

Serial No.382Document No.23ANNUAL MEETING - JUNE 1956NORWEGIAN RESEARCH REPORT, 1955Norwegian Fishery Investigations in Greenland Waters 1955

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The Fishery

During the 1955 fishing season a total of 73 Norwegian long-liners participated in the fishery off West Greenland. This is 6 vessels more than in the preceding year. Of the vessels 10 were fishing exclusively for halibut while 63 boats were engaged in the cod fishery. In addition to the long-liners 10 Norwegian trawlers made one or two trips each to these fishing grounds. The total catch amounted to 15,470 tons of salt cod. In addition 826 tons of halibut and 45 tons of fresh cod were landed. The catch of cod (*Gadus callarias* L.) in 1955 was somewhat smaller than in the preceding year.

The Norwegian long-liners started their fishery in the last week of April. During the first part of the season they were fishing on the southern banks, and mainly on Frederikshaabs Bank, Fiskenaes Bank and Danas Bank. The cod in these localities was of rather good size, but otherwise the fish was in poor condition with a small liver content. The long-line fishery was mainly carried out along the slopes of the banks in depths of 250-350 meters. According to reports the temperature conditions were very suitable for the fishery in the early period. However, towards the end of June heavy drift ice and cold arctic water were carried around Cape Farewell. In July the ice covered the southern fishing banks, and the majority of the long-liners were forced to retreat northwards. In July the Norwegian fleet therefore fished mostly on Fyllas bank. In August-September the fishery moved further north, to Lille Hellefiske Bank and the Holsteinborg Deep. Very few, if any, of the Norwegian vessels carried out any fishing on Store Hellefiske Bank, as the cod here generally was too small for salt-fish production.

As regards the influx of drift ice on the southern banks, our observations show that on July 10-11 the ice-pack stretched 90 miles offshore in the area of Danas and Fiskenaes Bank. Also Fyllas Bank was more or less covered by the ice. The presence of drift ice limited to a certain extent the long-line fishery during the whole month of July.

As in earlier years the Norwegian Institute of Marine Research collected material for the study of the composition of the long-line catches and the temperature conditions in relation to fishing. Cod samples from various banks were collected on board a commercial long-liner. About 2000 measurements and otoliths were taken from cod. Likewise tagging was made to a limited extent, and further studies made on the conversion factors.

Hydrographic Conditions

On August 3-4, hydrographic sections were worked westwards from Fyllas Bank, and across the southern and northern part of Lille Hellefiske Bank (see Fig.1). Temperature recordings were made by

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bathythermograph registering down to 250 meters. Water samples were taken by means of ordinary Nansen water bottles.

All three sections show that a core of cold arctic water is present along the western slopes of the banks. In the particular depths where the long-lines usually are set (150-200 meters) the bottom temperatures show the following trend:

On the Fyllas Bank the bottom temperature is 1.5-2.5°C. At the time of observation the long-line fishery in this area is thus carried out in relatively temperate water lying underneath the cold arctic water which covers the slope between 75 and 150 meters.

On the southern part of Lille Hellefiske Bank the temperature conditions are similar. Here the cold water covers the slope between 100 and 150 meters of depth, while still further down the temperatures are satisfactory for fishing.

On the northern part of Lille Hellefiske Bank the core of cold water lies still somewhat deeper, covering the slope down to 200 meters of depth.

In spite of the heavy influx of drift-ice during July, and the presence of a core of cold water, the temperatures in the sea cannot be termed unusually low in 1955. The hydrographic conditions do not differ very much from those found towards the end of July 1954 on the same banks. But the cold water seems to have remained longer in 1955, and this has probably influenced the shoaling of pelagic cod in the Holsteinborg Deep.

In the Holsteinborg Deep the cod usually concentrate in pelagic shoals towards the end of July. In 1955 this shoaling did not occur till about the middle of August. In order to study the temperature conditions in this area a section of 5 stations was worked with bathythermograph across the Deep from the southern edge of Store Hellefiske Bank towards the northern edge of Lille Hellefiske Bank. The observations show that the cold arctic water has penetrated in the southern part of the Deep. In the middle and northern part of the Deep the temperatures vary considerably from surface down to 250 meters. The horizontal thermocline usually found in 70-90 meter of depth had not yet formed and only few pelagic cod were present. An indication of stratification of the water layers was, however, found in the southern part of the Deep where the temperature rose sharply from 2 to 3°C. between 50 and 60 meters of depth. In that area a rich occurrence of plankton organisms was found and dense shoals of pelagic cod were present.

Catch Composition

In 1955 samples of cod were obtained from commercial catches taken in various areas. The size of cod caught on bottom long-lines varies somewhat from one locality to another. The mean sizes of the fish caught on the different banks are as follows:

	Mean Length (cm.)	Age
Store Hellefiske Bank, southern slope	72.80	9.58
Lille Hellefiske Bank, central part	73.49	9.84
Lille Hellefiske Bank, western slope	78.60	11.13
Fyllas Bank, southern slope	73.71	9.98
Fiskenaes Bank, southern slope	73.09	8.95
Danas Bank, eastern shallow	71.95	10.10
Total mean	73.72	9.87

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The size distribution of the cod in the various localities is illustrated in Fig.2. Generally the curves show a maximum around 70 cm. in all localities. An exception is the sample from the western slope of Lille Hellefiske Bank where the fish are larger with a maximum around 80 cm. As indicated in the lower part of the figure, these maxima correspond very well with the prominence of the two outstanding year-classes 1947 and 1942.

The age composition of cod in the Norwegian long-line catches on the different banks is shown in Table 1. On the northern banks the 1947 year-class is very prominent, the catches containing 44 per cent of this age group. On the western slope of Lille Hellefiske Bank the 1947 year-class becomes less prominent and large fish belonging to the 1942 year-class are dominating. The sample from this locality contains 20.9 per cent of cod born in 1947 and 27.5 per cent of cod born in 1942. On the Fyllas Bank, Fiskenaes Bank and Danas Bank, the 1947 year-class show a gradual numerical decrease towards the south. It is replaced more or less by the 1945 year-class.

Table 1. West Greenland. Age Composition of Norwegian Long-Line Catches

Age Years	Southern slope Store Hellefiske Bank	Central part Lille Hellefiske Bank	Western slope Lille Hellefiske Bank	Southern slope Fyllas Bank	Southern slope Fiskenaes Bank	Eastern shallow Danas Bank	Total Mean
	%	%	%	%	%	%	%
5	0.6	0.6	0.5	0.8	4.7	-	0.8
6	0.8	0.8	-	-	8.6	1.7	1.2
7	7.4	6.7	5.1	4.8	14.9	2.6	6.9
8	43.9	44.3	20.9	40.0	36.0	33.6	40.4
9	10.7	7.4	7.2	5.6	3.9	11.2	8.1
10	9.0	8.8	9.7	16.1	10.9	16.4	10.0
11	5.6	3.5	8.7	8.0	2.3	3.5	4.8
12	5.8	5.2	9.2	7.3	3.9	11.2	6.1
13	9.4	15.3	27.5	12.1	8.6	13.8	14.5
14	2.8	2.5	4.1	0.8	3.1	0.9	2.6
15	1.4	1.7	2.0	0.8	0.8	1.7	1.6
16	1.2	0.7	2.0	-	-	1.7	0.9
17	-	0.2	-	-	0.8	0.9	0.2
18	0.4	0.2	-	1.6	-	-	0.3
19	0.8	1.5	1.2	1.6	1.6	0.9	1.2
20	0.2	0.1	0.5	0.8	-	-	0.2
21	0.2	0.3	1.5	-	-	-	0.4
22	-	0.1	-	-	-	-	0.1
Total							
ind.	503	864	196	124	128	116	1931

Of particular interest perhaps is the sample taken on the eastern shallow slope of Danas Bank. The cod in this locality has a very low mean size (71.95 cm.) compared to other localities, while the mean age is fairly high (10.1 years). This sample was caught in a depth of about 50 meters. According to the observer, the fish apparently was so-called "fjord-cod". The cod in this particular locality must have had a very slow growth. This is a phenomenon which otherwise occurs in some Greenland fjords. In the Godthaabs Fjord, for instance, the Danish investigations have shown that the cod grow slowly, and the catches do not contain such large fish as should be expected from the age composition.

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Of particular importance to the Norwegian fishery are the pelagic shoals of cod in the Holsteinborg Deep. In 1955 we did not succeed in obtaining samples of cod caught with pelagic long-lines. On August 4, however, a sample of cod from this locality was taken by means of handlines. The commercial fishery had not yet started. In this handline sample the year-class 1942 constituted only 3.2 per cent. In 1952 this year-class made up 37.2 per cent of the catch in this area and it has since decreased steadily. It has been replaced by the 1947 year-class which in 1955 made up 33.2 per cent of the catch. A new strong year-class is that of 1950 which in the sample was represented by 32.2 per cent. Due to the heavy influx of young fish the mean size of the Holsteinborg cod in 1955 is only 63.54 cm. against 72.36 cm. in 1954 and 75.99 cm. in 1952. The mean age of Holsteinborg cod caught on long-lines was in 1952 11.1 years, in 1953 10.0 years and in 1954 9.9 years. In 1955 the cod caught with handlines has a mean age of only 7.0 years. This handline sample is not considered representative for the ordinary Norwegian catches in this locality. According to reports from the fishermen relatively large cod were caught later in summer when the commercial fishery started.

The total age distribution of cod in longline catches in the different years from 1948 to 1955 is shown in Fig.3. The year-class 1942, which has dominated in the Norwegian catches since 1950, is now on the decrease and the year-class 1947 has taken its place. In 1955 the 1947 year-class constituted 40.4 per cent of the total catch. Next in importance comes the still strong 1942-class with 14.5 per cent and the 1945-class with 10 per cent. These three year-classes alone make up about 65 per cent of the Norwegian catch.

According to Paul M. Hansen the 1950 year-class is estimated to be very rich, and in 1955 it was very prominent on the northern part of Store Hellefiske Bank where it constituted 47.5 per cent of the Danish catch. But this year-class has not yet appeared in any numbers in the Norwegian long-line catches. In 1955 it made up only 0.8 per cent of the catch. It will hardly become of importance to the fishery till 1957 or 1958.

It is the 1947 year-class which in the coming years will dominate in the Norwegian catches. In 1955 the cod of this year-class has a mean size of 69.22 cm. A cod of 70 cm. will give a saltfish size of about 53 cm. According to Norwegian standard a saltfish is most valuable when 58 cm. and more. The 1947 year-class thus still gives a product somewhat too small sized for our demand. But already next year the 1947-class should give a satisfactory saltfish size.

Tagging of Cod and Halibut

Tagging of cod was continued in the West Greenland area during the summer of 1955. In early July 132 cod were tagged on Lille Hellefiske Bank. From the middle of July to August 5 a further 137 cod were tagged in the Holsteinborg Deep. Thus a total of 275 cod were marked in the area. Some recaptures have already been reported. The results of the tagging experiments have not as yet been worked up.

Experiments on tagging of halibut, *Hippoglossus hippoglossus*(L.), in the Davis Strait were instituted in 1955. An observer from the Norwegian Institute of Marine Research began during the latter part of July the tagging operation on board a commercial halibut vessel. The fishery was, however, very poor and the observer succeeded in tagging only 20 individuals during his stay on board. An arrangement was made with the captain of the vessel, and later in the season he

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succeeded in tagging 80 specimens. Thus a total of 100 halibut were tagged. The halibut were released in various localities off West Greenland, off northern and central Labrador and off Cape Farewell. The tag used for halibut was the ordinary yellow plastic disc employed also in the cod taggings. The disc was fastened in the gill cover with silver wire. Only one recapture was reported towards the end of the season. The fish was retaken in the same locality where tagged.

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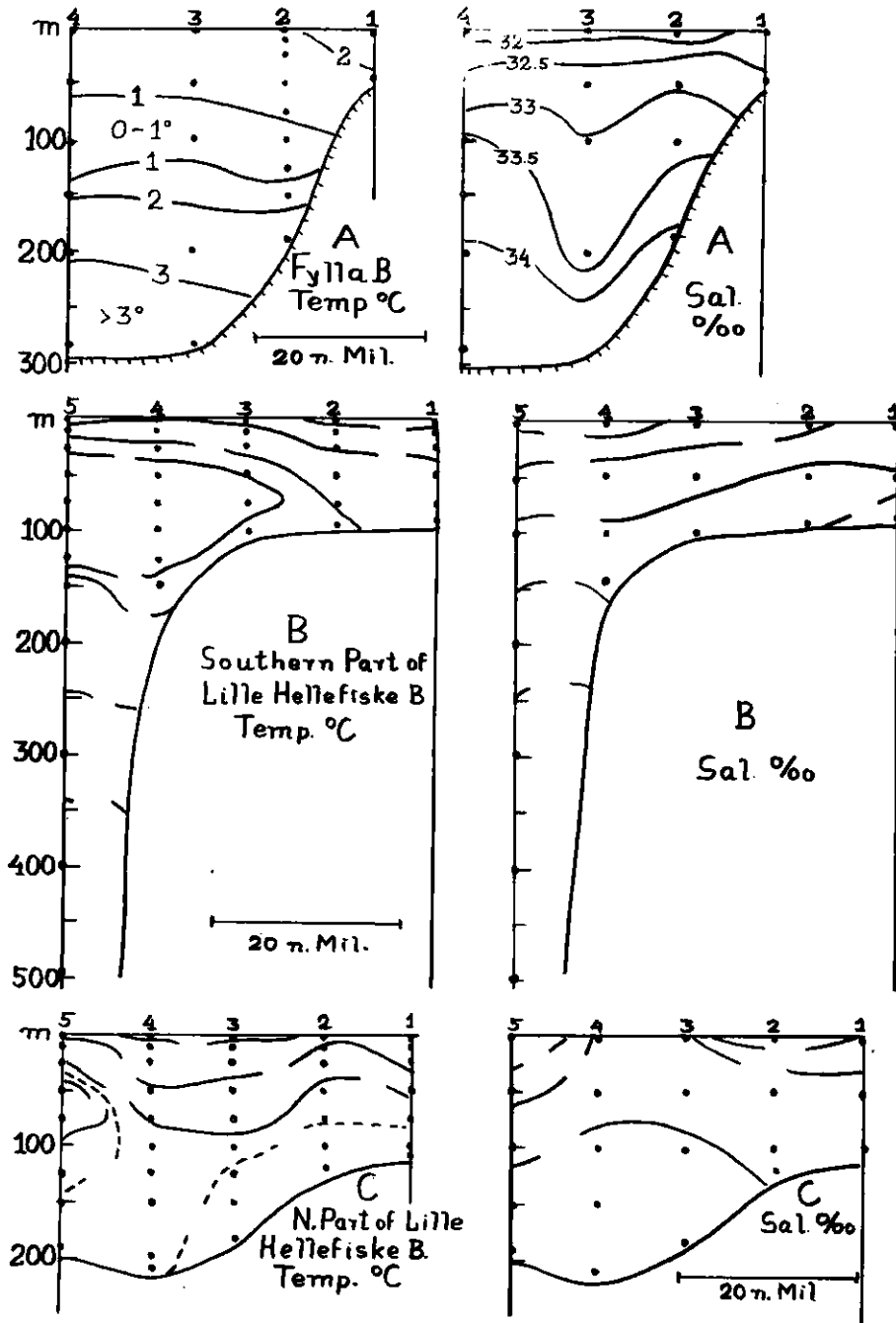


Fig.1 - Hydrographic Sections across Fylla Bank, and Southern and Northern part of Lille Hellefiske Bank, 3-4 August 1955.

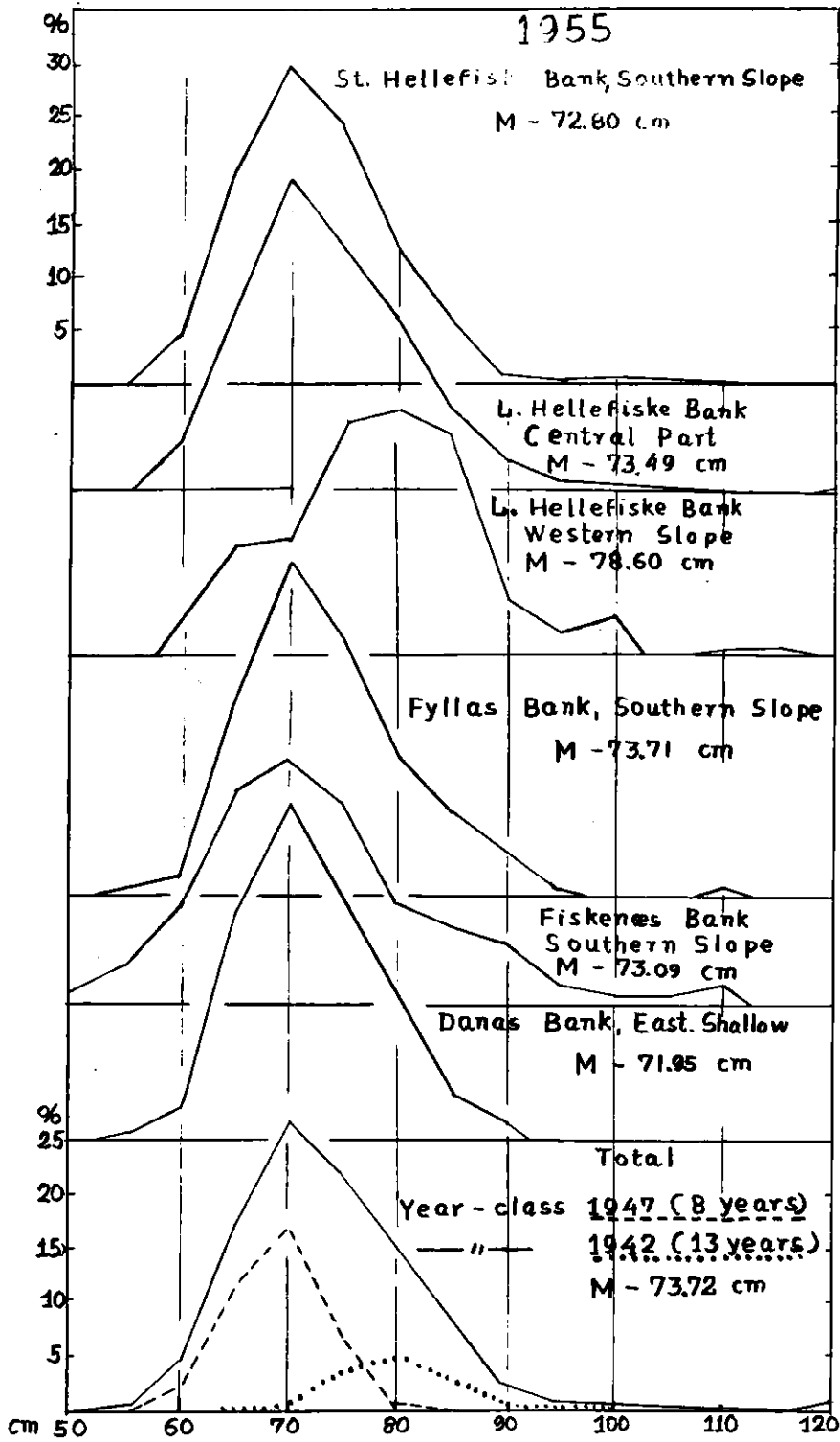


Fig.2 - Size Distribution of Cod caught on Bottom Long-Lines on the various banks in 1955.

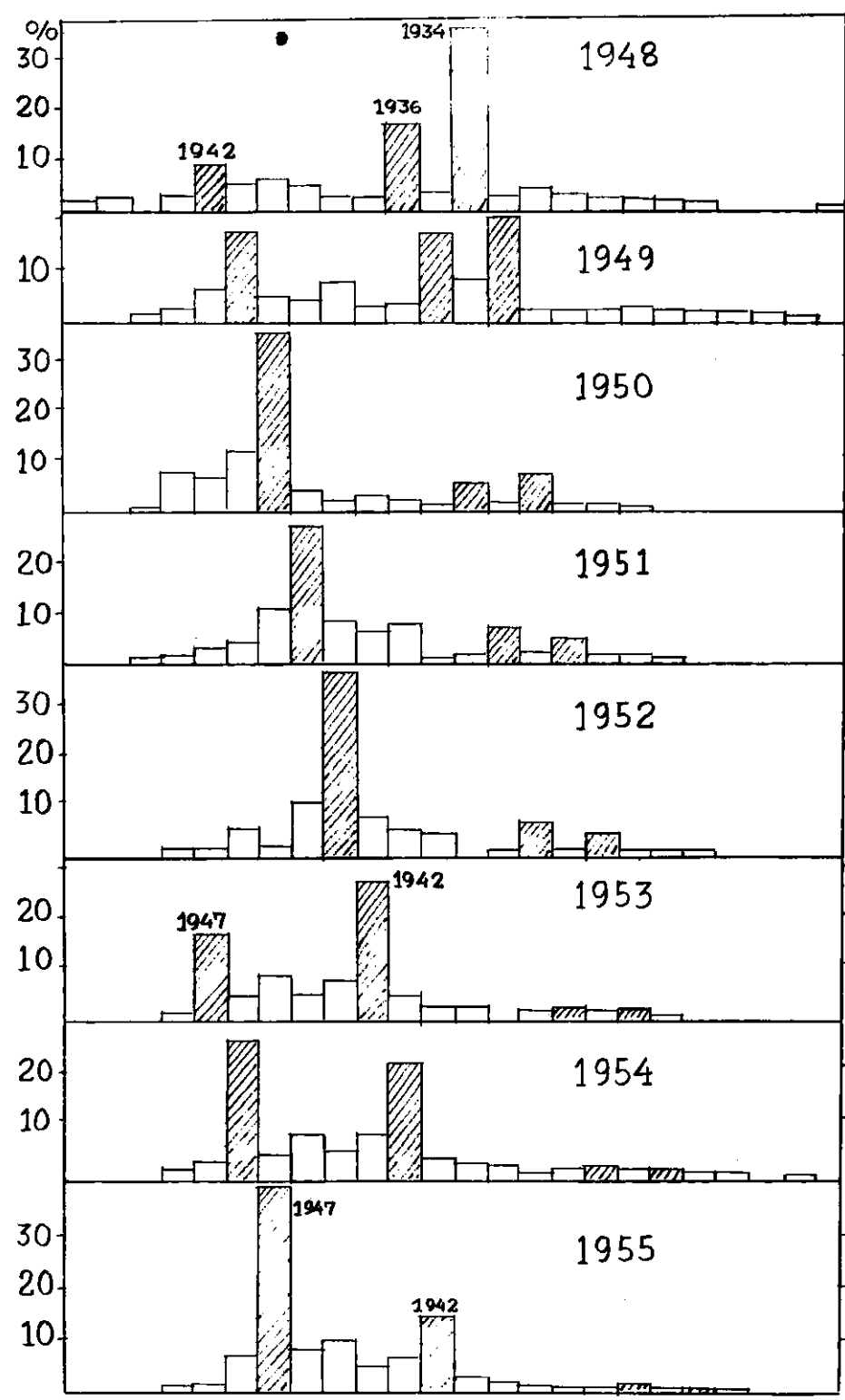


Fig.3 - Age Distribution of Cod in Commercial Norwegian Long-Line Catches in the different years from 1948 to 1955.