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Norway. Fisheries Investigations in Greenland Waters in 1960

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The Norwegian research vessel, "G.O. Sars" made a cruise to the waters off West Greenland between March 28 and May 6 in 1960. The actual working time on the West Greenland banks was from April 4 to April 26.

Compared with 1959 the ice conditions were good, but bad weather interfered very much with the work. The research programme was therefore much shortened.

Fig. 1 shows the route and the net of stations from the cruise.

Hydrography

Between April 5 and April 24, 5 hydrographical sections were taken. In addition, 17 temperature registrations were made, most of them by means of a bathythermograph and in connection with the fishing stations. The isotherms in the sections are shown in Figs. 2 to 6.

The temperatures showed no exceptional features compared with those taken in April 1959.

As usual, the Arctic component of the West Greenland Current was well developed; and thus the cold Arctic water, with temperatures below 2°C, characterised the surface layers and penetrated down to the tops of the banks.

The offshore slopes of the banks, that is, below 90 to 150 meters, were covered with water of Atlantic origin, and this water also characterised the midwater masses in the investigated area.

From Figs. 2 to 6 it might be concluded that the water masses off West Greenland were warmer in April 1960 than in April 1959. This change in temperature is probably not due to a change in the main hydrographical situation, but is more likely to be a temporary change due to a heavy stirring caused by the constantly blowing winds at that time.

Cod Investigations

On account of the weather conditions the survey with the echo-sounder was not very successful in 1960. Nevertheless, it may be said that the registrations made with the echo-sounder indicated a different distribution of the cod than that of April the year before.

As opposed to 1959, no cod were registered in the deeper parts of the western slopes of the banks where the temperature was 4°C or more. On the other hand, as in 1959, fish were found only on the top of one bank: namely, the middle part of Lille Hellefiske Bank.

The few successful registrations with the echo-sounder showed that most of the cod were staying in water where the temperature was between 2° and 4°C. This was confirmed by the fishing experiments (Tables 1 and 2).

Tables 1 and 2 could also indicate that the spawning temperature might have a lower limit than the 4°C-limit found the year before. This is probably not the case, because the cod were in a different stage of maturity than they were in 1959.

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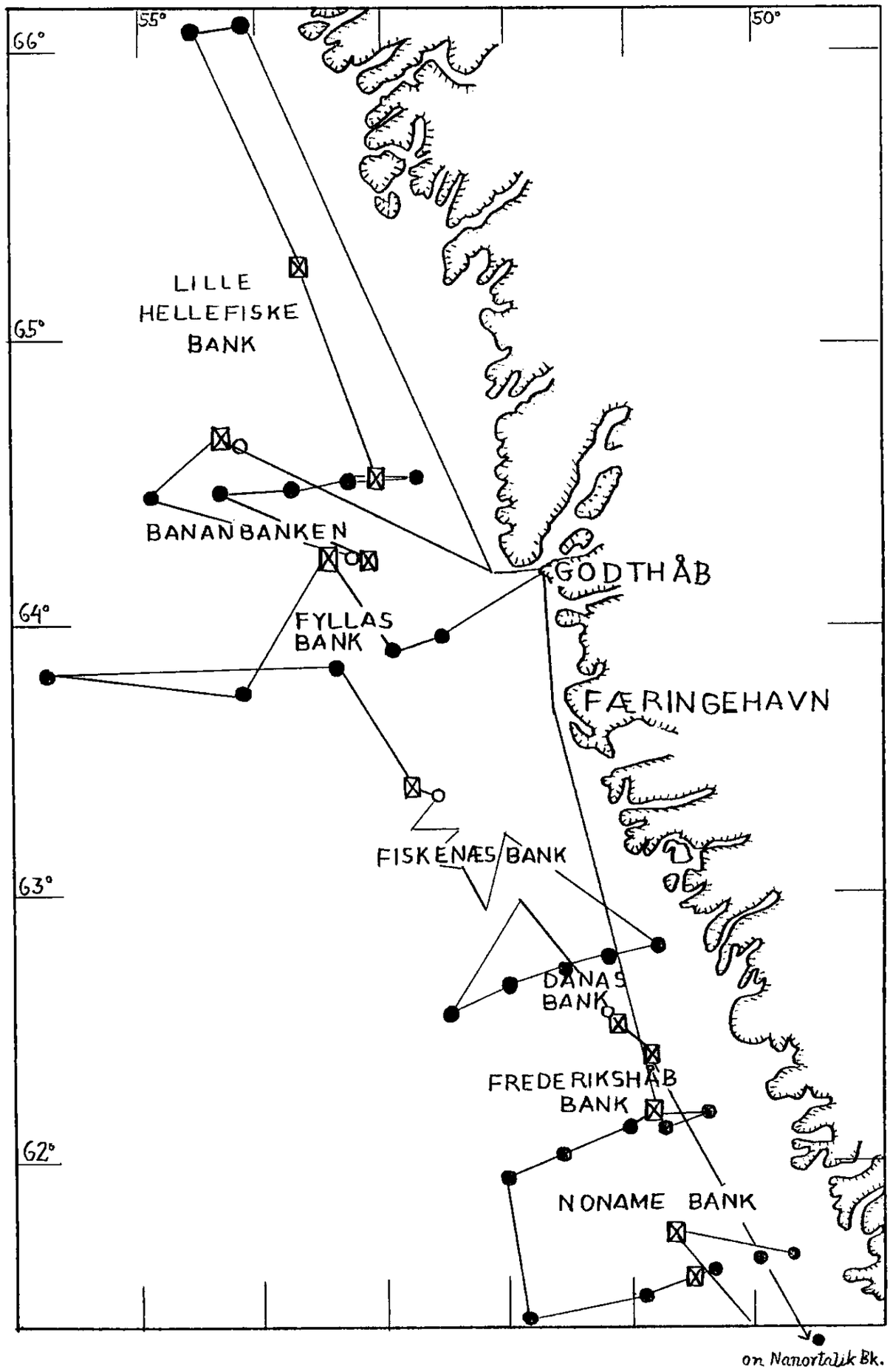

Fig. 1. "G.O. Sars", West Greenland, April 1960. Routes and net of stations. (X - bathythermograph station; ● - hydrographic station; 0 - trawl station; ⊠ - bottom longline and bathythermograph station.)

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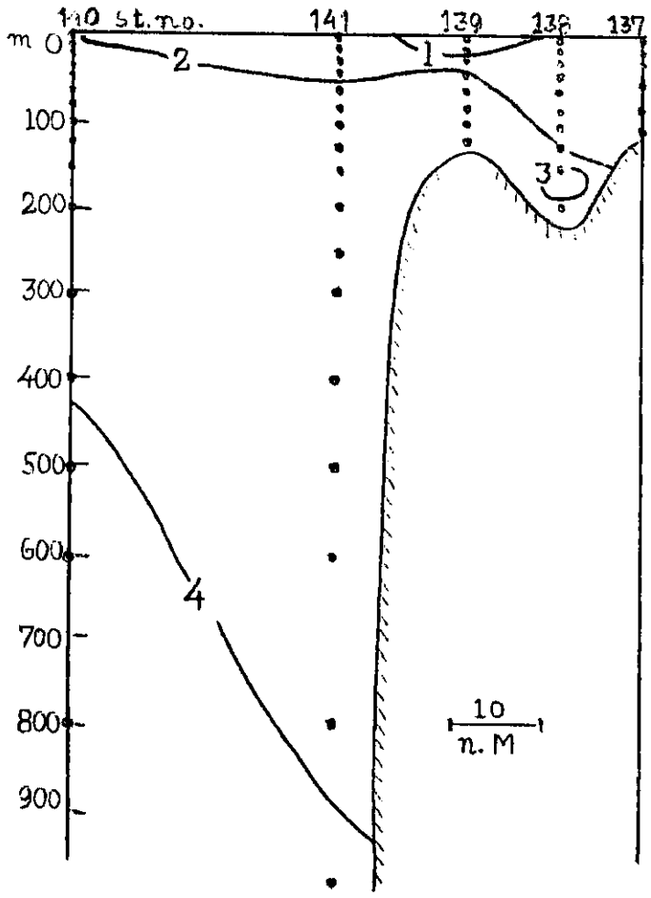

Fig. 2. "G.O. Sars", April 1960. Temperature section Noname Bank - westward.

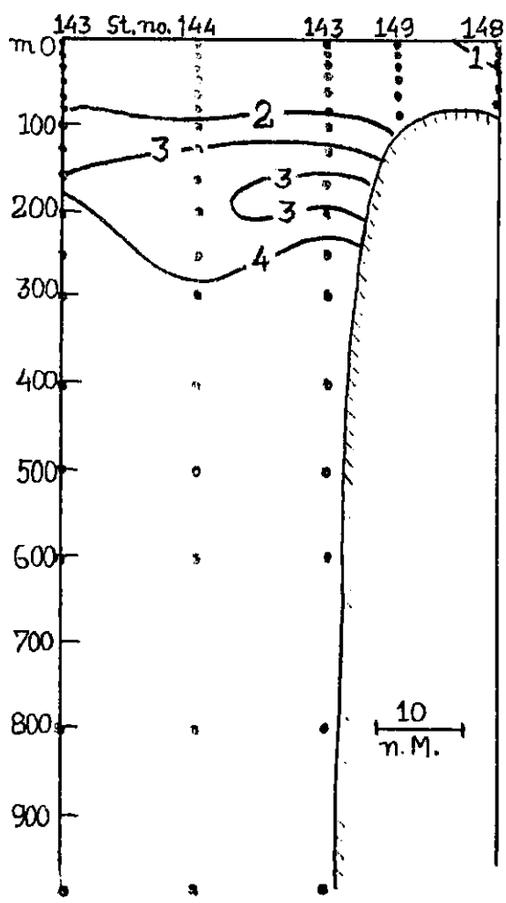

Fig. 3. "G.O. Sars", April 1960. Temp. section Frederikshaab Bank - westward.

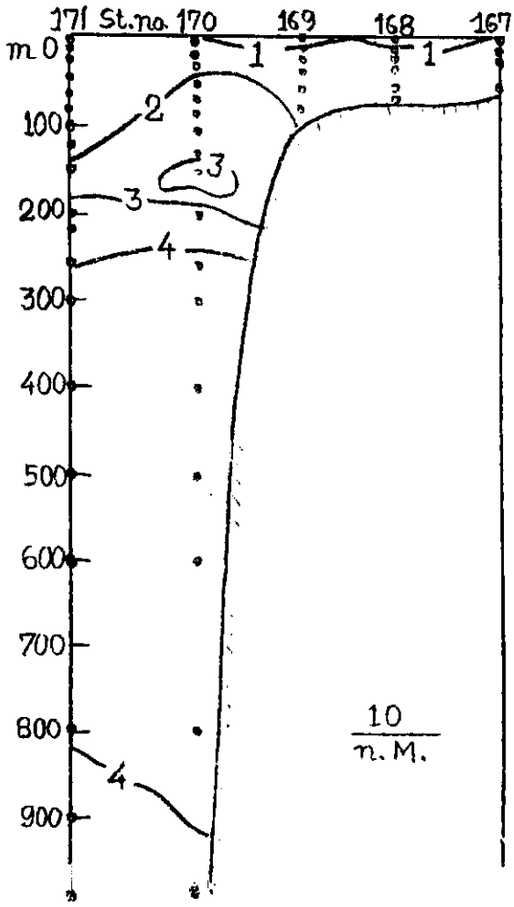

Fig. 4. "G.O. Sars", April 1960. Temperature section Dana Bank - westward.

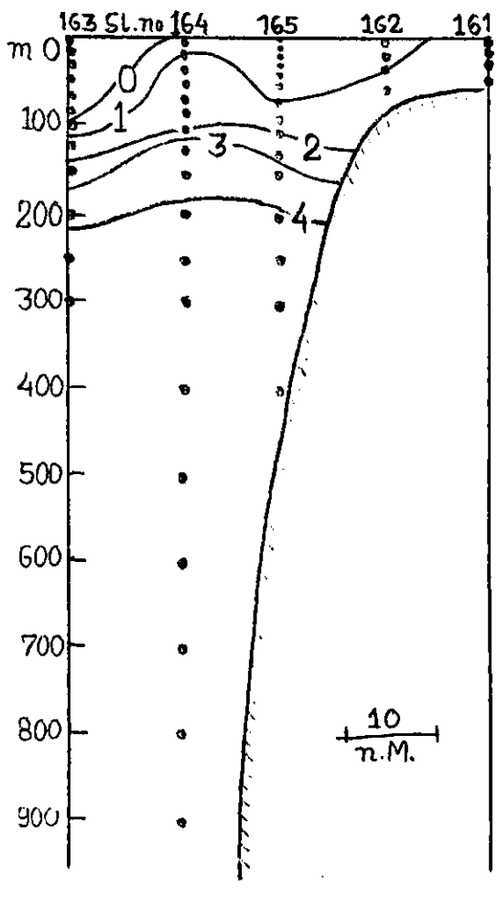

Fig. 5. "G.O. Sars", April 1960. Temperature section Fylla Bank - westward.

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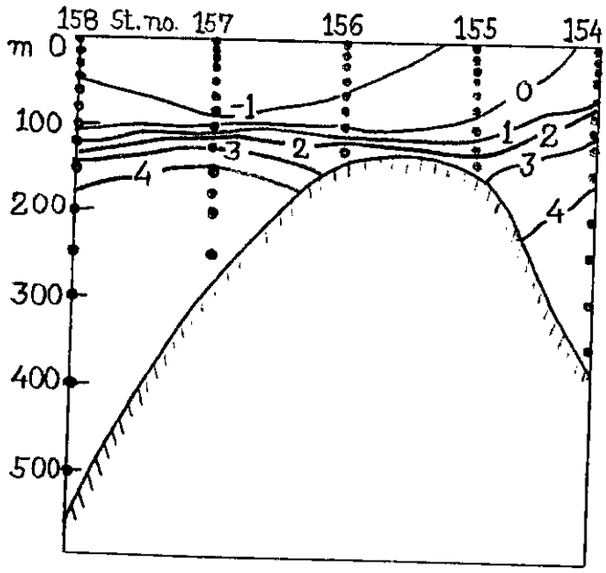

Fig. 6. "G.O. Sars", April 1960. Temperature section Banan Bank - westward.

Almost all the mature cod caught from all the banks had completed their spawning, Table 3. Only 10.5 percent of the cod were actually in the spawning stage, while 11.2 percent were still maturing.

Figs. 7 and 8 show the length distribution and the age composition of the cod caught by bottom longline.

The longline catch is dominated by relatively small fish, but a good part of the catch has a proper size for the Norwegian commercial fisheries. The mean length in the total longline catch 73.27 cm; in Divisions 1C, 1E and 1E, the mean lengths are 72.09, 74.16 and 73.55 cm respectively.

The age composition of the bottom longline catch shows that the rich year-classes 1942, 1947 and 1950 do not play an important part in the catch any longer. Together these year-classes amount to only 12.79 percent of the total catch. The 1953 year-class is the most dominant, constituting 43.07 percent of the total longline catch.

In Figs. 9 and 10 the length distribution and the age composition are shown for the total trawl catch.

As expected, these two figures differ a great deal from the corresponding figures for the bottom longline catch, but it must be borne in mind that the figures for the trawl catch are based on only two samples from two different banks. The mean length of the trawl-caught cod is only 58.48 cm, and almost all the cod in these two catches are of a size that is far below the proper commercial size for the Norwegian needs.

The small mean length of the trawl-caught cod is due to the 1956 year-class, with a mean length of 48.98 cm. This year-class does not appear in the same strength in the longline catch, because of the different selectivity of the two types of gear. The 1956 year-class seems to be a very strong one, but its influence on the trawl catch may be increased by different shoaling on the different banks.

From a comparison of the catch in April 1960 with the catch in April 1959, it is to be expected that the 1947 and 1950 year-classes will be of no importance to the longline fishery off West Greenland in 1961. The 1953 year-class will still play the dominant part and probably increa. in relative strength. The increasing importance of the 1953 year-class may involve a slight increase in the mean length of the longline-caught cod, but this depends on how the 1956 year-class will influence the longline fishery.

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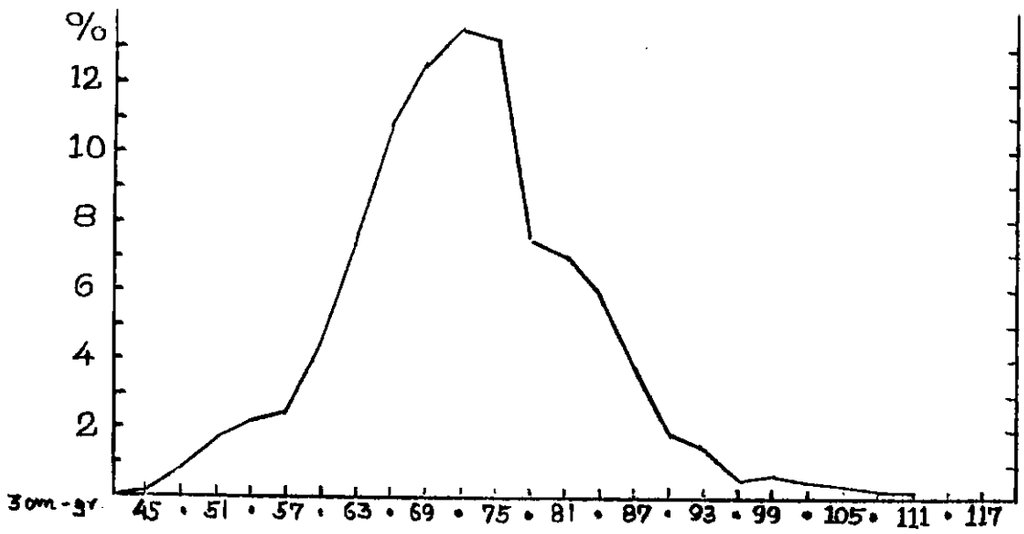

Fig. 7. "G.O. Sars", April 1960. Cod length distribution. Total catch bottom longline.

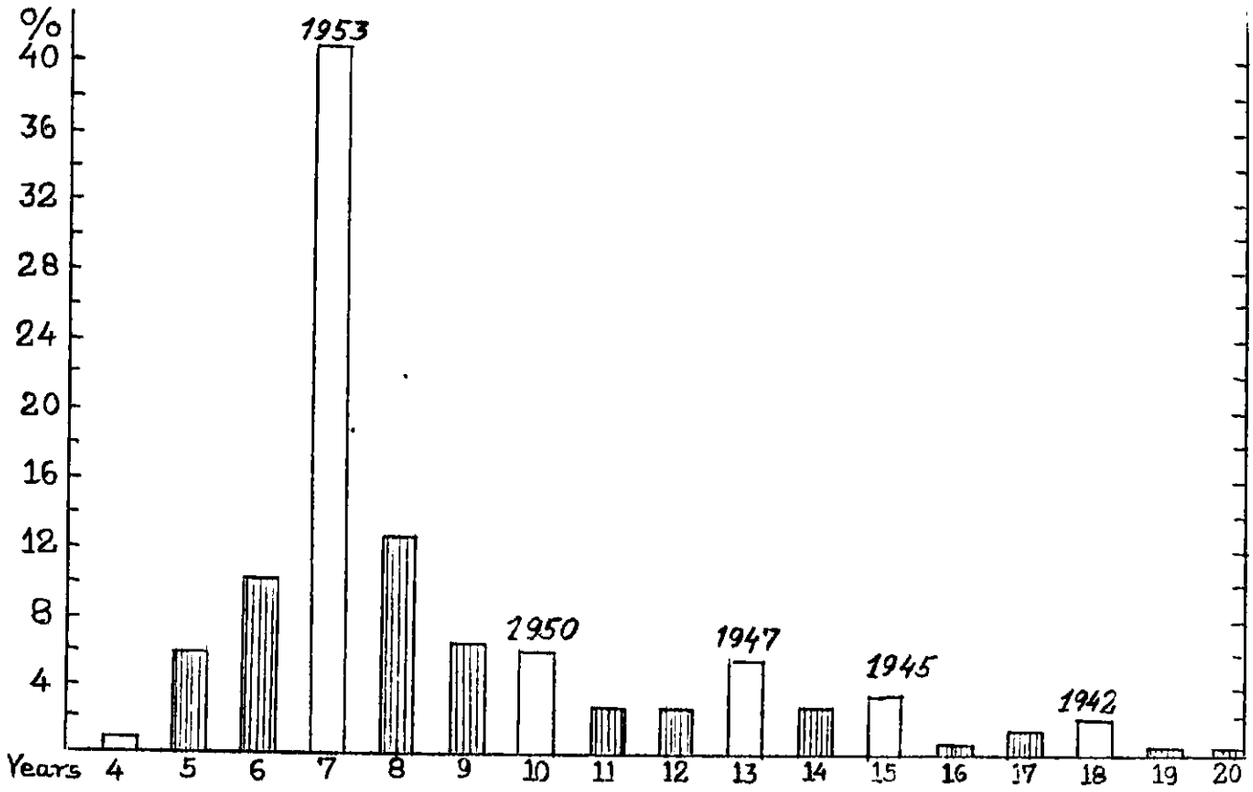

Fig. 8. "G.O. Sars", April, 1960. Cod age composition. Total catch bottom longline.

Halibut Investigations

In April 1960 attempts were made with halibut longline in localities where Norwegian longliners usually, and with some success, fish for halibut in the months June to September.

Table 2 shows the results of these fishing experiments. The catch was rather sparse, and, to some degree, the by-catch of halibut on the cod bottom longline was better (Table 1).

All the halibut caught were very small and immature. This may indicate that off West Greenland the mature halibut migrate from shallower and colder to deeper and warmer water during the year. The immature halibut probably stay on the upper slopes of the banks the whole year through.

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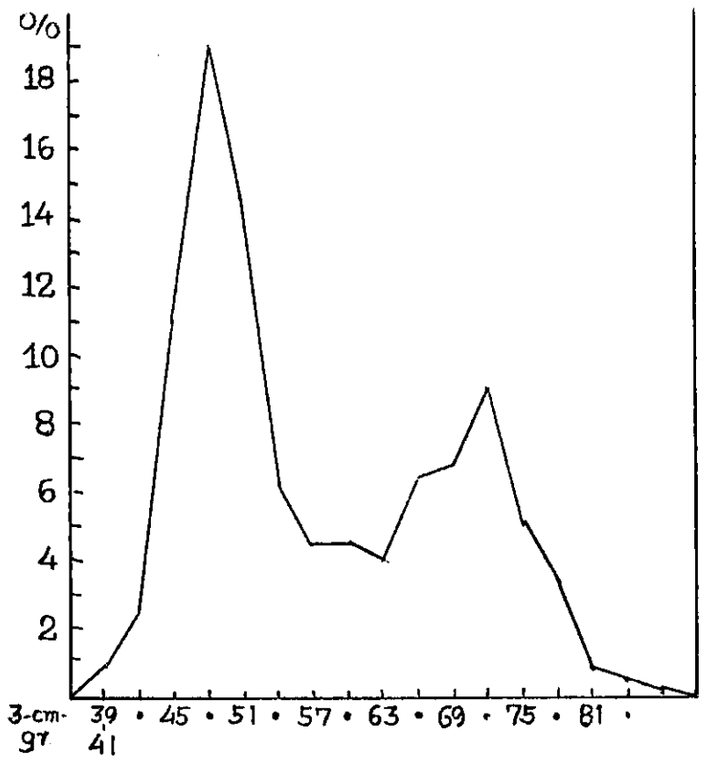

Fig. 9. "G.O. Sars", April, 1960. Cod length distribution. Total catch trawl.

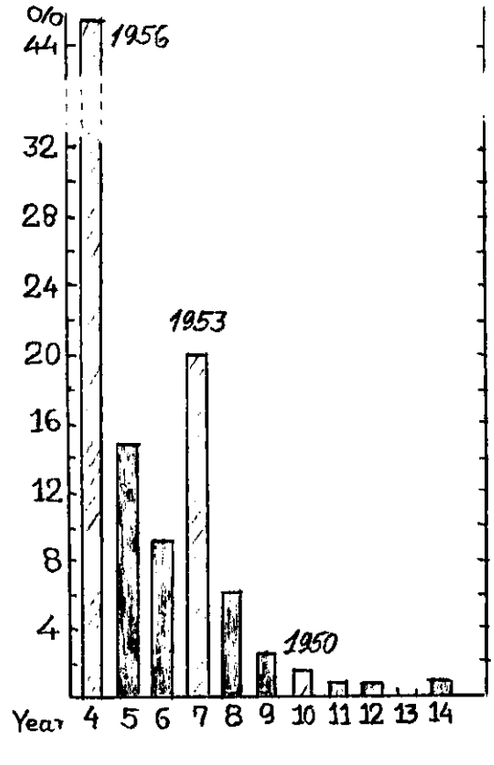

Fig. 10. "G.O. Sars", April, 1960. Cod age composition. Total catch trawl.

Tagging Experiments

Due to the bad weather during the cruise in April 1960, the tagging programme was very much shortened. Only 56 halibut and 107 cod were tagged. As usual, the halibut were tagged with the yellow plastic discs in the gill cover. All the cod were tagged with Lea tags attached by nylon anteriorly of the first dorsal fin.

Table 1. "G.O. Sars", West Greenland, April 1960. Cod bottom longline stations.

Date	Position	Depth	Bottom temp.°C	No. of Hooks	Catch	
					No. of Cod	No. of Halibut
April 5	61°41'N,50°39'W	190	3.3	1800	242	28
April 6	61°29'N,50°28'W	205	3.1	2100	197	18
April 7	62°13'N,50°49'W	140	1.9	1950	139	16
April 12	65°19'N,53°42'W	125	3.9	2050	82	0
April 13	64°12'N,53°05'W	170	3.2	2050	41	40
April 14	64°40'N,54°17'W	155	2.6	1900	298	4
April 22	63°24'N,52°44'W	135	1.8	2050	80	1
April 25	62°32'N,51°07'W	210	2.3	2050	110	0
April 26	62°25'N,50°50'W	200	2.0	2050	234	0

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Table 2. "G.O. Sars", West Greenland, April 1960. Halibut longline station.

Date	Position	Depth	Bottom temp. C	No. of Hooks	Catch	
					No. of Halibut	No. of Cod
April 5	61 44'N, 50 39'W	198	3.9	1000	7	20
April 7	62 12'N, 50 34'W	125	1.7	1000	6	51
April 12	64 31'N, 53 02'W	108	2.5	925	2	43
April 19	64 14'N, 53 17'W	200	4.5	1000	0	1
April 25	62 32'N, 51 07'W	210	2.3	1000	0	8
April 26	62 25'N, 50 50'W	200	2.0	1000	0	51

Table 3. "G.O. Sars", West Greenland, April 1960. Cod. Total catch bottom longline and trawl. Stage of maturity.

Sex	Females						Males						Total
Length	Stage of maturity[1]						Stage of maturity[1]						
cm-group	0	1	2	3	4	5	0	1	2	3	4	5	
39-41	1	-	-	-	-	-	1	-	-	-	-	-	2
42-44	3	-	-	-	-	-	3	-	-	-	-	-	6
45-47	14	-	-	-	-	-	12	-	-	-	-	-	26
48-50	24	-	-	-	-	-	25	-	-	-	-	-	49
51-53	20	-	-	-	-	-	25	-	-	-	-	3	48
54-56	16	-	-	-	-	1	14	-	-	-	-	-	31
57-59	17	-	-	-	-	1	10	-	-	1	2	1	32
60-62	17	-	1	1	2	5	7	-	-	1	7	9	50
63-65	21	-	1	-	1	13	11	1	1	7	7	16	79
66-68	24	-	1	4	5	16	5	-	4	8	10	31	108
69-71	16	-	3	5	6	43	3	-	1	7	16	26	126
72-74	10	-	-	4	4	62	2	-	5	4	18	28	137
75-77	8	-	1	8	3	61	2	-	1	7	10	27	128
78-80	4	-	1	9	1	41	-	-	1	2	2	16	77
81-83	2	-	-	5	1	38	-	-	-	2	6	13	67
84-86	4	-	-	-	5	29	-	-	1	1	3	9	52
87-89	2	-	-	4	1	18	-	-	-	3	1	4	33
90-92	1	-	-	1	2	12	-	-	-	2	-	2	20
93-95	-	-	-	-	-	9	-	-	-	-	2	1	12
96-98	-	-	-	-	1	4	-	-	-	-	-	-	5
99-101	-	-	-	1	-	4	-	-	-	-	-	1	6
102-104	-	-	-	1	-	1	-	-	-	-	-	1	3
105-107	-	-	1	-	-	-	-	-	-	-	-	-	1
108-110	-	-	-	-	-	1	-	-	-	-	-	-	1
111-113	-	-	-	-	-	-	-	-	-	-	-	-	-
114-116	-	-	1	2	-	-	-	-	-	-	-	-	3
Total	204	-	10	45	32	359	120	1	14	45	84	188	1102

1) The stages used here are a modification of the stages used by Maier and modified by Sivertsen.

Stage used here	Sivertsen stage	Maier stage
0	1	I, II, III
1, 2, 3	2	IV, V
4	3	VI
5	4	VII, VIII