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by Erling Bratberg and Johan Blindheim

Subarea 1

In 1966 the Norwegian R/V Johan Hjort worked off West Greenland from 29 March to 4 May. As in previous years, the main area investigated was between Nunarsuit and the Holsteinsborg Deep. During the cruise 18 localities were fished with bottom longline, and 16 hauls with trawl were carried out (Fig. 1).

A. Status of the Fisheries

I. Cod

1. Age and length composition of the commercial stock. In 1966 the 1960 year-class still dominates in the total catch on bottom longline. It has increased a little in importance, from 40.2% in 1965 to 42.0% in 1966 (Fig. 2 and 3). The 1957 year-class plays about the same part in the total bottom longline catch as in 1965 when it constituted 11.6% of the total catch. But compared to the total catch in 1964, the 1957 year-class has decreased considerably from 32.2% in 1964 to 10.0% in 1966. On the other hand, the proportion of cod 7 or more years old has been approximately the same for the last two years, about 37% and compared with 1964 this proportion has increased by 6.7%. The 1961 year-class, which entered into the bottom longline catches in 1965, is also of importance in 1966 as it constitutes 19.5% of the total catch on bottom longline.

In the total trawl catches in 1966, the 1960 and 1961 year-classes play the same part, as they both constitute about 41%. This is a marked change from 1965 when the 1960 year-class constituted 54% and the 1961 year-class 15.8% of the catch (Fig. 4 and 5). Also in the trawl catch, the proportion of 7 or more year-old cod has been almost constant in 1965 and 1966 but compared with the catch in 1964 this proportion has decreased from more than 29% in 1964 to only 14.7% in 1966.

The age distribution in the catches from covered hauls in 1966 (codend + cover) (Fig. 6) shows, to some degree, the same features as the age distribution from the codend only. The 1960 and 1961 year-classes which are also predominant in the covered hauls, together constituting 72.8% of the catch. On the other hand the proportion of cod 7 or more years old is lower while the proportion of small cod is much higher than in the not covered hauls. The 1963 year-class especially shows a marked difference.

The length distribution in the total bottom longline catch was approximately the same in 1966 as in 1965 (Fig. 7 and 8) and the overall mean length was 68.6 cm in 1965 and 68.5 cm in 1966. However, the mean length varied greatly from one locality to another (Table 1). The smallest fish were found on the Fylla Bank, mean length 58.7 cm and on the northwestern part of Lille Hellefiske Bank, mean length 63.3 cm. Taking only the southern banks into account, the mean length has increased considerably, from 65.3 cm in 1965 to 70.3 cm in 1966. On the northern banks the mean length seems to have decreased but this decrease may not be real as there were only two samples from the same area in 1965 and the samples were probably not representative for the cod in this area.

The station (18/1966) west of Banana Bank is interesting. The depth of this station is 500-600 m while all the other stations are 180-300 m deep. This locality is the only one where cod are found at such a depth at this time of the year. The cod are very big, mean length 84.9 cm in 1966, and do not

seem to mix with the cod in shallower water.

The mean length of the cod in the trawl catches was 63.0 cm in 1966. This mean length is based only on samples from one locality but compared to 1965 the mean length was almost the same at this locality.

2. Forecast for the cod fisheries. For the Norwegian bottom long-line fishery off West Greenland it is expected that the 1960 year-class will dominate in the catches, but compared to 1966 it will probably decrease in strength. The older year-classes will be of decreasing importance while the 1961 year-class will play a more important part. Due to the growth of the 1960 year-class, there may be a small increase in the overall mean length in the catches.

In 1967, the 1960 and 1961 year-classes will dominate the trawl catches. These two year-classes will be of approximately the same importance. However, compared to the catches in 1966, the 1960 year-class will show a decreasing tendency while the 1961 year-class will be of growing importance. The 1963 year-class seems to be promising but for the trawl fishery in 1967 it most probably will be of minor importance. The overall mean length in the trawl catches will be almost the same as in 1966.

B. Special Research Studies

I. Environmental Studies

1. Hydrography. This year the hydrographic program comprised one section off East Greenland and 5 sections in the waters off West Greenland. The observations in West Greenland waters were made between 29 March and 3 April. The whole section across Noname Bank could not be worked due to heavy weather conditions, but the remaining sections were worked in accordance with the program as shown in Fig. 1.

Temperature observations were made at all fishing stations by means of bathythermograph. At depths greater than 250 m reversing thermometer observations were made in addition.

The Irminger component of the West Greenland Current was very well developed at this time, and the greater part of its water masses was of temperatures significantly in excess of 5.0°C with corresponding salinities above 34.95% (Fig. 9 and 10). Off Frederikshaab salinities of 35.00% were observed at 300 to 400 m depth, and off Fylla Bank one salinity of practically 35.00% was observed at 600 m at some distance from the slope. Compared with the years since 1959 when the investigations started in this season, these are the highest salinities which have been observed in the Irminger component of the West Greenland Current. The extent of the Irminger component was also great in relation to the previous years as temperatures above 5.0°C were observed between approximately 300 and 800 m depth off Fylla Bank. Off Lille Hellefiske Bank temperatures above 5.5°C were observed between about 250 and 600 m with a maximum of 5.86 at 300 m. The salinities here were between 34.95 and 34.99% .

The surface layer was cold in relation to the preceding years. South of about 62°30'N its temperatures were below 0°C as far as approximately 20 nautical miles off the coast. North of the mentioned latitude no temperatures above 0°C were observed except at the most western station in the section across Fylla Bank. In the greater part of this section, the temperatures were below 0°C at depths less than 50 m. There were also temperatures below -1.0°C close to the coast and also at some distance from the shelf (Fig. 10). The low temperatures in the upper layers were seemingly connected with a very stable stratification. This was due to relatively low salinities in the upper layers, resulting in great vertical density gradients. The convection because of the winter cooling was therefore limited to the upper layers.

South of 62°N the surface layer seemed to be influenced by the great Atlantic inflow of the West Greenland Current. Here a sharp front was found along the coast, and outside this the temperatures were rather high.

The ice conditions were favourable. Along the east coast between Cape Tordenskjold and Cape Farewell, the ice extended to about 40 nautical miles

off the coast. This ice belt continued around Cape Farewell. North of Julianehaab Bay only a few icebergs were observed. Off Fylla Bank and Lille Hellefiske Bank, the ice border has not been found so far to the west since 1962.

2. Particle recordings. The particle distribution was recorded continuously at 5 m level with Berge's transparency meter. A further study of the sampled material will be prepared.

II. Biological Studies

1. Cod eggs. Sampling of cod eggs was carried out on all the hydrographical and fishing stations. A standard Hensen net was used in vertical hauls 100-0 m, in shallower water from bottom to surface. The sampled material has not been worked up in detail but the preliminary results seem to indicate that very few cod eggs were found even though most of the cod had completed spawning.

2. Cod distribution. The survey with the echo sounder and the bottom longline fishing showed that shoals of cod were present in the whole area investigated. Most of the cod were found on the western slopes of the Banks in depths from about 200 to 300 m. Pelagic concentrations of cod were found on Fylla Bank, on the southeastern part of Lille Hellefiske Bank and in the southern part of the Holsteinsborg Deep.

Table 1. R/V Johan Hjort, West Greenland 1965 and 1966. Mean length of cod at different fishing stations.

Station			Position			Mean length (cm)	
1965	1966	Bank	1965	1966	Gear	1965	1966
1	1	Off Nunarsuit	60°34'N,48°49'W	60°20'N,48°10'W	Bottom	65.5	71.8
2	2	Off Nunarsuit	60°34'N,48°49'W	60°36'N,48°32'W	longline	64.1	68.7
3	14	Noname Bank	61°22'N,50°07'W	61°46'N,50°40'W	"	66.9	76.0
	15	Noname Bank		61°26'N,50°24'W	"		73.1
	12	Frederikshaab Bank		62°18'N,50°57'W	"		70.3
	13	Frederikshaab Bank		62°11'N,50°36'W	"		64.4
5	11	Dana Bank	62°34'N,51°18'W	62°30'N,51°15'W	"	67.3	68.7
6	10	Dana Bank	62°31'N,51°20'W	62°50'N,51°46'W	"	68.2	69.7
4	16	Fiskenaes Bank	62°59'N,51°55'W	63°15'N,52°17'W	"	62.2	73.0
8		Fiskenaes Bank	63°29'N,52°13'W		"	63.8	
7		Fiskenaes Bank	62°55'N,51°30'W		"	61.8	
14	17	Fiskenaes/Fylla Bank	63°30'N,52°05'W	63°31'N,52°14'W	"	67.9	67.5
		Total Southern Banks			"	65.3	70.3
	9	Fylla Bank		64°10'N,53°14'W	"		58.7
	7	Lille Hellefiske Bank		64°18'N,54°44'W	"		65.1
	6	Lille Hellefiske Bank		64°13'N,54°25'W	"		66.3
11	18	West of Banana Bank	64°26'N,54°24'W	64°23'N,54°37'W	"	88.7	84.9
10	8	Lille Hellefiske Bank	65°00'N,54°30"W	65°00'N,53°06'W	"	66.5	66.9
	3	Lille Hellefiske Bank		66°29'N,54°26'W	"		65.1
	4	Lille Hellefiske Bank		66°05'N,55°17'W	"		63.3
		Total Northern Banks	(St.11/1965 and 18/1966 excluded)		"	66.5	64.2
		Total Northern Banks	(St.11/1965 and 18/1966 included)		"	77.6	67.2
		Total			"	68.6	68.5

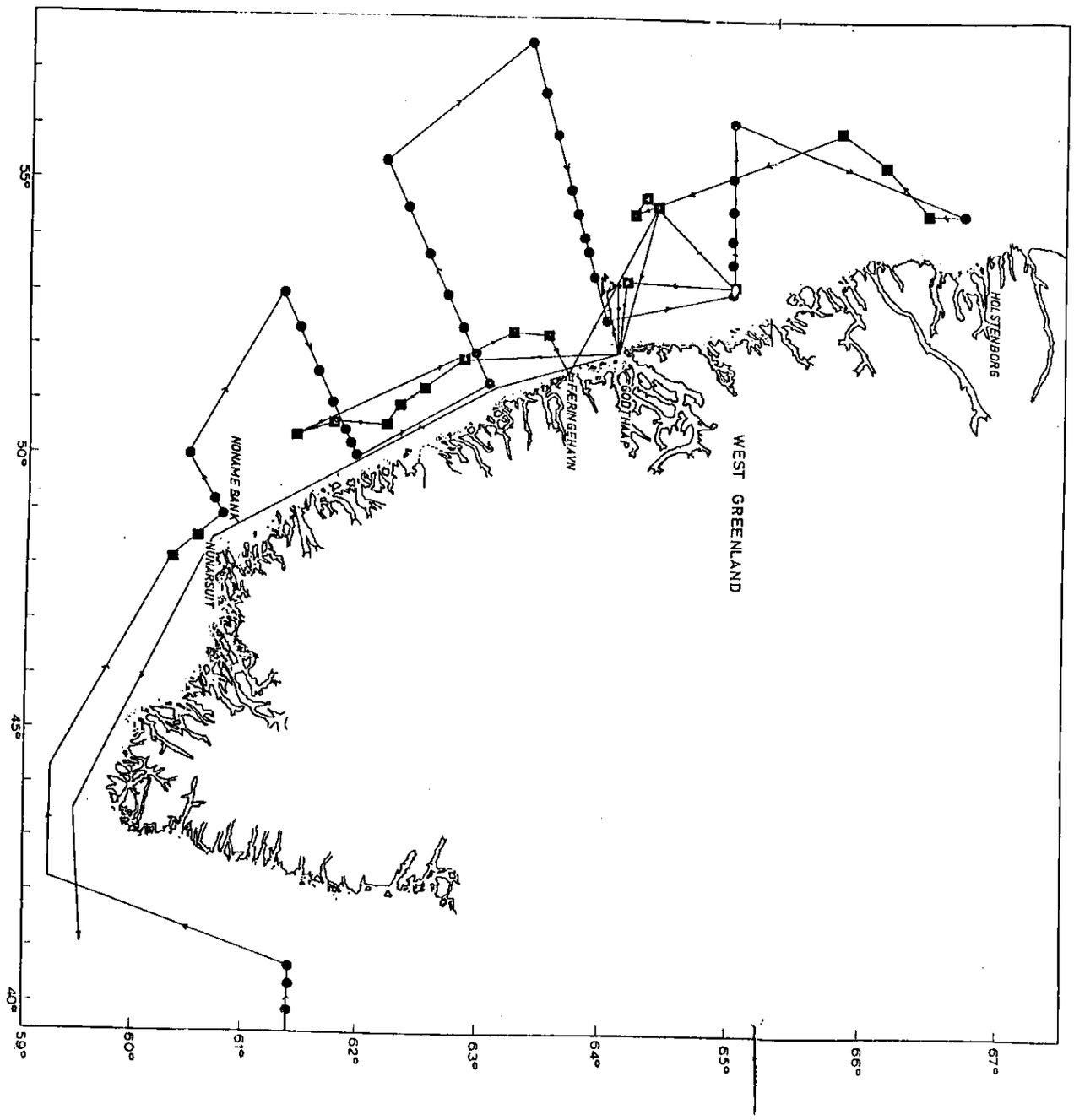

Fig. 1. Johan Hiort, West Greenland, March-May 1966. Part of route and net of stations.

●: hydrographical station; ■: bottom longline station.

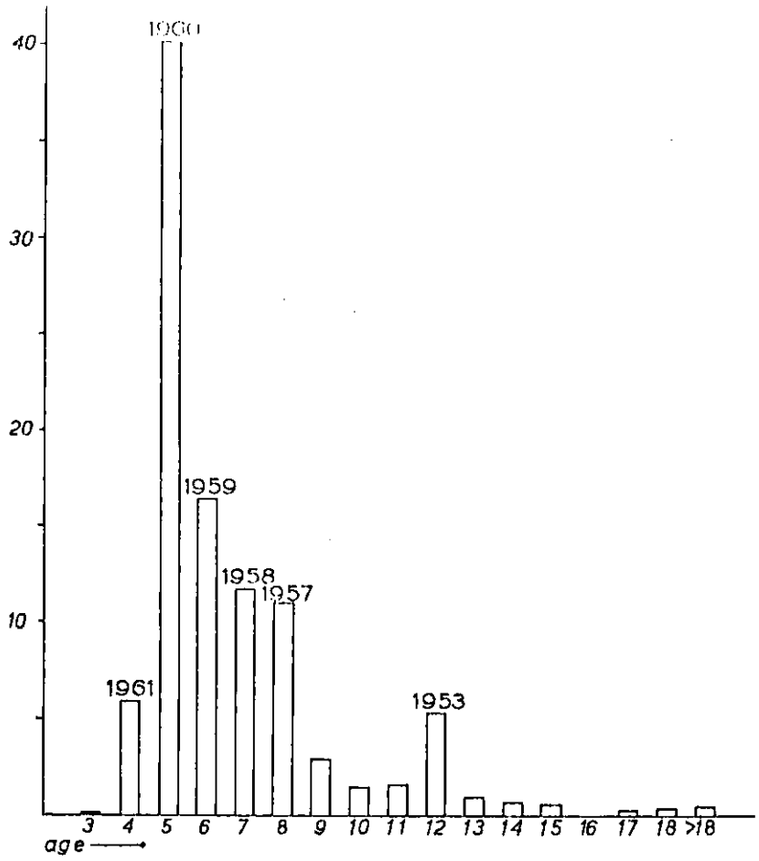

Fig. 2. Johan Hjort, West Greenland, April-May 1965. Cod. Age distribution. Total bottom longline catch.

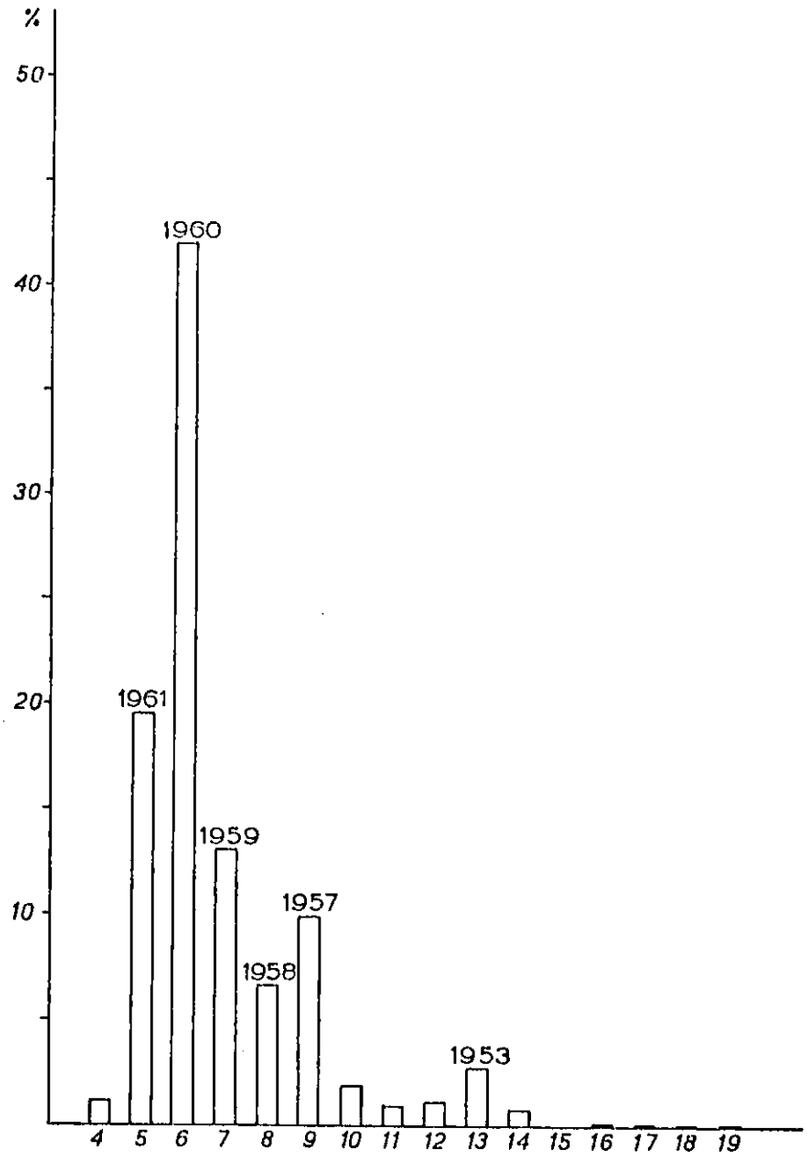

Fig. 3. Johan Hjort, West Greenland, March-May 1966. Cod. Age distribution. Total bottom longline catch.

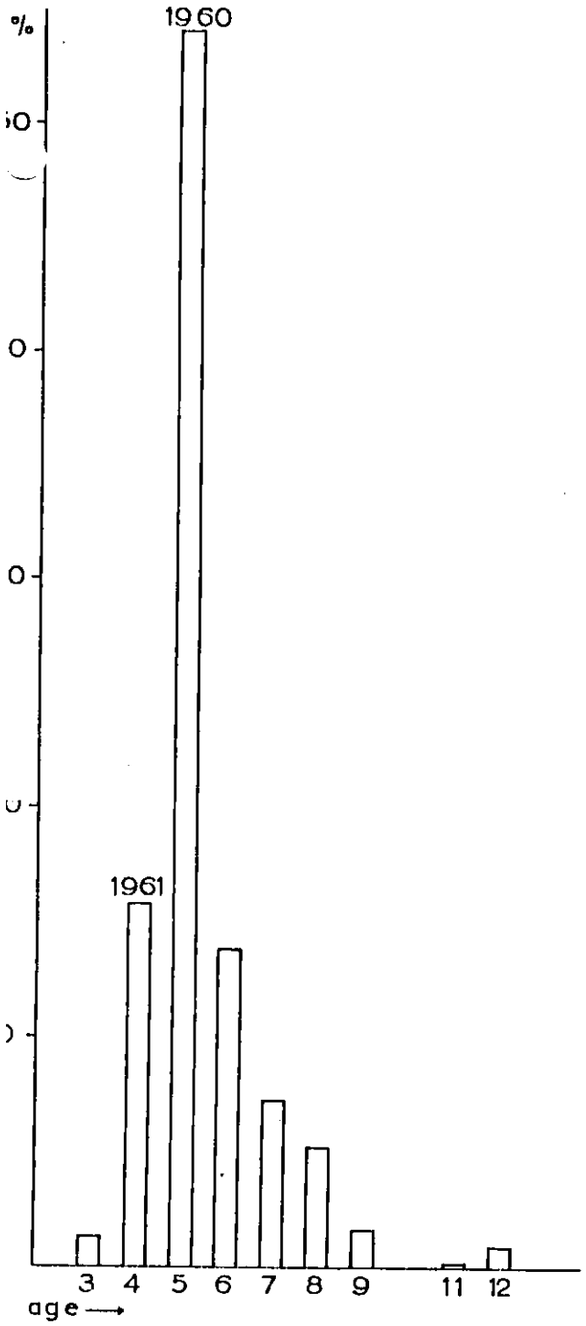

Fig. 4. Johan Hjort, West Greenland, April-May 1965. Cod. Age distribution. Total trawl catch.

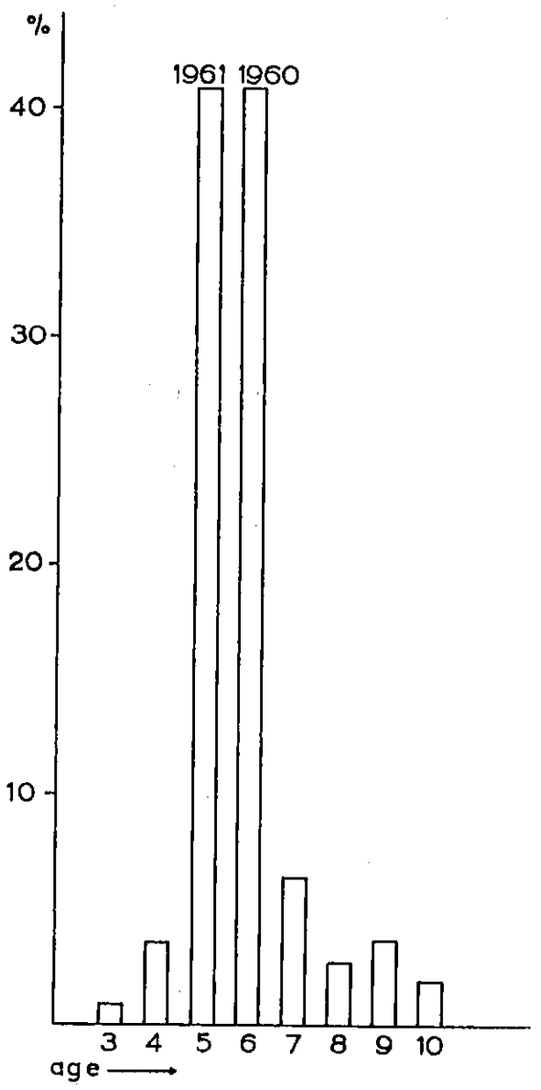

Fig. 5. Johan Hjort, West Greenland, Total trawl catch. March-May 1966. Cod. Age distribution.

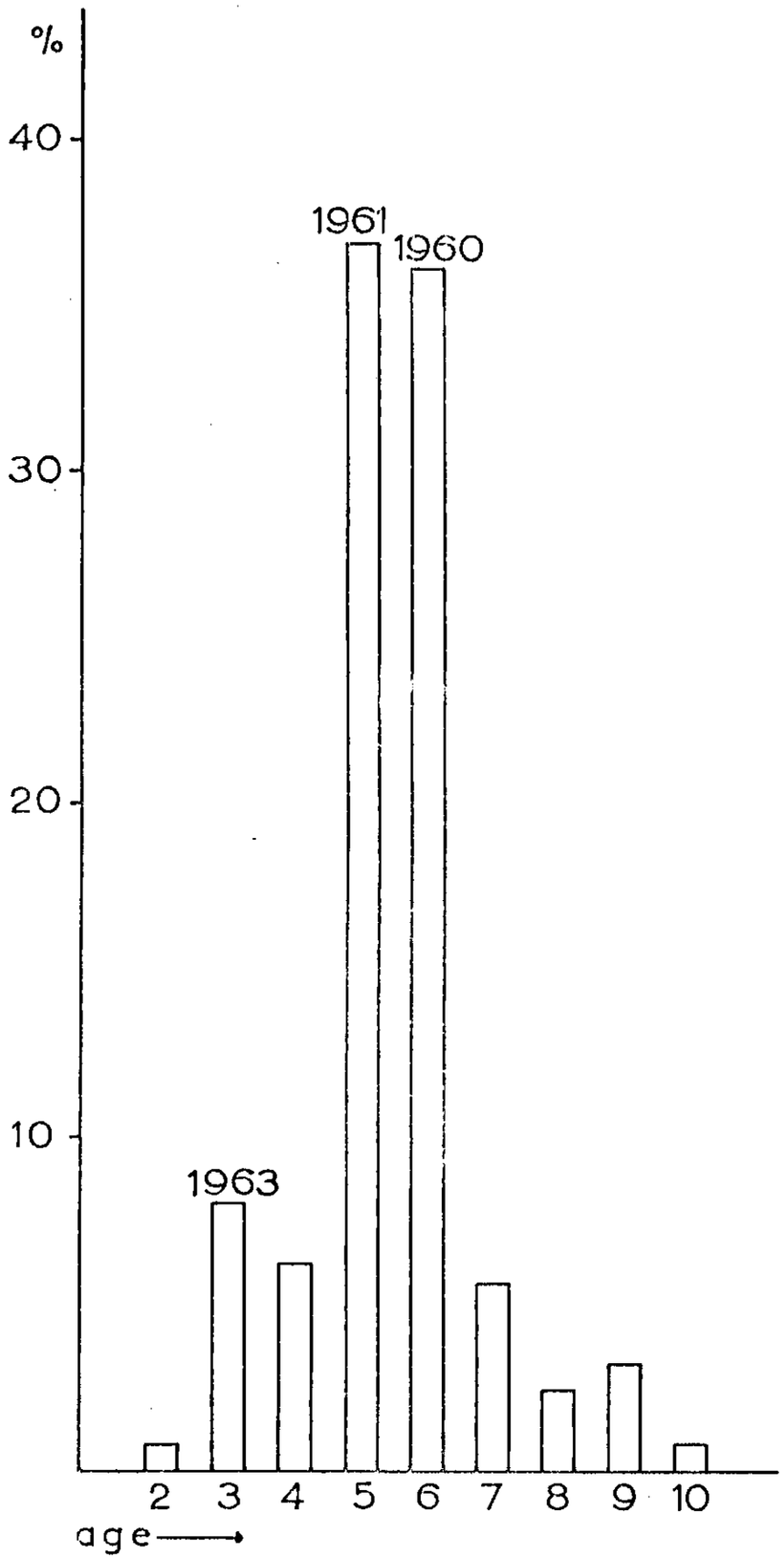

Fig. 6. Johan Hjort, West Greenland, March-May 1966. Cod. Age distribution. Total catch in covered trawl hauls (codend + cover).

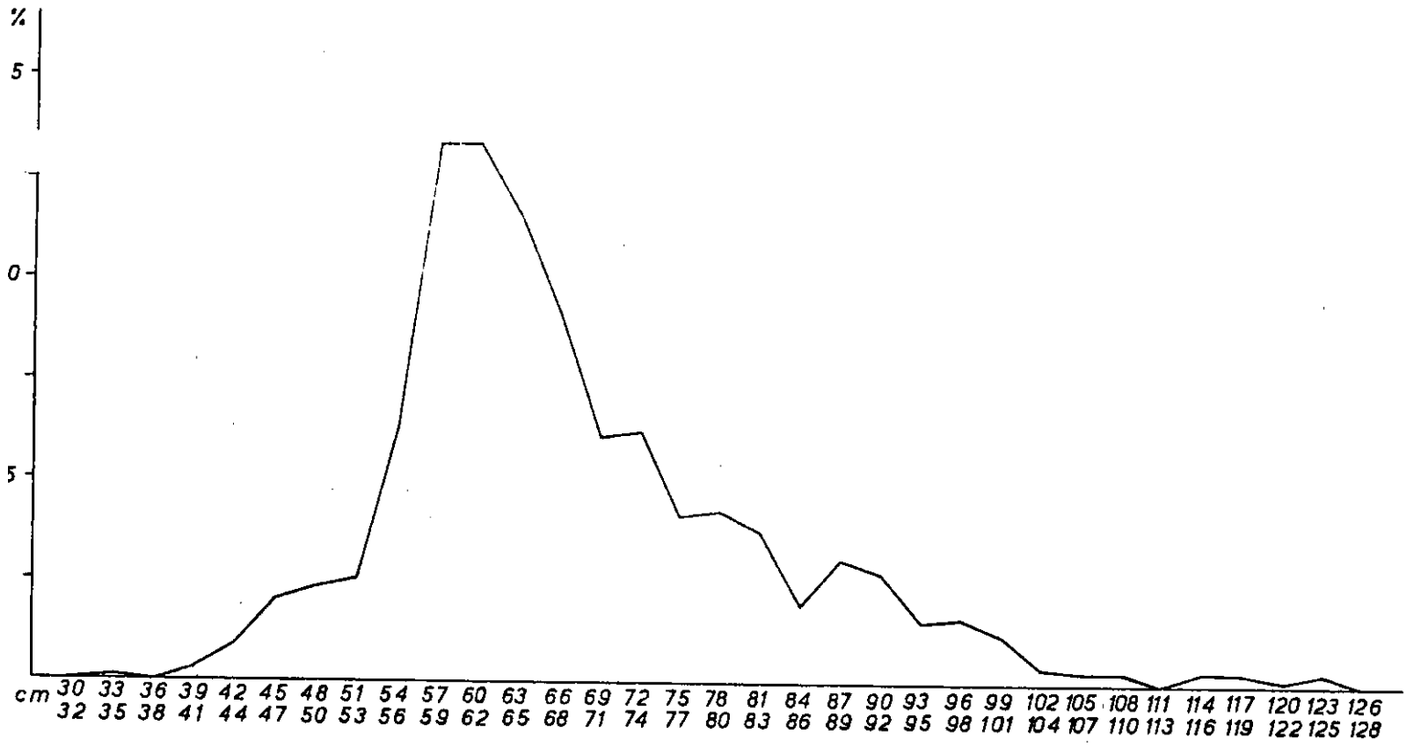

Fig. 7. Johan Hjort, West Greenland, April-May 1965. Cod. Length distribution. Total bottom longline catch.

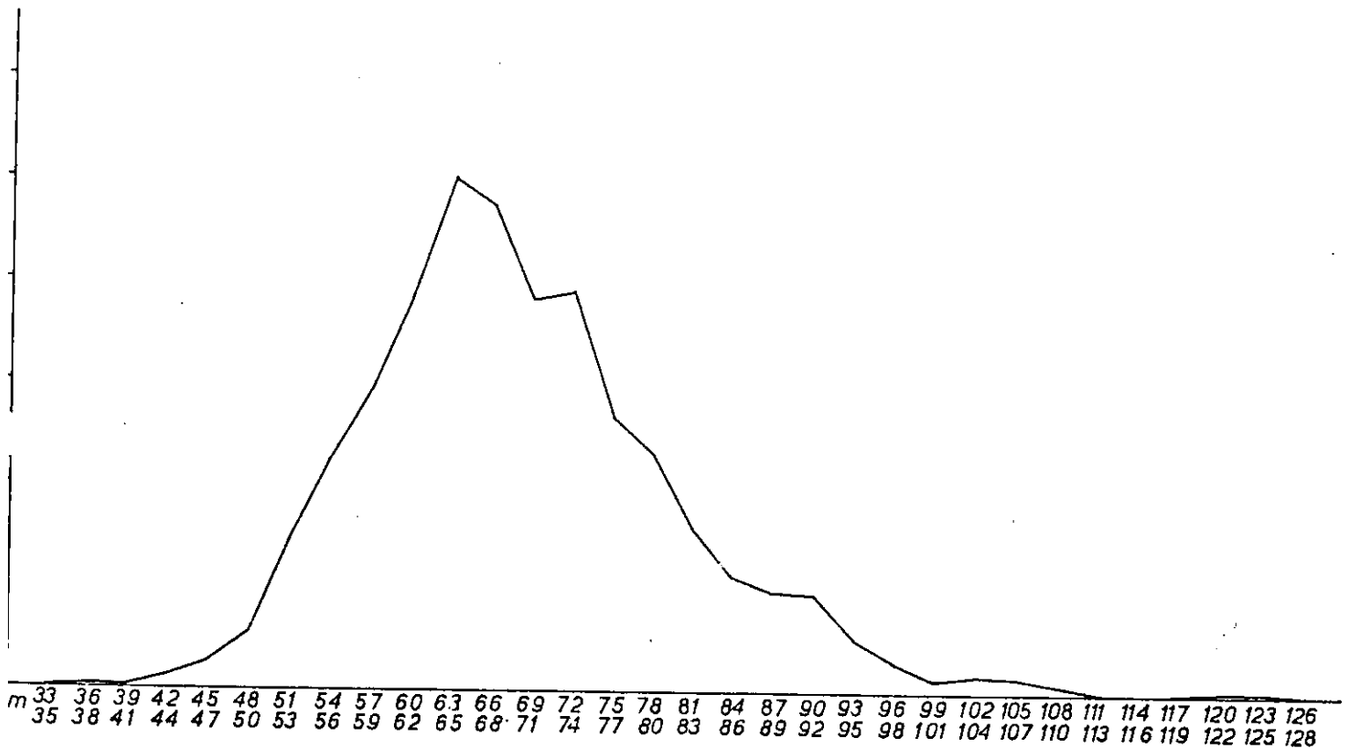

Fig. 8. Johan Hjort, West Greenland, March-May 1966. Cod. Length distribution. Total bottom longline catch.

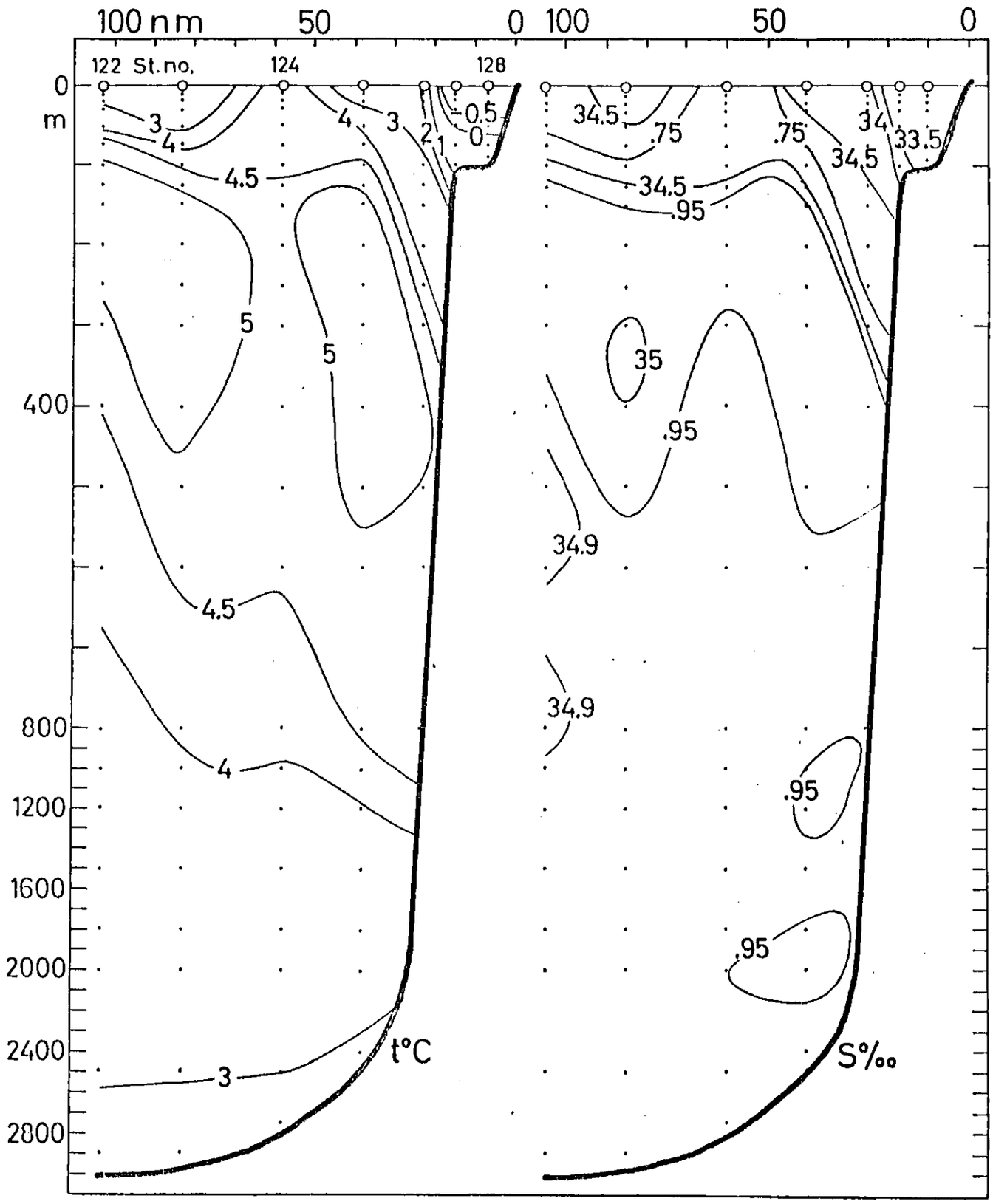

Fig. 9. Johan Hjort, West Greenland, 30-31 March 1966. Hydrographical section off Frederikshaab.

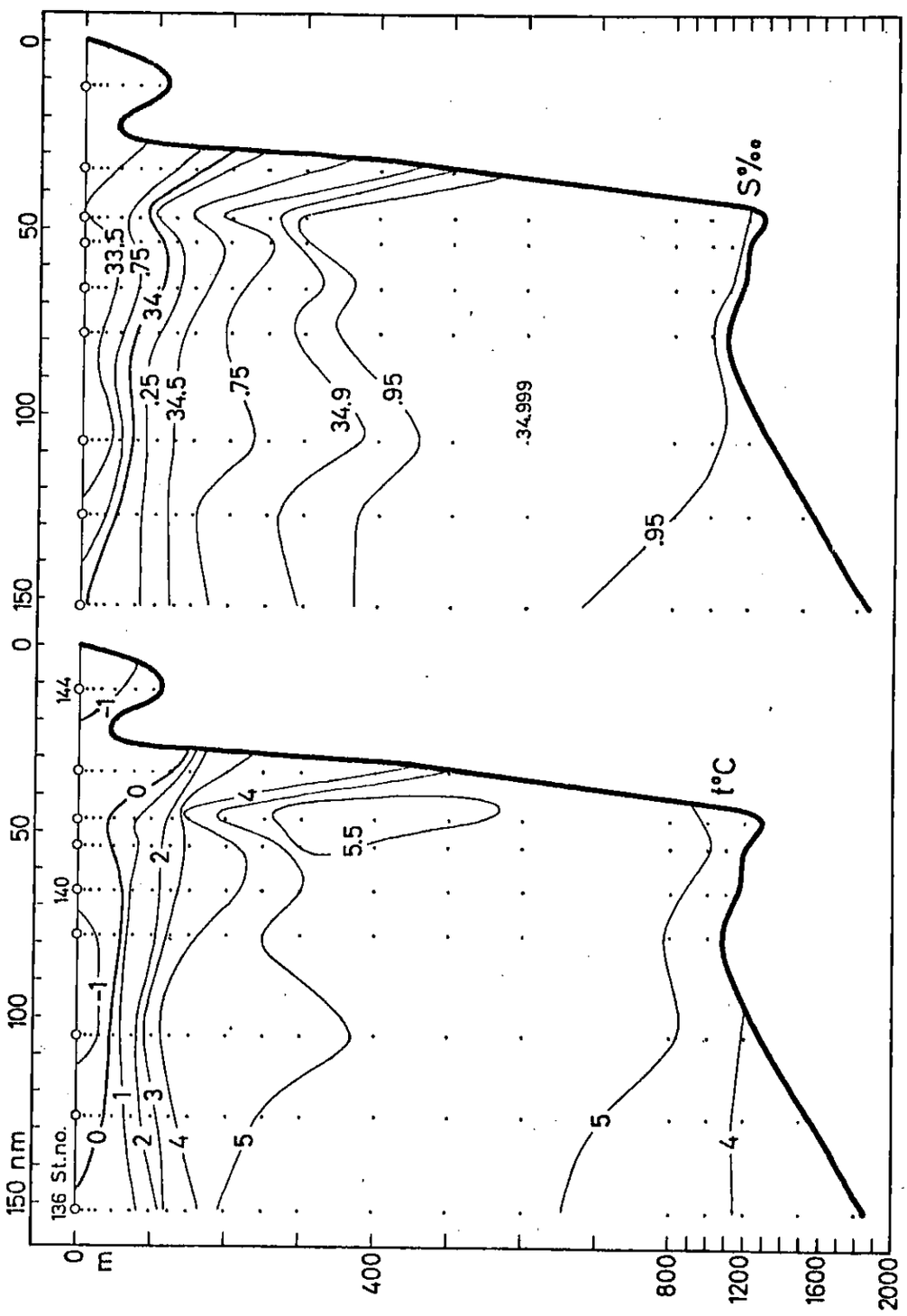

Fig. 10. Johan Hjort, West Greenland, 2-3 April 1966. Hydrographical section across Fylla Bank.