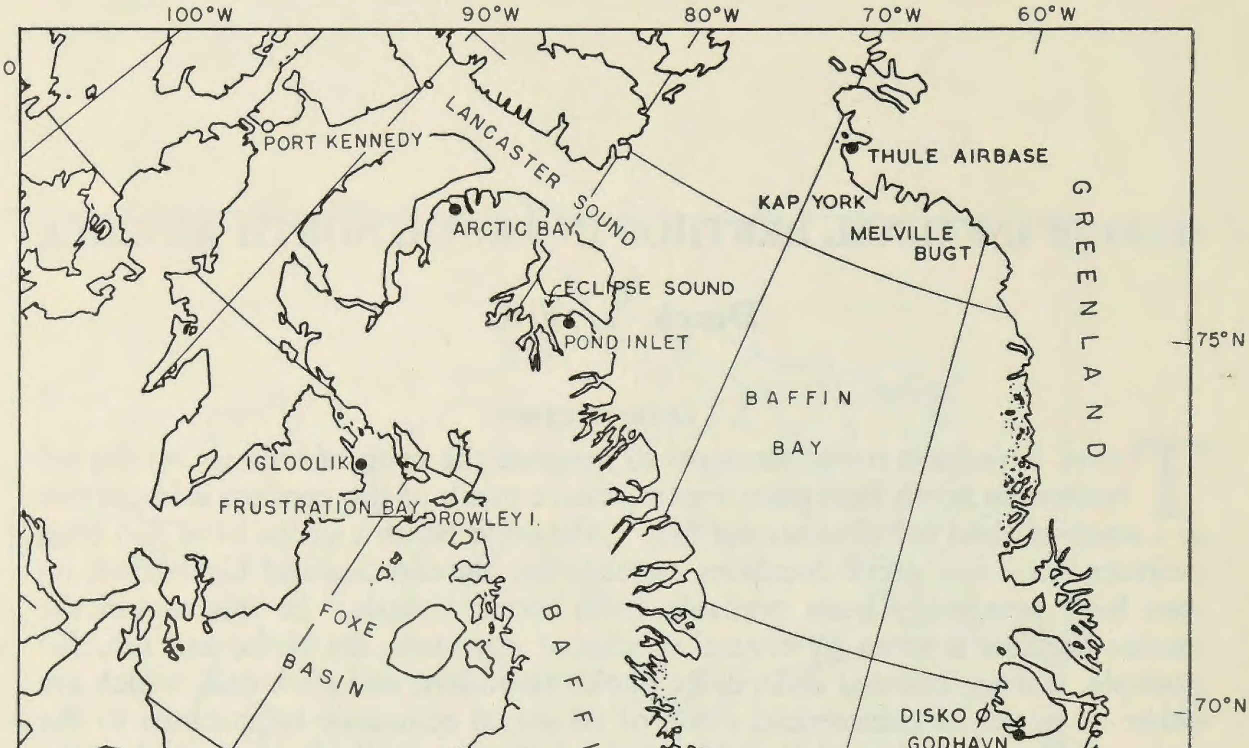


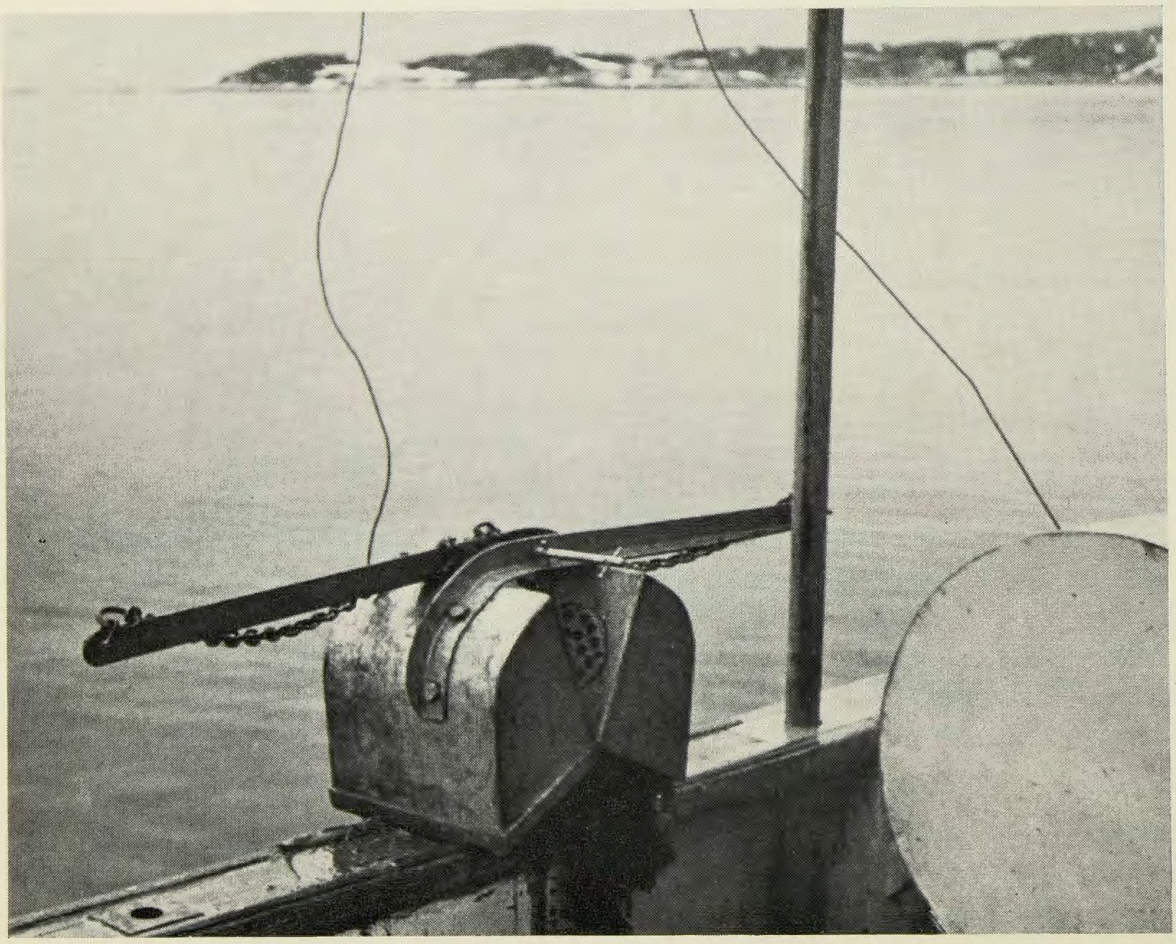

**Fig. 2.** Eastern arctic North America.

working on board C.G.M.V. *Calanus* from May 19 to August 30. The purposes and programs of the *Calanus* expeditions are described by Dunbar (1956) and in the *Annual Reports* of the Fisheries Research Board of Canada.

### 1. Gear and collecting techniques

Two types of grab were used in the surveys. The first, made by Messrs. Foerst, Chicago, sampled a surface area of 0.07 sq. m. and a maximum volume of 5 litres (Pl. 1). It was used in Baffin Island. This grab was similar to the

**Pl. 1.** Foerst grab with a haul of benthos being pulled on to sea ice in Eclipse Sound.



**Pl. 2.** Van Veen grab, in open position, on the *Adolf Jensen* in Godthaab Fjord.

"Petersen dredge" figured in Welch (1948), but differed greatly from the original Petersen grab (Ursin, 1954). The second, a Van Veen grab, sampled 0.1 sq. m. of bottom and a maximum volume of 15 litres (Pl. 2). It was used in Greenland and in Foxe Basin. The Van Veen grab was described by Thamdrup (1938) but the models used in these investigations were slightly different (Ursin, 1954 and 1956).

In Baffin Island only hauls more than half-full (2.5 litres) were used for quantitative records. In Greenland the volume of all hauls was measured. At Godthaab, where many hauls were made, only the largest, 4–6 litres, have been used for standing crop estimates. In Disko Bugt and also in Foxe Basin hauls were generally between 4 and 6 litres and smaller hauls were rejected for calculating the quantitative data. In Egedesminde harbour soft mud bottom permitted taking hauls of maximum volume (15 litres).

In Baffin Island a sieve with a 1.5-mm. mesh was used to separate animals from sediment; at Godthaab a 2-mm. mesh was used, at Godhavn a 1-mm. mesh, and in Foxe Basin a 2-mm. mesh. These mesh sizes correspond to those used in similar surveys elsewhere, and the use of different-sized meshes does not apparently affect the results described here. The animals retained by the sieves are equivalent to the "macrobenthos" and larger "meiobenthos" of Mare (1942) but not to her smaller "meiobenthos" and "microbenthos" nor to the "microfauna of the bottom" of Smidt (1951).

In Baffin Island the animals in each haul were preserved in 4 per cent neutralized formalin and were later counted and weighed. Specimens in 32 hauls were also weighed before preserving. The preserved weights from these hauls have been divided by the equivalent fresh weights to give a coefficient to convert preserved weights to fresh weights. There was on the average a 20 per cent loss in weight through preservation and the conversion coefficient is 1.2. In Greenland and Foxe Basin specimens were counted and weighed before preservation, except for 5 hauls from the prawn grounds in Disko Bugt. These hauls were made in 1953 by Greenland's Fisheries Investigations and had remained in preservation for three years before I examined them. Preserved weights of these specimens have also been multiplied by 1.2 to give fresh weights, using the same conversion coefficient as for the Baffin material.

The convention of converting numbers and weights of animals per haul into values per sq. m. has been followed here to facilitate comparison with quantitative surveys from other areas (Thorson, 1957).

## 2. Areas surveyed

*a. Baffin Island*

The survey was made in two parts: in Arctic Bay (Fig. 3) between 27 September and 1 December 1954, and in Eclipse Sound (Fig. 4) near Pond Inlet settlement between 16 June and 28 July 1955. When the sea was free of ice the grab was operated from a small dinghy but otherwise the grab was lowered through cracks or holes in the sea ice.

The collections were arranged in a series of 6 sections (plus a few extra hauls) extending out from shore approximately perpendicular to the coast. Section 1 in Arctic Bay revealed mud bottom at 7 metres with large numbers of stones, which gradually became less numerous with increasing depth (Fig. 3). The maximum depth sampled was 48 metres. There were several small streams

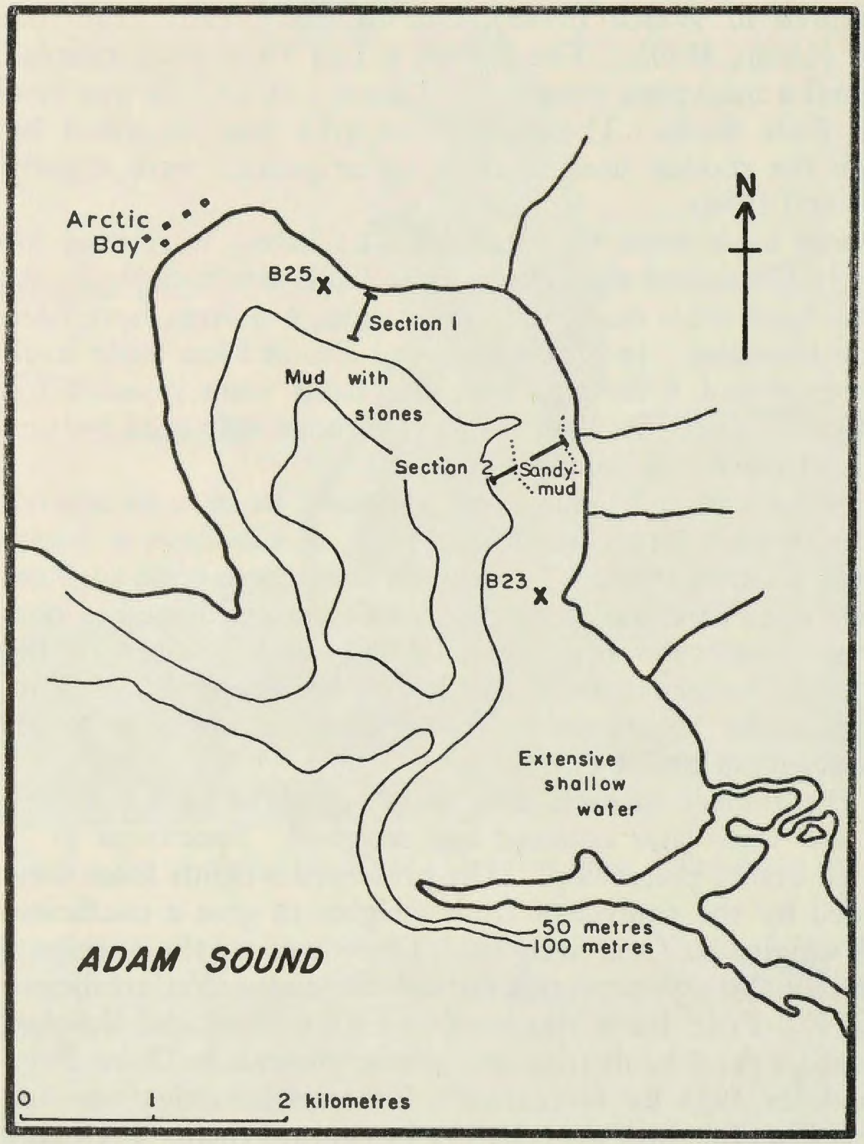



**Fig. 3.** Collecting grounds in Arctic Bay, Adam Sound.

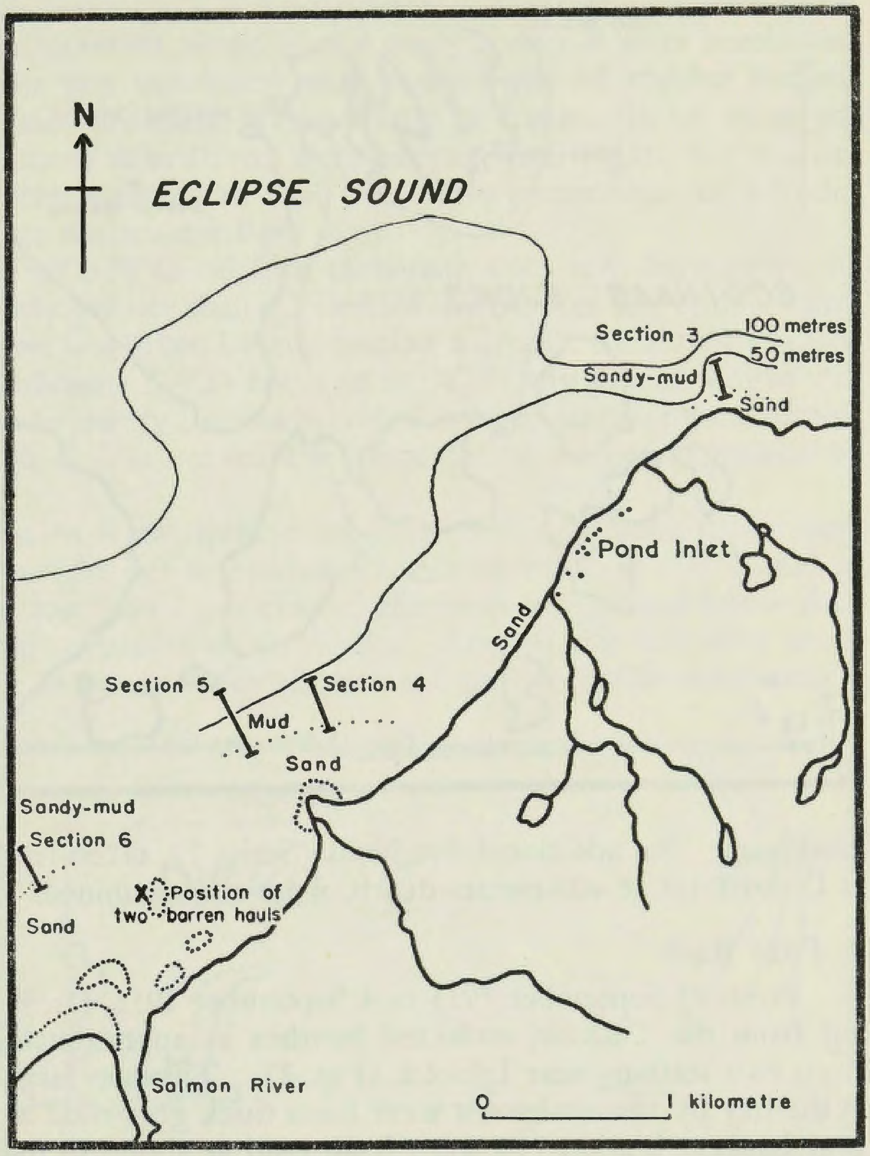
draining into the bay along its eastern shore and section 2 showed that the bottom near the mouths of at least one of these small streams consisted of sand in very shallow water (about 2 metres depth), changing gradually with increasing depth to sandy-mud (about 7 metres depth), and then to mud (at about 30 metres depth).

A narrow zone of sand stretched along the shore near Pond Inlet (Fig. 4). Section 3 at a small point east of the settlement showed that the sand graded into sandy-mud below 14 metres depth; hauls were taken to a maximum depth of 47 metres. There was a sandy submerged delta at the mouth of the Salmon River west of Pond Inlet settlement and sections 4, 5, and 6 crossed this delta to 43, 55, and 11 metres respectively. The sand was replaced by sandy-mud or mud between 5 and 10 metres depth in the three sections. In many of the hauls at the mouth of the river there were small pieces of coal which had been washed down by the Salmon River from deposits upstream.

*b. Godthaab Fjord*

In the Godthaab survey from 9 May to 6 June 1956, the usual method of making grab collections from a ship was modified so that the animals in all hauls could be examined alive. The Van Veen grab was operated from the

Fig. 4. Collecting grounds in Eclipse Sound near Pond Inlet settlement.




Greenland's Fisheries Investigations' research trawler *Adolf Jensen* in the standard fashion but the contents of each haul were emptied into a piece of sackcloth and taken entire, without sieving, to the laboratory. The cold air, near freezing point, kept the animals fresh and there was no sign that small polychaetes, etc. escaped through the meshes of the cloth. In this way it was possible to take up to 21 hauls on any one day, and to examine them within two to three days.

The hauls were taken from sand bottom off the mouth of a small stream draining into the sea between the mountains, Lille Malene and Store Malene (Fig. 5). The depths ranged from 8 to 18 metres at various stages of the tide (amplitude about 3 metres) and can be taken as approximately 10 metres. The sand, which was coarse with many small pebbles, was mixed with varying amounts of alga.

*c. Disko Bugt*

Six series of hauls were made at four different depths in various localities in Disko Bugt (Fig. 6; Table 1) between 15 June and 16 July 1956. The hauls were made from the Arctic Station's motor boat *Holk*[1] in the same way as at

[1]Formerly *Holck*.

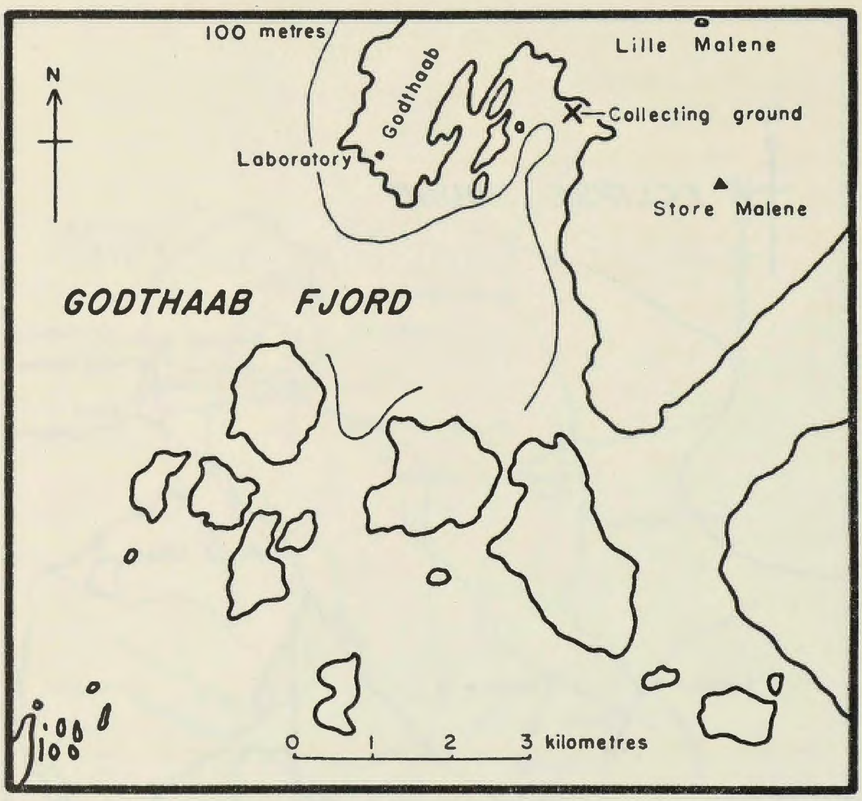



**Fig. 5.** Collecting ground in Godthaab Fjord near Godthaab.

Godthaab. An additional five hauls (Series 7), taken from the prawn grounds in Disko Bugt at 400 metres depth, were also examined.

*d. Foxe Basin*

From 25 September 1955 to 4 September 1956, Dr. E. H. Grainger, working from the *Calanus*, collected benthos at approximately monthly intervals from two stations near Igloolik (Fig. 2). Thirteen large hauls at Station 723 in the bay by the settlement were from thick grey mud at 22 metres depth and four hauls at Station 719 were from mud at about 50 metres in the mouth of the same bay.

In 1957 grab and dredge hauls were made at Frustration Bay, Rowley Island (Fig. 2). They consisted of 36 hauls with a Van Veen grab scattered across the mouth of the bay between 3 and 30 metres depth, and several dredge hauls down to 50 metres depth. The shores of Frustration Bay consist of coarse gravel and stones, replaced below low-water level by finer sediments. Sand bottom was found in several places at about 5 metres depth; and from 10 to 20 metres the sand or stony bottom changed into hard grey, often stagnant, mud with a softer superficial brown layer. There were some patches of kelp and other alga at all depths.

### 3. Dry organic matter determinations

Species collected in large numbers at Godthaab and Godhavn were dehydrated and combusted to determine coefficients to express standing crops in terms of dry organic matter as well as of fresh weights of animals. Specimens were first dehydrated at temperatures between 100°C and 110°C until the weight became constant; this process took about 24 hours. Shells and tubes were then removed from large lamellibranchs and *Cistenides* spp. and these and specimens without calcareous shells were combusted at 1,000°C. Small specimens with shells and tubes which could not be easily removed were combusted at 500°C. Combustion was continued until the weight of residue became constant, the process also normally taking about 24 hours. In all cases the fresh weights of specimens dehydrated were greater than 1 gm., but the decombusted residues were weighed to 0.01 gm. The percentages of ash and dry weights are given to the nearest 1 per cent.

At a temperature of 500°C calcium carbonate does not decompose; its partial pressure is slightly greater than 0.1 mm. of mercury at this temperature. An additional precaution was taken by combusting a known weight (4 gm.) of dehydrated calcium carbonate for 24 hours at 500°C. Any loss in weight was less than 0.01 gm. Consequently the loss in weight of specimens with calcareous shells combusted at 500°C does not include losses due to the decomposition of calcium carbonate.

At 500°C combustion is not quite complete. The difference in the percentage of the fresh weight left as residue after combustion at 500°C and at 1,000°C was generally less than 1 per cent of the fresh weight and hence does not seriously affect the accuracy of the results. Any residue left after combustion at 1,000°C for 24 hours is, for all practical purposes, non-combustible.

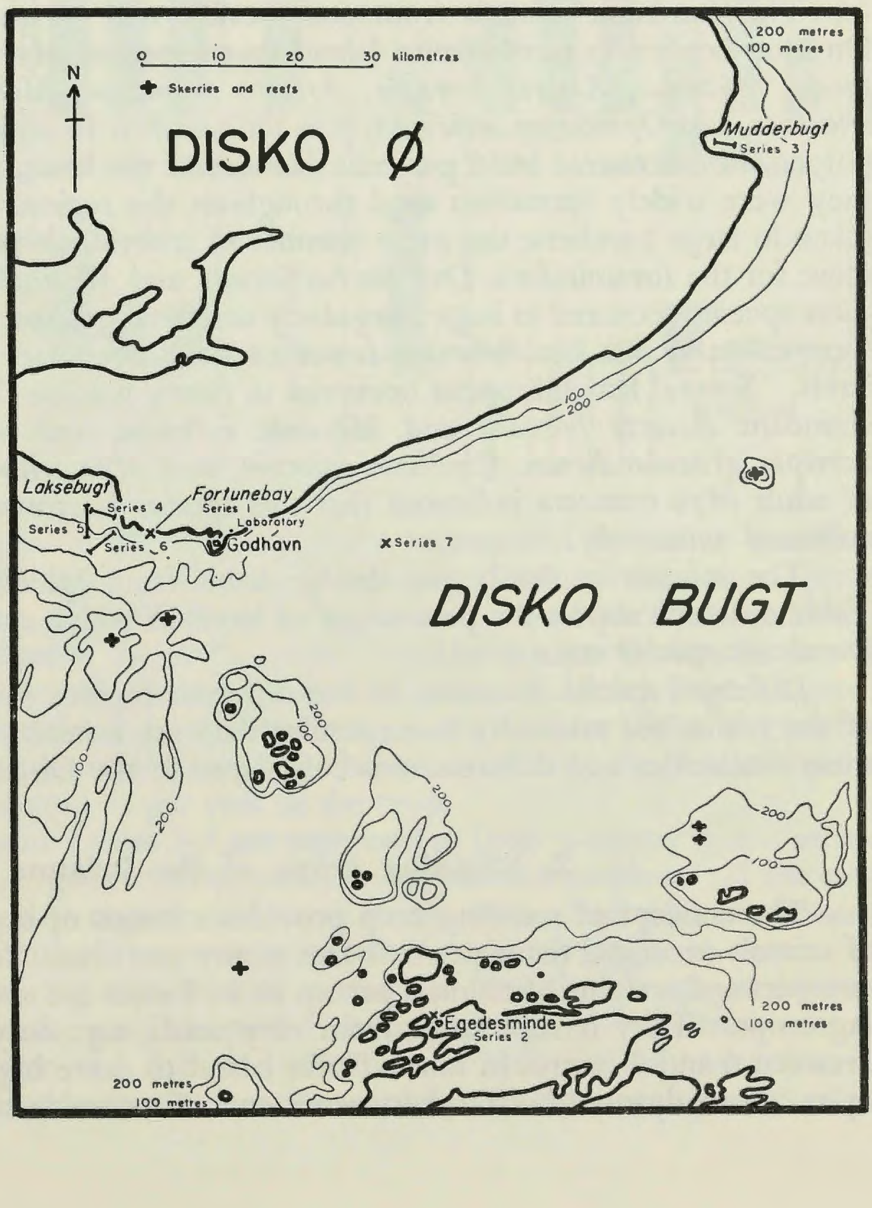



**Fig. 6.** Collecting grounds in Disko Bugt.

## III. Results

### 1. Composition of the infauna

The species collected, the percentages of hauls in which they occurred, and their mean numbers and weights per sq. m. are listed in Tables 2–5 for the areas investigated quantitatively. From the data it can be seen that a number of species numerically dominate the faunas. Now dominance is a rather vague concept. It has the general implication that some animals in a fauna are more noticeable than others, either through their abundance or through their biological relationships with the rest of the animals. Unfortunately there are no hard and fast criteria for selecting dominants, because their noticeability depends on so many properties, including for example whether it is a poor or rich area which is being investigated. Animals have been regarded as dominant here if, (1) they occurred in 50 per cent or more of the hauls from an area and hence were widely spread, (2) they were markedly more dense than the great majority of species present, or, (3) they represented about 10 per cent or more of the total standing crop (fresh weight). Dominance as used here is simply a numerical expression and has no biological significance. In Tables 2–5 dominant species are starred.

The dominant animals from one locality will be quoted as an example. On mud bottom in north Baffin Island seven species, *Myriochele heeri*, *Philomedes globosus*, *Astarte borealis*, *Astarte montagui*, *Macoma calcarea*, *Mya truncata*, and *Ophiocten sericeum*, plus unidentified foraminifera and sedentary polychaetes, occurred in 50 per cent or more of the hauls, which indicated that they were widely spread on mud throughout the region. Some species were taken in large numbers; the mean number of individuals per sq. m. was 100 or more for the foraminifera, *Owenia fusiformis*, and *Myriochele heeri*. Some of these species occurred in large irregularly scattered groups, e.g., 80 foraminifera were taken in one haul whereas fewer or none occurred in the neighbouring hauls. Several lamellibranchs occurred in heavy masses; there were groups of abundant *Astarte borealis* and *Macoma calcarea*, and heavy individuals of *Serripes groenlandicum*, *Cardium ciliatum*, and *Mya truncata*. Torn siphons of adult *Mya truncata* indicated that this species burrowed too deeply to be collected accurately.

The infauna in the largest dredge hauls from Igloolik is summarized in Table 6, which shows the percentage of hauls in which each species occurred. Dominant species are starred.

Different species dominate in the different regions investigated, yet some of the faunas are markedly more similar than are others. The significance of these similarities and differences is considered in the Discussion.

### 2. Standing crops of the infauna

The concept of standing crop provides a means of expressing the amount of animals or animal tissue per unit area at any one time. In these surveys total numbers and weights of animals per sq. m. in Tables 2–5 are estimates of standing crops. They have a range from very small, e.g., only 31 gm. per sq. m. between 0 and 3 metres in north Baffin Island to quite high, e.g., 438 gm. per sq. m. on sandy-mud bottom between 5 and 47 metres in the same region.

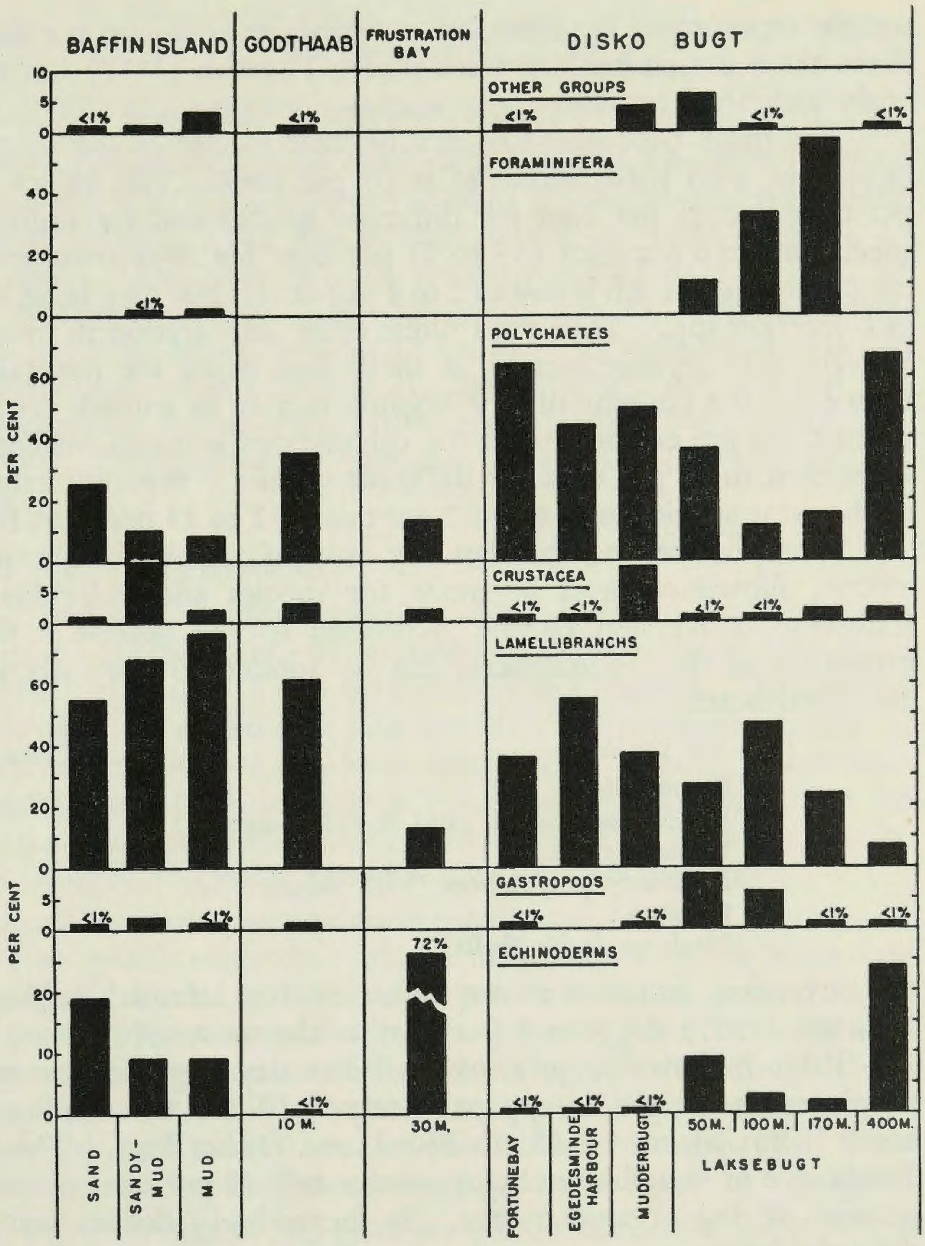



**Fig. 7.** Percentages of the mean weights of animals per sq. m. contributed by various taxonomic groups in the regions investigated.

The percentages of the standing crops represented by major taxonomic groups is shown in Fig. 7. Various groups are dominant in various places. Thus lamellibranchs represent between 60 per cent and 80 per cent of the crop in the areas investigated in north Baffin Island and near Godthaab, but are partially replaced by polychaetes in shallow water in Disko Bugt. Lamellibranchs are an insignificant part of the crop in the deepest Disko Bugt collections, where either foraminifera or polychaetes dominate. In Frustration Bay echinoderms represented 72 per cent of the crop.

Standing crops in Tables 2–5 are expressed as fresh weights, which include water, shells, tubes, organic matter, and non-combustible residues. If the crops are converted into dry organic matter, a much clearer indication is obtained of the mass of animal tissue present on the bottom at any one time. The technique for measuring dry organic matter was described on pages 10–11.

Table 7 shows for several species the percentages of the fresh weights represented by water and dehydrated residue. This residue comprises dry organic matter, ash, and sometimes shells or tubes. The percentage of the fresh weight represented by these last constituents is shown for some of the species. Since these determinations were made, Thorson (1957) has summarized previously published results.

The mean percentage of dry organic matter in species without shells and in species with shells removed is 20 per cent. The values vary between 14 per cent and 25 per cent for different species and for individuals of any one species up to 6 per cent (15 to 21 per cent for *Mya truncata*). In most cases the percentage of ash is small (2 to 4 per cent), but may be as high as 16 per cent in *Cistenides* spp. Thus the residue after dehydration in most species is almost entirely dry organic matter, if shells and tubes are not taken into account. However, the content of dry organic matter in animals with shells and tubes when these are considered in the calculations is much smaller; and varies from 1 per cent to 17 per cent for different species. Separate values for individuals of the same species vary up to 2 per cent (12 to 14 per cent for *Mya truncata*).

When converting the standing crop of animals into terms of dry organic matter, allowance must be made for species and individual variation. The following conversion factors, expressed to the nearest 5 per cent with the exception of the foraminifera, can be applied to the material in the surveys described here:

| *Species* | *Conversion factor* |
|---|---|
| Foraminifera | 1% |
| Errant polychaetes (and shell-less animals) | 20% |
| *Cistenides* spp. | 10% |
| Sedentary polychaetes (with tubes) | 5% |
| Crustacea | 15% |
| Molluscs (with shells) | 10% |

A conversion factor was not obtained for infaunal echinoderms. Data in Thorson (1957) suggests 5 per cent as the most appropriate value.

Table 8 shows crops converted into dry organic matter. The ratio dry weight:fresh weight is approximately 1:10 for the shallow-water faunas in north Baffin Island, Godthaab Fjord, and Disko Bugt. This ratio reflects the dominance of lamellibranchs, approximately 10 per cent of whose body weight consists of dry organic matter. In increasingly deeper water in Disko Bugt the ratio becomes greater as the proportion of the total weight represented by foraminifera increases (only 1 per cent of the fresh weight of foraminifera is dry organic matter). The ratio is lowest for the community on the prawn grounds in Disko Bugt, which is dominated by non-tubicolous sedentary polychaetes, 20 per cent of whose body weight is dry organic matter. The ratio was high at 30 metres in Frustration Bay where much of the crop consists of large holothurians with a small content of dry organic matter (5 per cent).

The weight of dry organic matter per unit area in shallow water is generally 15 gm. per sq. m. or more. The one exception is in Mudderbugt (5 gm. per sq. m.), where the weight has probably been badly underestimated because of a hard sand bottom. The weight of dry organic matter at depths greater than 50 metres is generally smaller than in shallow water, i.e., about 10 gm. per sq. m. or less. There appears to be a difference in the amount of dry organic matter per unit area in the two deep-water communities in Disko Bugt: the weights in the foraminifera community between 30 and 200 metres depth were between 2 and 8 gm. per sq. m. and in the deeper water community at 400 metres depth was about 13 gm. per sq. m.

# IV. Discussion

## 1. Quantitative benthos surveys

Most of the benthos collected in arctic North America has been obtained with scraper dredges and trawls. These instruments collect deeply burrowing or active animals very badly. They also bounce over the bottom sampling an unknown surface area. Thus they provide poor quantitative data. Benthic crops can best be estimated at present by combining scraper dredges, underwater cameras, and grabs or other penetrating samplers (McIntyre, 1956). In the surveys described here, crop estimates are based on grab collections, the only quantitative instrument which could profitably be used under arctic winter conditions. However, scraper dredges were used occasionally, particularly for collecting epifauna.

### *a. Effect of variable grab penetration*

Grabs are liable to penetrate variable depths into the sea bottom, depending on the experience of the operators and the hardness of the sediment. As a result they give poor quantitative data for deeply burrowing species. (Inevitably, they also give poor data on active and rare species). Nipped-off siphons of *Mya truncata* occurred in some of the hauls from Baffin Island. Large individuals of this species evidently burrowed beyond the depths reached by the grab. As a result the standing crop of *Mya truncata*, and total standing crops wherever this species occurred, may have been badly underestimated.

In order to check the extent of variation introduced into the quantitative data by variable grab penetration the volume of substrate in all hauls was measured during the Godthaab survey. Thirty-two hauls containing much alga were small (mean volume was 2.8 litres), whereas 24 hauls free of alga were generally larger (mean volume was 3.5 litres). Although the difference was not statistically significant ($P>0.05$), the large amounts of alga in the smaller hauls suggested that the grab merely scraped the surface of the bottom when much alga was present but dug deeper where the bottom was free of alga.

The effect of depth of bite of the grab on the collections is illustrated in Fig. 8. There is a steady rise in the mean number of animals per haul up to 3 litres of substrate. Approximately similar numbers of animals were taken in hauls containing between 3 and 5 litres of substrate; the higher numbers in 6 litres volume are based on only 3 hauls, so cannot be taken as evidence for a continued rise. It appears that when the grab merely scraped the surface of the bottom it collected the infauna very poorly, whereas when it penetrated sufficiently deeply to collect about 3 litres of substrate it collected most of the infauna.

In contrast, the weight of animals per haul increased almost regularly with increasing volume of substrate (Fig. 8). As the numbers of animals remained approximately constant above 3 litres volume, the increased weight in hauls of 4 to 6 litres must be due to the presence of heavier individuals in the largest hauls. These hauls contained heavy individuals of *Cistenides* spp., *Macoma calcarea*, and *Mya truncata*, and large numbers of *Ophelia* sp. and *Travisia forbesii*. These species, especially the largest individuals, probably burrow deeply; they will be collected adequately only when a deep-digging grab, which collects large volumes of substrate, is used. Large individuals are usually rare

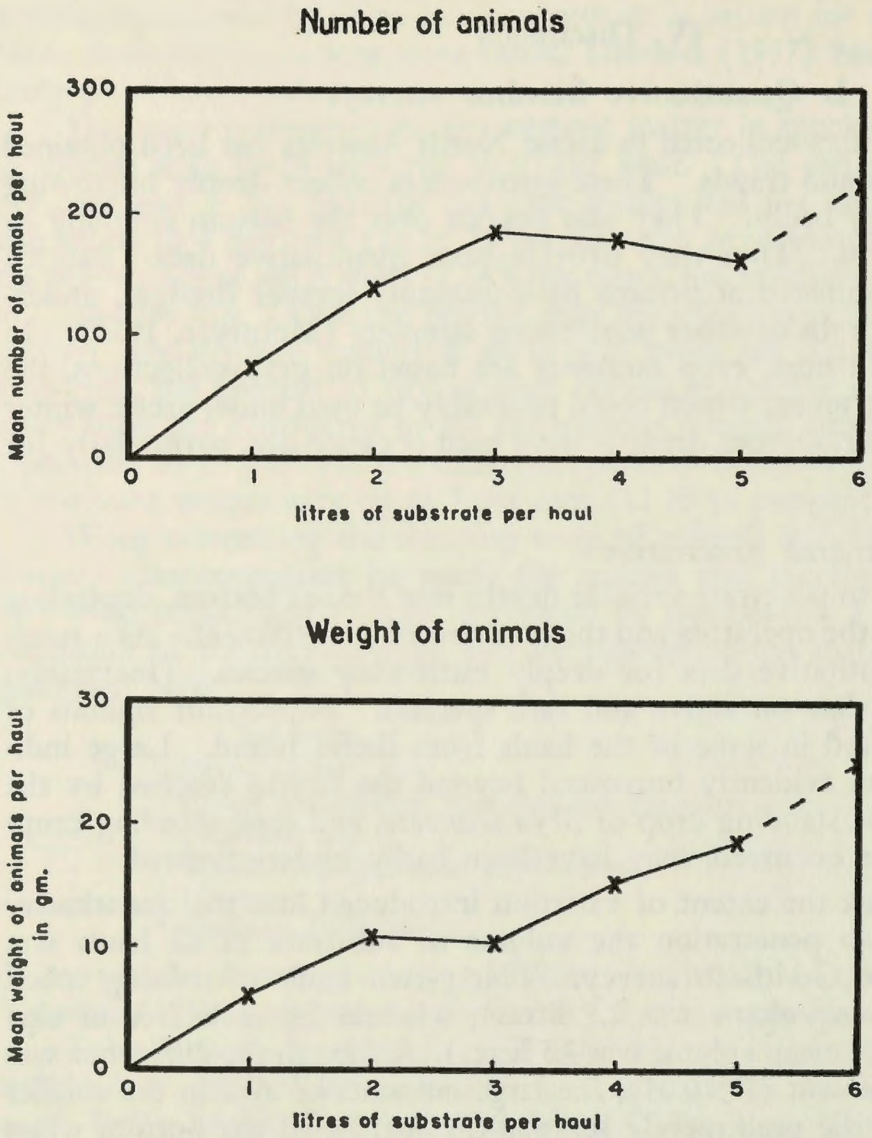



**Fig. 8.** The effect of varying grab penetration (measured by litres of substrate per haul) on the numbers and weights of animals collected in the Godthaab survey.

in arctic regions, hence missing them through poor collecting will have little effect on density estimates, but may cause serious underestimation of the standing crop by weight.

*b. Significance of quantitative data*

The first analysis of numerical data from Baffin Island showed that numbers and weights of animals per sq. m. had large variances, and that mean values had large standard errors and confidence limits. The numerical data were therefore not as reliable as was desired, and were usable only as rough guides to standing crops and relative abundance of different species. In the Greenland surveys attempts were made to check the reliability of quantitative data obtainable with Van Veen and similar coarse samplers.

Great variation in numbers and weights of animals per grab haul can be due either to biological phenomena or to poor collecting. The Godthaab survey was made to provide some evidence about the relative importance of these two sources of variability. Hauls were made on seven different days from one locality within a total time of one month. The percentage of hauls in which each species occurred often varied in the seven series as much as 40 per cent but rarely more than 50 per cent (Table 9). Mean numbers and weights were also variable; the more abundant species tended to have the greatest variation.

Poor collecting can be responsible for some of this variability. Many of the extreme values occurred in series 1, 3, and 4, which are based on the smallest number of hauls: 8, 10, and 7 respectively. The greatest values for some species occurred in series 7; the final series when large volumes were being collected. The grab was probably being operated more efficiently by the seventh day's collecting than earlier.

Biological phenomena can also account for some of the variation. Local environmental differences within the investigated region may cause the fauna to vary (Sanders, 1956). The great size range of some species will affect the variability of their weights per haul. Many benthic species are dispersed over the bottom in groups (MacGinitie, 1939). The variance in numbers per haul of grouped (aggregated) species tends to be large (greater than the mean), of randomly dispersed species smaller (equal to the mean), and of evenly dispersed species smallest (less than the mean).

The type of dispersion can be shown in several ways, of which the coefficient of dispersion:

$$\frac{\Sigma\,(x-\bar{x})^2}{\bar{x}(n-1)}$$

is most convenient for the present material (Clark and Milne, 1955). In this formula x represents the number of individuals per haul, $\bar{x}$ the mean number of individuals per haul, and n the number of hauls. The coefficient tends to unity for random dispersion, to less than unity for even dispersion, and to more than unity for aggregated dispersion. Fig. 9 shows that the range of the coefficient for species collected in north Baffin Island was generally greater than unity indicating widespread aggregation.

Theoretically it is possible to test the evidence for aggregation from the values of the coefficient, but as some of the variation in numbers per haul comes from collecting errors, the test would be meaningless with this material.

Where benthic animals are aggregated, quantitative data obtained with grab samplers of the Petersen-Van Veen type will inevitably have high variances, and they cannot be as reliable as could be wished even if a very large number of hauls is obtained. For instance, it will usually be impossible to use statistical methods for comparing differences between means.

What conclusions then can be based on these surveys? And how many hauls are required?

Collections made with these samplers show which species occur in a large percentage of the hauls and hence are scattered widely over the bottom, which species are numerous in the hauls and hence are scattered densely over the bottom, and which species occur as heavy individuals or in heavy groups and hence contribute much to the total weight of animals on the bottom. This is just the type of information which is summarized by the concept of marine level-bottom communities (see page 19).

There is a method of checking if the number of hauls obtained from a region has been sufficient to collect all the widely spread species. The curves in Fig. 10 have been obtained by random selection of hauls from the three substrates in north Baffin Island. After 15 hauls the rate at which new species occur on mud and sandy-mud drops considerably. On these substrates at least

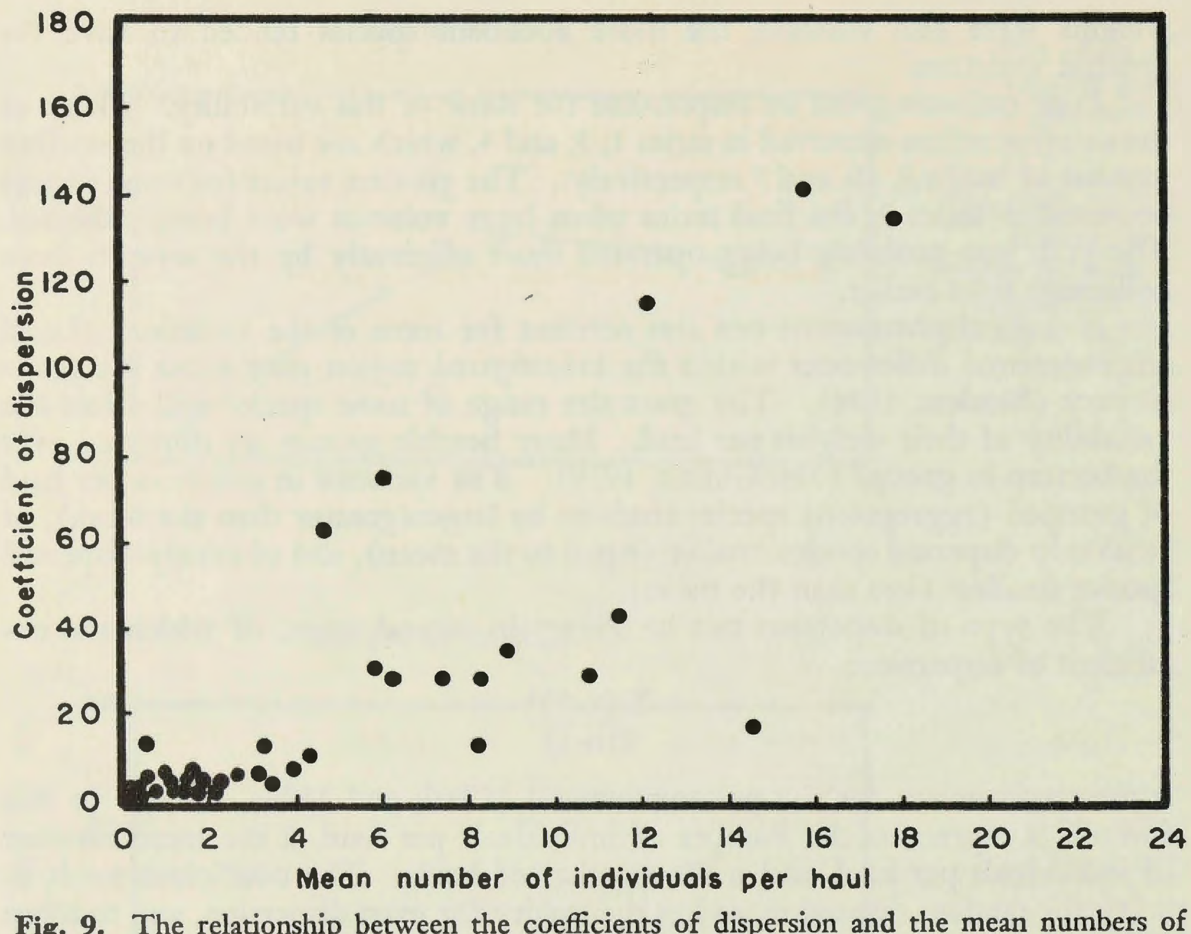



**Fig. 9.** The relationship between the coefficients of dispersion and the mean numbers of individuals per haul for some species in north Baffin Island.

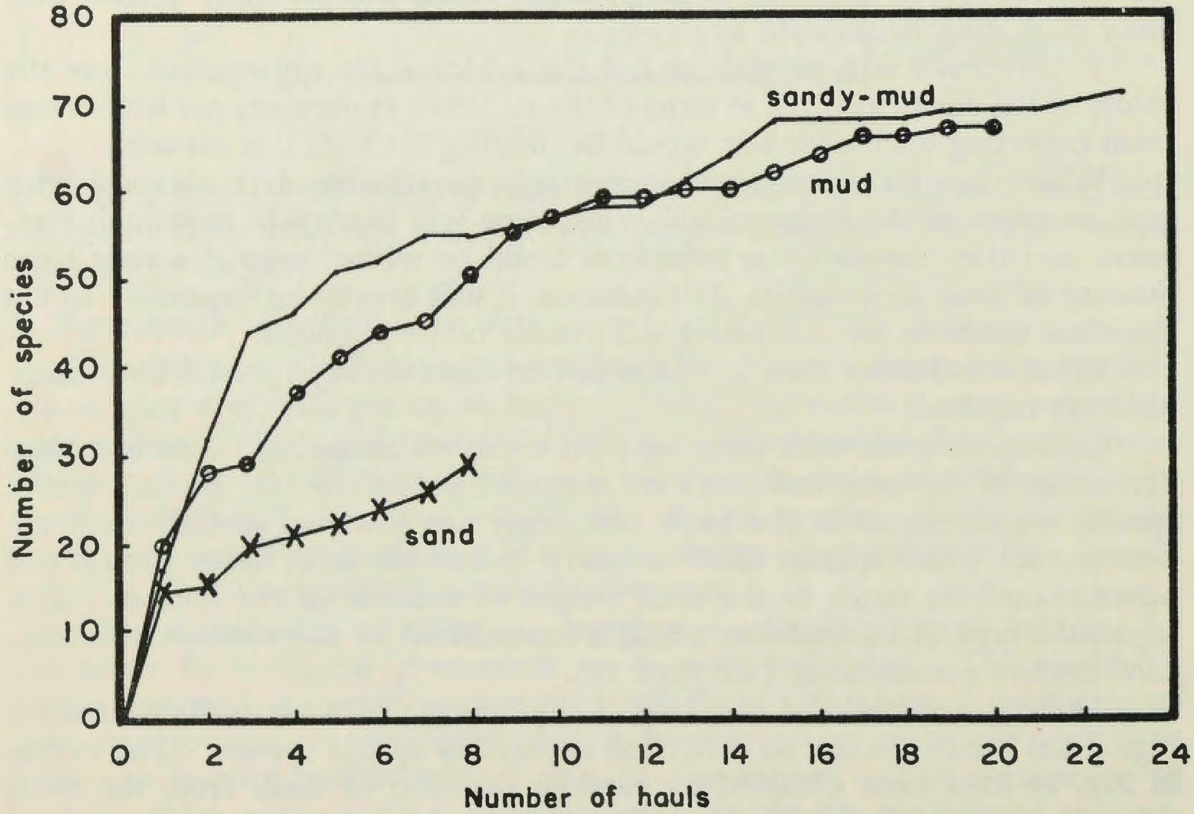



**Fig. 10.** The relationship between the number of species and the number of hauls from three substrates in north Baffin Island. At least 15 hauls (of 0.07 sq. m.) were required before most common species could be collected.

15 hauls each of 0.07 sq. m. (or a total surface area greater than 1 sq. m.) are required before all the widely spread species are collected, and the community present can be adequately determined. This figure of total bottom area to be sampled was used as a guide for the later surveys, even though field conditions occasionally did not permit keeping to it.

### 2. Marine level-bottom communities

The results of quantitative benthic surveys show that species associate in such a way that similar faunas are found under similar environmental conditions. The species associations on soft sea bottoms are marine level-bottom communities (Thorson, 1957). It is a convention to name these communities after one of the dominant, characteristic species (indicator species). The communities are treated here strictly as numerical associations. They may also be ecological associations, but this aspect of their biology has not been studied during these investigations.

This concept of communities is particularly useful as a means of summarizing the infauna of a region where there are few species, but many of them abundant, some of which have strict environmental requirements and a limited distribution. These criteria apply to the arctic regions. Few infaunal species occur (compared with the tropics for instance), but many of them are abundant, and some occur in easily definable environmental niches.

Undoubtedly many arctic species tolerate a wide range of conditions. *Macoma calcarea* is one obvious example. There are others, particularly polychaetes, which are so widespread that they occur in several recognized communities both in the Arctic and in warmer marine regions. This however is inevitable when trying to apply a scheme of classification to what are, after all, almost infinitely variable faunas scattered over vast tracts of level sea bottom with few sharply defined environmental boundaries.

#### a. *Known arctic communities*

Marine level-bottom communities described from the arctic regions include shallow-water *Gomphina fluctuosa*, *Portlandia arctica*, and *Macoma* communities, and deeper-water foraminifera and *Astarte crenata* communities (Thorson, 1957; Öckelmann, 1958). *Macoma* communities may contain a distinct, upper, *Astarte* zone. There is also a little known *Chiridothea sabini* community (Vibe, 1939).

Characteristic dominant species in these communities are listed by Thorson (1957), and their principal distinguishing features are summarized in Fig. 11. The model system developed by Danish authors is not used here, as it gives the impression that infaunal animals are scattered uniformly over the bottom, which they most decidedly are not (MacGinitie, 1955, and see p. 17). The lamellibranch constituents of arctic communities have recently been described in detail by Ockelmann (1958), who has changed a number of the original community names. These changes have been adopted here, although they were not used in a previous reference to these investigations (Ellis, 1959).

#### b. *Communities in Baffin Island, west Greenland, and Foxe Basin*

The stars in Table 2 indicate the species which dominate the infauna in shallow water in north Baffin Island. They include many of the species characterizing the arctic *Macoma* communities (Fig. 11). Large numbers of

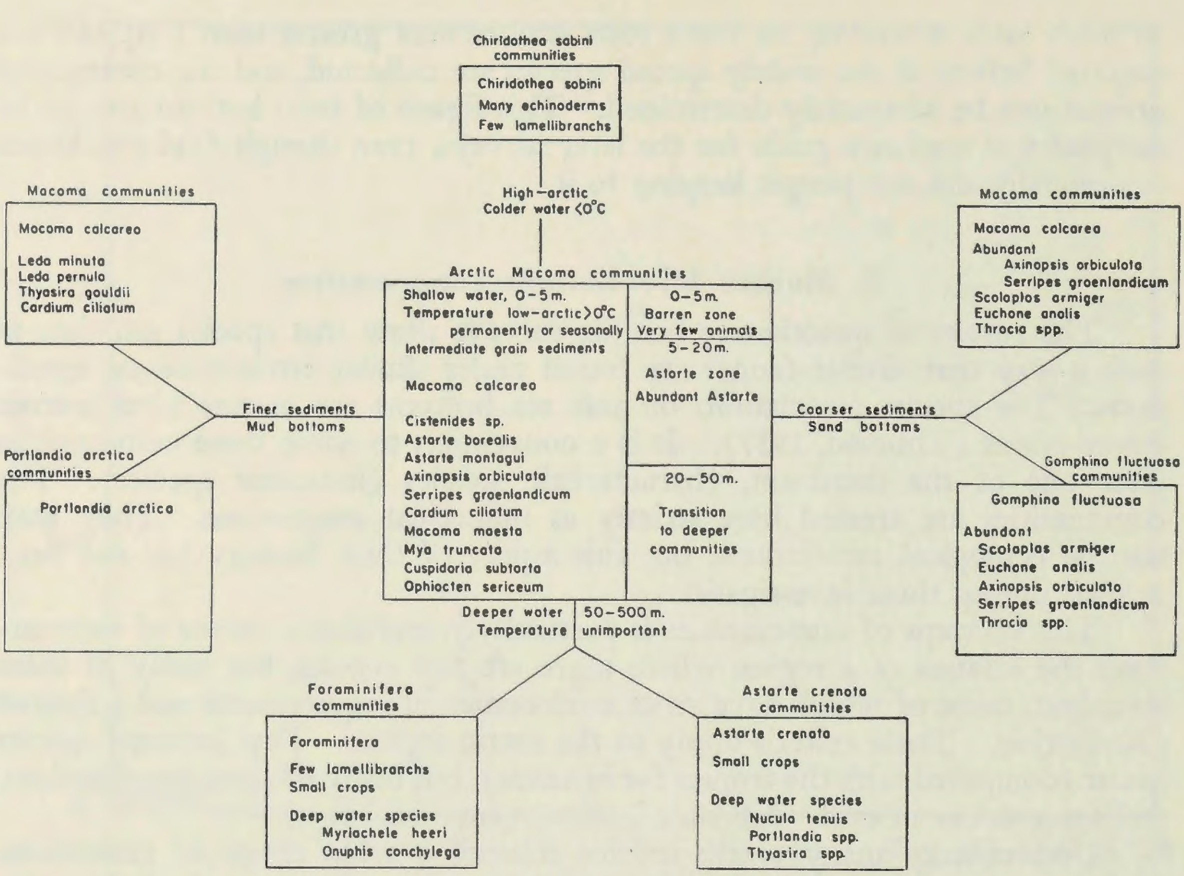



**Fig. 11.** The principal characteristic features of known arctic level-bottom communities.

*Astarte borealis* and *Astarte montagui* occurred to depths of about 20 m. and suggested the presence of an upper *Astarte* zone similar to those found in east Greenland (Thorson, 1933). Below 20 metres to at least 50 metres the fauna included an increasing number of species characterizing the foraminifera communities, and appeared to be in the process of changing from a *Macoma* community. These community changes with depth are summarized in Fig. 12.

The sandy bank sampled at 10 metres depth near Godthaab (see Table 3) also supported a *Macoma* community, although differing in many details from the fauna in north Baffin Island.

The shallow bottoms sampled in Disko Bugt (Table 3) all supported *Macoma* communities, although the faunas in Fortunebay and Mudderbugt were more alike than either were to the fauna in Egedesminde harbour. Between 30 and 60 metres depth, the dominant animals suggested that the fauna was changing from a shallow *Macoma* community to a deeper foraminifera community. In deeper water still, particularly between 100 and 170 metres, the dominant animals (Table 4) indicated a foraminifera community. The community changes with depth are summarized in Fig. 13. At 400 metres the fauna seemed unusually constant in spite of there being only 5 hauls available. Table 4 shows that several of the species occurred in 3 out of the 5 hauls. The small sample and unusual species association prevents applying a community name at present.

The fauna in Frustration Bay, Rowley Island, comprised principally abundant *Nephthys* spp., and sedentary polychaetes with consistent but smaller numbers of *Chiridothea sabini*, *Macoma* spp., *Yoldia* sp., Ophiuroids, and

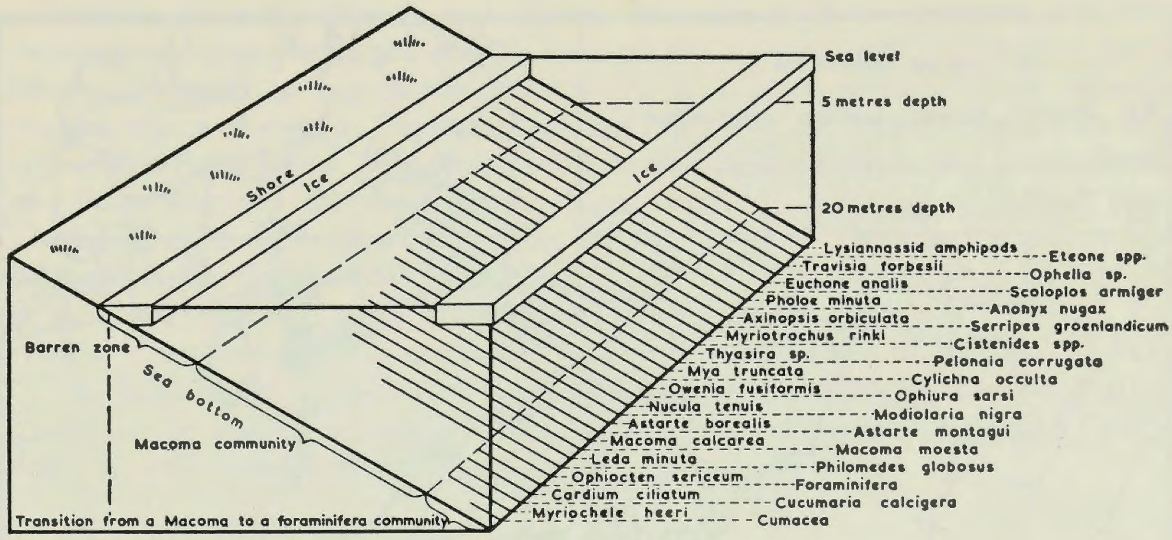



**Fig. 12.** Depth ranges for the most abundant species in the north Baffin Island collections. There is a faunal zonation with depth consisting of a progressive change from a barren shallow zone (0–5 m.), to *Macoma* community (5–20 m.), and to foraminifera community below 20 m.

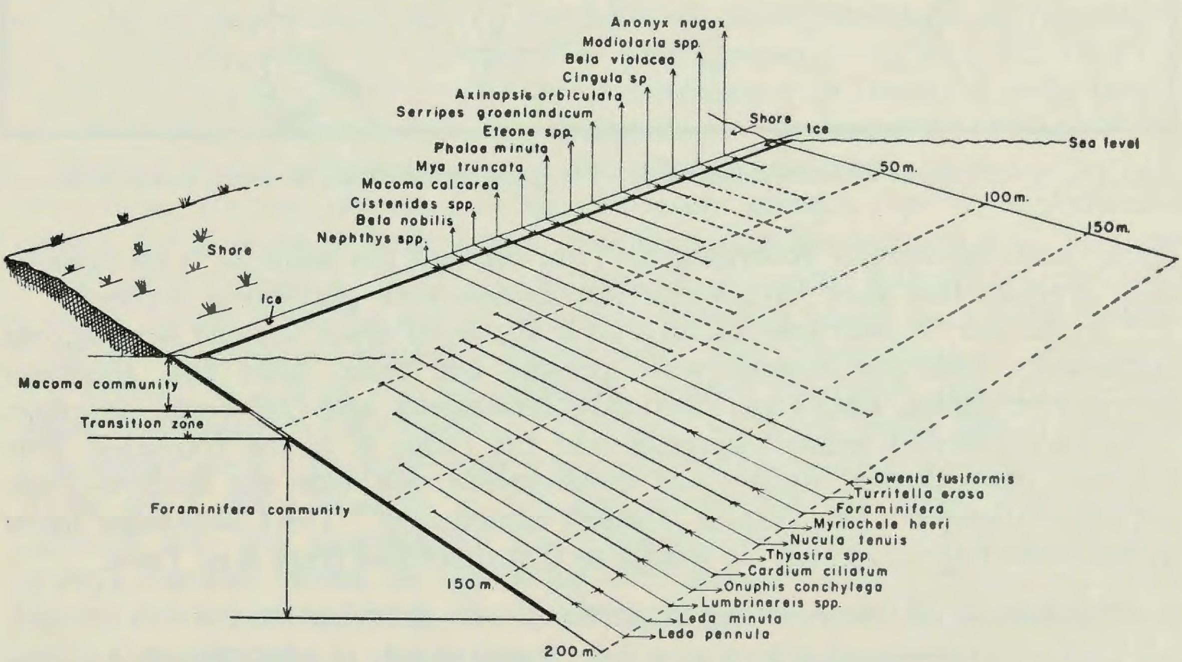



**Fig. 13.** Depth ranges for the most abundant species in the Disko Bugt collections. Infaunal zonation with depth consists of shallow-water *Macoma* communities being replaced by foraminifera communities between 30 and 60 m.

*Cucumaria calcigera.* This faunal association, the unusually high percentage of the crop (by weight) represented by echinoderms (Fig. 7), and the low percentage represented by lamellibranchs suggest a *Chiridothea sabini* community similar to that found at Kap York, west Greenland, by Vibe (1939).

At Station 723 in the bay by the settlement of Igloolik, the infauna on thick mud at a depth of 22 metres contained large numbers of *Portlandia arctica* and *Chiridothea sabini* but few of the species comprising the *Macoma* communities. The fauna was closest to those described by Thorson (1934) as the *Portlandia arctica* communities of east Greenland. These communities also

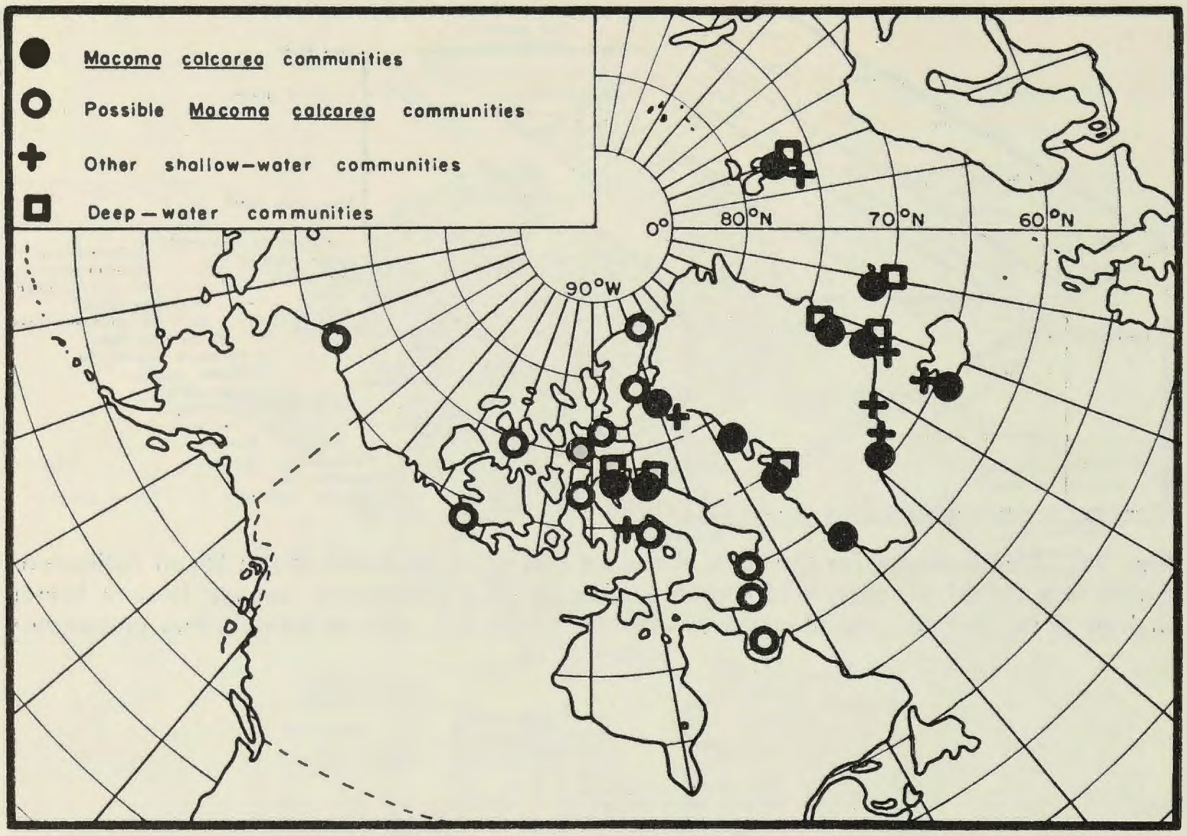



**Fig. 14.** Distribution of known marine level-bottom communities in arctic north America.

occur near Spitsbergen according to Thorson, and the material from Igloolik now suggests that they have wider distribution than previously realized.

At Station 719 near Igloolik on mud at 50 metres depth some of the *Macoma* community indicator species were present but there were also abundant *Chiridothea sabini*, *Yoldia* sp., *Portlandia intermedia*, and *Ophiocten sericeum*. This association of animals suggests that the fauna is in the transition zone between shallow- and deep-water communities, but that the shallow-water community may not be a typical *Macoma* community. The *Chiridothea sabini* in the fauna suggests it may be similar to that described from Kap York.

*c. Distribution of communities in arctic North America*

*Macoma* communities have now been found widely in arctic North America (Fig. 14). In addition published reports of dredge collections contain many of the arctic *Macoma* communities' indicator species. They have been taken from north and south Ellesmere Island, Cumberland Sound, Frobisher Bay, Ungava Bay, Foxe Basin, Lancaster Sound, Melville Island, Port Kennedy, Dolphin and Union Strait, and Point Barrow (Figs. 1 and 2). A list of about 70 references describing these collections is given by Ellis (unpublished thesis). The widespread distribution of these indicator species suggests that *Macoma* communities are also widely spread in arctic North America. They seem to be the commonest communities in shallow arctic water being displaced by others only under localized, special conditions.

Quantitative deep-water collections between 50 and 500 metres depth in arctic North America have resulted in descriptions of two faunal associations, the *Astarte crenata* and foraminifera communities. Most non-quantitative collections in arctic Canada and Alaska do not extend to sufficient depths to demonstrate changes in the composition of the infauna with increasing depth. However there is some evidence available. Dredge hauls near Igloolik suggest that a change in the fauna occurred at about 50 metres depth. Dredge collections from below 50 metres in Ellesmere Island, Dolphin and Union Strait, and Point Barrow (for reference see Ellis, unpublished thesis) all include some of the deep-water communities' indicator species. Bottom samples taken between Baffin Bay and Melville Island in 1947 at depths from 30 to 800 metres generally contained large numbers of foraminifera (Phleger, 1952). The results of the few, widely scattered deep-water collections of benthos in arctic North America all suggest that there is a change in the composition and abundance of the infauna between 20 and 50 metres depth; and that in many places the change is from a *Macoma* to a foraminifera community.

### 3. Factors affecting the composition and standing crop of arctic infaunal benthos

*a. Periodic population fluctuations*

The infauna present in any locality may show considerable fluctuations from season to season and from year to year (Jensen, 1919; Blegvad, 1928 and 1951). Fluctuations of this type occur where many of the constituent species are short-lived and reproduce by means of pelagic larvae (Thorson, 1950). Neither of these conditions apply to the arctic infauna, since 95 per cent of the dominating species, representing all taxonomic groups, reproduce without a pelagic larval phase and the heavy abundant lamellibranchs tend to be long-living forms (Thorson, 1936). Consequently, the arctic infauna does not have a heavy mortality at the end of an annual breeding season with poor replacement due to a reduced spatfall. Furthermore, young individuals are apparently not exposed to a high rate of predation because predatory animals are only minor constituents of the benthos (Thorson, 1957) and so the rate of turnover is probably small. Consequently it is unlikely that periodic population fluctuations cause great changes in the composition of the arctic communities, although they will undoubtedly affect the abundance of the few species such as *Mya truncata* which do reproduce with pelagic larvae. Therefore, quantitative surveys made at any one time should give a satisfactory description of arctic communities.

*b. Fluctuating environmental conditions*

In regions where the environment fluctuates, one series of collections may not adequately describe the communities as they exist throughout the whole possible range of conditions. Benthos in a region with changing or fluctuating oceanographic conditions tends to be a mixture of the species characterizing both preceding and existing conditions, unless there has been a catastrophic change. This applies especially to the arctic regions where many species are long-lived and reproduce non-pelagically.

The epifauna of southwest Greenland is an excellent example because the typically arctic species' associations include some animals which do not occur in purely polar water, for example *Pandalus borealis* (Horsted and Smidt, 1956). Their presence in southwest Greenland reflects the influence of warm Atlantic water from the south. Occasionally cold polar water appears along this coast and has a catastrophic effect on the stock of *Pandalus borealis*, and presumably on other species with similar distribution. Benthic surveys in such regions may require more extended collecting than in more stable areas.

*c. Substrate*

Thorson (1957) has reviewed the relationships between marine level-bottom communities and substrates. In the Arctic, for instance, *Portlandia arctica* communities have been found only on soft mud, especially off glaciers and river mouths, and *Gomphina fluctuosa* communities only on sand bottoms. Arctic *Macoma* communities, however, tolerate a wide range of substrates, and this is reflected by their variable composition.

Thus in north Baffin Island many species occurred on part only of the total range of substrates sampled. For instance, sand bottom or sand and sandy-mud together, supported more *Eteone* spp., *Travisia forbesii*, *Ophelia* sp., *Euchone analis*, lysiannassid and oedicerotid amphipods, *Serripes groenlandicum*, *Cylichna occulta*, *Bela violacea*, and *Myriotrochus rinki* than did mud. On mud bottom, or mud and sandy-mud together, there were more foraminifera, *Myriochele heeri*, *Philomedes globosus*, and *Ophiocten sericeum* than on sand, although this may have been a depth effect as mud tended to occur at greater depths than sand. A few species were markedly more abundant on sandy-mud than on either mud or sand: *Pholoe minuta*, *Cistenides* spp., *Astarte borealis*, *Astarte montagui*, *Macoma moesta*, and *Cucumaria calcigera*.

The Godthaab *Macoma* community included a number of sand-bottom animals not collected in north Baffin Island, e.g., *Nebalia bipes* and *Diaphana minuta*.

The sand bottoms sampled in Fortunebay and Mudderbugt supported similar faunas, which were quite different from the mud bottom fauna in Egedesminde harbour, although all three were within the limits of variability of arctic *Macoma* communities. For instance large numbers of *Pholoe minuta* and *Axinopsis orbiculata* were taken from the two sandy areas, but few or none from mud.

Infaunal standing crop also appears to be influenced by substrate. In north Baffin Island (Table 2) faunal densities on sand and mud below the barren uppermost 5 metres were similar (1,082 and 987 animals per sq. m. respectively) but were noticeably higher on sandy-mud (1,815 animals per sq. m.). Crop weights were also similar on sand and mud at these depths (201 and 200 gm. per sq. m. respectively) and higher on sandy-mud (438 gm. per sq. m.). Frequency diagrams of animal weights per sq. m., based on individual grab hauls, also suggest that the crop of animals on sandy-mud is greater than on mud (Fig. 15). The distributions show left-hand skew due to the predominance of small hauls. On mud bottom 7 hauls give weights less than 100 gm. per sq. m. and 13 greater; whereas on sandy-mud all hauls give a calculated weight per sq. m. greater than 100 gm.

In the Godthaab survey (Table 3) the calculated weight of animals per sq. m. was 133 gm. and was therefore lower than the value on sand ground in north Baffin Island. This could have resulted from poor penetration by the grab, as many large, torn specimens of *Mya truncata* were collected. The actual weight of animals is probably larger than this survey shows. The density

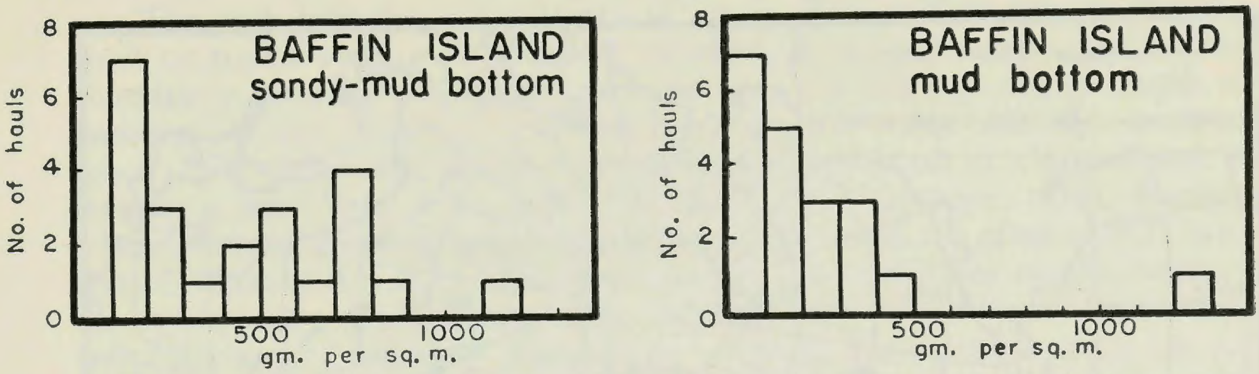



**Fig. 15.** The relative crop sizes on sandy-mud and mud bottom in north Baffin Island as shown by frequency distributions of weights of infauna per sq. m.

of animals in the Godthaab survey is as high as in Baffin Island, due principally to swarms of juvenile lamellibranchs.

In Disko Bugt (Table 3) the density of animals was as high in Mudderbugt (1,507 per sq. m.) and in Fortunebay (1,528 per sq. m.) as in north Baffin Island, but few animals were collected in Egedesminde harbour (432 per sq. m.). The weight of infauna per sq. m. in Fortunebay (296 gm. per sq. m.) and Egedesminde harbour (320 gm. per sq. m.) was comparable to those in north Baffin Island, but was much smaller in Mudderbugt (48 gm. per sq. m.). These crop data reflect population differences. Mudderbugt fauna consisted almost entirely of small species and juveniles of large species; but as the grab penetrated the substrate badly it may have missed heavier individuals of the larger species. Mudderbugt's low faunal weight could also have resulted from lethal effects of runoff from a nearby river. The low density of animals in Egedesminde harbour was probably due to the foul bottom limiting the variety and abundance of species.

The dredge hauls from Igloolik do not permit any conclusions on the size of the crop there.

In Frustration Bay (Table 5) the shores were generally barren. On sand bottom at about 5 metres depth there was a scant fauna with a crop of 35 gm. per sq. m. At 15 metres depth, where sand had been replaced by finer sediments, the crop was larger (210 gm. per sq. m.) due to many big *Serripes groenlandicum.* A patch of soft stagnant mud at the same depth (not referred to in Table 5) had a very low crop (only 8 gm. per sq. m.), and as the grab collected well from this bottom the low value was undoubtedly real. At 20 metres depth the bottom consisted of mud and stones and the grab collected badly so that the low value (93 gm. per sq. m.) could be a bad underestimate. At 30 metres the crop was again high (290 gm. per sq. m.) with heavy *Nephthys* spp., *Yoldia* sp., *Serripes groenlandicum, Cucumaria calcigera,* and asteroids.

The crops between 200 and 300 gm. per sq. m. are close to those generally found in arctic North America at depths between 5 and 50 metres. The smaller crops at 5 and 15 metres appear to be real phenomena arising from ice scouring (see page 29) and stagnant bottom respectively, whereas the smaller crop at 20 metres depth is probably not real, but an underestimate due to poor grab penetration.

There is another possible cause of low crops related to substrate. This has been referred to by Thorson (1934), who deduced that low crops in *Macoma* communities at the heads of east Greenland fiords was due to poor

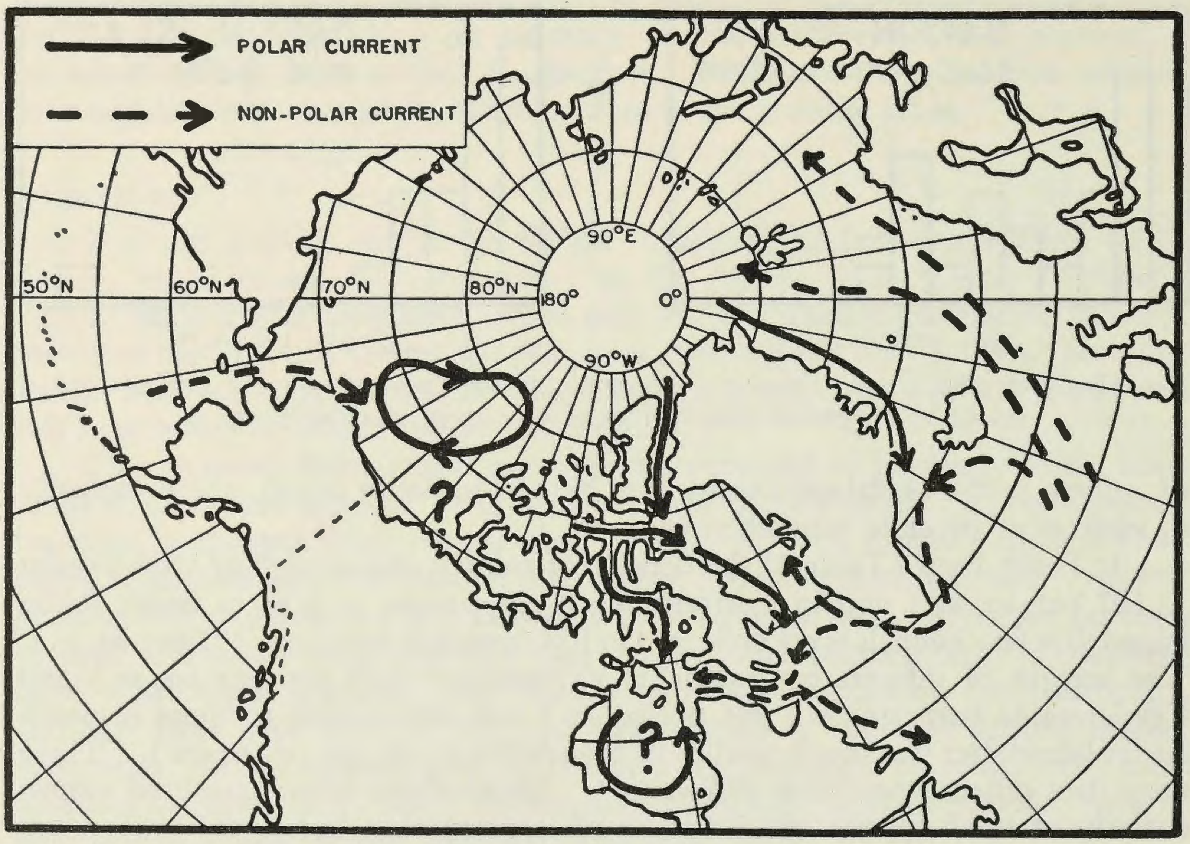



**Fig. 16.** Arctic North America showing polar currents and the areas of mixing with non-polar currents.

supply of nutrient organic matter. Thorson maintains that communities situated near the open sea benefit from a greater nutrient supply than those in fiords stretching a hundred kilometres or more inland.

Good nutrient supply is a possible explanation of the high crops on sandy-mud bottom in north Baffin Island. Sandy-mud bottoms sampled were close to the mouths of rivers and creeks, which provide nutrient material to the sea (Sverdrup, Johnson, and Fleming, 1942), and the same authors present evidence that fluvial deposits around river mouths have a locally high organic content. Sand bottoms sampled were also near rivers but their crops were low. These were all in shallow water exposed to limiting effects of ice scouring and melt water (see page 29), and their productive potential would therefore not be realized.

The effect of a change in substrate on the fauna has been followed by MacGinitie (1955) at Point Barrow, Alaska. He described how the offshore fauna changed considerably during the winter of 1948–9, when river mud was deposited over a large area.

*d. Oceanography*

The upper 200–300 metres of water throughout most of arctic North America originates in the Polar Basin at the same depth. This water characteristically has negative temperatures and a salinity about 33‰ or less (Dunbar, 1951; Bailey, 1955 and 1957). The distribution of such water flowing directly from the Polar Basin is shown in Fig. 16. The characteristics of deeper water are described by Bailey (1957).

The high latitudes and presence of ice in these regions ensures that the euphotic zone is small. The depth from which phytoplankton can be collected abundantly indicates empirically that this zone reaches a maximum depth of between 30 and 50 metres. Within the zone the water warms in summer usually, but not always, to positive temperatures and cools in winter almost to freezing point (Digby, 1953; Ellis, 1956; Bailey, 1957; Grainger, 1959). Regions where summer warming produces positive temperatures are often called "low-arctic" (Ekman, 1953), whereas regions where temperatures remain negative throughout the year are referred to as "high-arctic". These terms "low-arctic" and "high-arctic" can also be applied to vertically distributed zones in the sea because "low-arctic" temperatures overlie "high-arctic" temperatures in many localities during the summer months (Fig. 17).

In some far north regions summer warming of sea water is negligible and lasts for only a few weeks, as in the vicinity of the northern Ellesmere ice shelf (Crary, 1956) and Frustration Bay (unpublished data from the *Calanus* expedition, 1957). High-arctic temperature conditions may be almost permanent in any region where fast or drift ice usually remains throughout the summer.

In the greater part of arctic North America summer insolation is more prolonged. It often causes a stable, brackish layer to form at the surface, the "fjord-water", with temperatures occasionally greater than 5°C and salinities

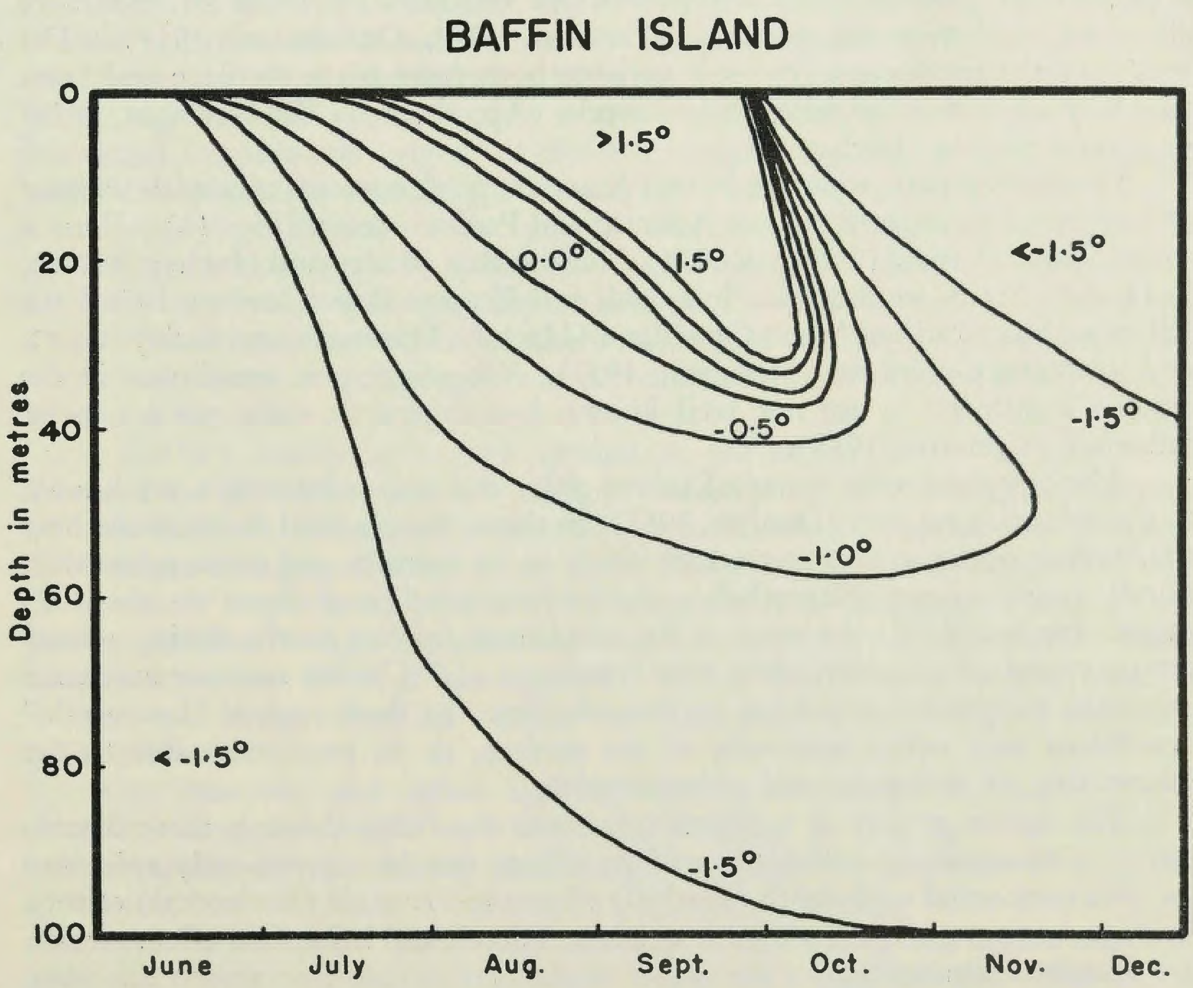



**Fig. 17.** Seasonal changes of temperature with depth off north Baffin Island to show the effects of summer insolation in polar water. Positive temperatures may overlie negative temperatures. (Data from Ellis, 1956).

possibly near zero (Thorson, 1934). This layer is very variable and may extend to 5 or more metres depth. Insolation is also often sufficient for positive (low-arctic) temperatures to reach depths of 20 to 50 metres before approaching winter brings about a general surface cooling in September or October (Fig. 17). Below the surface-warmed water, the rate at which temperature decreases with increasing depth is occasionally so great in late summer that it suggests the presence of a thermocline coincident with the lower level of the euphotic zone. Such a thermocline may not be normal. It may develop only if there is unusually steady insolation during the summer. Nevertheless a rapid drop in temperature can be expected most years (below the insolated layer) at depths between 20 and 50 metres.

Throughout arctic North America the sea surface begins to cool towards the end of August and during September, and the summer stratification then breaks down. Surface ice starts to form in September or October. Water between 50 and 100 metres depth, which often warms slightly during the summer, may not return to its winter temperature until December or later (Fig. 17). Data so far available for the winter months indicate that from December to May polar water is thoroughly mixed without sign of stratification.

Apart from temperature and salinity cycles there are other changes in the water of the euphotic zone, the sum of which results in a marked seasonal upgrowth of plankton and a reproductive outburst by some of the more abundant shallow-water benthos (Thorson, 1957; Ockelmann, 1958). The length of the productive season is variable both from place to place and from year to year; it may last barely a few weeks (Appollonio, 1957; Grainger, 1959) or several months (Digby, 1953).

In southern parts of arctic North America, polar currents mix with warmer and more saline water from the Atlantic and Pacific oceans (Fig. 16). This is so near Point Barrow (Johnson, 1956), Hudson Bay (Bailey and Hachey, 1951a), in Hudson Strait, southern Baffin Island, and Ungava Bay (Dunbar, 1958), the Labrador coast and southwest Greenland (Hachey, Hermann, and Bailey, 1954), and southeast Greenland (Hermann, 1957). Oceanographic conditions in the eastern Beaufort Sea are not well known but appear to show no non-polar influence (Cameron, 1953).

These regions with water of mixed polar and non-polar origin are known as the subarctic regions (Dunbar, 1951); in them, the seasonal fluctuations near the surface occur over water which tends to be warmer and more saline than purely polar water. Nevertheless the surface conditions down to about 50 metres are essentially the same as the conditions farther north; during winter temperatures are negative, often near freezing (−1.7°C), but summer insolation raises the temperatures and lowers the salinities. In these regions "low-arctic" conditions may occur seasonally at the surface, or be permanent due to the intermixing of non-polar and polar currents.

The oceanography of a region influences the fauna through three dimensions. Consequently a discussion of its effects can be conveniently split into sections concerned with depth (vertical) effects and latitude (horizontal) effects. In these surveys too there are some combined depth and latitudinal effects which are discussed separately.

*i. Depth effects*: Danish quantitative surveys in Greenland laid the basis for describing arctic infaunal zonation with increasing depth. This zonation has three major components (Figs. 12 and 13). At the surface, from 0–3 metres, is an almost barren layer kept clear of life by ice scouring, freezing, and the temporary occurrence of a low salinity "fjord-water" layer during summer (Thorson, 1933). Slightly deeper, from 5–50 metres, is the most densely populated zone, usually comprising a *Macoma* community. Deeper still, generally below 50 metres to at least 500 metres depth, are the impoverished deep-water faunas, so far known as two distinct associations, the foraminifera and *Astarte crenata* communities. These have been found at all depths between these two levels in polar water, mixed polar and non-polar water, and deep Atlantic water beneath the polar currents. Evidently they are little affected by the oceanographic differences between these characteristic water masses.

There are of course wide areas of gradation between the three zones. Thus the barren zone gives way to shallow-water communities between 3 and 5 metres; *Macoma* communities merge gradually into foraminifera communities between 20 and 50 metres.

What is the cause of the widespread faunal change between 20 and 50 metres depth? It is just at this general level that there is a rapid drop in temperature during the summer months as a result of surface insolation (Fig. 17). Can this be a causal relationship? The biology of some species suggests that it is.

It has long been known that the vertical as well as the geographical range of many marine species are limited by sea temperature (Murray and Hjort, 1912; Orton, 1920). For instance Lemche (1941a, 1941b) deduced that in the arctic regions some opisthobranch molluscs only matured and spawned within restricted temperature ranges. They were apparently bound to the depths at which temperatures suitable for maturation and spawning occurred (even if only for a short period of the year). Occasionally individuals were found outside the normal limits of abundance of the species, but these had presumably settled accidentally at unusual depths and were unable to breed. Some of the opisthobranch molluscs reproduced only in shallow water; some only in deeper water; and some were independent of whatever factor imposed the vertical limits on the others.

Lemche's reasoning can be applied to the infaunal benthos in general. Some of the abundant species in shallow water spawn only during the summer (Thorson, 1936) and appear to depend on warm water in order to reproduce. The deeper living species spawn in water almost unaffected by insolation with permanently negative temperatures. These species do not depend on the temporary summer conditions near the surface in order to reproduce. Some species reproduce both in the euphotic zone (some in summer and some in winter) and below; they are adapted to conditions in both shallow and deep polar water.

The *Macoma* and other shallow-water communities in arctic North America comprise species reproducing principally in the euphotic zone and others capable of reproducing both in and below the zone (some of the latter group are, however, most numerous in the euphotic zone). The deeper-water communities comprise species reproducing both in and below the euphotic zone and others only able to reproduce below the euphotic zone. The oceanographic conditions in purely polar water whereby a warm, insolated layer is superimposed in summer on permanently cold water is responsible for the presence of distinct shallow-water infaunal communities overlying deeper-water communities.

There are extensive regions in arctic Canada with permanent or almost permanent ice cover (Jenness, 1953; Moira Dunbar, 1954), but, unfortunately, almost nothing is presently known about the extent of the euphotic zone and the vertical distribution of the infaunal communities in these regions, apart from the presence of *Chiridothea sabini* communities in the shallow water of Melville Bugt and Frustration Bay. The benthic fauna at Melville Bugt was unique when described by Vibe (1939) and was ascribed partly to the high-arctic marine environment and partly to the nearby presence of a vast breeding colony of dovekies. The similarity with the Foxe Basin fauna now suggests that the marine conditions are most important, because the environments in Frustration Bay and near Igloolik are both high-arctic, but there are no nearby breeding colonies of sea birds (Ellis and Evans, in press).

*ii. Latitude effects*: Towards the southern limits of arctic North America the water becomes warmer and more saline due to the influence of Atlantic or Pacific currents (the subarctic regions); and the marine fauna at all depths includes a gradually increasing number of species which do not occur in polar water, e.g., *Macoma baltica* and *Mya arenaria.* Different species may be associated with either Atlantic or Pacific influences, e.g., *Cardium fasciatum*, *Syndosmya nitidum*, and *Cyprina islandica* appear in the fauna near the Atlantic Ocean, and *Macoma oneilli* and *Mya intermedia* near the Pacific Ocean. Associated with these faunal changes will be gradual changes in the communities, for instance, the boreal *Macoma baltica* communities will gradually replace the arctic *Macoma* communities.

Most of the infaunal species taken in these surveys are spread throughout arctic North America and many are circumpolar; but nevertheless some species are limited to either eastern or western sections. For instance, although *Diaphana minuta* occurred in southwest Greenland, it has never been taken in Baffin Island or north of 71°N. in Greenland (Lemche, 1941a). *Cingula* sp. in Table 3 is possibly *Cingula globulus* (see Appendix), which has northern limits similar to those of *Diaphana minuta,* and there are yet other species (which were not taken in the Godthaab survey) with similar northern limits, e.g., *Cyrtodaria kurriana* and *Macoma baltica* (Thorson, 1951). At least two epifaunal species taken in the Godthaab survey, *Hyas araneus* and *Hyas coarctatus,* have the same pattern of distribution. Many Pacific species penetrate only to the north coast of Alaska, although some may reach as far east as Dolphin and Union Strait, and a few to Greenland and Ungava Bay (Dunbar, 1954; Grainger, 1954 and 1955). Many Atlantic species are recorded from southwest Greenland and Hudson Strait, although a few occur in north Baffin Island, and some even at Point Barrow (MacGinitie, 1955; Berkeley and Berkeley, 1956). Some Atlantic or Pacific species can therefore be expected almost anywhere in arctic North America, although the region between Victoria Island and Baffin Island is likely to contain few such species. This region can be regarded as a zoogeographic boundary between Atlantic and Pacific influences on the infaunal benthos of arctic North America.

Some animals are restricted to the northern part of the arctic regions. For instance, *Macoma moesta* has been taken in north Baffin Island but not southwest Greenland. There are other species with a similar northerly distribution, e.g., *Portlandia arctica* (Thorson, 1951).

Some infaunal species are therefore limited to only part of arctic North America, and their absence elsewhere appears not to be due to inadequate collecting but to fundamentally different environmental conditions summarized by the terms "arctic" and "subarctic". Nevertheless differences in infaunal composition and crop in arctic and subarctic regions appear to be slight, and essentially similar *Macoma* communities exist on similar substrates under the two sets of oceanographic conditions.

*iii. Combined depth and latitude effects*: Many of the arctic, shallow-water species, and the communities which they form, penetrate to greater depths in regions where polar water mixes with non-polar water (Thorson, 1941; Ekman, 1953) than in purely polar water. Both Brotsky (1930) and Idel'son (1930) recorded *Macoma* communities at almost 100 metres near Spitsbergen and Parat and Devillers (1936) found the same communities at similar depths near Jan Mayen. MacGinitie's (1955) collections from Point Barrow recorded many species between 100 and 200 metres which have generally been taken only at smaller depths in polar water.

A little can be said about the composition of the deep-water communities in regions with mixed polar and non-polar water. Horsted and Smidt (1956) showed that the various prawn grounds at about 400 metres depth in Disko Bugt and elsewhere in southwest Greenland had different benthonic faunas, explainable in part by the presence of cold or warm water, but actually their species lists suggest the presence on all grounds of essentially similar infaunal communities whose detailed composition only is modified by local temperature differences.

Oceanographic evidence indicates that there are pockets of high-arctic conditions in the low-arctic subregion. The offshore water along the Labrador coast is low-arctic according to data in Bailey and Hachey (1951b), but Nutt and Coachman (1956) show that Hebron Fiord has high-arctic temperatures due to a submarine sill forming a threshold which prevents free entry of water from the Labrador current. However, the surface water in the fiord acquires low-arctic conditions temporarily in summer through insolation. Other Labrador fiords have similar high-arctic conditions in deep water (Nutt, 1953). Nordre Strømfjord in west Greenland also has high-arctic conditions in deep water (Wesenberg-Lund, 1950a) due to the presence of a sill at its mouth. These pockets of high-arctic conditions can be expected to have a more arctic fauna than the surrounding low-arctic areas and, in fact, Wesenberg-Lund (1950a) and Horsted and Smidt (1956) both show that the benthos in the threshold fiords of southwest Greenland has a more arctic character than that in the open fiords with warmer water.

### 4. Productivity

The standing crop of benthos expresses the number or weight of animals per unit area of bottom at any one time. The crop is the momentary realization of the opposed processes of production and destruction, consequently the size of the crop gives no direct information about the actual rate of production of animals on the sea bottom. For instance, the weight of the infauna in the arctic regions varies from less than 50 gm. per sq. m. in deep water to almost 1,500 gm. per sq. m. in shallow water at one locality in west Greenland (Vibe, 1939). This range of values is as great as in warmer regions (cf. Spärck, 1935) if not greater, but it does not imply as great a rate of benthic production, because the size of the crop tells nothing about the rate at which it is destroyed and replaced.

There are several observations, however, which indicate that biological processes operate at lower rates in the Arctic than in warmer regions, although there is also good evidence for some thermal acclimation of metabolic processes (Dunbar, 1957). The standing crop (by weight) in arctic shallow-water communities is dominated by lamellibranchs which live for several years, whereas in warmer regions the dominant species may be largely the result of one year's production (Jensen, 1919; Smidt, 1951). Arctic species generally reproduce non-pelagically and recruitment of such species tends to be at a more uniform and lower rate than of species which reproduce with pelagic larvae (Thorson, 1946 and 1950). The rate of predation is small in the arctic regions (Thorson, 1957) where the proportion of the benthic crop represented by predatory polychaetes, gastropods, and echinoderms is low. The annual turnover of animals in the arctic shallow-water communities appears to be small and less than in the infaunal communities of warmer regions, where the annual production of benthos may be from 2 to 5 times as great as the standing crop at any one time (Sanders, 1956). In the Arctic the annual production will probably be less than the value of the crop at any one time.

## V. Summary

1. Quantitative surveys of marine infaunal benthos were made in north Baffin Island during 1954 and 1955, in Greenland during 1956, and in Foxe Basin during 1957.

2. Species found in each area are tabulated, and mean numbers and weights per sq. m. calculated. Lamellibranchs represented between 60 per cent and 80 per cent of the crop in north Baffin Island and near Godthaab, but were partially replaced by polychaetes in shallow water in Disko Bugt. Lamellibranchs were an insignificant part of the crop in the deepest Disko Bugt collections, where either foraminifera or polychaetes dominated. In Frustration Bay, Foxe Basin, echinoderms represented 72 per cent of the crop. The ratio between the amount of dry organic matter and fresh weight of animals varied with the taxonomic groups. The weight of dry organic matter in shallow water (to 50 metres depth) was generally 15 gm. per sq. m. or more, and in deeper water generally 10 gm. per sq. m. or less.

3. There are many possible sources of error in making quantitative surveys of the benthos, e.g., variable penetration by the sampler, and these are difficult to eradicate with present methods of collecting specimens. The collecting errors cause the recorded numbers and weights of animals per haul to vary; but some of the numerical variation also arises from natural phenomena, e.g., grouping of animals. The variation in the quantitative data is so great that they cannot be used as reliable estimates of the numbers and weights of animals per unit area of bottom. But the results of these surveys do show which species occur in a large percentage of the hauls and hence are widely spread in the investigated regions, which species are numerous in the hauls and hence are scattered densely over the bottom, and which species occur as heavy

individuals or groups and hence contribute much to the total weight of animals per unit area. The surveys reveal the marine level-bottom communities present and provide rough estimates of the standing crops of animals within the communities.

4. *Macoma* communities occurred in north Baffin Island on mud, sandy-mud, and sand between 5–20 metres depth, in Godthaab Fjord on a sandy bank at 10 metres depth, and in Disko Bugt on sand at 5–10 metres depth in Fortune-bay and Mudderbugt and in mud at 10 metres depth in Egedesminde harbour.

5. The *Macoma* communities in north Baffin Island appeared to change to foraminifera communities between 20 and 50 metres depth (the maximum sampled). In Laksebugt, Disko Bugt, a similar change occurred between 30 and 50 metres. The foraminifera community there extended to at least 170 metres.

6. An unusual faunal association occurred on mud bottom at 400 metres depth on the prawn trawling grounds in Disko Bugt, and could not be referred to any known community.

7. A *Chiridothea sabini* community was found in Foxe Basin, at Frustration Bay, and was best developed on mud bottom at 20 and 30 metres depth.

8. Dredge hauls near Igloolik in Foxe Basin suggested the presence of a *Portlandia arctica* community on mud at 22 metres depth.

9. *Macoma* communities appear to be very widely spread in shallow water to about 50 metres depth in arctic North America, being replaced by others mainly on localized, unusual substrates. An infaunal change with depth also appears to be widespread, with shallow-water communities being replaced by others below 50 metres.

10. Periodic fluctuations in the composition of arctic marine level-bottom communities appear to be small.

11. The benthic fauna in regions with changing or fluctuating environmental conditions tends to be a mixture of the species characterizing the preceding and the existing conditions.

12. The effects of substrate on arctic shallow-water infauna can usually be described within the known limits of variability of the *Macoma* communities. Occasionally substrate affects the composition of the fauna so greatly in shallow water, that the resulting species association justifies being regarded as a distinct community, e.g., the *Portlandia arctica* and *Gomphina fluctuosa* communities on mud and sand respectively.

13. Standing crop estimates for *Macoma* communities near the open sea generally indicate more than 1,000 animals (retained by 1- to 2-mm. sieves) per sq. m. weighing more than 200 gm. per sq. m. Special conditions may reduce the crops, e.g., at the heads of fiords, in very shallow water 0–5 metres depth, and on stagnant bottom. In north Baffin Island sandy-mud appeared to support greater crops than either mud or sand, possibly due to the proximity of this type of sediment to river mouths, which would develop a locally high organic content in the sediments.

14. The upper 200–300 metres of water throughout most of arctic North America originates in the Polar Basin. It has negative temperatures (high-arctic conditions) and low salinities near 32‰. It overlies warmer, more saline

water of Atlantic origin. Summer insolation causes temperatures to rise in the uppermost 50 metres, occasionally to positive values (low-arctic conditions). This occurs especially at the surface where a warm brackish layer (the "fjord-water") may develop. High-arctic temperatures may occur permanently at the surface in the farthest north regions. The terms "low-arctic" and "high-arctic" can apply to temperature zones in the sea as well as zoogeographical regions.

15. In west Greenland and southeast Baffin Island polar water mixes with Atlantic surface water (subarctic regions). Where the prevailing temperatures are positive, low-arctic conditions may be permanent, not seasonal.

16. The oceanographic conditions influence the infauna through three dimensions, and its effects are considered under three categories—depth, latitude, and combined depth and latitude effects.

17. Oceanographic effects with depth are as follows: The "fjord-water" layer supports very few animals; it may be absent or extend to about 5 metres depth. *Macoma* and other shallow-water communities, often with large crops, occur to about 50 metres depth, coinciding approximately with the extent of insolation effects in polar water. Deeper foraminifera and *Astarte crenata* communities, with small crops, occur below the shallow-water communities. In two regions where surface insolation is negligible, only *Chiridothea sabini* communities have been found in shallow water. The deep-water communities have smaller crops (by weight) than the shallow-water communities, but swarms of benthic foraminifera in deep water may keep the density of animals as high as in shallow water.

18. Oceanographic effects with latitude are as follows: Many infaunal species are circumpolar but some are limited to only parts of arctic North America. Some are found only in the northern regions in polar water, others in southern regions with mixed polar and non-polar water (Atlantic or Pacific). The region between Victoria Island and north Baffin Island appears to be a zoogeographic boundary between Atlantic and Pacific influences on the American arctic fauna. Differences in infaunal composition under polar and mixed polar and non-polar water nevertheless appear to be slight, and essentially similar communities occur on equivalent substrates under the two sets of oceanographic conditions.

19. Combined depth and latitude effects are as follows: *Macoma* communities, which in polar water appear bound to shallow water and its seasonal low-arctic temperatures, may extend deeper in mixed polar and non-polar water, due to warmer water at greater depth. The arctic deep-water communities have been found in polar water, and its underlying water of Atlantic origin; also in mixed polar and non-polar water. The deep communities are apparently little affected by the oceanographic change from arctic to subarctic regions. The size of the infaunal crop also seems unaffected by the change from Arctic to Subarctic because the known size of standing crops is as large in the Arctic as in warmer regions.

20. The long life of the dominating lamellibranchs, the small number of species reproducing by pelagic larvae, and the low weight of predators all indicate a lower rate of infaunal production in the Arctic than in warmer marine regions.

## VI. Acknowledgments

I am deeply grateful to many people for their assistance and advice during the course of this research. I am equally grateful for the kindness and hospitality shown me by many people in the Arctic; without their personal friendship this project would never have been completed.

In arctic Canada: The personnel of the following organizations – the Hudson's Bay Company (particularly Mr. and Mrs. R. Cruickshank, Mr. E. Mitchell, and Mr. D. Stevenson), the Royal Canadian Mounted Police, the Anglican and Catholic missions, and the arctic weather stations of the Department of Transport; also the many Eskimo who assisted me in the field work (particularly Kowtak at Arctic Bay and Kamminerk at Pond Inlet).

At McGill University: Dr. J. Stanley, Dr. F. K. Hare, Dr. G. Paul, Miss M. E. Davidson, Mr. W. Pollock, and many graduate students.

With the Arctic Institute of North America: Mr. P. D. Baird, Dr. S. Orvig, Mr. T. H. Manning, Mr. G. Watson, and the staff of the Montreal office.

With the Fisheries Research Board of Canada: Dr. H. D. Fisher, Dr. E. H. Grainger, Dr. H. B. Hachey, Mr. I. McLaren, and the staffs of the Montreal and Nanaimo offices.

At the University of Copenhagen: Prof. R. Spärck, Prof. P. Brandt Reiberg, Prof. R. Ege, Dr. H. Lemche, Dr. H. Volsøe, Dr. E. Zeuthen, Cand. Mag. E. Ockelmann, Mg. Sc. E. Wesenberg-Lund, Cand. Mag. T. Wolff, Mg. Sc. F. Jensenius Madsen, Cand. Mag. J. Kirkegaard, Cand. Mag. K. Storgaard, Stud. Mag. E. Nøstvik, Stud. Mag. E. Brunberg Christensen, and the staff of the Zoology Museum.

With Denmark's Fishery and Marine Investigations: The late Dr. A. V. Tåning, Mg. Sc. F. Hermann, Dr. E. Ursin, Mg. Sc. B. Muus, and Cand. Mag. J. Knudsen.

With Greenland's Fishery Investigations: Dr. P. Marinus Hansen, Dr. E. L. B. Smidt, Cand. Mag. J. Nielsen, Hr. J. Kreuzman, Skipper H. Mortensen, and the crew of the *Adolf Jensen.*

At the Arctic Station of the University of Copenhagen: Cand. Mag. U. Røen, Hr. O. Jensen, and the crew of the *Holk.*

I am especially grateful to my academic tutors, Dr. M. J. Dunbar, McGill University, and Dr. G. Thorson, University of Copenhagen, for their constant help, advice, and encouragement.

This project was financed by grants from the Arctic Institute of North America (field work in 1954 and 1955, and assistance with travelling expenses in 1956) and scholarships from the McGill University-Arctic Institute Carnegie Program (1954) and the National Research Council of Canada (during 1955–6 at the University of Copenhagen, and during 1956–7 at McGill University). I am very grateful to these organizations for the financial support which allowed me to work on this project.

## VII. Appendix: An Annotated List of Species Collected in the Surveys

This list shows the epifauna and infauna collected and gives details of their origin and depth ranges not shown in Tables 2–6, which are based only on the larger hauls used for quantitative analyses. The taxonomic arrangement and nomenclature are based on recent usage in Greenland to facilitate comparison of Greenlandic and Canadian faunas.

Foraminifera: Several species. Arctic Bay 26–48 m., Eclipse Sound 35–55 m., Laksebugt 36–179 m., Igloolik 22 m.

Sponges: Several species. Epifauna. Arctic Bay 15–21 m., Laksebugt 88–152 m., Igloolik 22 m.

Coelenterates: Sea anemones and hydroid colonies. Epifauna. Arctic Bay 8–17 m., Eclipse Sound 8 m., Godthaab Fjord 10 m., Laksebugt 90–159 m., Igloolik 22 m.

Bryozoa: Several species. Epifauna. Laksebugt 88–159 m., Igloolik 22 m., Frustration Bay 30 m.

Nemertines: *Parapolia* sp., *Micrura* sp., *Cerebratulus* sp., and possibly others. Arctic Bay 2–26 m., Eclipse Sound 35–43 m., Disko Bugt 400–40 m., Igloolik 22 m.

Nemertodes: Igloolik 22 m.

Gephyrea: Several species. Arctic Bay 2–35 m., Eclipse Sound 2.5–47 m., Disko Bugt 440 m., Igloolik 22 m.

*Priapulus* sp.: Igloolik 22 m.

Errant polychaetes:

*Gattyana cirrosa* (Pallas): Arctic Bay 15–45 m., Eclipse Sound 25–40 m.

*Harmothoe* spp.: *Harmothoe imbricata* (L.) and other species. Arctic Bay 2–21 m., Eclipse Sound 16–35 m.

(Other) Polynoid polychaetes: unidentified rare species or fragments. Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 36–159 m., Disko Bugt 380–410 m., Igloolik 22, 50 m., Frustration Bay 5–30 m.

*Pholoe minuta* (Fabricius): Arctic Bay 7–20 m., Eclipse Sound 5–47 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 36–91 m., Frustration Bay 15 m.

*Phyllodoce* spp.: *Phyllodoce groenlandica* Oersted and other species. Arctic Bay 7–48 m., Eclipse Sound 5–40 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Mudderbugt 5 m., Laksebugt 36–167 m., Frustration Bay 5–20 m.

*Eteone* spp.: *Eteone longa* (Fabricius) and *Eteone flava* (Fabricius). Arctic Bay 2–48 m., Eclipse Sound 3–47 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Mudderbugt 5–10 m., Laksebugt 36–59 m., Igloolik 22 m., Frustration Bay 5 m.

(Other) Phyllodocid polychaetes: Unidentified rare species. Laksebugt 59 m., Frustration Bay 30 m.

*Nereis zonata* Malmgren: Arctic Bay 8–21 m.

*Nephthys* spp.: *Nephthys ciliata* Müller, *Nephthys coeca* Fabricius and other species. Arctic Bay 26–41 m., Eclipse Sound 26–55 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 41–166 m., Igloolik 50 m., Frustration Bay 3–30 m.

*Onuphis conchylega* Sars: Arctic Bay 48 m., Laksebugt 63–166 m.

*Lumbrinereis* spp.: *Lumbrinereis fragilis* (Müller) and other species. Arctic Bay 35–45 m., Laksebugt 82–179 m., Disko Bugt 380–440 m.

(Other) Errant polychaetes: Unidentified rare species or fragments. Arctic Bay 2–48 m., Eclipse Sound 5–47 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 35–166 m., Frustration Bay 30 m.

Sedentary polychaetes:

*Scoloplos armiger* (Müller): Arctic Bay 7–41 m., Eclipse Sound 3–35 m., Godthaab Fjord 10 m., Mudderbugt 5–10 m., Laksebugt 45–52 m., Disko Bugt 380 m.

(Other) Aricid polychaetes: *Nainereis quadricuspida* (Fabricius) and unidentified fragments. Fortunebay 5–10 m., Mudderbugt 5 m., Laksebugt 86–124 m., Frustration Bay 15 m.

*Scalibregma inflatum* Rathke: Arctic Bay 2–41 m., Eclipse Sound 5 m.

*Travisia forbesii* Johnston: Eclipse Sound 2–8 m., Godthaab Fjord 10 m., Frustration Bay 5 m.

*Ophelia* sp.: Probably *Ophelia limacina* (Rathke). Eclipse Sound 2–8 m., Godthaab Fjord 10 m., Fortunebay 5–10 m.

*Ammotrypane aulogaster* Rathke: Arctic Bay 7–41 m., Godthaab Fjord 10 m., Igloolik 22, 50 m.

*Capitella capitata* (Fabricius): Arctic Bay 2–20 m., Eclipse Sound 2 m.

*Notomastus latericeus* Sars: Disko Bugt 380–440 m.

*Praxillella gracilis* (Sars): Disko Bugt 380–440 m.

(Other) Maldanid polychaetes: Several species. Arctic Bay 7 m., Igloolik 22, 50 m., Frustration Bay 20–30 m.

*Owenia fusiformis* Delle Chiaje: Arctic Bay 7–45 m., Eclipse Sound 6–55 m., Laksebugt 35–159 m.

*Myriochele heeri* Malmgren: Arctic Bay 16–48 m., Eclipse Sound 3–55 m., Laksebugt 36–179 m.

*Cistenides* spp.: *Cistenides granulata* (L.) and *Cistenides hyperborea* Malmgren, which may not be distinct species (Wesenberg-Lund, 1950b). Many of the specimens cannot be identified as either species. Arctic Bay 7–45 m., Eclipse Sound 5–47 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 35–166 m., Disko Bugt 380 m., Igloolik 22, 50 m., Frustration Bay 20–30 m.

*Terebellides stroemi* Sars: Arctic Bay 7 m., Eclipse Sound 25 m., Disko Bugt 380 m.

*Euchone analis* (Krøyer): Arctic Bay 2 m., Eclipse Sound 3-26 m., Godthaab Fjord 10 m., Fortunebay 5–10 m.

(Other) Sabellid polychaetes: *Chone duneri* Malmgren and other species. Arctic Bay 41–5 m., Eclipse Sound 3 m., Igloolik 22 m., Frustration Bay 3 m.

(Other) Sedentary polychaetes: Unidentified rare species and fragments. Arctic Bay 2–48 m., Eclipse Sound 2–55 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 36–179 m., Disko Bugt 380–440 m., Igloolik 22, 50 m., Frustration Bay 3–30 m.

Leech: Unidentified single specimen. Igloolik 22 m.

(Other) Unidentified worms: fragments of nemertines, gephyrea, polychaetes, etc. Godthaab Fjord 10 m., Fortunebay 5–10 m., Mudderbugt 5–10 m., Laksebugt 36–159 m., Disko Bugt 380–440 m.

Crustacea:

*Hyas araneus* L.: Epifauna. Laksebugt 52–179 m.

*Hyas coarctatus* Leach: Epifauna. Mudderbugt 5–10 m., Laksebugt 45–90 m.

*Hyas spp.* (juv.): Epifauna. Unidentified specimens of the two preceding species. Godthaab Fjord 10 m.

Anomuran decapods: Few unidentified specimens. Laksebugt 42–179 m., Igloolik 50 m.

(Other) Decapod crustacea: Epifauna. *Spirontocaris* spp. and *Nectocrangon* sp. Godthaab Fjord 10 m., Mudderbugt 5–10 m., Laksebugt 35–103 m., Igloolik 22, 50 m., Frustration Bay 20–30 m.

*Anonyx nugax* (Phipps): Arctic Bay 16 m., Eclipse Sound 5–40 m., Godthaab Fjord 10 m., Mudderbugt 5–10 m., Igloolik 22, 50 m., Frustration Bay 30 m.

(Other) Lysiannassid amphipods: *Onisimus* spp., *Pseudalibrotus* spp., and possibly others. Arctic Bay 16 m., Eclipse Sound 1–7 m.

Ampeliscid amphipods: *Ampelisca* spp., *Byblis* spp., *Haploops* spp., and possibly others. Arctic Bay 7–48 m., Eclipse Sound 16–47 m.

*Pontoporeia femorata* Krøyer: Eclipse Sound 35 m., Fortunebay 5–10 m., Mudderbugt 5 m.

Oedicerotid amphipods: *Paroediceros* spp., *Monoculodes* spp., and possibly others. Arctic Bay 7–16 m., Eclipse Sound 5–49 m.

*Gammarus* spp.: Epifauna. *Gammarus setosus* Dementieva, *Gammarus zaddachi* Sexton, subsp. *oceanicus* Segerstråle, and possibly others. Eclipse Sound 1 m., Mudderbugt 5–10 m.

*Caprella septentrionalis* Krøyer: Epifauna. Godthaab Fjord 10 m.

*Neohela monstrosa* (Boeck): Disko Bugt 440 m.

(Other) Amphipods: Unidentified rare species and fragments. Arctic Bay 7–26 m., Eclipse Sound 2–47 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 37–175 m., Disko Bugt 380–440 m., Igloolik 22, 50 m., Frustration Bay 5–30 m.

*Chiridothea sabini* (Krøyer): Igloolik 22, 50 m., Frustration Bay 15–30 m.

(Other) Isopods: Several species. Arctic Bay 20 m., Igloolik 22, 50 m.

Copepods: Plankton. Mudderbugt 5–10 m.

Cumacea: *Diastylis* spp., *Brachydiastylis* spp., *Campylaspis* spp., and possibly others. Arctic Bay 20–38 m., Eclipse Sound 5–43 m., Fortunebay 5–10 m., Mudderbugt 5–10 m., Disko Bugt 380 m., Igloolik 22, 50 m., Frustration Bay 3 m.

*Philomedes globosus* (Lilljeborg): Arctic Bay 10–48 m., Eclipse Sound 25–47 m., Fortunebay 5–10 m., Laksebugt 36 m.

*Balanus balanus* (L.): Epifauna. Arctic Bay 26 m.

*Balanus* spp.: Epifauna. *Balanus balanoides* (L.) and possibly *Balanus balanus* (L.) and *Balanus crenatus* Bruguiere. Godthaab Fjord 10 m., Mudderbugt 5–10 m., Laksebugt 88–103 m., Frustration Bay 10–15 m.

*Nebalia bipes* Fabricius: Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Laksebugt 159 m., Igloolik 50 m.

*Chaetonymphon* sp.: Epifauna. Possibly *Chaetonymphon spinosissimum* Norman. Eclipse Sound 16 m.

(Other) Pycnogonids: Igloolik 22 m.

Brachiopods: Igloolik 50 m.

Lamellibranch molluscs:

*Nucula tenuis* (Montagu): Arctic Bay 7–41 m., Eclipse Sound 41 m., Laksebugt 36–179 m., Igloolik 22, 50 m., Frustration Bay 30 m.

*Nucula delphinodonta* Mighels and Adams: Eclipse Sound 35–55 m.

*Nucula* ? sp.: Rare, unidentified specimens. Fortunebay 5–10 m.

*Leda minuta* Müller: Arctic Bay 8–48 m., Eclipse Sound 35 m., Laksebugt 82–175 m., Frustration Bay 15–30 m.

*Leda pernula* Müller: Lakesbugt 116–67 m., Igloolik 22, 50 m., Frustration Bay 20–30 m.

*Portlandia arctica* Gray: Igloolik 22 m.

*Portlandia intermedia* Sars: Disko Bugt 380–440 m., Igloolik 50 m.

*Portlandia* sp. juv.: unidentifiable juveniles. Disko Bugt 380–440 m.

*Yoldia* sp.: *Yoldia hyperborea* (Loven) Torell but possibly others also. Igloolik 22, 50 m., Frustration Bay 20–30 m.

*Arca glacialis* Gray: Disko Bugt 380–440 m.

*Dacrydeum vitreum* (Møller): Eclipse Sound 31 m.

*Crenella decussata* Montagu: Laksebugt 63–166 m.

*Modiolaria laevigata* (Gray): Epifauna. Frustration Bay 15 m.
*Modiolaria corrugata* Stimpson: Arctic Bay 7–35 m., Laksebugt 46 m., Igloolik 50 m.
*Modiolaria nigra* (Gray): Arctic Bay 7–45 m., Eclipse Sound 19–35 m., Igloolik 22, 50 m.
*Modiolaria faba* (Müller): Epifauna. Fortunebay 5–10 m., Frustration Bay 15 m.
*Modiolaria* sp(p). (juv.): *M. corrugata*, *M. nigra*, and possibly others. Arctic Bay 20 m., Mudderbugt 5–10 m., Frustration Bay 20 m.
*Mytilus edulis* L.: Epifauna. Godthaab Fjord 10 m., Fortunebay 5–10 m.
*Pecten groenlandicus* Sowerby: Eclipse Sound 26 m.
*Pecten islandicus* Müller: Laksebugt 88–103 m.
*Astarte borealis* (Chemnitz): Arctic Bay 7–45 m., Eclipse Sound 5–47 m., Igloolik 22, 50 m.
*Astarte montagui* (Dillwyn): Arctic Bay 7–48 m., Eclipse Sound 11–55 m., Laksebugt 57–90 m., Igloolik 22, 50 m.
*Astarte elliptica* Brown: Arctic Bay 7–32 m., Eclipse Sound 25–55 m., Laksebugt 90 m.
*Astarte* spp. (juv.): Eclipse Sound 1–11 m., Laksebugt 152–66 m., Igloolik 22 m.
*Thyasira gouldii* Philippi: Arctic Bay 7–45 m., Eclipse Sound 5–55 m.
*Thyasira* sp(p).: At least two species, one of which may be *T. gouldii*. Laksebugt 36–179 m., Disko Bugt 380–440 m., Frustration Bay 15–30 m.
*Axinopsis orbiculata* Sars: Arctic Bay 7–16 m., Eclipse Sound 5–55 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Mudderbugt 5–10 m., Laksebugt 36–59 m., Frustration Bay 3–30 m.
*Serripes groenlandicum* (Chemnitz): Arctic Bay 7–16 m., Eclipse Sound 5–25 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 36–46 m., Igloolik 50 m., Frustration Bay 15–30 m.
*Cardium ciliatum* (Fabricius): Arctic Bay 16–26 m., Eclipse Sound 26–41 m., Laksebugt 45–179 m., Igloolik 50 m.
*Cardium elegantulum* (Møller): Laksebugt 90 m.
*Macoma calcarea* (Chemnitz): Arctic Bay 2–48 m., Eclipse Sound 8–47 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Laksebugt 90–124 m., Igloolik 22, 50 m.
*Macoma moesta* (Deshayes): Arctic Bay 7–32 m., Eclipse Sound 8–47 m., Igloolik 22 m.
*Macoma* spp. (juv.): Unidentifiable small specimens of the two preceding species. Arctic Bay 7–48 m., Eclipse Sound 5–41 m., Mudderbugt 5–10 m., Laksebugt 36–179 m., Igloolik 22 m., Frustration Bay 15–30 m.
*Saxicava arctica* L.: Epifauna. Arctic Bay 7–26 m., Eclipse Sound 5–41 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Mudderbugt 5–10 m., Laksebugt 28–90 m., Igloolik 22, 50 m.
*Mya truncata* L.: Arctic Bay 7–38 m., Eclipse Sound 5–43 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Egedesminde harbour 5–10 m., Mudderbugt 5–10 m., Laksebugt 36–103 m., Igloolik 22 m.
*Lyonsia arenosa* Møller: Arctic Bay 16 m., Eclipse Sound 11 m.
*Thracia myopsis* Beck: Eclipse Sound 10–35 m.
*Thracia septentrionalis* Jeffreys: Eclipse Sound 5–8 m.
*Thracia* spp.: Possibly the two preceding species. Godthaab Fjord 10 m., Mudderbugt 5–10 m., Laksebugt 90 m.
*Periploma abyssorum* Bush: Arctic Bay 26–32 m.
(Other) Lamellibranchs (juv.): A few rare species. Eclipse Sound 5 m., Godthaab Fjord 10 m.

Placophoran molluscs:
*Tonicella marmorea* (Fabricius): Epifauna. Arctic Bay 21–32 m.

(Other) Placophora: Epifauna. Possibly *Trachydermon albus* (L.). Laksebugt 41–88 m., Igloolik 22 m.

Scaphopod molluscs:

*Siphonodentalium vitreum* Sars: Disko Bugt 440 m.

Solenogastrid molluscs:

*Chaetoderma nitidulum* Loven: Disko Bugt 380–440 m.

*Chaetoderma* sp.: Possibly aberrant *C. nitidulum*. Disko Bugt 380–440 m.

(Other) Solenogastres: Igloolik 22 m.

Gastropod molluscs:

*Diaphana minuta* Brown: Godthaab Fjord 10 m.

*Cylichna alba* (Brown): Arctic Bay 16–45 m., Eclipse Sound 10–40 m.

*Cylichna occulta* (Mighels): Arctic Bay 10–32 m., Eclipse Sound 5–43 m.

*Cylichna* spp.: Possibly the two preceding species. Igloolik 22 m., Frustration Bay 20–30 m.

*Retusa obtusa* (Montagu): Arctic Bay 26 m., Fortunebay 5–10 m., Laksebugt 45–88 m.

*Philine lima* (Brown): Arctic Bay 38 m.

(Other) Opisthobranchs: Igloolik 22 m., Frustration Bay 30 m.

*Puncturella noachina* (L.); Epifauna. Laksebugt 103 m., Igloolik 22 m.

*Acmaea testudinalis* (Müller): Epifauna. Arctic Bay 8–15 m., Godthaab Fjord 10 m.

*Acmaea rubella* (Fabricius): Epifauna. Arctic Bay 8–15 m., Igloolik 22 m.

*Lepeta caeca* (Müller): Epifauna. Arctic Bay 15–48 m., Laksebugt 90–159 m.

*Margarita groenlandica* (Chemnitz): Epifauna. Arctic Bay 21 m., Laksebugt 88 m., Igloolik 22 m.

*Margarita helicina* (Phipps): Epifauna. Arctic Bay 16 m., Godthaab Fjord 10 m., Fortunebay 5–10 m., Igloolik 22 m.

*Margarita cinerea* (*Couthouy*): Epifauna. Laksebugt 82 m.

*Margarita* spp.: Epifauna. Igloolik 22, 50 m.

*Littorina saxatilis* L.: Epifauna. Godthaab Fjord 10 m.

*Cingula castanea* (Møller): Arctic Bay 7–26 m., Mudderbugt 5–10 m.

*Cingula* spp.: Several species, including possibly *Cingula globulus* (Møller). Godthaab Fjord 10 m., Mudderbugt 5–10 m., Laksebugt 45–59 m.

*Onoba aculeus* (Gould): Fortunebay 5–10 m.

*Turritella erosa* Couthouy: Laksebugt 36–124 m.

*Trichotropis borealis* Broderip and Sowerby: Arctic Bay 10–26 m., Eclipse Sound 10 m., Igloolik 22 m., Frustration Bay 15–20 m.

*Lunatia pallida* (Broderip and Sowerby): Arctic Bay 20–35 m., Eclipse Sound 11–35 m., Laksebugt 90–124 m., Igloolik 50 m.

*Natica clausa* Broderip and Sowerby: Laksebugt 45 m.

*Velutina velutina* (Müller): Laksebugt 88 m.

*Trophon clathratus* (L.): Laksebugt 88–124 m.

*Buccinum belcheri* Reeve: Eclipse Sound 35 m.

*Buccinum ciliatum* Fabricius: Eclipse Sound 5 m.

*Buccinum* spp.: Godthaab Fjord 10 m., Laksebugt 42–166 m., Igloolik 22, 50 m., Frustration Bay 15 m.

*Bela nobilis* (Møller): Arctic Bay 7 m., Mudderbugt 5–10 m., Laksebugt 35–124 m.

*Bela exarata* (Møller): Eclipse Sound 35 m.

*Bela violacea* (Mighels): Arctic Bay 10–20 m., Eclipse Sound 3–35 m., Mudderbugt 5–10 m., Laksebugt 46 m.

*Bela simplex* Middendorff: Laksebugt 90 m.

*Bela decussata* (Couthouy): Arctic Bay 7 m., Eclipse Sound 5–26 m.

*Bela* spp.: Godthaab Fjord 10 m., Laksebugt 52–175 m., Disko Bugt 400–40 m., Igloolik 22, 50 m., Frustration Bay 3–30 m.

(Other) Gastropods: A few rare species. Godthaab Fjord 10 m., Igloolik 22, 50 m., Frustration Bay 5–20 m.

Echinoderms:

*Ophiura sarsi* Lütken: Arctic Bay 41 m., Eclipse Sound 6–35 m., Laksebugt 41–98 m., Igloolik 22, 50 m.

*Ophiura robusta* (Ayres): Arctic Bay 15–38 m., Eclipse Sound 5–55 m., Mudderbugt 5–10 m., Laksebugt 41–103 m.

*Ophiocten sericeum* (Forbes): Arctic Bay 20–48 m., Eclipse Sound 11–43 m., Igloolik 50 m.

(Other) Ophiuroids: Fortunebay 5–10 m., Mudderbugt 5–10 m., Laksebugt 88–166 m., Igloolik 22, 50 m., Frustration Bay 3–30 m.

*Strongylocentrotus droebachiensis* (Müller): Epifauna. Arctic Bay 7–26 m., Laksebugt 57–103 m., Igloolik 22 m.

*Cucumaria calcigera* (Stimpson): Arctic Bay 16–32 m., Eclipse Sound 25–33 m., Godthaab Fjord 10 m., Mudderbugt 5–10 m., Laksebugt 45–61 m., Frustration Bay 15–30 m.

*Psolus phantapus* (Strussenfeldt): Arctic Bay 45 m.

*Psolus fabricii* (Duben and Koren): Arctic Bay 21 m., Laksebugt 57–103.

*Psolus* sp.: Igloolik 22, 50 m.

*Eupyrgus scaber* Lütken: Eclipse Sound 33–43 m., Frustration Bay 20–30 m.

*Myriotrochus rinki* Steenstrup: Arctic Bay 7–26 m., Eclipse Sound 5–35 m., Frustration Bay 20 m.

(Other) Holothurians: Godthaab Fjord 10 m., Egedesminde harbour 5–10 m., Laksebugt 46–90 m.

*Ctenodiscus crispatus* (Retzius): Disko Bugt 380 m.

(Other) Asteroids: Fortunebay 5–10 m., Laksebugt 28 m., Igloolik 22 m., Frustration Bay 30 m.

Tunicates:

*Pelonaia corrugata* Goodsir and Forbes: Eclipse Sound 5–35 m., Mudderbugt 5–10 m., Laksebugt 45–52 m., Frustration Bay 30 m.

(Other) Tunicates: Epifauna. Arctic Bay 2 m., Laksebugt 82–152 m., Igloolik 22, 50 m., Frustration Bay 15 m.

Fish:

*Icelus bicornis* (Reinhardt): Epifauna. Eclipse Sound 10 m.

*Gymnacanthus* sp.: Epifauna. Possibly *Gymnacanthus tricuspis* (Reinhardt). Arctic Bay 7 m.

(Other) Sculpins: Epifauna. Igloolik 22, 50 m.

(Other) Fish: Epifauna. Eclipse Sound 8 m., Fortunebay 5–10 m., Frustration Bay 20 m.

**Table 1.** Collecting grounds in Disko Bugt.

| Series no. | Locality | No. of hauls | Depth in metres | Substrate |
|---|---|---|---|---|
| 1 | Fortunebay | 13 | 5–10 | Sand and alga (kelp and rockweed) |
| 2 | Egedesminde harbour | 10 | 5–10 | Soft mud with rotting vegetation and domestic sewage |
| 3a | Mudderbugt | 12 | 5–10 | Hard sand with broken shells overlain by quarter-inch layer of river mud |
| b | Mudderbugt | 3 | 3 | Soft mud close to river mouth |
| c | Mudderbugt | 6 | 3–5 | Series between 3a and 3b |
| 4 | Laksebugt | 14 | 28–63 | Sticky mud with sand, pebbles, and shells, plus 1 haul from soft mud in Godhavn harbour |
| 5 | Laksebugt | 14 | 82–124 | Mud, many small stones, and broken shells |
| 6 | Laksebugt | 7 | 151–79 | Mud, many small stones, and broken shells |
| 7 | 69° 15N., 53° 10W. | 5 | 380–440 | Soft mud |

**Table 2.** Quantitative data for infauna collected in north Baffin Island.

| Depth in metres | 0–3 | | | 5–14 | | | 5–47 | | | 7–55 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Substrate | Sand | | | Sand | | | Sandy-mud | | | Mud | | |
| No. of hauls | 11 | | | 8 | | | 23 | | | 20 | | |
| Species | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. |
| Foraminifera | — | — | — | — | — | — | 30 | 85 | — | 50* | 151* | 3 |
| Nemertines | 9 | 1 | — | — | — | — | 13 | 1 | — | 5 | 1 | — |
| Gephyrea | 18 | 3 | — | 11 | 8 | — | 17 | 3 | — | 15 | 3 | — |
| *Gattyana cirrosa* | — | — | — | — | — | — | 4 | 1 | — | 15 | 3 | — |
| *Harmothoe* spp. | 18 | 4 | 5* | — | — | — | 4 | — | — | 5 | 1 | — |
| *Pholoe minuta* | — | — | — | 44 | 8 | — | 61* | 27 | — | 30 | 7 | — |
| *Phyllodoce* spp. | — | — | — | 11 | 1 | — | 30 | 10 | 2 | 30 | 6 | — |
| *Eteone* spp. | 18 | 3 | — | 56* | 13 | — | 35 | 11 | — | 25 | 4 | — |
| *Nereis zonata* | — | — | — | — | — | — | — | — | — | 15 | 3 | — |
| *Nephthys* spp. | — | — | — | — | — | — | 26 | 4 | 5 | 20 | 3 | — |
| *Onuphis conchylega* | — | — | — | — | — | — | — | — | — | 5 | 3 | — |
| *Lumbrinereis* spp. | — | — | — | — | — | — | — | — | — | 15 | 3 | 2 |
| Other errant polychaetes | 18 | 7 | — | 11 | 1 | — | 61* | 15 | 2 | 45 | 11 | — |
| *Scoloplos armiger* | 9 | 1 | — | 22 | 7 | — | 43 | 11 | — | 40 | 10 | — |
| *Scalibregma inflatum* | 18 | 8 | — | 11 | 1 | — | 13 | 10 | — | 5 | 1 | — |
| *Travisia forbesii* | 46 | 11 | 5* | 22 | 11 | 3 | 9 | 3 | 2 | — | — | — |
| *Ophelia* sp. | 45 | 11 | 3 | 44 | 22 | 2 | 13 | 3 | — | — | — | — |
| *Ammotrypane aulogaster* | — | — | — | — | — | — | 4 | — | — | 20 | 3 | — |
| *Capitella capitata* | 18 | 6 | — | — | — | — | — | — | — | 5 | 1 | — |
| Maldanid polychaetes | — | — | — | — | — | — | — | — | — | 10 | 1 | — |
| *Owenia fusiformis* | — | — | — | 44 | 392* | 18 | 61* | 116* | 10 | 40 | 125* | 10 |
| *Myriochele heeri* | 9 | 1 | — | — | — | — | 61* | 60 | 1 | 60* | 161* | 2 |
| *Cistenides* spp. | — | — | — | — | — | — | 52* | 22 | 8 | 25 | 4 | — |
| *Terebellides stroemi* | — | — | — | — | — | — | 4 | — | — | 5 | 3 | — |
| *Euchone analis* | 18 | 17 | 8* | 78* | 204* | 24* | 17 | 251* | 17 | 20 | 10 | — |
| Other sabellid polychaetes | 27 | 255* | 10* | — | — | — | — | — | — | 10 | 3 | — |
| Other sedentary polychaetes | 45 | 46 | — | 44 | 202* | 2 | 91* | 104* | 1 | 75* | 88 | 2 |
| *Anonyx nugax* | — | — | — | 22 | 7 | 2 | 22 | 171* | 42* | 20 | 14 | 3 |
| Other Lysiannassid amphipods | 27 | 4 | — | 56* | 8 | — | 22 | 66 | 1 | — | — | — |
| Ampeliscid amphipods | — | — | — | — | — | — | 39 | 13 | — | 30 | 8 | — |
| *Pontoporeia femorata* | — | — | — | — | — | — | 4 | — | — | — | — | — |
| Oedicerotid amphipods | — | — | — | 33 | 8 | — | 26 | 14 | — | 5 | 1 | — |
| Other amphipods | 9 | 1 | — | 11 | 13 | — | 13 | 3 | — | 15 | 3 | — |
| Isopods | — | — | — | — | — | — | 4 | — | — | — | — | — |
| Cumacea | — | — | — | 11 | 1 | — | 39 | 10 | — | 25 | 8 | — |
| *Philomedes globosus* | — | — | — | — | — | — | 70* | 115* | 1 | 55* | 83 | 1 |
| *Nucula tenuis* | — | — | — | — | — | — | 34 | 11 | 2 | 20 | 4 | 2 |
| *Nucula delphinodonta* | — | — | — | — | — | — | 9 | 1 | — | 10 | 3 | — |
| *Leda minuta* | — | — | — | — | — | — | 39 | 21 | 2 | 35 | 11 | 2 |
| *Dacrydeum vitreum* | — | — | — | — | — | — | — | — | — | 5 | 1 | — |
| *Modiolaria corrugata* | — | — | — | — | — | — | 22 | 11 | 5 | 10 | 3 | 2 |
| *Modiolaria nigra* | — | — | — | — | — | — | 17 | 4 | 3 | 20 | 4 | 7 |
| *Modiolaria* spp. juv. | — | — | — | — | — | — | 4 | 1 | — | — | — | — |
| *Pecten groenlandicus* | — | — | — | — | — | — | — | — | — | 5 | 1 | — |
| *Astarte borealis* | — | — | — | 22 | 6 | 18 | 83* | 56 | 123* | 55* | 17 | 20* |
| *Astarte montagui* | — | — | — | — | — | — | 70* | 221* | 37 | 50* | 46 | 15 |
| *Astarte elliptica* | — | — | — | — | — | — | 26 | 4 | 2 | 15 | 4 | — |
| *Astarte* spp. | — | — | — | — | — | — | 9 | 1 | — | — | — | — |
| *Thyasira gouldii* | — | — | — | — | — | — | 61* | 43 | 2 | 45 | 21 | — |
| *Axinopsis orbiculata* | — | — | — | 56* | 20 | — | 61* | 36 | — | 35 | 22 | — |
| *Serripes groenlandicum* | — | — | — | 56* | 13 | 74* | 35 | 15 | 12 | 25 | 4 | 25* |
| *Cardium ciliatum* | — | — | — | — | — | — | 26 | 4 | 32 | 10 | 3 | 30* |
| *Macoma calcarea* | 9 | 1 | — | 22 | 13 | 5 | 78* | 38 | 24 | 75* | 21 | 24* |
| *Macoma moesta* | — | — | — | 11 | 1 | — | 57* | 13 | 3 | 20 | 6 | — |
| *Macoma* spp. juv. | — | — | — | — | — | — | 78* | 62 | 2 | 30 | 11 | — |
| *Mya truncata* | — | — | — | 67* | 22 | 12 | 74* | 41 | 40* | 60* | 14 | 25* |
| *Lyonsia arenosa* | — | — | — | — | — | — | 9 | 1 | — | — | — | — |
| *Thracia myopsis* | — | — | — | 11 | 1 | — | 13 | 3 | — | 5 | 1 | — |
| *Thracia septentrionalis* | — | — | — | 11 | 4 | — | 9 | 3 | 2 | — | — | — |
| *Periploma abyssorum* | — | — | — | — | — | — | 4 | — | — | 5 | 1 | — |
| Other lamellibranchs | — | — | — | — | — | — | 4 | — | — | — | — | — |
| *Cylichna alba* | — | — | — | — | — | — | 22 | 3 | — | 10 | 3 | — |
| *Cylichna occulta* | — | — | — | 56* | 29 | 2 | 26 | 10 | 1 | 5 | 1 | — |
| *Retusa obtusa* | — | — | — | — | — | — | 4 | — | — | — | — | — |
| *Philine lima* | — | — | — | — | — | — | — | — | — | 5 | 1 | — |
| *Cingula castanea* | — | — | — | — | — | — | 22 | 11 | — | — | — | — |
| *Trichotropis borealis* | — | — | — | — | — | — | 22 | 4 | 2 | 5 | 1 | — |
| *Lunatia pallida* | — | — | — | — | — | — | 22 | 3 | — | 5 | 1 | — |
| *Buccinum belcheri* | — | — | — | — | — | — | 4 | 1 | 5 | — | — | — |
| *Buccinum ciliatum* | — | — | — | — | — | — | 4 | 1 | 3 | — | — | — |
| *Bela nobilis* | — | — | — | — | — | — | — | — | — | 5 | 1 | — |
| *Bela exarata* | — | — | — | — | — | — | 4 | — | — | — | — | — |
| *Bela violacea* | 9 | 1 | — | 44 | 11 | — | 22 | 3 | — | 5 | 3 | — |
| *Bela decussata* | — | — | — | — | — | — | 13 | 3 | — | 10 | 3 | — |
| *Ophiura sarsi* | — | — | — | 33 | 6 | 27* | 4 | 1 | — | 25 | 4 | 10 |
| *Ophiura robusta* | — | — | — | — | — | — | 17 | 3 | — | 20 | 3 | — |
| *Ophiocten sericeum* | — | — | — | — | — | — | 22 | 8 | 2 | 60* | 25 | 1 |
| *Cucumaria calcigera* | — | — | — | — | — | — | 26 | 6 | 32 | — | — | — |
| *Psolus phantapus* | — | — | — | — | — | — | — | — | — | 5 | 1 | 5 |
| *Psolus fabricii* | — | — | — | — | — | — | — | — | — | 5 | 1 | — |
| *Eupyrgus scaber* | — | — | — | — | — | — | 22 | 6 | — | 5 | 1 | — |
| *Myriotrochus rinki* | — | — | — | 78* | 49 | 12 | 57* | 32 | 7 | 20 | 11 | 1 |
| *Pelonaia corrugata* | — | — | — | — | — | — | 13 | 1 | 3 | 15 | 3 | 8 |
| Totals | | 381 | 31 | | 1,082 | 201 | | 1,815 | 438 | | 987 | 200 |

*Dominant species (see p. 12).

**Table 3.** Quantitative data for infauna collected from shallow water in Godthaab Fjord and Disko Bugt.

| Place | Godthaab Fjord | | | Fortunebay | | | Egedesminde harbour | | | Mudderbugt | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth in metres | 10 | | | 5–10 | | | 5–10 | | | 5–10 | | |
| Substrate | Sand | | | Sand | | | Mud | | | Sand | | |
| No. of hauls | 39 | | | 13 | | | 10 | | | 12 | | |
| Species | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. |
| Polynoid polychaetes | 92* | 43 | 1 | 46 | 5 | 2 | 30 | 4 | — | 33 | 3 | — |
| *Pholoe minuta* | 97* | 162* | 2 | 92* | 75 | 1 | 70* | 22 | — | 83* | 101* | 1 |
| *Phyllodoce* spp. | 33 | 7 | 10 | 53* | 8 | 9 | — | — | — | — | — | — |
| *Eteone* spp. | 33 | 5 | — | 92* | 232* | 2 | — | — | — | 25 | 3 | — |
| *Nephthys* spp. | 95* | 30 | 9 | 46 | 8 | 20 | 60* | 13 | 11 | 58* | 8 | 5* |
| Other errant polychaetes | 82* | 169* | 2 | 84* | 357* | 1 | 50* | 11 | — | 8 | 1 | — |
| Scoloplos armiger | 41 | 7 | — | — | — | — | — | — | — | 8 | 2 | — |
| Other Aricid polychaetes | — | — | — | 31 | 25 | — | — | — | — | — | — | — |
| *Travisia forbesii* | 13 | 2 | 1 | — | — | — | — | — | — | — | — | — |
| *Ophelia* sp. | 64* | 22 | 1 | 8 | 1 | — | — | — | — | — | — | — |
| *Ammotrypane aulogaster* | 3 | — | — | — | — | — | — | — | — | — | — | — |
| *Cistenides* spp. | 97* | 190* | 20* | 100* | 428* | 151* | 90* | 251* | 130* | 100* | 338* | 11* |
| *Euchone analis* | 31 | 9 | — | 23 | 18 | 1 | — | — | — | — | — | — |
| Othersedentarypolychaetes | 79* | 79 | 2 | 54* | 75 | 1 | 20 | 2 | — | 83* | 110* | 6* |
| Other unidentified worms | 38 | 16 | — | 31 | 7 | — | — | — | — | 8 | 1 | — |
| *Anonyx nugax* | 54* | 20 | 1 | — | — | — | — | — | — | 33 | 5 | 1 |
| *Pontoporeia femorata* | — | — | — | 8 | 1 | — | — | — | — | — | — | — |
| Other amphipods | 95* | 200* | 2 | 38 | 8 | — | 30 | 83* | 1 | 100* | 262* | 3 |
| Cumacea | — | — | — | 8 | 1 | — | — | — | — | 17 | 3 | — |
| *Philomedes globosus* | — | — | — | 15 | 8 | — | — | — | — | — | — | — |
| *Nebalia bipes* | 92* | 104* | 1 | 8 | 1 | — | 30 | 7 | — | — | — | — |
| *Nucula?* sp. | — | — | — | 23 | 30 | 1 | — | — | — | — | — | — |
| *Modiolaria* sp. juv. | — | — | — | — | — | — | — | — | — | 92* | 82 | 1 |
| *Axinopsis orbiculata* | 85* | 54 | 1 | 85* | 130 | 1 | — | — | — | 100* | 98* | 1 |
| *Serripes groenlandicum* | 13 | 1 | 12* | 30 | 4 | 55* | 40 | 4 | 14 | 83* | 24 | 5* |
| *Macoma calcarea* | 97* | 347* | 58* | 77* | 71 | 25* | 50* | 11 | 9 | — | — | — |
| *Macoma* sp. juv. | — | — | — | — | — | — | — | — | — | 92* | 203* | 3 |
| *Mya truncata* | 90* | 93 | 6 | 85* | 28 | 26* | 70* | 23 | 150* | 100* | 226* | 7* |
| *Thracia* spp. | 33 | 9 | 2 | — | — | — | — | — | — | 8 | 1 | — |
| *Diaphana minuta* | 13 | 2 | — | — | — | — | — | — | — | — | — | — |
| *Retusa obtusa* | — | — | — | 31 | 3 | — | — | — | — | — | — | — |
| *Cingula castanea* | — | — | — | — | — | — | — | — | — | 17 | 12 | — |
| *Cingula* sp. | 77* | 145* | 1 | — | — | — | — | — | — | 42 | 4 | — |
| *Onoba aculeus* | — | — | — | 8 | 1 | — | — | — | — | — | — | — |
| *Buccinum* spp. | 3 | — | — | — | — | — | — | — | — | — | — | — |
| *Bela nobilis* | — | — | — | — | — | — | — | — | — | 33 | 3 | — |
| *Bela violacea* | — | — | — | — | — | — | — | — | — | 50* | 7 | 1 |
| *Bela* spp. | 62* | 12 | 1 | — | — | — | — | — | — | — | — | — |
| *Ophiura robusta* | — | — | — | — | — | — | — | — | — | 8 | 1 | — |
| Other ophiuroids | — | — | — | 8 | 1 | — | — | — | — | 8 | 1 | — |
| *Cucumaria calcigera* | 5 | 1 | — | — | — | — | — | — | — | 42 | 5 | 1 |
| Other holothurians | — | — | — | — | — | — | 10 | 1 | 5 | — | — | — |
| Other asteroids | — | — | — | 8 | 2 | — | — | — | — | — | — | — |
| *Pelonaia corrugata* | — | — | — | — | — | — | — | — | — | 25 | 3 | 2 |
| Totals | | 1,729 | 133 | | 1,528 | 296 | | 432 | 320 | | 1,507 | 48 |

*Dominant species (see p. 12).

**Table 4.** Quantitative data for infauna collected from deep water in Disko Bugt.

| Place | Laksebugt | | | Laksebugt | | | Laksebugt | | | 69°15N., 53°10W. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth in metres | 28–63 | | | 82–124 | | | 151–79 | | | 380–440 | | |
| Substrate | Mud and sand | | | Mud and stones | | | Mud and stones | | | Soft mud | | |
| No. of hauls | 14 | | | 14 | | | 7 | | | 5 | | |
| Species | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. |
| Foraminifera | 84* | 396* | 5* | 100* | 1386* | 37* | 86* | 1092* | 26* | — | — | — |
| Nemertines | — | — | — | — | — | — | — | — | — | 40 | 10 | 1 |
| Gephyrea | — | — | — | — | — | — | — | — | — | 20 | 2 | — |
| Polynoid polychaetes | 38 | 5 | — | 31 | 9 | 1 | 14 | 1 | — | 60* | 12 | 1 |
| *Pholoe minuta* | 62* | 20 | — | 8 | 2 | — | — | — | — | — | — | — |
| *Phyllodoce* spp. | 8 | 1 | — | — | — | — | 14 | 1 | — | — | — | — |
| *Eteone* spp. | 15 | 4 | — | — | — | — | — | — | — | — | — | — |
| Other Phyllodocid polychaetes | 8 | 2 | 1 | — | — | — | — | — | — | — | — | — |
| *Nephthys* spp. | 31 | 2 | — | 46 | 8 | 5 | 29 | 3 | — | — | — | — |
| *Onuphis conchylega* | 8 | 1 | — | 15 | 3 | — | 29 | 26 | 1 | — | — | — |
| *Lumbrinereis* spp. | — | — | — | 31 | 4 | 3 | 57* | 7 | 1 | 40 | 12 | — |
| Other errant polychaetes | 54* | 8 | 1 | 23 | 4 | — | 14 | 1 | — | — | — | — |
| *Scoloplos armiger* | 15 | 4 | — | — | — | — | — | — | — | 20 | 2 | — |
| Other Aricid polychaetes | — | — | — | 38 | 5 | — | — | — | — | — | — | — |
| *Notomastus latericeus* | — | — | — | — | — | — | — | -- | — | 100* | 68 | 29* |
| *Praxillella gracilis* | — | — | — | — | — | — | — | — | — | 100* | 18 | 5 |
| *Owenia fusiformis* | 62* | 85* | 4 | 15 | 3 | — | 14 | 3 | — | — | — | — |
| *Myriochele heeri* | 46 | 18 | — | 31 | 5 | — | 86* | 21 | — | — | — | — |
| *Cistenides hyperborea* | — | — | — | — | — | — | — | — | — | 20 | 2 | — |
| *Cistenides* spp. | 100* | 48 | 11* | 62* | 13 | 2 | 14 | 1 | — | — | — | — |
| *Terebellides stroemi* | — | — | — | — | — | — | — | — | — | 20 | 2 | 1 |
| Othersedentarypolychaetes | 54* | 22 | 1 | 85* | 21 | 1 | 86* | 43 | 5* | 100* | 500* | 17* |
| Other unidentified worms | 31 | 6 | 3 | 8 | 1 | — | 14 | 1 | — | 40 | 72 | 1 |
| Anomuran decapods | 8 | 1 | — | — | — | — | 14 | 1 | — | — | — | — |
| *Neohela monstrosa* | — | — | — | — | — | — | — | — | — | 20 | 3 | 1 |
| Other amphipods | 54* | 12 | — | 38 | 5 | — | 57* | 11 | 1 | 40 | 4 | — |
| Cumacea | 31 | 6 | — | — | — | — | — | — | — | 20 | 4 | — |
| *Philomedes globosus* | 8 | 8 | — | — | — | — | — | — | — | — | — | — |
| *Nebalia bipes* | — | — | — | — | — | — | 14 | 1 | — | — | — | — |
| *Nucula tenuis* | 23 | 4 | — | 54* | 8 | — | 71* | 9 | — | — | — | — |
| *Leda minuta* | — | — | — | 31 | 4 | — | 57* | 7 | — | — | — | — |
| *Leda pernula* | — | — | — | 23 | 4 | 2 | 57* | 11 | 2 | — | — | — |
| *Portlandia intermedia* | — | — | — | — | — | — | — | — | — | 40 | 16 | 1 |
| *Portlandia* sp. juv. | — | — | — | — | — | — | — | — | — | 40 | 10 | — |
| *Arca glacialis* | — | — | — | — | — | — | — | — | — | 60* | 58 | 4 |
| *Crenella decussata* | 8 | 1 | — | 8 | 2 | — | 29 | 6 | — | — | — | — |
| *Modiolaria corrugata* | 8 | 1 | — | — | — | — | — | — | — | — | — | — |
| *Pecten islandicus* | — | — | — | 15 | 2 | 6 | — | — | — | — | — | — |
| *Astarte montagui* | 8 | 1 | — | 8 | 1 | — | — | — | — | — | — | — |
| *Astarte elliptica* | — | — | — | 15 | 2 | 5 | — | — | — | — | — | — |
| *Astarte* spp. | — | — | — | — | — | — | 29 | 3 | — | — | — | — |
| *Thyasira* spp. | 8 | 8 | — | 8 | 2 | — | 57* | 14 | — | 100* | 104* | 1 |
| *Axinopsis orbiculata* | 8 | 5 | — | — | — | — | — | — | — | — | — | — |
| *Serripes groenlandicum* | 23 | 2 | 3 | — | — | — | — | — | — | — | — | — |
| *Cardium ciliatum* | 15 | 2 | 1 | 54* | 6 | 35* | 29 | 4 | 9* | — | — | — |
| *Cardium elegantulum* | — | — | — | 8 | 1 | — | — | — | — | — | — | — |
| *Mccoma calcarea* | — | — | — | 23 | 2 | 1 | — | — | — | — | — | — |
| *Macoma* sp. juv. | 69* | 18 | 1 | 38 | 5 | — | 29 | 10 | — | — | — | — |
| *Mya truncata* | 8 | 2 | 7* | 23 | 2 | 2 | — | — | — | — | — | — |
| *Thracia* spp. | — | — | — | 8 | 1 | 2 | — | — | — | — | — | — |
| *Siphonodentalium vitreum* | — | — | — | — | — | — | — | — | — | 20 | 2 | — |
| *Chaetoderma nitidulum* | — | — | — | — | — | — | — | — | — | 80* | 14 | — |
| *Chaetoderma* sp. | — | — | — | — | — | — | — | — | — | 40 | 8 | — |
| *Retusa obtusa* | 15 | 2 | — | 8 | 1 | — | — | — | — | — | — | — |
| *Cingula* spp. | 23 | 3 | — | — | — | — | — | — | — | — | — | — |
| *Turritella erosa* | 23 | 3 | 1 | 54* | 23 | 2 | — | — | — | — | — | — |
| *Lunatia pallida* | — | — | — | 8 | 1 | — | — | — | — | — | — | — |
| *Natica clausa* | 8 | 1 | — | — | — | — | — | — | — | — | — | — |
| *Velutina velutina* | — | — | — | 8 | 1 | — | — | — | — | — | — | — |
| *Trophon clathratus* | — | — | — | 15 | 3 | 1 | — | — | — | — | — | — |
| *Buccinum* spp. | 23 | 3 | 2 | 8 | 1 | 4 | 14 | 1 | — | — | — | — |
| *Bela nobilis* | 54* | 24 | 1 | 62* | 8 | — | — | — | — | — | — | — |
| *Bela violacea* | 8 | 1 | — | — | — | — | — | — | — | — | — | — |
| *Bela simplex* | — | — | — | 8 | 1 | — | — | — | — | — | — | — |
| *Bela* spp. | 8 | 1 | — | — | — | — | 14 | 1 | — | 60* | 6 | — |
| *Ophiura sarsi* | 8 | 1 | 2 | 8 | 2 | — | — | — | — | — | — | — |
| *Ophiura robusta* | 8 | 1 | — | 8 | 5 | 2 | — | — | — | — | — | — |
| Other ophiuroids | — | — | — | 15 | 3 | — | 57* | 14 | 1 | — | — | — |
| *Cucumaria calcigera* | 23 | 9 | 1 | — | — | — | — | — | — | — | — | — |
| *Psolus fabricii* | 8 | 1 | — | 31 | 4 | 1 | — | — | — | — | — | — |
| Other holothurians | 8 | 1 | 1 | 8 | 1 | — | — | — | — | — | — | — |
| *Ctenodiscus crispatus* | — | — | — | — | — | — | — | — | — | 20 | 2 | 7 |
| *Pelonaia corrugata* | 38 | 5 | 1 | — | — | — | — | — | — | — | — | — |
| Totals | | 749 | 47 | | 1,565 | 112 | | 1,293 | 46 | | 931 | 69 |

*Dominant species (see p. 12).

**Table 5.** Quantitative data for infauna collected in Frustration Bay.

| Depth in metres | 5 | | | 15 | | | 20 | | | 30 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Substrate | Sand | | | Sandy-mud | | | Mud | | | Mud | | |
| No. of hauls | 6 | | | 4 | | | 5 | | | 11 | | |
| Species | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. |
| Polynoid polychaetes | 17 | 2 | — | — | — | — | 20 | 2 | — | 9 | 1 | — |
| *Pholoe minuta* | — | — | — | 50* | 5 | — | — | — | — | — | — | — |
| *Phyllodoce* spp. | 50* | 5 | — | 50* | 8 | 1 | 20 | 2 | — | — | — | — |
| *Eteone* spp. | 17 | 3 | — | — | — | — | — | — | — | — | — | — |
| Other Phyllodocid polychaetes | — | — | — | — | — | — | — | — | — | 9 | 1 | — |
| *Nephthys* spp. | 67* | 16 | 17* | 100* | 20* | 9 | 100* | 20 | 7 | 100* | 46* | 27* |
| Other errant polychaetes | — | — | — | — | — | — | — | — | — | 9 | 2 | — |
| Aricid polychaetes | — | — | — | 25 | 5 | — | — | — | — | — | — | — |
| *Travisia forbesii* | 33 | 7 | 7* | — | — | — | — | — | — | — | — | — |
| Maldanid polychaetes | — | — | — | — | — | — | 40 | 10 | 15* | 45 | 25 | 5 |
| *Cistenides* spp. | — | — | — | — | — | — | 20 | 2 | — | 36 | 4 | 4 |
| Sabellid polychaetes | 83* | 85* | 9* | — | — | — | — | — | — | — | — | — |
| Other sedentary polychaetes | 100* | 80* | 1 | 100* | 28* | 5 | 100* | 92* | 1 | 91* | 106* | 5 |
| *Anonyx nugax* | — | — | — | — | — | — | — | — | — | 9 | 1 | — |
| Other amphipods | 83* | 15 | — | 50* | 30* | 2 | — | — | — | 9 | 1 | — |
| *Chiridothea sabini* | — | — | — | 25 | 8 | 5 | 100* | 12 | 9* | 64* | 9 | 6 |
| Cumacea | 100* | 67* | 1 | — | — | — | — | — | — | — | — | — |
| *Nucula tenuis* | — | — | — | — | — | — | — | — | — | 9 | 1 | 1 |
| *Leda minuta* | — | — | — | 25 | 3 | 1 | — | — | — | 18 | 1 | — |
| *Leda pernula* | — | — | — | — | — | — | 20 | 2 | 1 | 9 | 1 | 1 |
| *Yoldia* sp. | — | — | — | — | — | — | 20 | 2 | 2 | 73* | 11 | 17 |
| *Modiolaria* sp. | — | — | — | — | — | — | 40 | 8 | 7 | — | — | — |
| *Thyasira* sp. | — | — | — | 25 | 3 | 1 | — | — | — | 18 | 3 | — |
| *Axinopsis orbiculata* | — | — | — | — | — | — | 20 | 2 | — | 9 | 1 | — |
| *Serripes groenlandicum* | — | — | — | 50* | 5 | 132* | — | — | — | 9 | 1 | 17 |
| *Macoma* spp. | — | — | — | 100* | 48* | 14 | 100* | 12 | 3 | 82* | 11 | 3 |
| *Cylichna* sp. | — | — | — | — | — | — | 40 | 4 | — | 36 | 4 | — |
| Other opisthobranchs | — | — | — | — | — | — | — | — | — | 9 | 1 | — |
| *Trichotropis borealis* | — | — | — | 25 | 3 | 2 | 20 | 2 | 1 | — | — | — |
| *Buccinum* spp. | — | — | — | 50* | 5 | 23* | — | — | — | — | — | — |
| *Bela* spp. | — | — | — | 50* | 10 | 1 | 40 | 4 | — | 9 | 1 | — |
| Other gastropods | 17 | 2 | — | — | — | — | 20 | 2 | — | — | — | — |
| Ophiuroids | — | — | — | 100* | 25* | 5 | 80* | 16 | 3 | 36 | 5 | 1 |
| *Cucumaria calcigera* | — | — | — | 25 | 3 | 9 | 60* | 8 | 32* | 82* | 24 | 173* |
| *Eupyrgus scaber* | — | — | — | — | — | — | 60* | 6 | 1 | 18 | 1 | — |
| *Myriotrochus rinki* | — | — | — | — | — | — | 60* | 8 | 11* | — | — | — |
| Asteroids | — | — | — | — | — | — | — | — | — | 9 | 1 | 29* |
| *Pelonaia corrugata* | — | — | — | — | — | — | — | — | — | 9 | 1 | 1 |
| Totals | | 282 | 35 | | 209 | 210 | | 216 | 93 | | 264 | 290 |

*Dominant species (see p. 12).

**Table 6.** Percentage of dredge hauls in which infaunal species were collected near Igloolik.

| F.R.B. Stn. no. | 723 | 719 |
|---|---|---|
| Depth in metres | 22 | 50 |
| Substrate | Mud | Mud |
| No. of hauls | 13 | 4 |
| Species | | |
| Foraminifera | 8 | — |
| Nemertines | 46 | — |
| Nemertodes | 8 | — |
| *Priapulus* sp. | 8 | — |
| Other gephyrea | 8 | — |
| Polynoid polychaetes | 85* | 50* |
| *Eteone* spp. | 8 | — |
| *Nephthys* spp. | — | 25 |
| *Ammotrypane aulogaster* | 8 | 25 |
| Maldanid polychaetes | 8 | 25 |
| *Cistenides* spp. | 15 | 75* |
| Sabellid polychaetes | 77* | — |
| Other sedentary polychaetes | 92* | 75* |
| Leech | 8 | — |
| Anomuran decapods | — | 25 |
| *Anonyx nugax* | 62* | 50* |
| Other amphipods | 77* | 50* |
| *Chiridothea sabini* | 69* | 50* |
| Other isopods | 31 | 50* |
| Cumacea | 15 | 25 |
| *Nebalia bipes* | 46 | — |
| Pycnogonids | 8 | — |
| Brachiopods | — | 50* |
| *Nucula tenuis* | 62* | 100* |
| *Leda pernula* | 8 | 25 |
| *Portlandia arctica* | 100* | — |
| *Portlandia intermedia* | — | 50* |
| *Yoldia* sp. | 8 | 75* |
| *Modiolaria corrugata* | — | 25 |
| *Modiolaria nigra* | 8 | 75* |
| *Astarte borealis* | 46 | 75* |
| *Astarte montagui* | 31 | 25 |
| *Astarte* spp. | 31 | — |
| *Serripes groenlandicum* | — | 75* |
| *Cardium ciliatum* | — | 50* |
| *Macoma calcarea* | 23 | 75* |
| *Macoma moesta* | 8 | — |
| *Macoma* spp. | 8 | — |
| *Mya truncata* | 8 | — |
| Solenogastres | 8 | — |
| *Cylichna* spp. | 8 | — |
| Other opisthobranchs | 62* | — |
| *Trichotropis borealis* | 15 | — |
| *Lunatia pallida* | — | 25 |
| *Buccinum* spp. | 15 | 50* |
| *Bela* spp. | 8 | 25 |
| Other gastropods | 8 | 25 |
| *Ophiura sarsi* | 8 | 75* |
| *Ophiocten sericeum* | — | 50* |
| Other ophiuroids | 8 | 25 |
| *Psolus* sp. | 8 | 25 |
| Asteroids | 62* | — |
| Unidentified tissues | 38 | — |

*Dominant species (see p. 12).

**Table 7.** Percentage composition of the fresh weight of various species.

| Species | No. of specimens | Percentage of various components: water | residue after dehydration | dry organic matter | ash |
|---|---|---|---|---|---|
| **A. Expressed as percentages of the total body weight (including any shells, tubes, etc.)** | | | | | |
| Foraminifera | 350 | 33 | 67 | 1 | 66 |
| Nemertines | 22 | 77 | 23 | — | — |
| Polynoid polychaetes | 30 | 80 | 20 | — | — |
| *Pholoe minuta* | 100 | 77 | 23 | — | — |
| *Phyllodoce* spp. | 1 | 79 | 21 | 20 | 1 |
| ″ | 8 | 75 | 25 | 23 | 2 |
| *Nephthys* spp. | 2 | 75 | 25 | — | — |
| ″ | 32 | 72 | 28 | 24 | 4 |
| *Cistenides* spp. | 36 | 91 | 9 | — | — |
| ″ ″ * | 70 | 84 | 16 | 8 | 8 |
| Sedentary polychaetes (tubeless) | 50 | 78 | 22 | — | — |
| ″ ″ (tube-dwellers) | 100 | 50 | 50 | 4 | 46 |
| Amphipods | 300 | 64 | 36 | 17 | 19 |
| ″ | 50 | 78 | 22 | 14 | 8 |
| *Axinopsis orbiculata* | 100 | 43 | 57 | — | — |
| *Serripes groenlandicum** | 1 | 39 | 61 | 11 | 50 |
| *Cardium ciliatum** | 2 | 26 | 74 | 3 | 71 |
| *Macoma calcarea* | 300 | 52 | 48 | 10 | 38 |
| ″ ″ * | 12 | 33 | 67 | 9 | 58 |
| ″ ″ * | 13 | 33 | 67 | — | — |
| *Mya truncata* | 100 | 54 | 46 | — | — |
| ″ ″ * | 1 | 52 | 48 | 14 | 34 |
| ″ ″ * | 1 | 51 | 49 | 12 | 37 |
| ″ ″ * | 1 | 60 | 40 | 12 | 28 |
| Mixed lamellibranchs | 11 | 56 | 44 | — | — |
| Gastropods† | 50 | 42 | 58 | 10 | 48 |
| Asteroids | 1 | 76 | 24 | — | — |
| ″ | 1 | 76 | 24 | — | — |
| **B. Expressed as percentages of tissue weight (i.e., body weight without any shells, tubes, etc.)** | | | | | |
| *Cistenides* spp. | 70 | 70 | 30 | 14 | 16 |
| *Serripes groenlandicum* | 1 | 73 | 27 | 25 | 2 |
| *Cardium ciliatum* | 2 | 83 | 17 | 15 | 2 |
| *Macoma calcarea* | 12 | 75 | 25 | 21 | 4 |
| *Mya truncata* | 1 | 81 | 19 | 17 | 2 |
| ″ ″ | 1 | 76 | 24 | 21 | 3 |
| ″ ″ | 1 | 83 | 17 | 15 | 2 |

*Shells or tubes removed before dehydration.
†Mixed specimens of *Bela* spp., *Buccinum* spp., *Cingula* spp., and *Diaphana minuta*.

**Table 8.** Estimates of the amount of dry organic matter expressed as gm. per sq. m. in the investigated regions.

| Species | North Baffin Island: Sand | Sandy-mud | Mud | Godthaab Fjord | Disko Bugt: Fortune-bay | Egedes-minde harbour | Mudder-bugt | Laksebugt 50m. | 100m. | 170m. | Prawn grounds | Frustra-tion Bay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Foraminifera | — | — | — | — | — | — | — | — | — | — | — | — |
| Errant polychaetes and other species without shells or tubes | 1 | 3 | 2 | 5 | 7 | 2 | 2 | 1 | 2 | 1 | 11 | 1 |
| *Cistenides* spp. | — | 1 | — | 2 | 15 | 13 | 1 | 1 | — | — | — | — |
| Tubicolous sedentary polychaetes | 2 | 1 | 1 | — | — | — | — | — | — | — | — | — |
| Crustacea | — | 6 | 1 | 1 | — | — | — | — | — | — | — | 1 |
| Lamellibranchs | 11 | 30 | 15 | 8 | 11 | 17 | 2 | 1 | 5 | 1 | 1 | 4 |
| Gastropods | — | 1 | — | — | — | — | — | 1 | 1 | — | — | — |
| Echinoderms | 2 | 2 | 1 | — | — | — | — | — | — | — | 1 | 10 |
| Total dry organic matter per sq. m. | 16 | 44 | 20 | 16 | 33 | 32 | 5 | 4 | 8 | 2 | 13 | 16 |
| Total fresh weight of animals per sq. m. | 200 | 446 | 200 | 133 | 296 | 320 | 48 | 47 | 112 | 45 | 69 | 290 |
| Ratio: Dry organic matter: fresh weight | 1:13 | 1:10 | 1:10 | 1:8 | 1:9 | 1:10 | 1:10 | 1:12 | 1:14 | 1:23 | 1:5 | 1:18 |

**Table 9.** Quantitative data for infauna collected from Godthaab Fjord arranged in seven series each taken during one day between 9 May and 6 June 1956.

| Series no. | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | | | 7 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of hauls | 8 | | | 16 | | | 10 | | | 7 | | | 18 | | | 20 | | | 21 | | |
| Species | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. | Present in % of hauls | Mean no./sq. m. | Mean wt./sq. m. in gm. |
| Polynoid polychaetes | 63 | 46 | 2 | 75 | 31 | 1 | 70 | 24 | 1 | 86 | 41 | 1 | 83 | 61 | 2 | 95 | 52 | 2 | 95 | 38 | 1 |
| *Pholoe minuta* | 75 | 26 | — | 94 | 102 | 1 | 80 | 144 | 1 | 100 | 127 | 1 | 100 | 122 | 1 | 95 | 102 | 1 | 100 | 193 | 2 |
| *Phyllodoce* spp. | 13 | 3 | 1 | 25 | 4 | 5 | 20 | 2 | 4 | 42 | 1 | — | 6 | 2 | — | 10 | 2 | 2 | 43 | 12 | 14 |
| *Eteone* spp. | 38 | 4 | — | 19 | 3 | — | 70 | 11 | — | 42 | 4 | — | 11 | 1 | — | 10 | 1 | — | 48 | 5 | — |
| *Nephthys* spp. | 88 | 25 | 8 | 75 | 16 | 4 | 90 | 23 | 7 | 86 | 30 | 7 | 94 | 35 | 12 | 95 | 34 | 9 | 90 | 24 | 8 |
| Other errant polychaetes | 75 | 169 | 1 | 69 | 88 | — | 100 | 336 | 1 | 100 | 237 | — | 77 | 139 | — | 75 | 78 | — | 76 | 100 | — |
| *Scoloplos armiger* | 13 | 4 | — | 25 | 6 | — | 40 | 4 | — | 14 | 1 | — | 28 | 3 | — | 30 | 4 | — | 53 | 8 | — |
| *Ophelia* sp. | — | — | — | 56 | 13 | — | 40 | 6 | — | — | — | — | 22 | 3 | — | 40 | 6 | — | 95 | 40 | 2 |
| *Travisia forbesii* | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 24 | 3 | 3 |
| *Ammotrypane aulogaster* | — | — | — | — | — | — | — | — | — | — | — | — | 6 | 1 | — | 5 | 1 | 1 | 5 | — | — |
| *Cistenides* spp. | 100 | 61 | 2 | 94 | 100 | 6 | 90 | 141 | 9 | 100 | 146 | 3 | 100 | 218 | 13 | 95 | 161 | 12 | 95 | 262 | 28 |
| *Euchone analis* | 50 | 10 | — | 25 | 6 | — | 20 | 8 | — | 19 | 10 | — | 22 | 5 | — | 30 | 6 | — | 43 | 14 | 1 |
| Other sedentary polychaetes | 38 | 26 | — | 81 | 97 | 3 | 70 | 113 | 2 | 86 | 47 | 1 | 83 | 45 | 1 | 75 | 51 | 1 | 81 | 101 | 4 |
| Other unidentified worms | 63 | 30 | — | 44 | 11 | — | 10 | 6 | — | 29 | 46 | — | 39 | 12 | — | 35 | 7 | — | 29 | 4 | — |
| *Anonyx nugax* | 13 | 1 | — | 31 | 5 | — | 50 | 7 | — | 29 | 6 | — | 28 | 4 | 1 | 30 | 7 | — | 76 | 36 | 1 |
| Other amphipods | 100 | 79 | — | 94 | 63 | — | 100 | 177 | 2 | 100 | 124 | 1 | 77 | 59 | — | 90 | 99 | 1 | 90 | 435 | 5 |
| *Nebalia bipes* | 75 | 133 | 1 | 94 | 92 | 1 | 90 | 127 | 1 | 100 | 70 | — | 66 | 45 | — | 90 | 96 | 1 | 86 | 68 | — |
| *Axinopsis orbiculata* | 88 | 68 | 1 | 75 | 88 | 1 | 80 | 84 | 1 | 71 | 149 | 1 | 94 | 123 | 1 | 90 | 80 | 1 | 90 | 57 | 1 |
| *Serripes groenlandicum* | — | — | — | 19 | 2 | 30 | 10 | 1 | 1 | — | — | — | 28 | 3 | 1 | 20 | 2 | 10 | 10 | 1 | — |
| *Macoma calcarea* | 100 | 211 | 21 | 94 | 279 | 48 | 90 | 481 | 62 | 100 | 587 | 31 | 100 | 416 | 42 | 95 | 442 | 24 | 100 | 363 | 46 |
| *Mya truncata* | 63 | 30 | — | 94 | 78 | 4 | 80 | 249 | 6 | 100 | 144 | 2 | 94 | 31 | 2 | 85 | 90 | 3 | 100 | 114 | 11 |
| *Thracia* spp. | — | — | — | 25 | 4 | 1 | — | — | — | — | — | — | 6 | 1 | — | 15 | 2 | — | 67 | 19 | 2 |
| Other lamellibranchs | — | — | — | — | — | — | 20 | 2 | — | 14 | 1 | — | — | — | — | — | — | — | — | — | — |
| *Diaphana minuta* | — | — | — | 6 | 1 | — | 10 | 1 | — | — | — | — | 17 | 2 | — | 20 | 2 | — | 24 | 3 | — |
| *Cingula* spp. | 50 | 24 | — | 50 | 32 | — | 90 | 145 | 1 | 100 | 81 | — | 39 | 11 | — | 70 | 34 | — | 81 | 260 | 1 |
| *Buccinum* spp. | — | — | — | 6 | 1 | — | 10 | 1 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| *Bela* spp. | 38 | 8 | — | 63 | 9 | — | 60 | 11 | — | 57 | 26 | 1 | 72 | 14 | — | 70 | 16 | 1 | 67 | 14 | — |
| Other gastropods | — | — | — | — | — | — | 10 | 1 | — | 14 | 1 | — | — | — | — | — | — | — | — | — | — |
| Ophiuroids | — | — | — | 13 | 1 | — | — | — | — | — | — | — | 11 | 1 | — | — | — | — | — | — | — |
| *Cucumaria calcigera* | — | — | — | — | — | — | — | — | — | — | — | — | 6 | 1 | — | 15 | 2 | 1 | 5 | — | — |
| Other holothurians | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 5 | — | — |
| Totals | | 958 | 37 | | 1,132 | 105 | | 2,105 | 99 | | 1,879 | 49 | | 1,358 | 76 | | 1,377 | 78 | | 2,174 | 130 |

# МОРСКОЙ БЕНТОС (ИНФАУНА) АРКТИЧЕСКОЙ СЕВЕРНОЙ АМЕРИКИ

Количественные исследования морского бентоса (инфауны) были произведены в Арктик Бей и Понд Инлет (северная Баффинова Земля) в 1954 и 1955 гг., в Годхааб и Годхавн (западная Гренландия) в 1956, и в Фрустрейшен Бей (Фокс Бассейн) в 1957 г.

Явно выраженные *Macoma*-сообщества с биомассой обычно выше 200 грм. на 1 м$^2$. (живой вес) были встречены на мелководьи, на глубине до 50 м., в большинстве исследованных участков. Сообщество *Chiridothea sabini* было найдено на мелководьи в Фрустрейшен Бей. Foraminifera-сообщества с биомассой обычно меньше 100 грм. на 1 м$^2$. были обнаружены на глубине свыше 50 м. в северной части Баффиновой Земли, а также в заливе Диско.

Биомасса бентоса, выраженная в весе сухого органического вещества, была обычно 15 грм., или больше, на 1 м$^2$. на глубинах до 50 м., и 10 грм., или меньше, на 1 м$^2$. на бо́льших глубинах.

Эти исследования, равно как и произведенные раньше в Гренландии, показывают, что *Macoma*-сообщества встречаются во многих местах в арктической северной Америке, но лишь там, где температура морской воды, постоянно или сезонно, ниже-арктическая, то-есть 0—5°C. На крайнем севере эти сообщества оказываются приуроченными к мелководьям, нагреваемым летней инсоляцией до нижне-арктического уровня. Сообщества *Gomphina fluctuosa* и *Portlandia arctica* в нижне-арктических условиях среды приурочены повидимому к определенным типам данных отложений: крупный песок для первого сообщества и тонкий ил для второго. Сообщества *Chiridothea sabini* были найдены только на мелководьи в двух местах, оба повидимому с постоянной верхне-арктической температурой, то-есть ниже 0°C. Сообщества foraminifera и *Astarte crenata* были найдены исключительно на глубинах вне влияния инсоляции, где температурные условия могут быть либо нижне- либо верхне-арктические.

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