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Norwegian Research Report, 1963

Norwegian research of interest to ICNAF was carried out operating from the Institute of Marine Research, by the R/V "G.O. Sars", in Subarea 1 (7 April -6 May) (Fig. 1), and by the R/V "Johan Hjort" in East Greenland waters (12 August-16 September) (Fig. 2).

SUBAREA 1

A. Status of the Fisheries

I. Cod

From 22 April-6 May, fishing experiments with trawl and bottom long-line were carried out from just north of Holsteinsborg in the north to Nunarsuit in the south and west to the drift ice border (Fig. 1). The experiments showed that cod were present on all the banks investigated. Heavy concentrations of cod were found on Banan Bank and the northwestern part of Fylla Bank. On Banan Bank some cod were pelagic and good records were obtained using the echo sounder.

Both in the trawl and bottom long line catches the mean length of the cod varied very much. The smallest fish were taken with trawl on the northwestern part of Fylla Bank, mean length 57.2 cm and on the northern part of Lille Hellefisk Bank, mean length 59.0 cm. The largest fish were taken on bottom long line on Fiskenaes Bank and off Sukkertoppen, mean length 68.3 cm and 68.2 cm respectively. The largest fish in the trawl catches, mean length 67.9 cm, were found on Dana Bank. The mean length of three trawl catches on the Banan Bank was 63.8 cm. On the same bank the mean length in one bottom long line catch was 63.9 cm. The overall mean length in the trawl catches was 62.6 cm and in the bottom long line catches 66.4 cm. This is a very marked decrease in mean length from last year when the mean length on bottom long line was 70.47 cm.

The age distribution in the total catches on bottom long line and in the total trawl catches are shown on Fig. 3 and 4. From the figures we see that both the 1947 and 1950 year classes are of no importance. Further, the 1953 year class has decreased considerably, from about 20% of the total catch on bottom long line last year to about 5% of the total bottom long line catch and slightly less than 3% of the total trawl catch this year. Also the 1956 year class has diminished, and in all only about 29% of the total long line catch and about 16% of the total trawl catch are of fish 7 or more years old. In 1962 slightly less than 49% of the catch on bottom long line belonged to these year classes. The 1957 year class, over all mean length in all catches 64.45 cm, is strongly dominant and has increased in importance from about 36% to 45% of the total catch on bottom long line. In the trawl catches this year class constitutes 50.2%.

Last year a slight increase in the mean length of the cod off West Greenland was expected for 1963. Instead of the increase a decrease in mean length has found place. This must for some part be due to the great decrease in importance of the 1953 year class. A decrease in this year class was expected but not that much. On the other hand all the catches are taken in the spawning season and so it is possible that some big late spawners have not yet joined the shoals fished. It is therefore possible that the overall mean length in the "G.O. Sars" catches is not representative for the West Greenland cod population but it is thought that the difference is not big and that our age and length distribution give us a good hint.

Both for the bottom long line and the trawl fishery off West Greenland in 1964 it is expected that fish which are 8 or more years old will play a very little part in the catches. The 1957 year class will be dominant and probably increase in importance. It is possible that the mean length of the cod will increase but this will depend upon the strength of the year classes which are younger than seven years.

## B. Special Research Studies

### I. Environmental Studies

Research included studies of the hydrography, distribution and abundance of cod eggs and larvae and zooplankton from 7 April-22 April as part of Norwegian participation in the ICNAF Environmental Survey (NORWESTLANT 1-3) in Subarea 1. This research is reported separately in 1964 Meeting Document No. 25 "Report on Norwegian participation in NORWESTLANT I, April, 1963".

## EAST GREENLAND

### A. Status of the Fisheries

#### I. Cod

In 1963 fifteen Norwegian commercial fishing vessels were working in East Greenland waters. Some of these were operating both for cod and halibut. In the cod fishery both hand line and bottom long line was used. First in the season the fishery for cod was relatively good, but later on the difficult ice situation hampered the fishery very much, and the catches were very poor.

"Johan Hjort" worked off East Greenland in the late part of the fishing season and concentrations of cod were not found by means of the echo sounder or by fishing experiments with bottom long line on the banks. Relatively good concentrations of cod were located in the mouth of Prins Christian Sund and in the Angmagssalik Fjord. Due to the ice conditions other fjords could not be investigated.

The age distribution of the cod caught on hand line in the mouth of Prins Christian Sund is shown on Fig. 5. The 1947, 1950 and 1953 year classes still play in the catches as they together constitute about 14.5% of the total catch, but the young fish dominates. The 1956 year class is the most important. More than 41% of the total catch belongs to this year class. The 1957 year class has diminished compared with the age distribution last year, but last year the samples were taken in another area. Together the 1956 and 1957 year classes constitute slightly more than 55% of the total sample. In 1962 about 50% of the catch constituted of these two year classes.

The overall mean length in 1963 was 77.0 cm. This is a very marked increase compared with the catches from last year in the North Fjord in Skjoldungen and in the Angmagssalik area where the mean length were 73.6 and 73.3 cm respectively. The cause to this increase in mean length must for a part be the relatively increased importance of the 1956 year class, mean length 74.1 cm, and the decrease of the 1957 year class. Another factor which has played a part in the increase of the mean length is that when last year about 37% of the fish in the total catch was more than 6 years old, in 1963 about 39% was more than 7 years old. If the catches from 1962 and 1963 are comparable, it is expected that the mean length of the cod in the Norwegian hand line fishery off East Greenland will be approximately the same in 1964 as in 1963. The 1956 and 1957 year classes probably will have the same importance in the catches while the older year classes will decrease.

## B. Special Research Studies

### I. Environmental Studies

In 1963 the Norwegian research vessel "Johan.Hjort" worked in East

Greenland waters between 17 August and 10 September. Compared with the previous years there were heavy concentrations of drift ice off the Southeast Greenland coast this year. Off Cape Dan the ice disappeared in the middle of August. Further south the drift ice was extending 15-20 nautical miles offshore. Between Prins Christian Sund and Cape Bille there seemed to be no drift ice on the 23 August. Further north was then observed continuous drift ice to Cape Møsting. Most probably there were also plenty of drift ice north of this position. At this time the ice belt covered the sea to a distance of 20 nautical miles from Skjoldungen and Cape Møsting. At the end of the cruise (6 September) there were also plenty of ice along the coast in this area.

1. Hydrography.

Fig. 2 shows the route and the net of stations from the cruise. During the cruise the following sections were worked:

1. From Prins Christian Sund and eastwards:  
60°03'N, 42°55'W - 60°03'N, 38°50'W
2. Between Cape Tordenskjold and Ocean Weather Station 'Alfa'  
61°24'N, 42°10'W - 62°00'N, 33°00'W
3. From Cape Møsting and southeastwards:  
63°35'N, 39°35'W - 62°44'N, 36°45'W
4. From Cape Dan and southeastwards:  
65°26'N, 36°50'W - 64°19'N, 34°00'W
5. Across the Denmark Strait from Cape E. Holm to Bjargtangar:  
67°45'N, 31°49'W - 66°46'N, 28°32'W

In these sections together 57 stations were worked. In connection with the fishing experiments 7 hydrographic stations were taken. Figs. 6-10 show the isotherms in the sections. Compared with the hydrographic situation in 1961 and -62 the continuous temperature observations at the surface showed that cold water, temperature near 0°C, had a great extension this year. South of Cape Møsting this water was found relatively wide offshore. It seems safe to conclude that the reason of this was the melting of ice which took place in this area. The sections at Prins Christian Sund, Cape Tordenskjold and Cape Møsting showed namely that the cold water was limited to the surface layer. From a depth of 50 m to the bottom the temperature was about the same as in 1962 or probably a little higher. The bottom temperatures at depths from 200 to 500 m were between 3 and 5°C.

The section off Cape Dan was worked the 26 August, which is about two weeks after the drift ice had disappeared. It was then found higher temperatures than in 1962, both at the surface and in the deeper layers. The influx of warm water of Atlantic origin seemed therefore to be relatively heavy at this time. The bottom temperatures at depths from 200 to 500 m were also here between 3 and 5°C.

The most characteristic in the section across the Denmark Strait was that the Polar Current was not only limited to the coastal water. The current had in that area more branches and the main branch was found over the steepest slope on the western side of the Denmark Strait, which is situated nearer to Iceland than to Greenland. Here temperatures down to -1.73°C were found. Farther west over the eastern slope of the Øst Bank, one branch with water of temperature down to -1.5°C was located. A third branch was located near to the coast of Greenland.

Over the northern slope of the Kangerdlugsuak Deep warm water with temperatures up to 4°C was found, and the bottom temperature on the Øst Bank was above 3°C. This water is of Atlantic origin and flows towards northwest along the northern slope of the Kangerdlugsuak Deep.

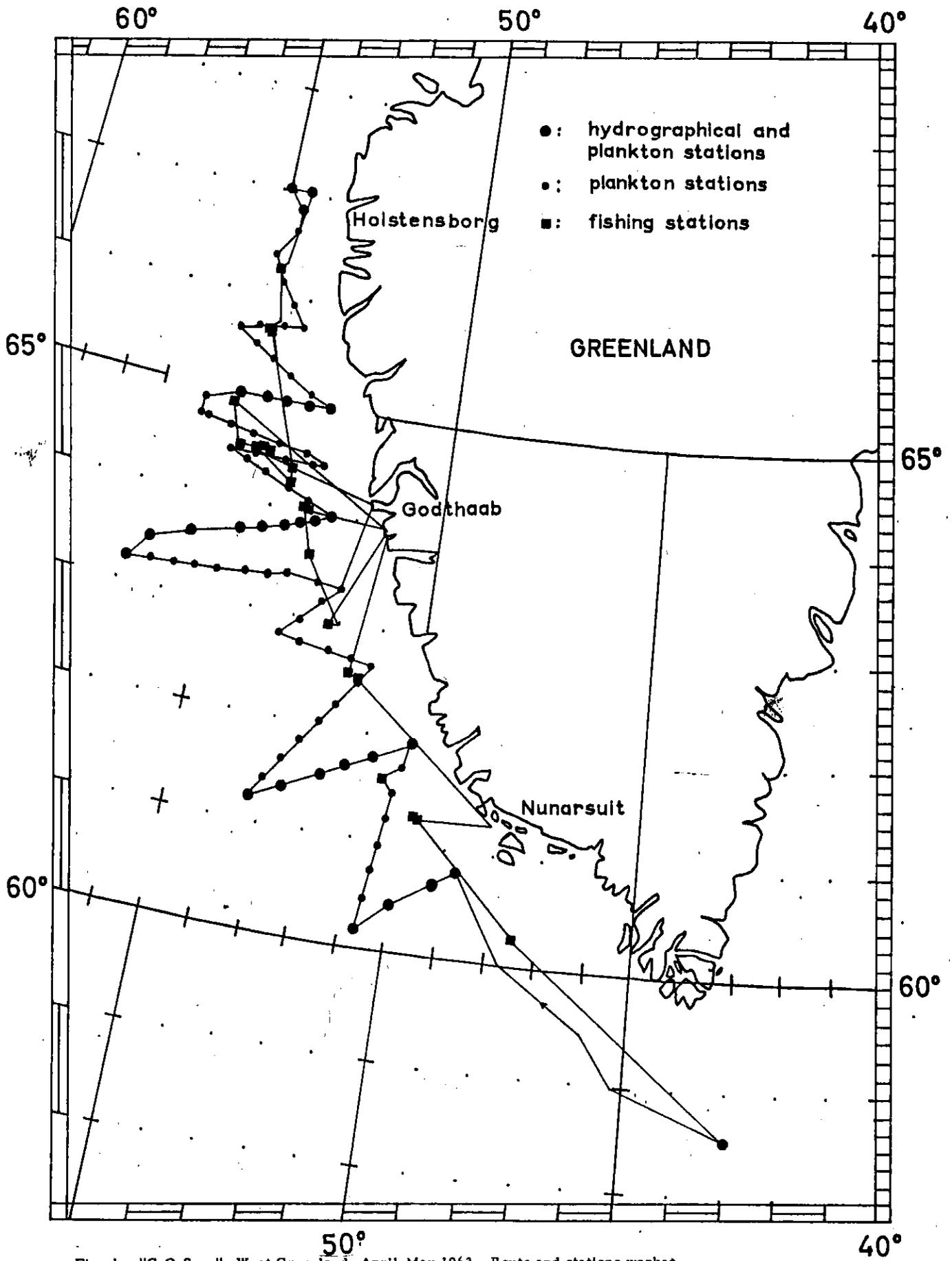


Fig. 1. "G.O. Sars", West Greenland, April-May 1963. Route and stations worked.

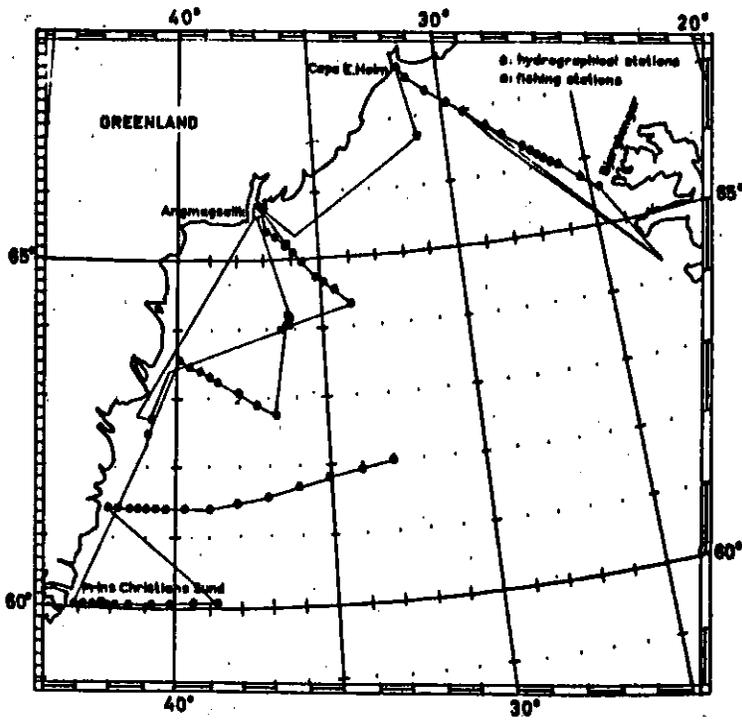


Fig. 2. "Johan Hjort", East Greenland, August-September 1963. Route and stations worked.

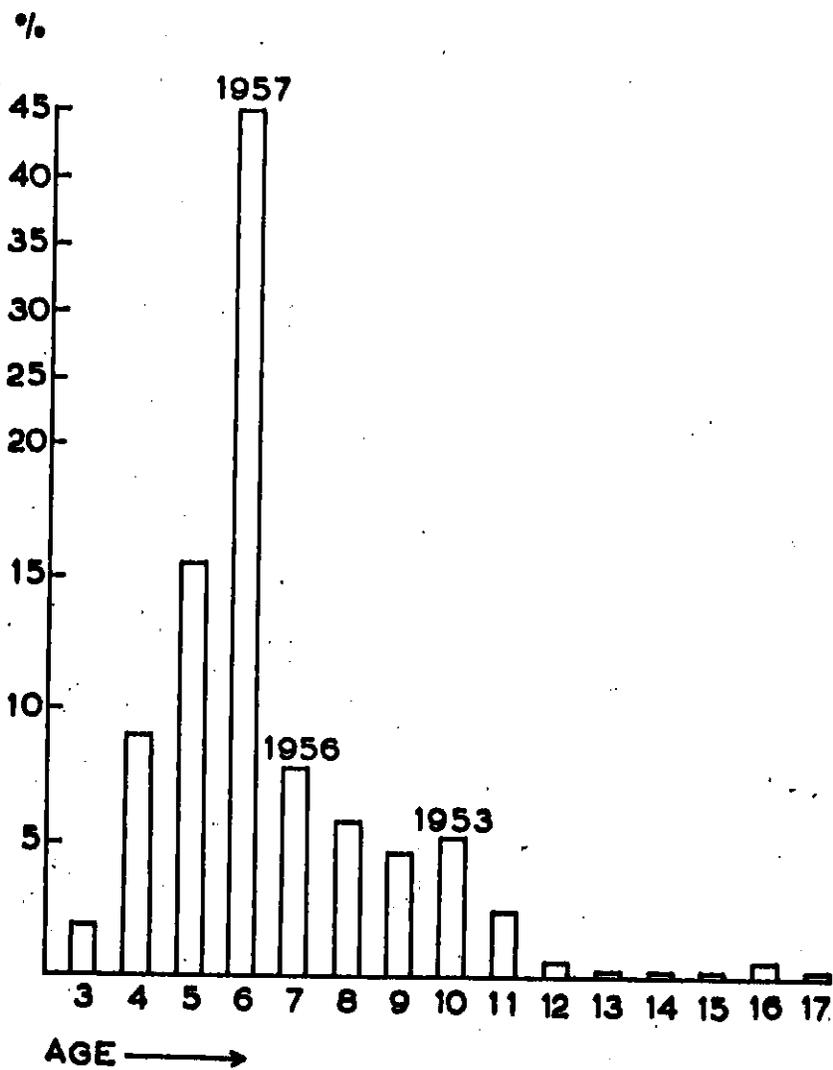


Fig. 3. "G. O. Sars", West Greenland, April-May 1963. Cod. Age distribution. Total bottom long line catch.

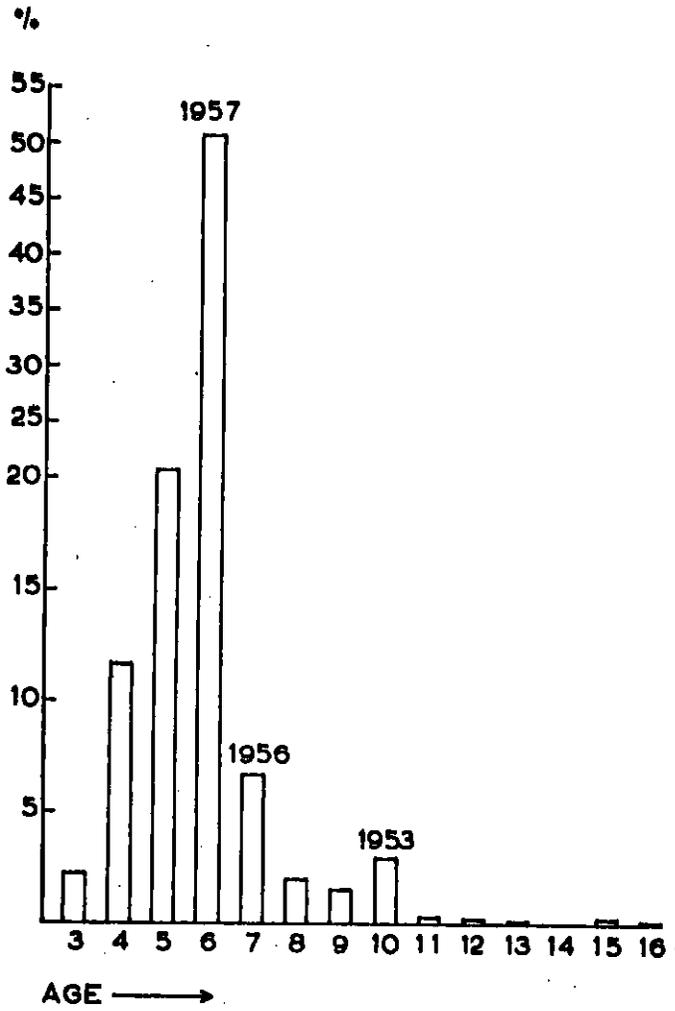


Fig. 4. "G. O. Sara", West Greenland, April-May 1963. Cod. Age distribution. Total trawl catch.

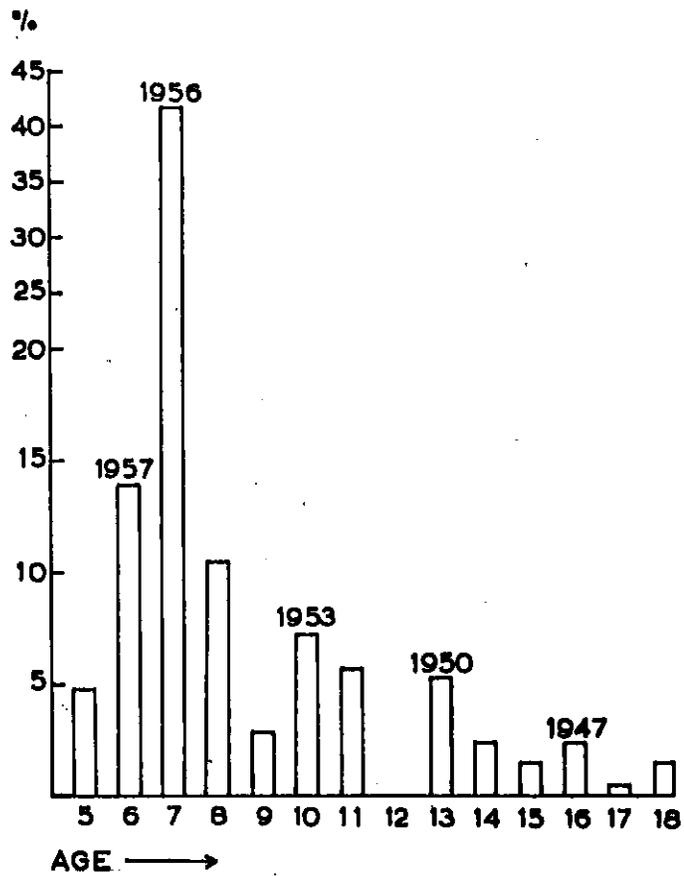


Fig. 5. "Johan Hjort", East Greenland, August-September 1963. Cod. Age distribution. Total hand line catch.

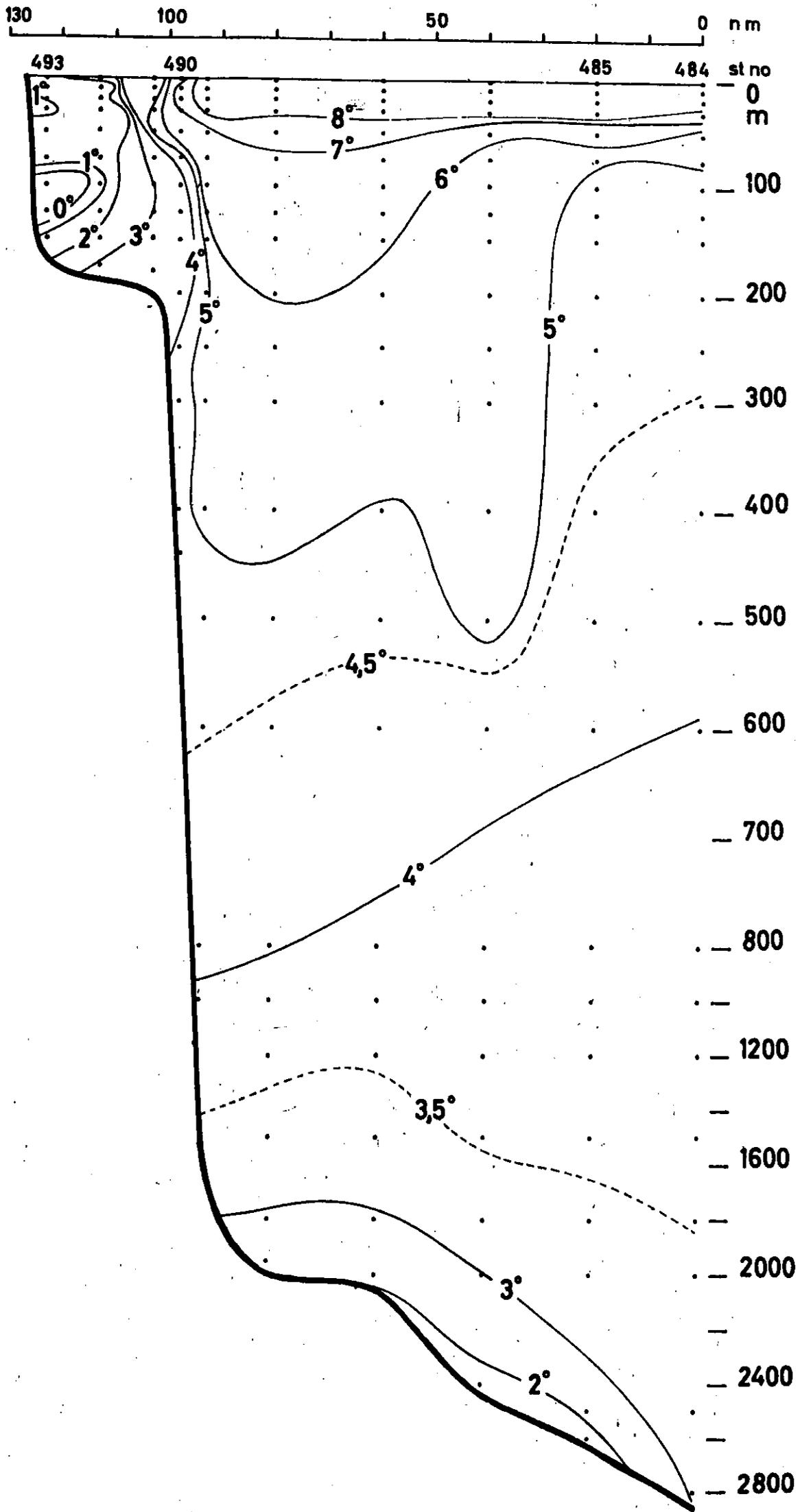


Fig. 6. "Johan Hjort", East Greenland, August-September 1963. Section eastwards from Prins Christian Sund. Vertical distribution of temperature ( $^{\circ}\text{C}$ ).

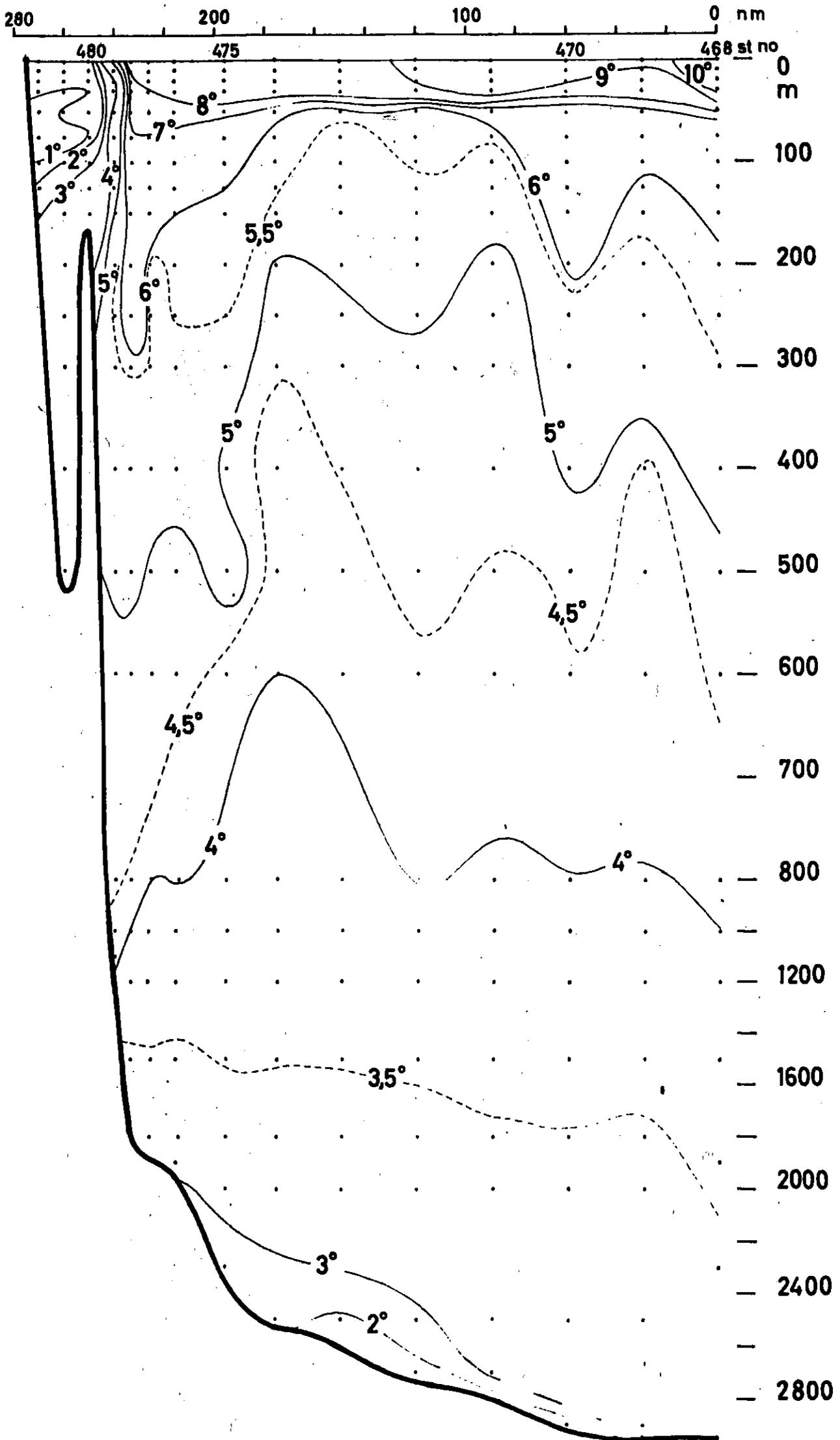


Fig. 7. "Johan Hjort", East Greenland, August-September 1963. Section between Cape Tordenskjold and Ocean Weather Station "Alfa". Vertical distribution of temperature ( $^{\circ}\text{C}$ ).

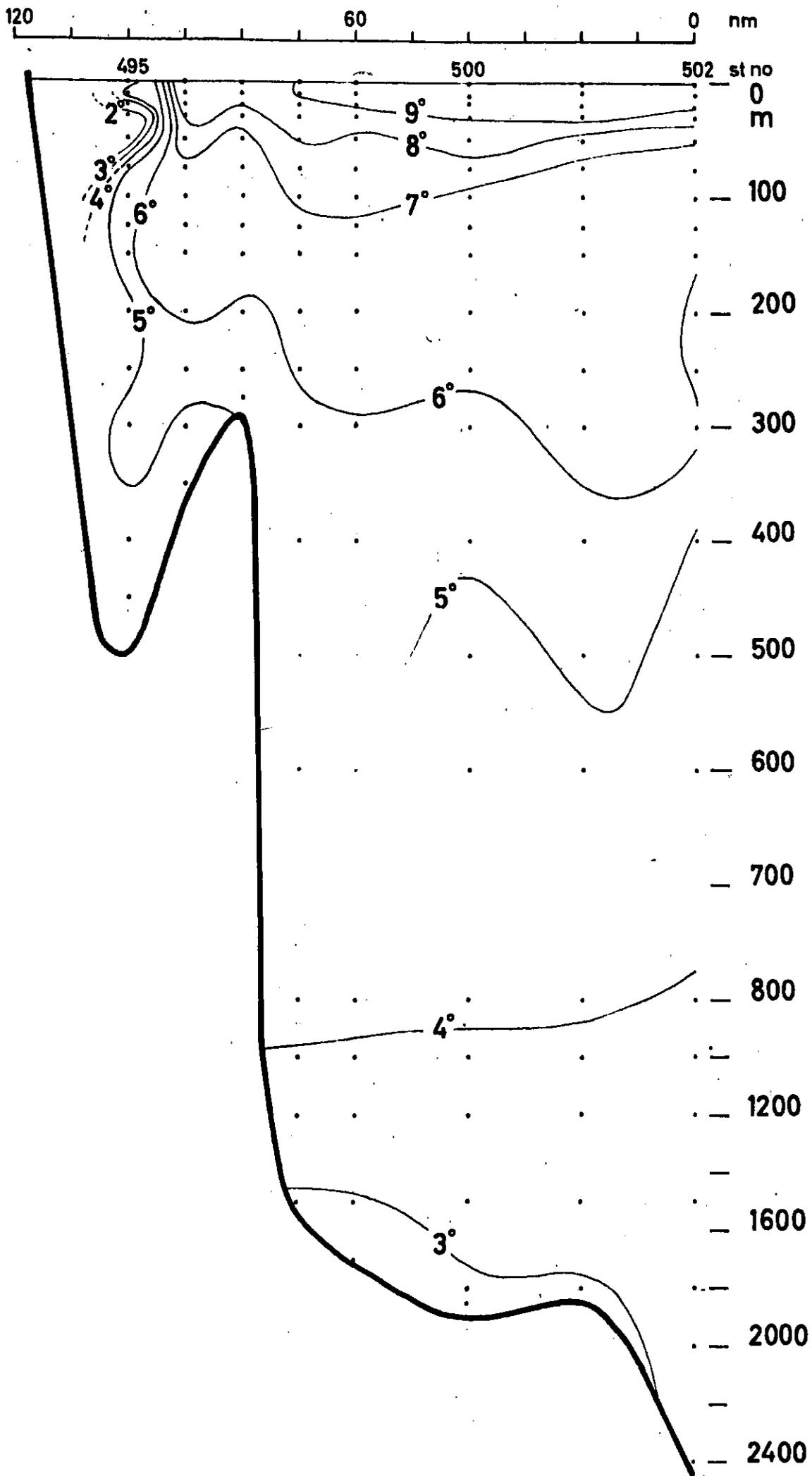


Fig. 8. "Johan Hjort", East Greenland, August-September 1963. Section towards south-east from Cape Dan. Vertical distribution of temperatures ( $0^{\circ}\text{C}$ )

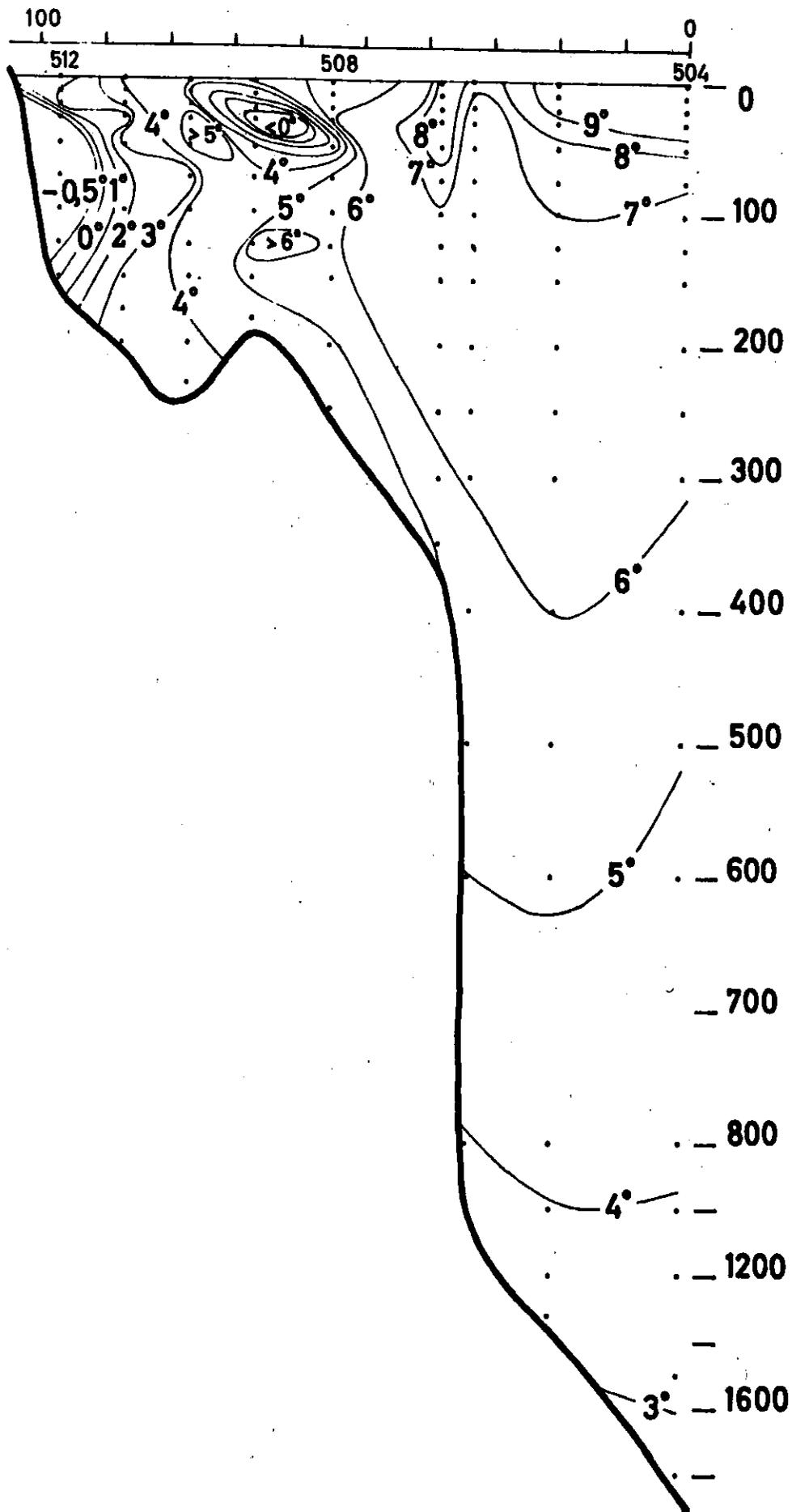


Fig. 9. "Johan Hjort", East Greenland, August-September 1963. Section towards south-east from Cape Dan. Vertical distribution of temperature (°C).

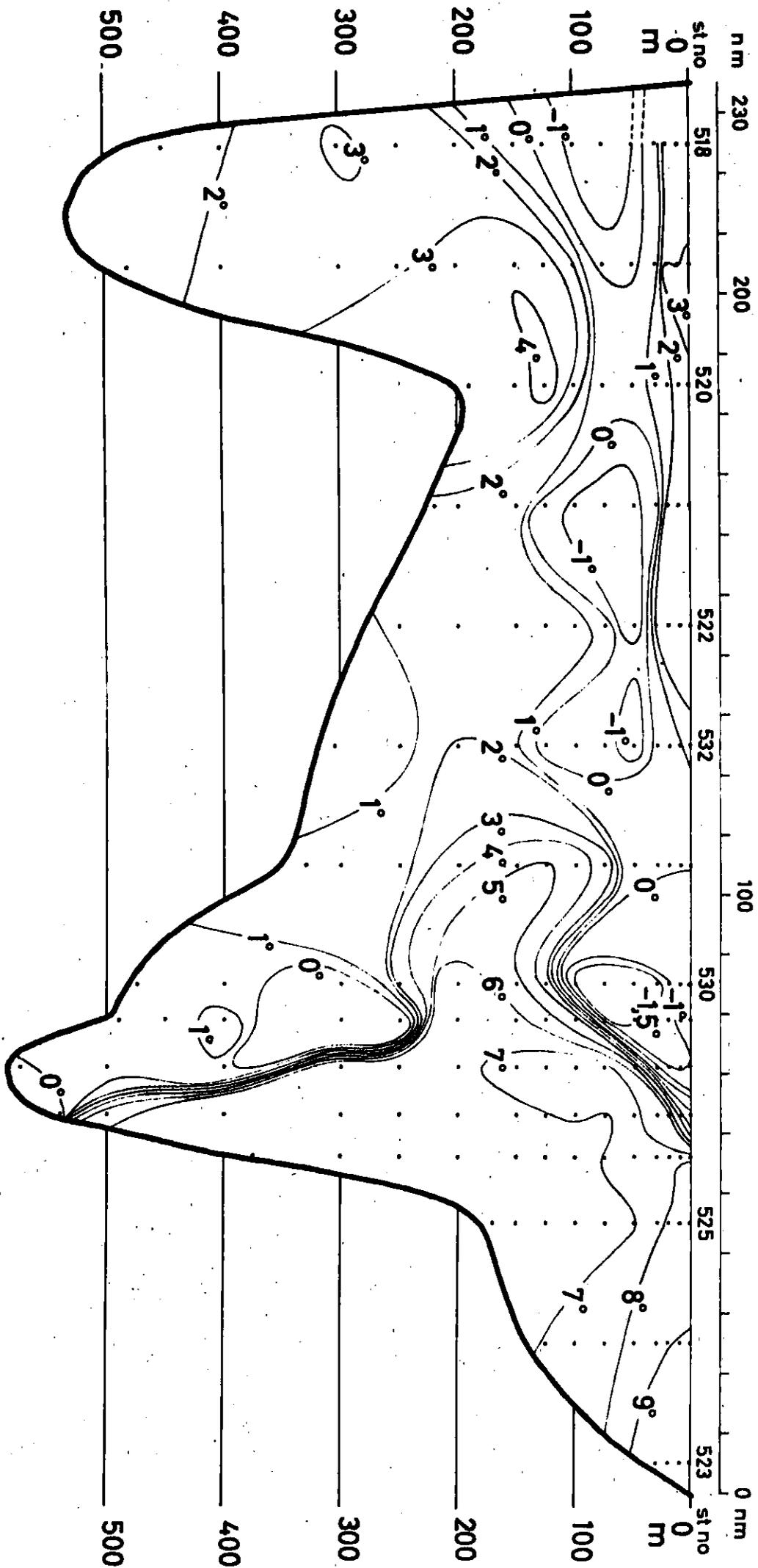


Fig. 10 "Johan Hjort", East Greenland, August-September 1963. Section across the Denmark Strait. Vertical distribution of temperature ( $^{\circ}\text{C}$ ).