

Serial No. 756

(D. Res. a. 59)

Document No. 38

ANNUAL MEETING, MAY/JUNE 1960

Icelandic Research Report, 1959.

Atvinnudeild Háskolans-Fiskideild

Introduction

In 1959, one cruise was made to East Greenland waters and two cruises to the ICNAF area with chartered commercial trawlers. The main purpose of the cruise to East Greenland waters was to get information on the spawning stock of cod. Both cruises to the ICNAF area were made in order to search for redfish.

A. Summary of Cruises. By Jakob Magnússon.

I. Cruise.

The first cruise was made to East Greenland waters during April 1st to 15th. Experimental hauls were taken in different depths on the off-shore banks and their slopes along the East Greenland coast from the Anton Dohrn-Bank ($65^{\circ}35'N$ $29^{\circ}40'W$) to the Fylkir Bank ($63^{\circ}40'N$ $37^{\circ}30'W$). Some places could not be fished as planned because of ice. In general, the catches were poor for cod as well as for redfish with the exception of the Fylkir Bank where heavy concentrations of spawning cod were found. On this bank also good catches of redfish were obtained. Cod and redfish were mixed but cod was usually in majority, but varying according to depth: In depths of 100-120 fms, redfish accounted for only about 1/4 or less of the catch but in greater depths for 1/3 - 1/2 of the catch. The average catch per trawling hour was $15\frac{1}{2}$ tons for cod and redfish together..

II. Cruise.

The second cruise was made to the Newfoundland banks, July 2nd to 19th. Only 8 days were used for fishery on the banks, the remaining time for travelling. Experimental hauls were only taken in Subarea 3 (Subdivisions 3K, 3L and 3M), 76 hauls altogether. On the trawl stations temperature measurements were made. Because of lack of time and the object of the cruise, no special hydrographic sections were operated. The bottom temperatures on the trawl stations in Subdivision 3K were $3.1^{\circ}C$ to $3.4^{\circ}C$. The temperature conditions along the NE-slope of the Grand Bank, the SW and NE part of Flemish Cap are given in sections I-III, located as shown in fig. 1.

The conditions on the NE slope of the Grand Bank are shown in fig. 2. Under a layer of warm water caused by the summer heating, is a thin layer of cold water, thereafter, the temperature gradually increases towards the bottom, being somewhat lower towards NW.

Fig. 3 shows temperature across the SW corner of Flemish Cap. The bottom temperatures are very similar through the region, but in the intermediate layer we can see the influx of warm water in the southern part and of cold water in the northern part of the section.

Along the W-side of Flemish Cap, the bottom temperatures are 3.5°C to 3.9°C .

Fig. 4 shows the conditions at the NE corner of Flemish Cap.

III. Cruise.

During the period August 28th to September 13th, a cruise was made to the Davis Strait. Much time was spent on searching for banks indicated on some sea-charts, but without result. Therefore, relatively few hauls were made. Some hauls were made in Subdivisions 1C and 1B. The bottom temperature was measured at different localities, the northernmost station was at $67^{\circ}22'N$ $57^{\circ}31'W$ where the bottom temperature was 2.8°C at 350 m.

Some temperature measurements and hauls were made in the western part of the Davis Strait (see fig. 5). Off Baffin Island, the bottom temperature was very low: At st. 1: 0.2°C in 340 m, at st. 2: 1.2°C in 460 m and st. 3: 1.6°C in 380 m.

At the trawl stations (see fig. 5) the bottom temperatures were:

st. 4:	2.4°C
" 5:	3.0°C
" 6:	2.9°C

B. The Redfish. By Jakob Magnússon.

I. Cruise.

As the area surveyed on this cruise does not belong to the ICNAF area and as the main purpose was cod investigations, the redfish will not be further discussed here.

II. Cruise.

In all hauls on this cruise redfish were caught, and redfish was the main species caught. Other species as cod, halibut, American Plaice were almost of no importance.

In Subdivision 3K, 11 hauls were taken at two localities in depths of 140-230 fms. (see fig. 6 hauls 1-11). All hauls were poor, the best yielded 3.5 tons of redfish in one hour, but the average was only about $1\frac{1}{3}$ tons per hour.

In Subdivision 3L, 36 sets were made all on the NE-slope of the Grand Bank in depths of 165-230 fms. (see fig. 6). In sets 12-18, the average catch was only 1.3 tons per trawling hour.

In sets 19-39 (see fig. 6), the best hauls on the cruise were made with an average of $4\frac{1}{4}$ tons per trawling hour, but the maximum was about 10 tons of redfish per one hour. All other hauls taken in this subdivision were poor, the best yielding 3 tons after 75 min. trawling.

At Flemish Cap (Subdivision 3M), 21 hauls were taken in depths in 150-225 fms. No good catch was obtained. At the V- and NE-side of the Bank some good hauls were made ($3-3\frac{1}{2}$ tons after 65 min.). There appears to be a rather large quantity of redfish in the surveyed area, but the fish are scattered over a vast area and no heavy concentrations were found except on the NE-slope of the Grand Bank (see above), however, by far not as dense as on Ritubanki and Sundáll in the previous year. But an average catch of $4\frac{1}{4}$ tons per trawling hour (in experimental hauls) gives a base for a commercial fishing in the area.

The redfish caught on this cruise were mainly of the mentella type. On the Ritubank mentella and marinus were mixed. But on the NE Grand Bank exclusively mentella was found. On the SW and NE part of Flemish Cap the marinus type occurred again.

The size composition of the redfish was very uniform in all areas of Subdivisions 3K and 3L with the peak at 34-36 cm (see fig. 7). At the southernmost stations some bigger fish (40-45 and 46-47 cm) were also caught.

At the Flemish Cap, the redfish were somewhat smaller. At the SW part of the bank, the 34-36 cm size groups are still dominant, but in the other areas the peak was at the 31-33 cm group (see fig. 8).

The size composition of the marinus type differed considerably from the mentella type and varied in different localities as shown in fig. 9.

III. Cruise.

The catch of redfish on this cruise was generally very poor, though good hauls were made at the Lille Hellefiske Bank off West Greenland with a maximum of 9 tons after 40 min. trawling. In the western part of the Davis Strait, the catch was especially poor.

The size composition of the redfish in the hauls taken on the banks off West Greenland differed much from haul to haul. Thus the peaks were formed by different size groups between 25 and 62 cm. The size of the redfish caught on the west side of the Davis Strait, however, was very uniform with the 35-40 cm size group dominating. The only exception was st. 4 where only small redfish were caught with the peak at 23-25 cm.

C. Cod. By Jón Jónsson.

In April 1959, the Icelandic trawler "Fylkir" was chartered for fisheries investigations in East Greenland waters.

The purpose of this expedition was to investigate the spawning stock of cod, as our earlier observations had indicated a quite considerable spawning of cod in these waters.

The trawling stations are shown on fig. 1.

Otoliths were taken from 1646 fish, a number of fish were measured and examined with regard to maturity. A total of 1050 cod were tagged, mainly with the Lea's hydrostatic tag.

Table I shows the state of maturity on the various stations off East Greenland - in April 1959.

TABLE I

State of maturity of the cod at East Greenland in April 1959, expressed in percentages of the total. For the stations see fig. 1.

	No. of station							
State of maturity ...	1-3	4	5-6	7	14	10	15	16
Immature	10.4	9.2	22.1	11.3	6.0	10.7	0.7	4.3
Maturing	80.4	81.6	56.5	69.1	56.1	55.3	51.3	17.1
Spawning	2.4	3.6	3.4	4.1	15.6	17.3	43.3	70.1
Spawned	6.8	5.6	17.9	15.5	22.4	16.7	4.7	8.5
Total investigated ...	337	250	262	291	487	150	150	234

Spawning had hardly begun in the northern part of the area, but most of the fish had maturing gonads. The percentages of spawning fish increased southwards, with the highest figures on the southernmost stations, the Fylkir Bank. Very high catches in this area indicated large concentrations of spawning cod. The bottom temperatures in 200 meters were 4.2° - 5.2° C.

Fig. 2 shows the onset of maturity of the East Greenland and Icelandic cod based on observations of the spawning zones in the otoliths of fish from the 1959 spawning season. The Icelandic cod mature as early as 3 years

old and spawn for the first time as 4 years old. Only few East Greenlandic cod spawn before age 6.

The age-distribution of the cod from East-Greenland is shown in fig. 3. It is fairly homogenous with the 1949, 1950 and 1951 yearclasses predominating in all samples. On the three southernmost stations the 1947 and 1945 year-classes were still of importance.

Fig. 4 shows all the samples from East Greenland in April 1959 taken together as well as the age distribution of the spawning stock of cod on the Icelandic spawning grounds in the 1959 spawning season.

The age distribution as a whole is strikingly uniform in both areas and suggests a very close relationship between these two stocks.

A few samples of cod otoliths were collected from the cruises mentioned in dr. Magnússon's report.

Fig. 5 shows the age distribution of two samples from West-Greenland in early September 1959. Sample no. 2 from this area shows a great dominance of the 1953 yearclass in conformity with our samples from this area in 1958. On the other hand sample no. 1 shows a dominance of the 1947 yearclass.

The age distribution of the five samples from the Newfoundland area 8.-14. July 1959 is shown in fig. 6. Samples 3, 4 and 5 show a clear cut dominance of the 1953 and 1954 year classes.

Finally, the average lengths of the age groups from these various areas is shown in table II.

Table II

Cod 1959. Average sizes of the age groups.

Age	Iceland spawn. season	East Greenland April	West Greenland Sample 2	Newfoundland Sample 3
3	55.1	44.4		
4	65.9	54.9	(58.0)	
5	75.1	63.1	67.6	53.0
6	83.5	69.1	69.8	57.6
7	86.5	74.3	74.7	62.3
8	89.7	77.8	80.0	62.8
9	90.4	80.4	79.1	64.7
10	92.5	82.8	(85.7)	68.2
11	97.4	82.8	(88.7)	
12	97.4	85.4	(87.3)	
13	100.2	78.7	(79.0)	

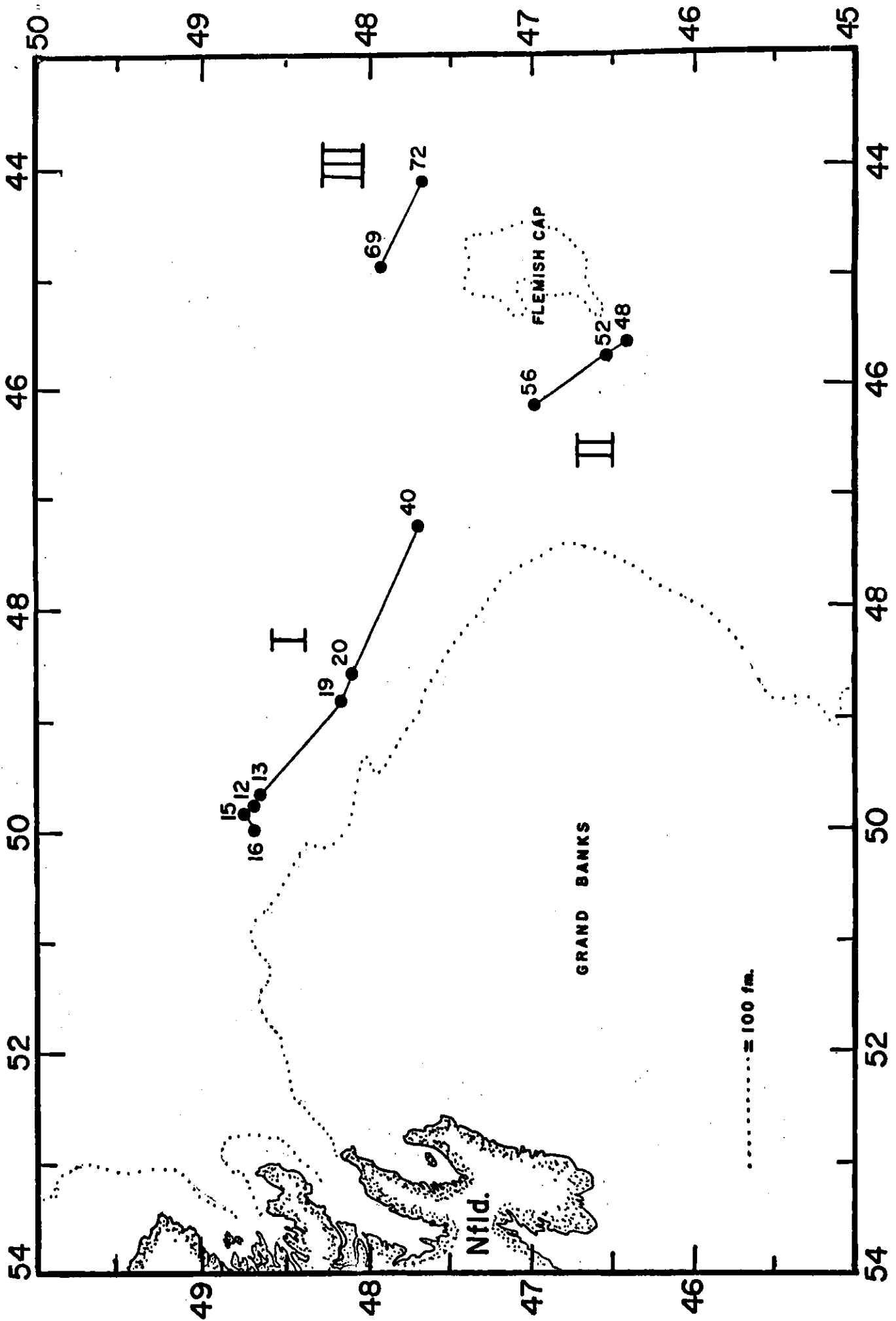


Fig. 1. Location of hydrographic sections on cruise II.

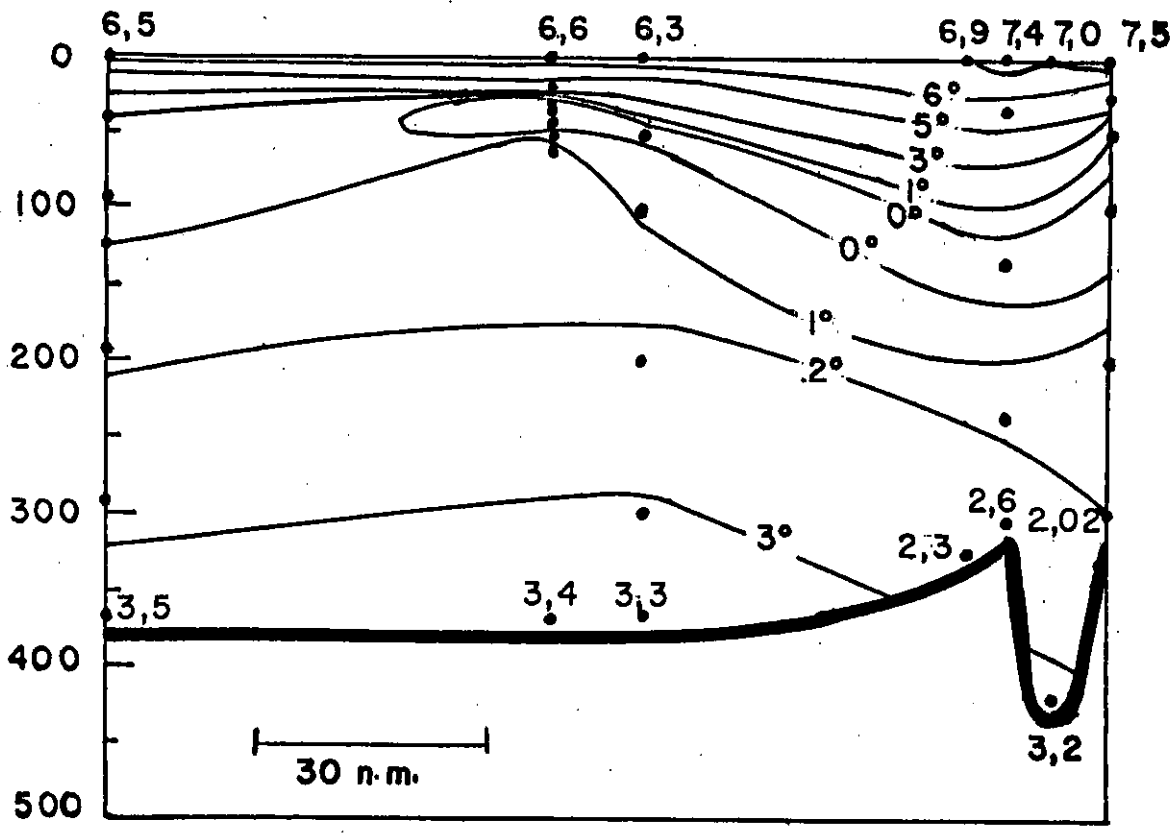


Fig. 2. Temperature distribution along the NE slope of the Grand Bank. (Section I).

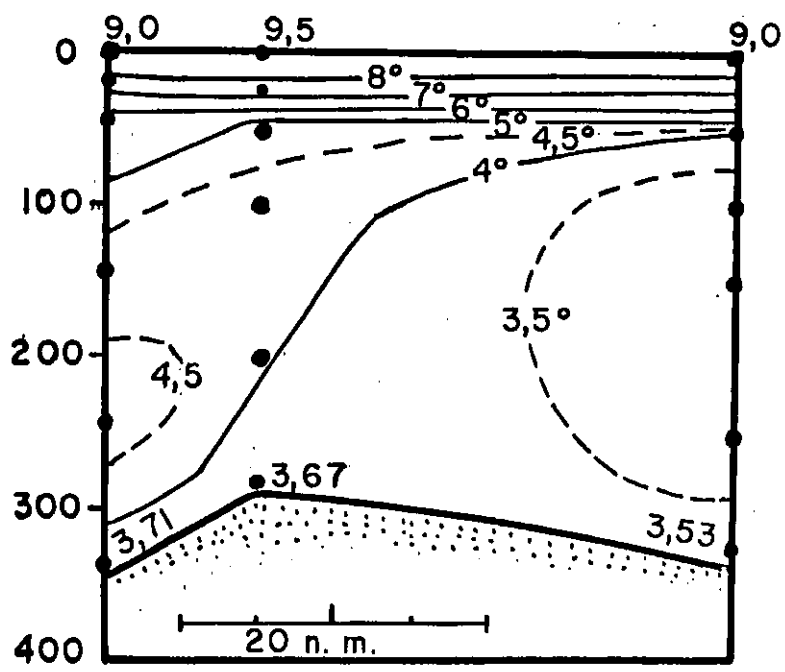


Fig. 3. Temperature distribution at the NE part of the Flemish Cap. (Section II)

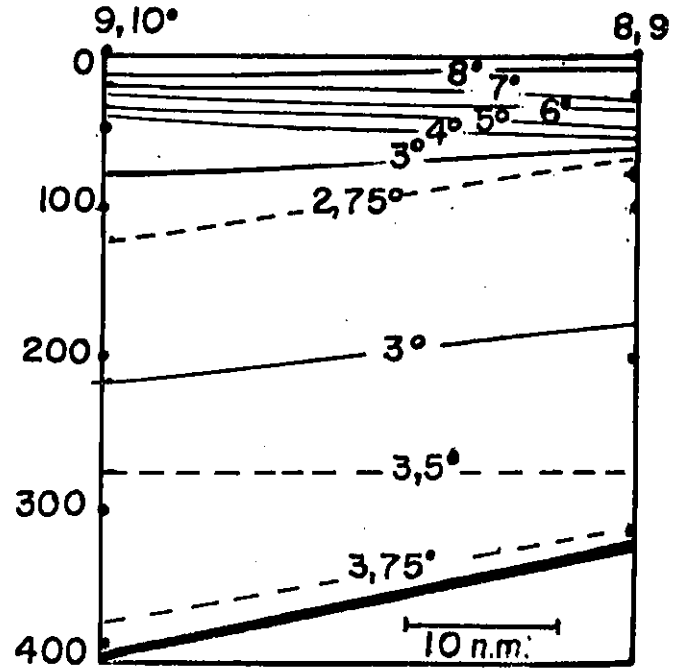


Fig. 4. Temperature distribution at the NE part of the Flemish Cap. (Section III)

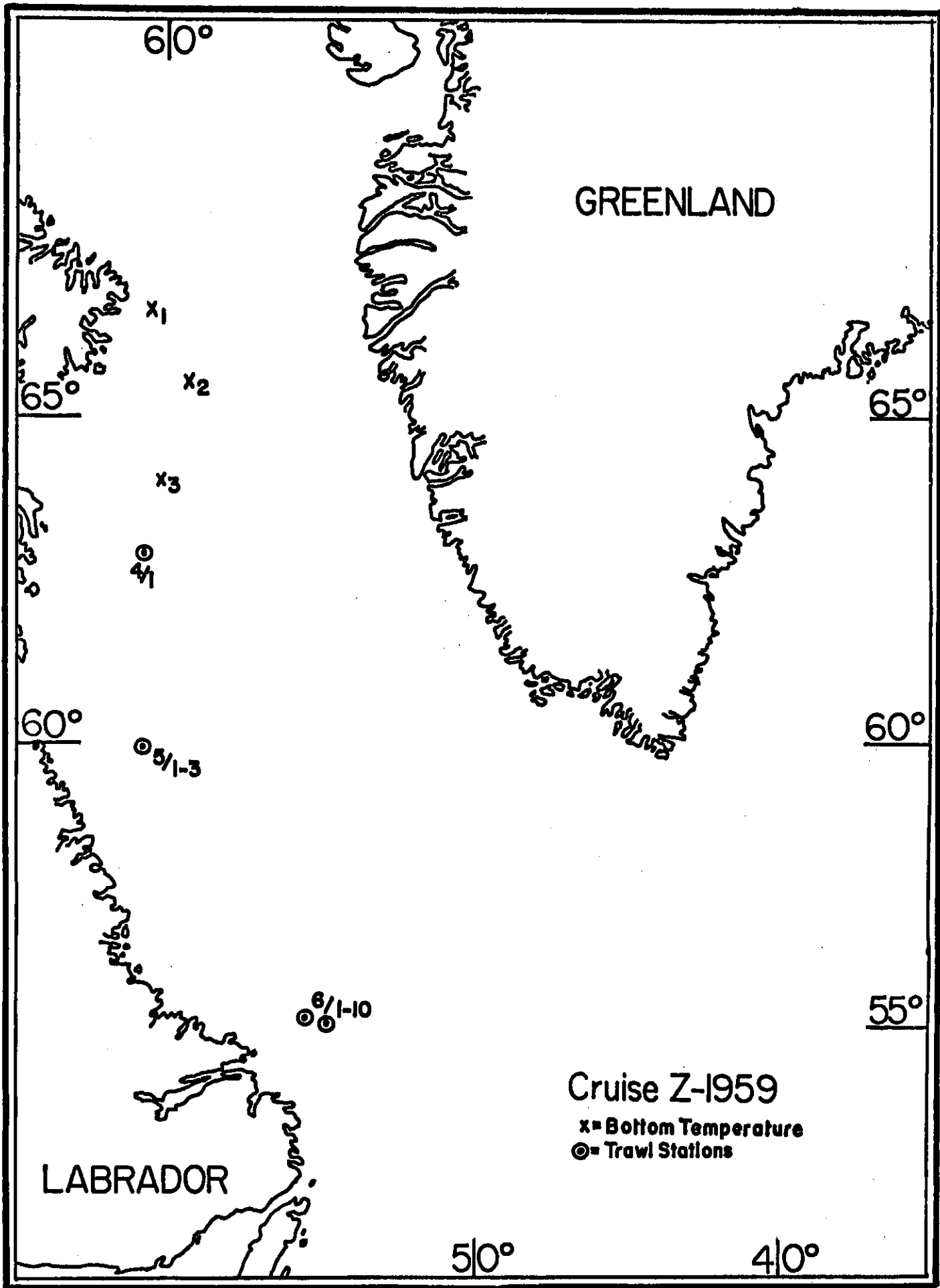


Fig. 5. Location of stations in the western part of the Davis Strait.

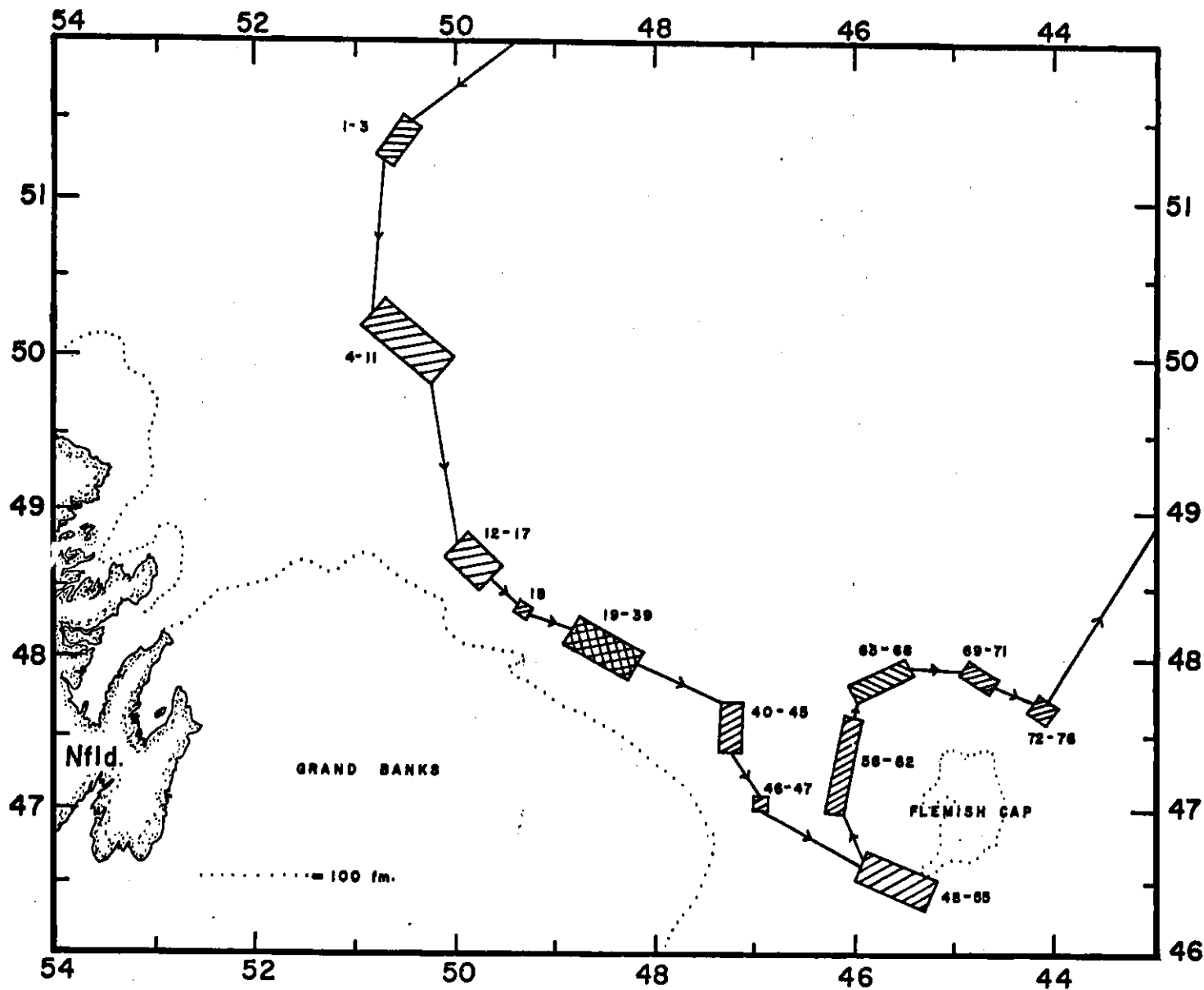


Fig. G. A map showing the surveyed area on cruise II. The shaded rectangles indicate the fished areas. Double shaded: Here the best results were obtained. The figures indicate the current number of hauls.

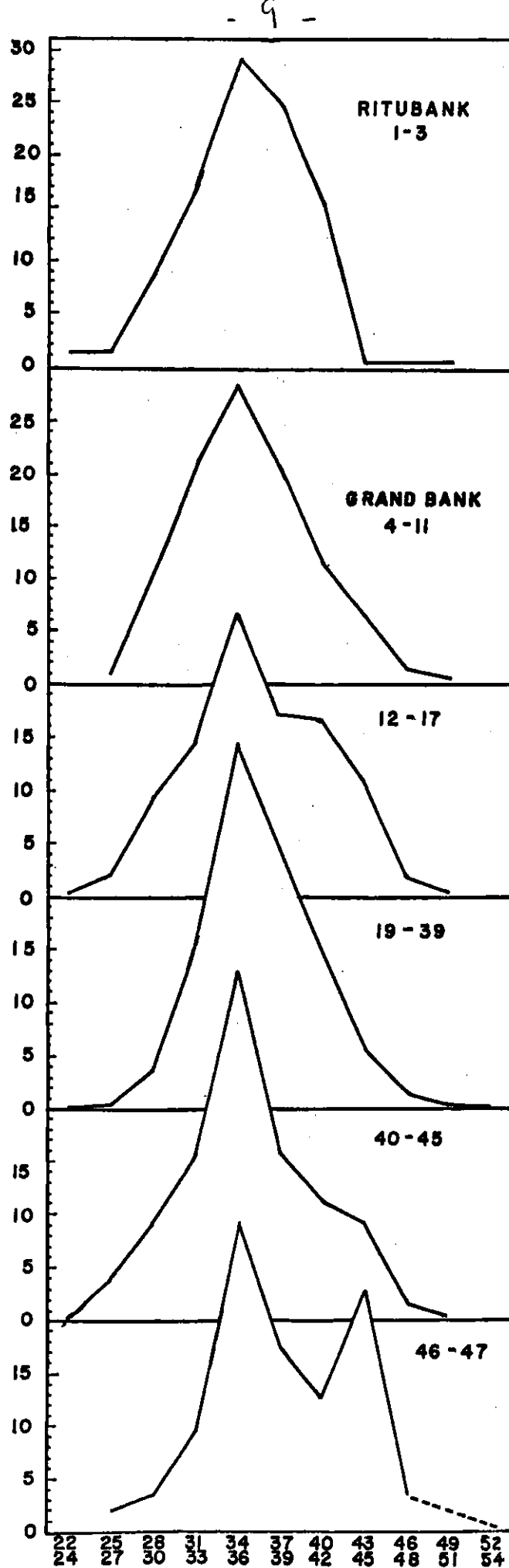


Fig. 7. Diagram showing the length composition of redfish (mentella) at different places in subdivisions 3K and 3L.

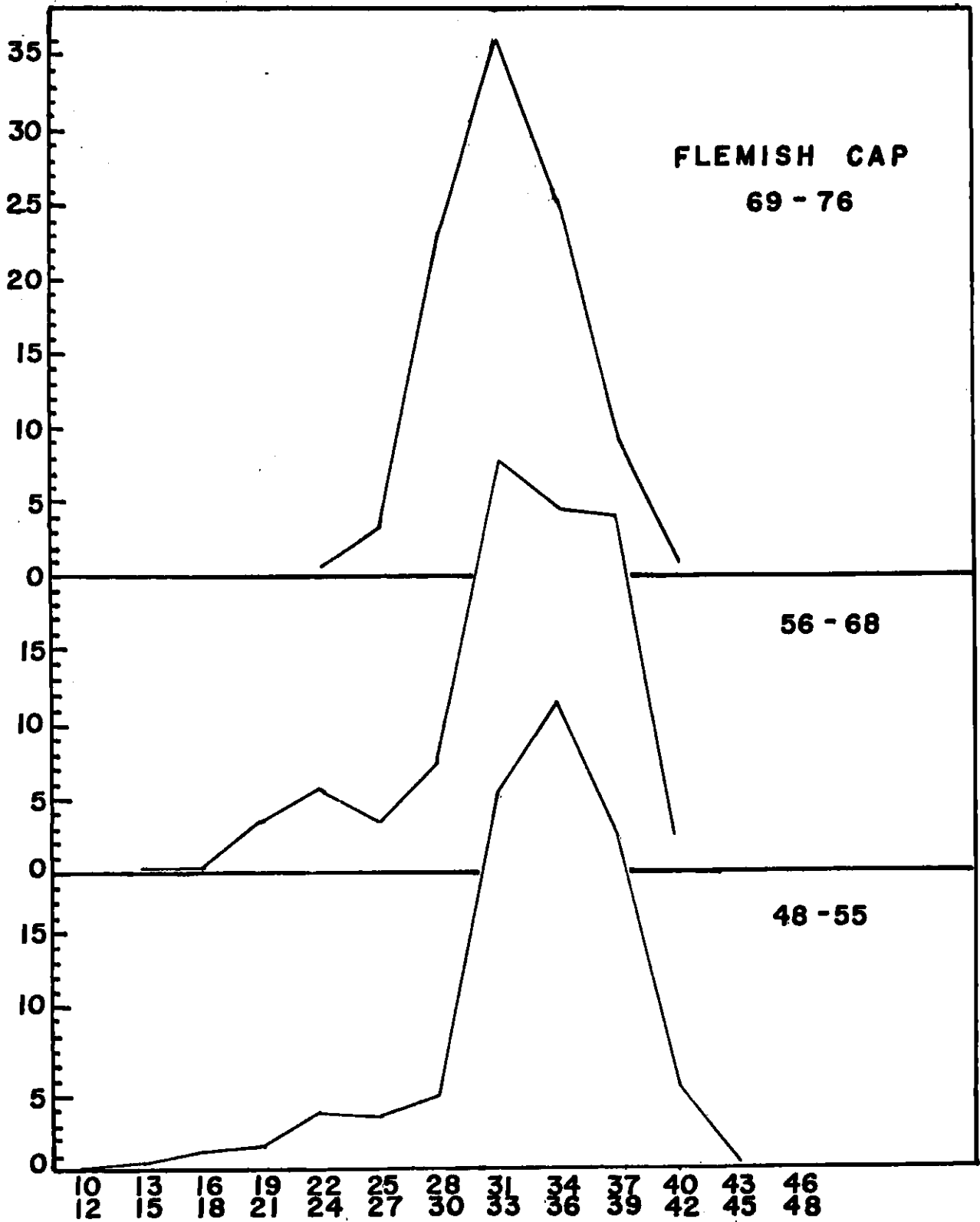


Fig. 8. Diagram showing the length composition of redfish (mentella) at different places at Flemish Cap (subd. 3M).

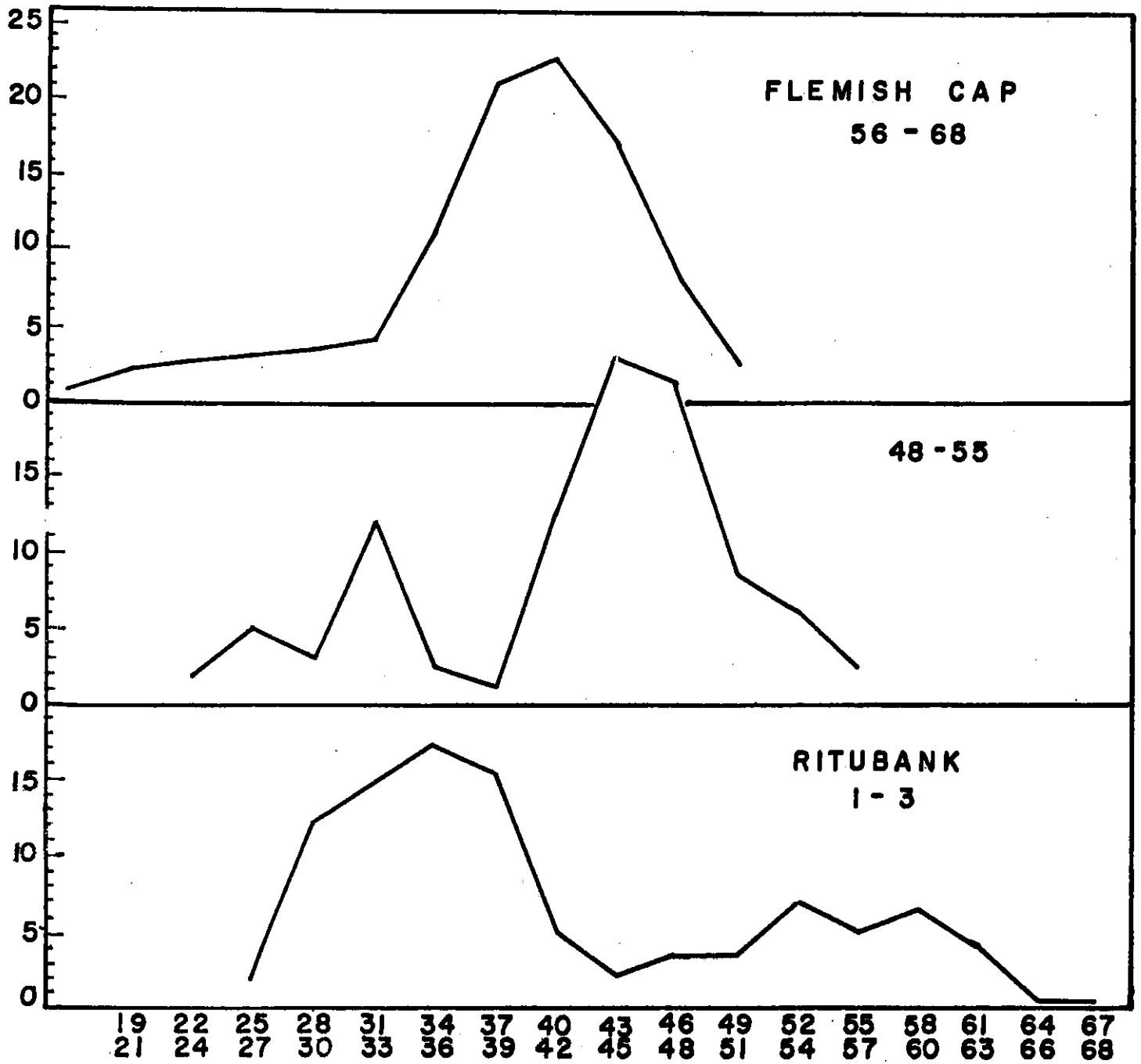


Fig. 9. Diagram showing the length composition of the marinus type in different areas.

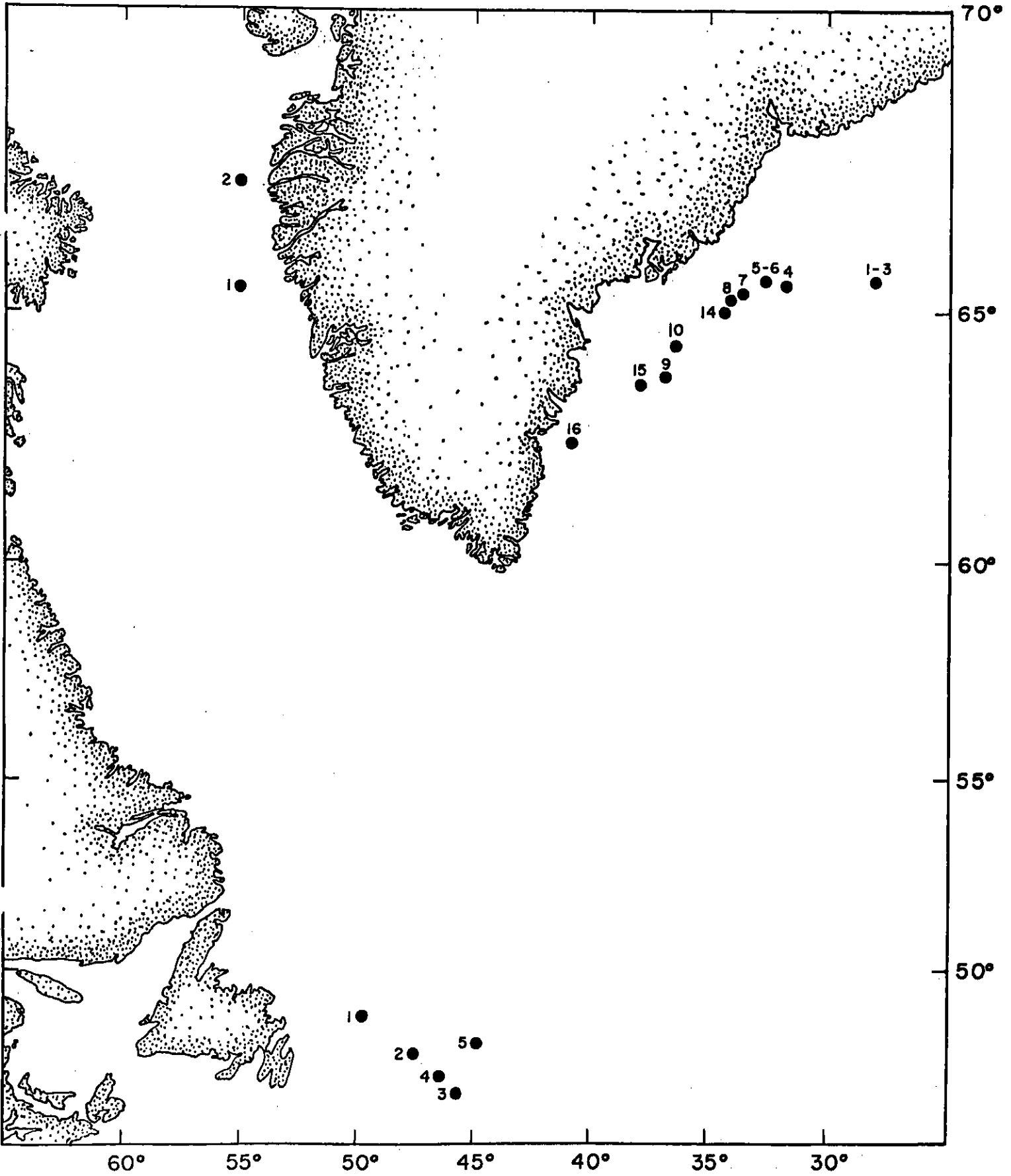


Fig. I. Samples of cod in 1959.

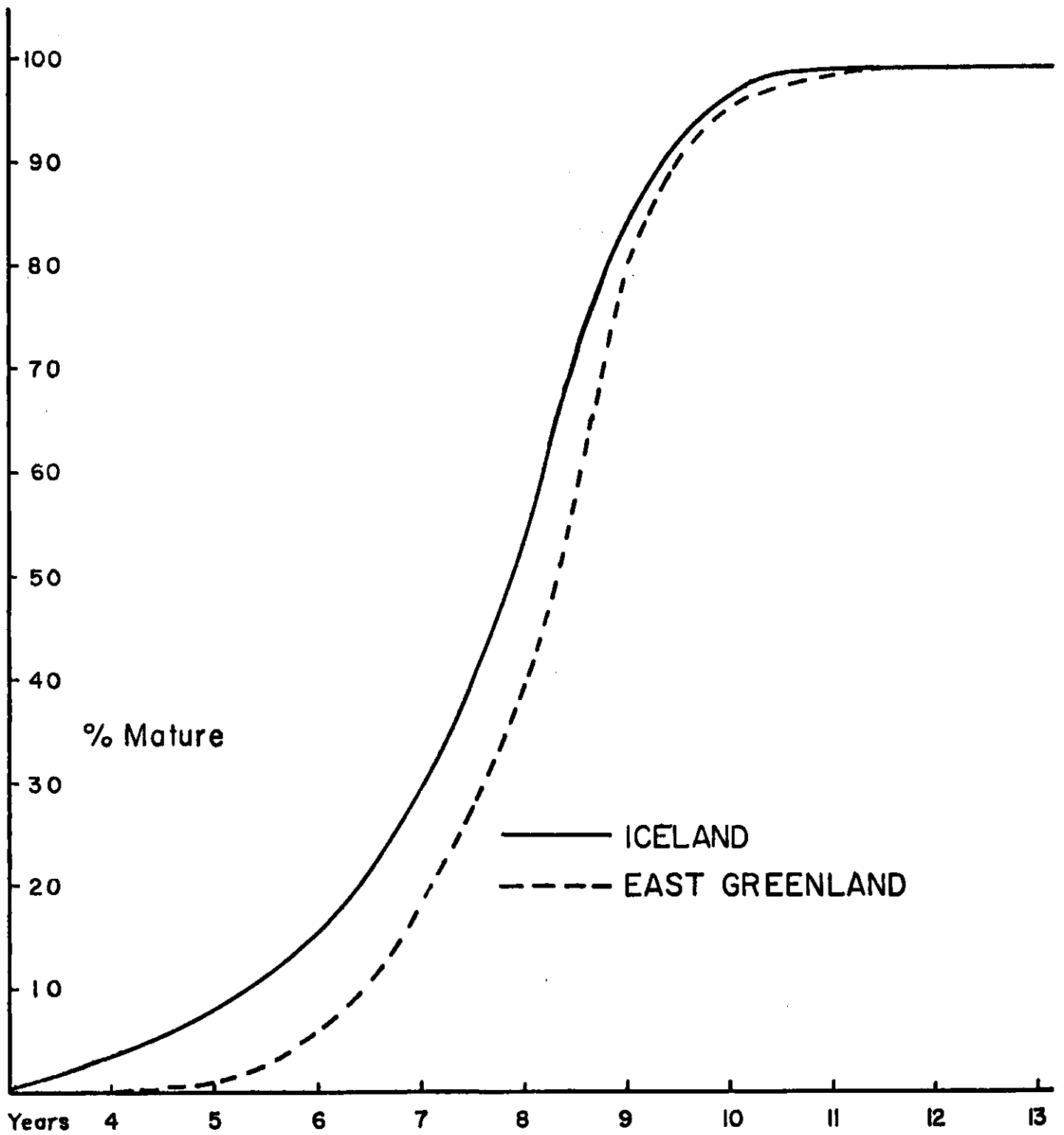
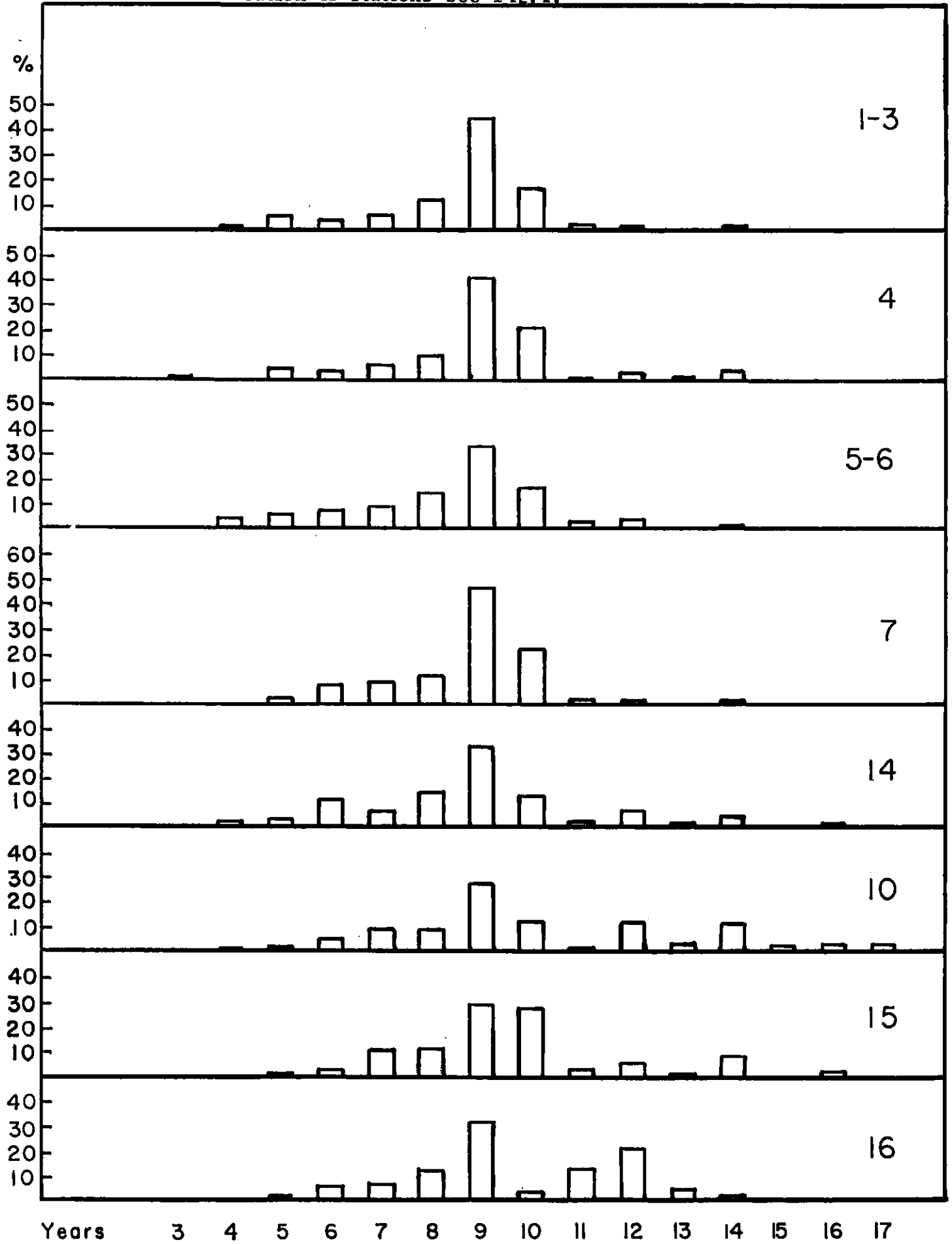


Fig. 2. Onset of maturity of the east Greenlandic and the Icelandic stocks of cod.

Fig 3. Age distribution of cod at East Greenland in April 1959.
For location of stations see Fig. 1.



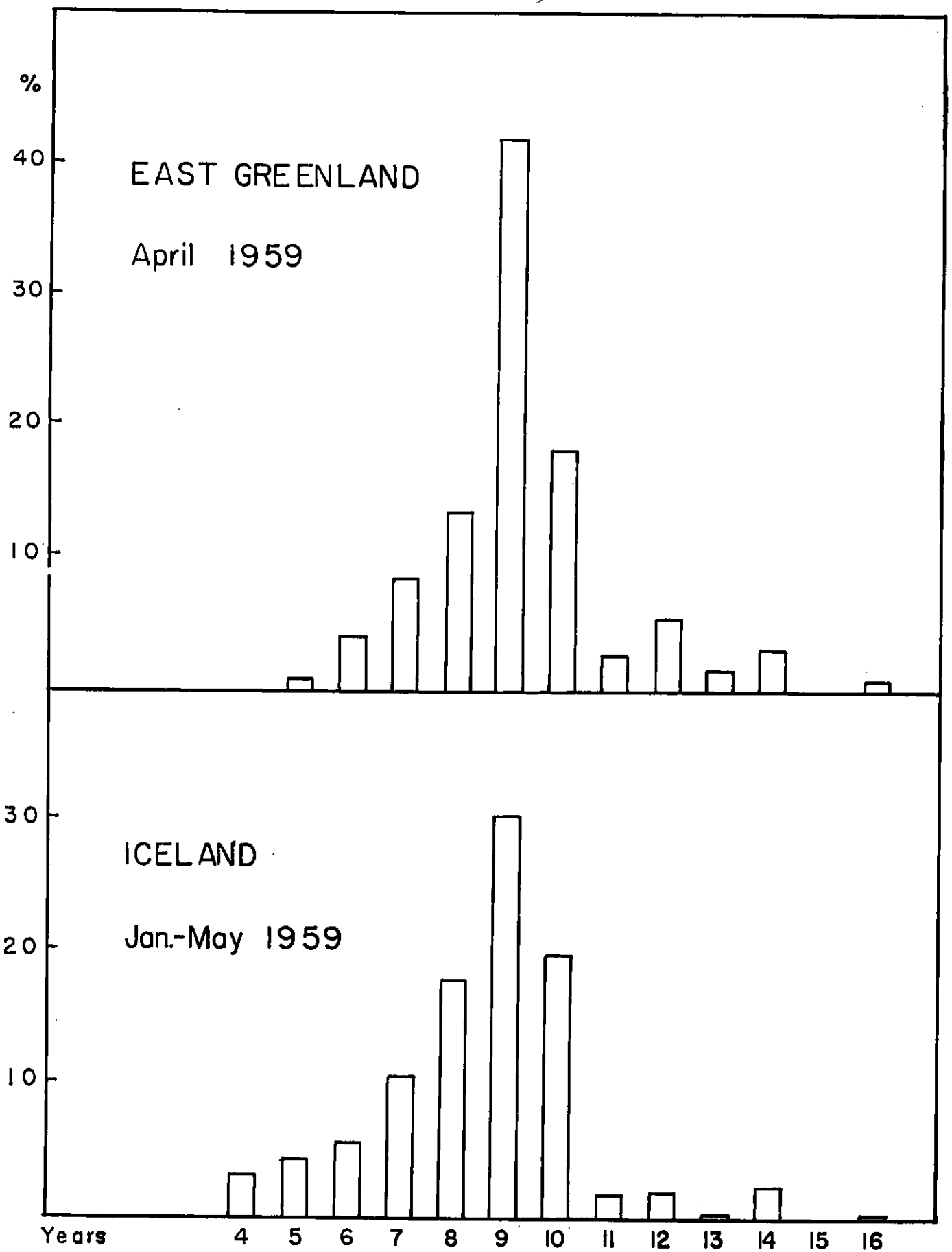


Fig. 4. Age distribution of the East Greenlandic and Icelandic spawning stocks of cod in 1959.

WEST-GREENLAND

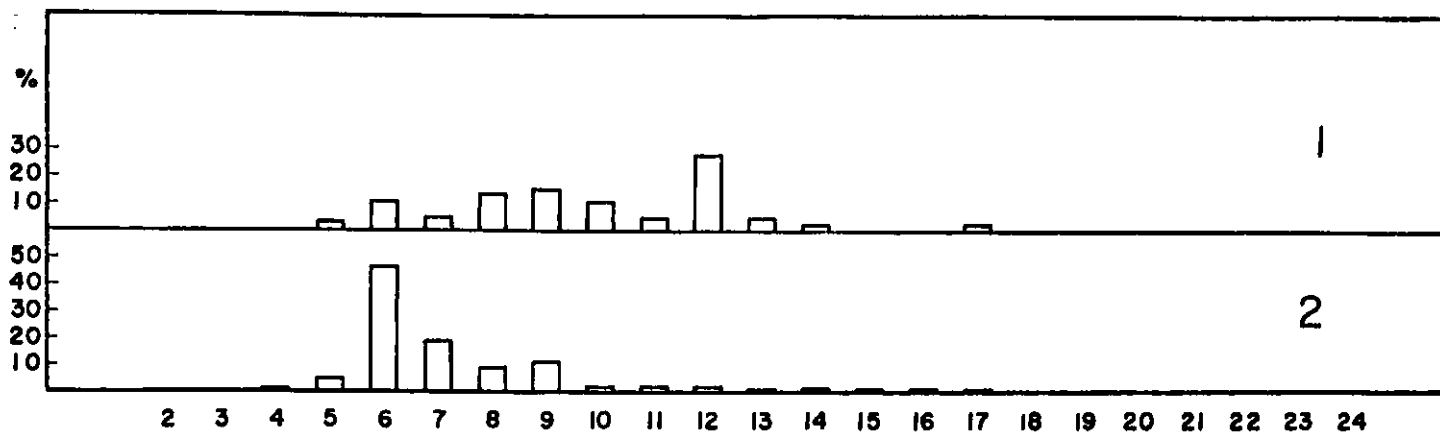


Fig. 5. Age distribution of cod off West-Greenland. Sept. 1959.

NEWFOUNDLAND

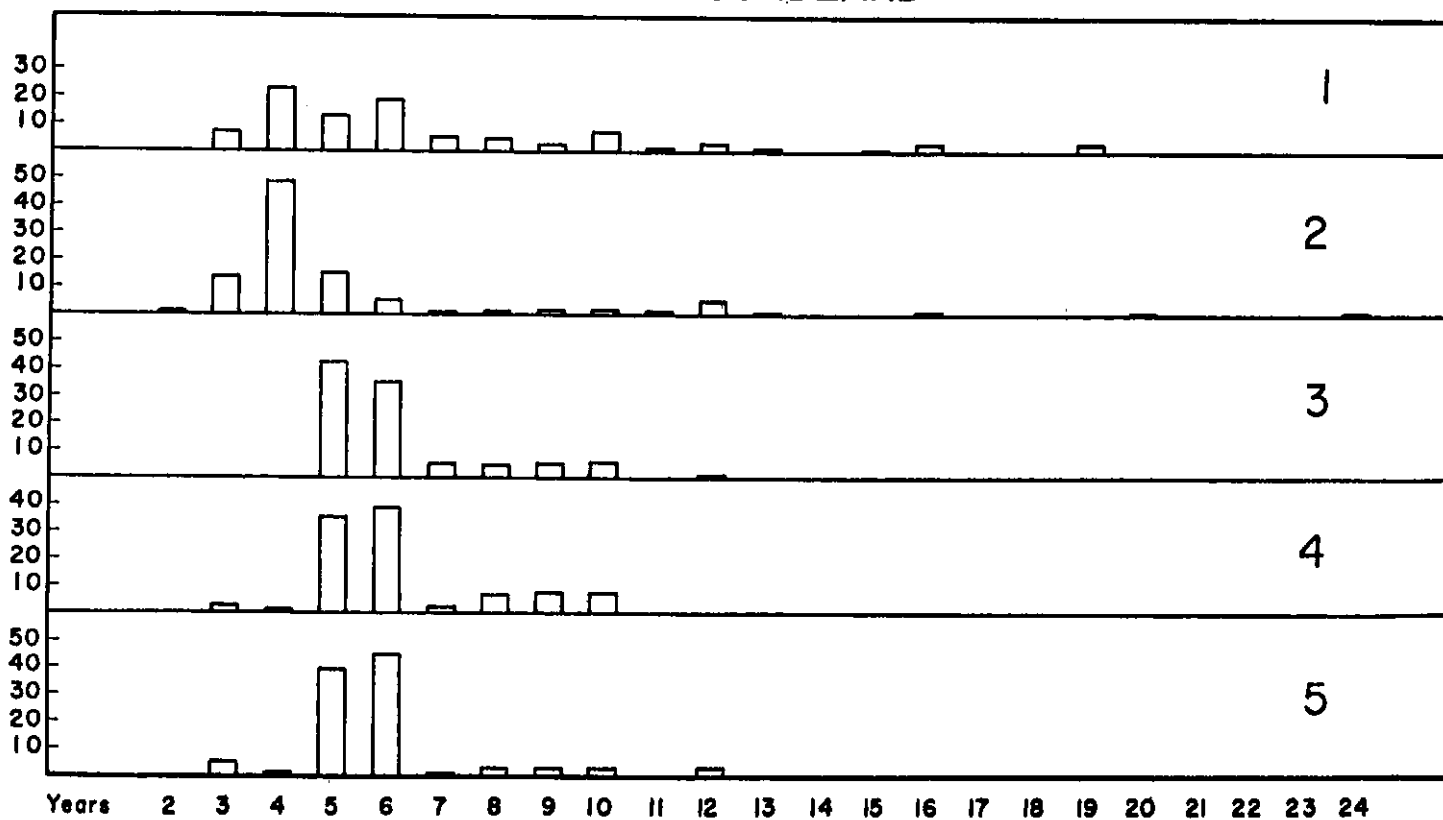


Fig. 6. Age distribution of cod on the Newfoundland-bank. July 1959.