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I. COD - WEST GREENLAND

1. Young Stages

a. Occurrence of Cod Eggs

In the period January to June, hauls with a 1 m stramin-net were made in the Godthåb Fjord area, both on the surface (100-50 m wire out) and in deep water (400, 500 and 600 m wire out).

No cod eggs were caught in January nor February.

On March 16th the first cod eggs were caught in the inner part of the fjord, near the most important spawning grounds. In hauls with 100-50 m wire out and 400 m wire out, 46 and 45 cod eggs were taken respectively.

On April 11th, 803 and 77 cod eggs were taken at the same place with 100-50 and 400 m wire out respectively; this was the largest number of cod eggs taken in this fjord in 1960. Thus, as in 1959, the number of cod eggs taken in the Godthåb Fjord area in 1960 was rather small.

Also, in the coastal area at Godthåb few cod eggs were taken, the best haul (100-50 m wire out) containing 140 eggs.

On April 30th three hauls (100-50 m wire out) were made on the Fylla Bank section (1D). Between the bank and the coast 46 cod eggs were taken, while on the middle of the bank 22 eggs and over the western slope of the bank 3457 cod eggs were taken. At the last-mentioned station 545 cod eggs and 5 larvae were also taken, in a haul with 600 m wire out.

b. Occurrence of Cod Fry

Owing to engine trouble the "Dana" could not work in Greenland waters in 1960 and the work in the Davis Strait, during July, therefore, had to be carried out from the cutters "Adolf Jensen" and "Sujumut". On four sections, recommended hydrographical observations and hauls with 2 m stramin-net were made. The hauls were made with only 100-50 m wire out. It was impossible to work the westernmost stations normally taken from the "Dana", with the small vessels (Figure 1). On the southernmost section the occurrence of cod fry was better than in most of the previous years, the largest numbers being found between 65° and 66° N. Lat. The number of cod larvae, however, was not particularly large on the different stations, and it is therefore rather difficult to predict the importance of the 1960 year-class to the future fishery. It is, however, very likely that this year-class will not be considered a rich year-class, but rather, a medium one.

c. Occurrence of Small Cod of Age-Groups I, II and III

In 1960 nine samples of small cod of the age-groups I, II and III were collected. The length frequencies are given in Figure 2. The samples a.-h. were all taken in the area south of Godthåb (1D, ca. 64° N. Lat.). Sample i. is from the harbour of Christianshåb (1B, ca. 68° 50' N. Lat.), while samples a.-f. are from catches with a shrimp trawl (ca. 250 m depth)

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during January, February and March. Samples g., h. and i. were caught with a hand-seine from the shore during June, July and August.

Age-group I (1959 year-class) occurs in small amounts in samples a., c. and i. and is not represented in the other samples.

Age-group II (1958 year-class) is strongly represented in all samples, which is rather surprising, because this year-class, in the previous year, was present in only one sample from 1F.

Age-group III (1957 year-class) is strongly represented in all samples with the exception of sample h. This year-class was also strongly represented in the samples from 1958 and 1959. Otoliths of 199 cod (sample a.) were taken for age determination. The mean lengths of cod belonging to age-groups II and III were 20.1 and 27.6 cm respectively.

2. Commercial Fish, Coastal Waters and Offshore Banks

a. Age-Composition

Offshore Banks:

Otoliths of 3134 cod were collected from the offshore banks: 1459 from catches by handline and 1675 by longline. All catches were taken by the "Adolf Jensen" and "Sujumut" and were distributed, according to divisions, in the following way:

Table 1

<u>Division</u>	<u>Handline</u>	<u>Longline</u>
1B	253	291
1C	555	634
1D	651	750
1F	234	830

The stations where the experiments have been carried out are shown on the map, Figure 3, while Figure 4 shows the age and length distributions. The lengths are given in 5-cm groups and the length distribution curves include aged as well as tagged cod and cod which had only been measured. In order to compare age compositions and length distributions of handline and longline catches, both gears have been used on eight different stations. From the figures it is evident that the handline catches consist of younger and smaller cod, than the catches taken by longline. The differences in mean ages and mean lengths are given in Table 2.

Table 2

<u>No.</u>	<u>Long-</u>	<u>Hand-</u>	<u>Long-</u>	<u>Hand-</u>
	<u>line</u>	<u>line</u>	<u>line</u>	<u>line</u>
	<u>Mean Age</u>		<u>Mean length cm.</u>	
1	8.08	5.85	79.3	62.6
2	10.69	9.47	79.4	77.0
3	10.06	8.28	76.0	-
4	8.65	8.01	75.1	73.9
8	9.52	6.86	75.7	68.2
10	10.11	8.31	83.4	78.1
11	11.60	9.74	83.3	79.9
12	10.94	8.12	73.2	68.9

It appears from Table 2 that the mean ages as well as the mean lengths are higher for cod taken by longline than for cod taken by handline. Age-groups younger than the V-group amount to 29 percent of the handline catches, but only to 11.2 percent of the longline catches.

b. Inshore Waters and Fjords

From the coastal area and the fjords, 4613 cod from 24 catches were aged. The results are shown in Figures 5 and 6.

The samples are distributed according to divisions as follows:

<u>Division</u>	<u>Sample Number</u>
1A	13, 14
1B	15, 16, 17
1C	no samples
1D	18, 19, 23 to 36
1E	20, 21
1F	22

The 1947 year-class predominates in only two samples (13 and 29), and is below 20 percent in all other samples, except No. 22.

The 1953 year-class is strongly dominating in a sample from Division 1A (No. 14) and in the samples from the northern part of Division 1B (Nos. 15 and 16). It is also well represented in samples from the coastal region of Division 1D, where it is the predominant year-class in samples No. 26, 30 and 31. It is very poorly represented in the interior part of the Godthåb Fjord, where the 1952 year-class predominates in samples Nos. 33, 34 and 35. Outside the Godthåb Fjord, the 1952 year-class has been poor. In the two samples from Division 1E the 1953 year-class is strongly represented in No. 22 and predominating in No. 23.

The 1955 year-class is abundant in some samples from the Godthåb Fjord. In a sample from the inner part of the fjord (No. 36) it predominates with about 30 percent and in another sample (No. 33), from the same place, it amounts to about 22 percent.

The 1956 year-class predominates in seven samples, three from the mouth of the Godthåb Fjord (Nos. 24, 25 and 28), one from the middle part of the same fjord (No. 32), two from the southern part of Division 1D (Nos. 18 and 19), and one from Division 1E (No. 20). In two other samples (Nos. 27 and 28), from the mouth of the Godthåb Fjord, it is represented by more than 30 percent.

The rich year-class 1957 has not yet entered the commercial catches. This year-class predominates with 56.7 percent in a handline catch (No. 28) from the mouth of the Godthåb Fjord.

3. Maturity

Age at first maturity is determined by means of the otoliths of all aged, mature cod. Large amounts of material for such determinations are available for only the 1947 year-class. The age at first maturity for this year-class is shown in Table 3.

The data are given separately for the following regions: coastal area north of 63° N., coastal area south of 63° N. and West Greenland Banks. It appears from the table and also from previous data, that males as a rule mature earlier than females.

Table 3. Age at first maturity of the 1947 year-class of Greenland cod in 1960.

Coastal area north of 63° N.					
Age Imm.	Males		Females		
	No.	o/oo	No.	o/oo	
6	7	68	8	62	
7	42	408	41	318	
8	42	408	52	403	
9	10	97	26	202	
10	2	19	2	16	
Total	103		129		
Mean Age	7.5		7.8		

Coastal area south of 63° N.					
Age Imm.	Males		Females		
	No.	o/oo	No.	o/oo	
6	8	308	3	214	
7	11	423	6	429	
8	6	231	4	286	
9	1	38	-	-	
10	-	-	1	71	
Total	26		14		
Mean Age	7.0		7.3		

Banks off the west coast					
Age Imm.	Males		Females		
	No.	o/oo	No.	o/oo	
6	76	169	17	46	
7	235	523	167	453	
8	115	256	154	417	
9	20	45	29	79	
10	1	2	2	5	
11	2	4	-	-	
Total	449		369		
Mean Age	7.2		7.5		

4. Tagging Experiments

In 1960 a total of 4575 cod were tagged in West Greenland waters. Of these 2882 cod were tagged on the offshore banks and 1693 in coastal waters and fjords. The distribution according to divisions is as follows:

<u>Division</u>	<u>Offshore banks</u>	<u>Coastal waters and fjords</u>
1B	611	-
1C	1105	-
1D	1147	866
1E	19	-
1F	-	432

White Petersen discs were used for all tagging on the banks. In the coastal waters and fjords 731 cod were tagged with the white Peterse discs, while 545 were tagged with hydrostatic tags and 43 with red plastic tags.

At present the bulk of the expected recaptures has not been received.

II. REDFISH

A fishery with shrimp trawl for small redfish was carried out in continuation of previous years' experiments in the Godthåb Fjord (1D).

Tables showing the length distribution of the samples will be presented in the Sampling Yearbook Vol. 5, 1960. The total catch was 9997 redfish. Hauls were made in all months with the exception of May, June and August. In December two hauls were made, while in the other eight months only one haul was made. 281 large redfish caught in pound nets, or with a big jig, in the Godthåb Fjord, were tagged with white Petersen discs.

III. GREENLAND HALIBUT

Investigations on the Greenland halibut have been carried out in Umanak Fjord and Disko Bay (Division 1A), in the Godthåb Fjord (Division 1D) and in Lichtenau Fjord (Division 1F).

A total of 173 specimens were tagged.

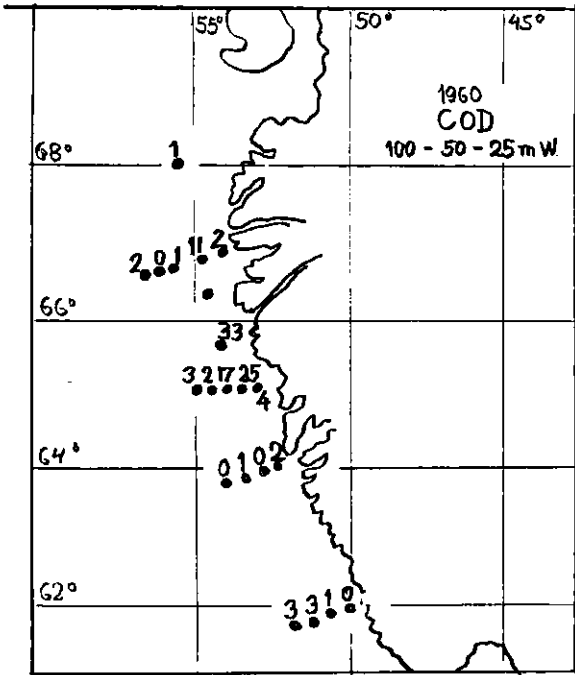


Fig. 1. Number of cod larvae caught per 30-minute hauls with the 2 m stramin net. "Dana", 1960.

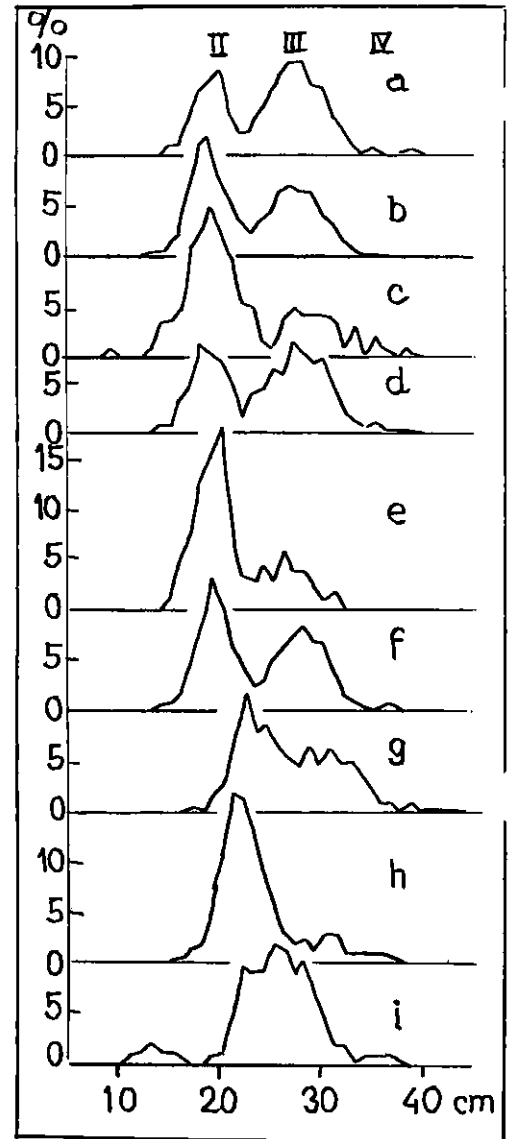


Fig. 2. Length frequency curves for young cod (II- to IV-Gr.). Coastal waters, 1960.

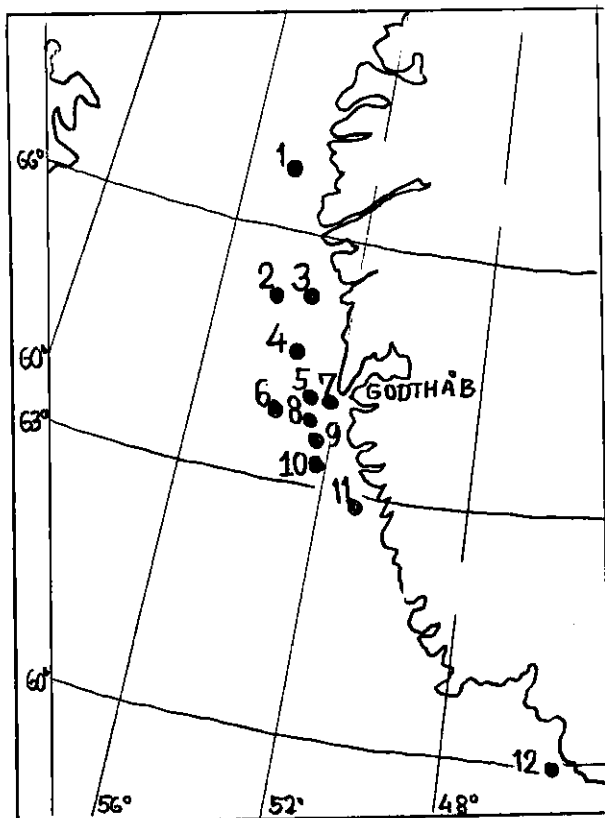


Fig. 3. Position of samples of off-shore caught cod. 1960.

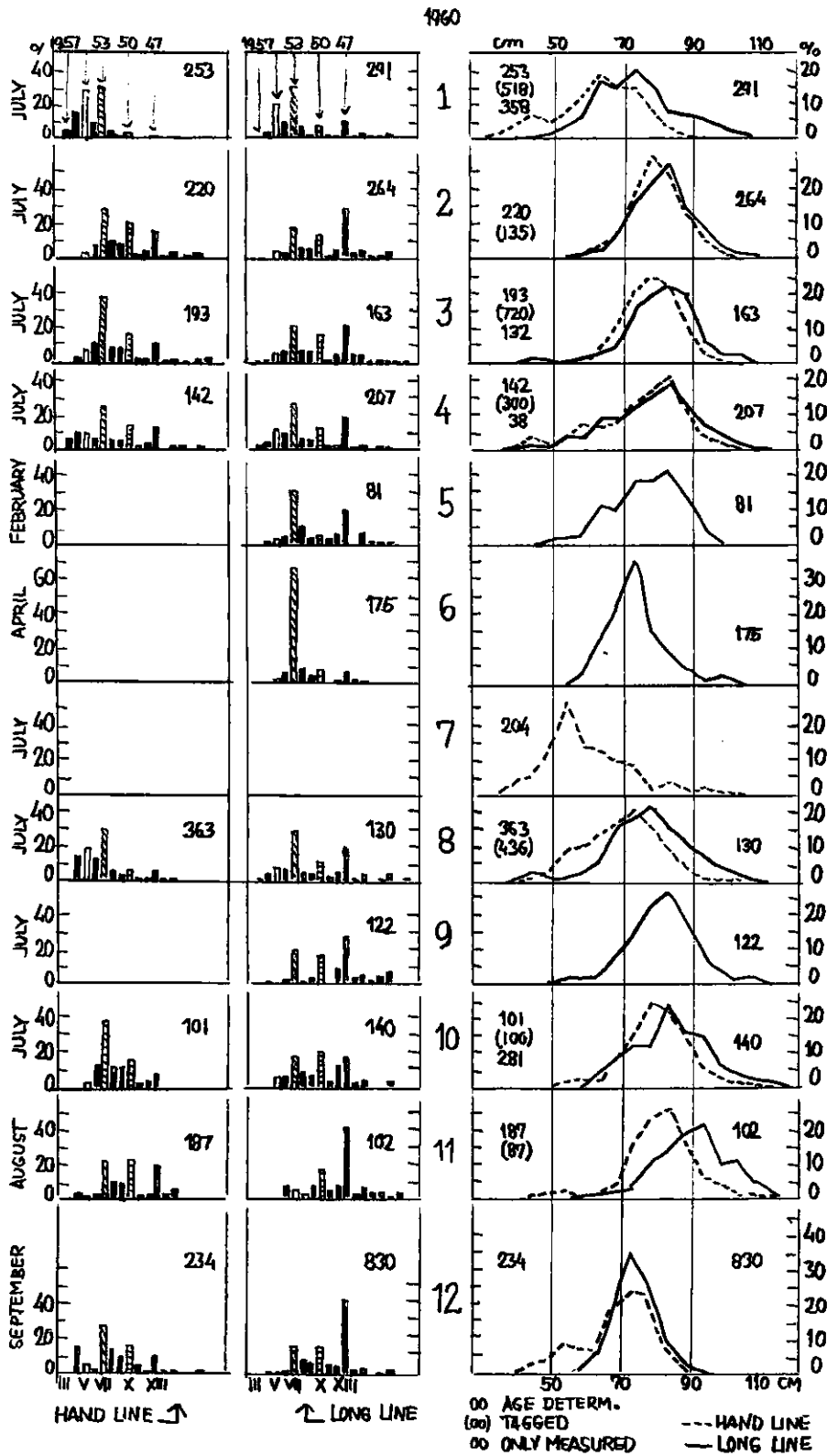


Fig. 4. Age- and length distribution of samples of offshore caught cod. 1960.

Fig. 5

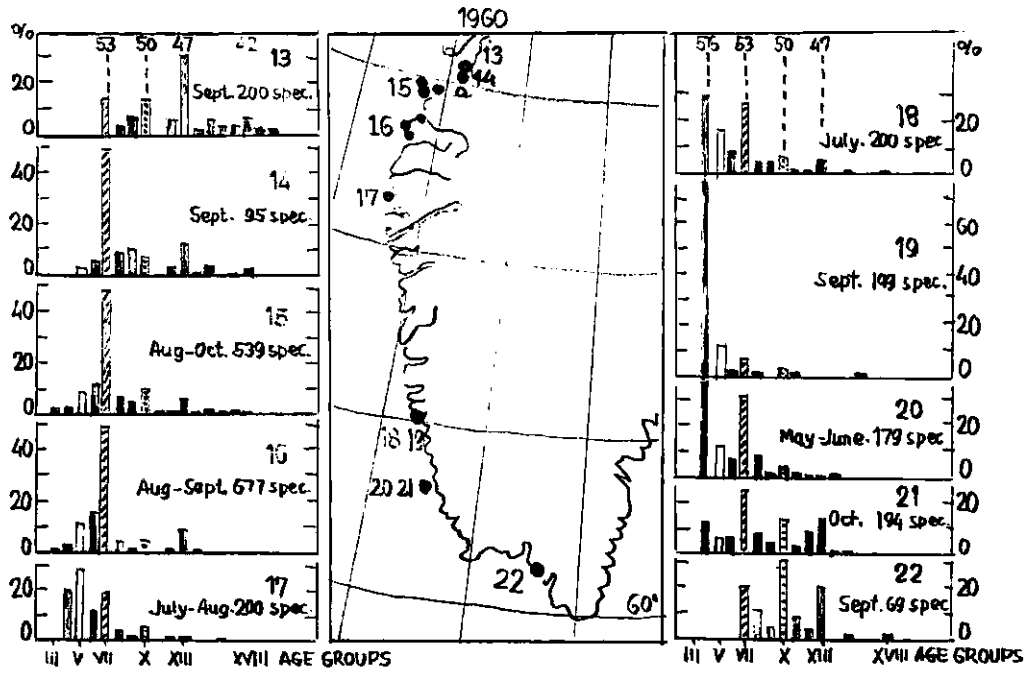


Fig. 6

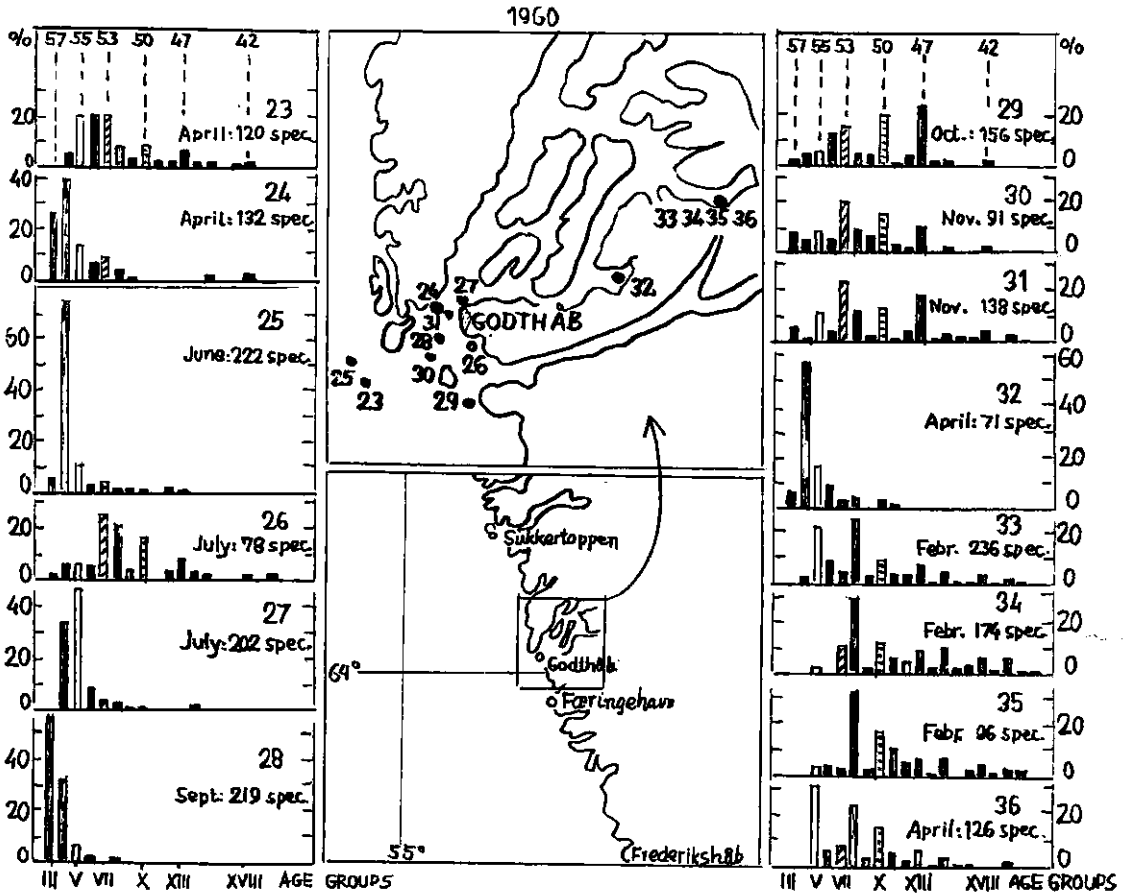


Fig. 5. Age-distribution of samples of cod from inshore waters, 1960.

Fig. 6. Age-distribution of cod from the Godthåb Fjord area, 1960.