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THE CONDITIONS OF THE HERRING FISHERY IN THE NORWEGIAN SEA IN 1958.

Ju.Ju.Marty.

As in the two previous years the abundant 1950 year-class has constituted the main bulk of the herring catches from drift nets in the summer of 1958. Figure 1 illustrates the age composition of the Norwegian catches of winter herring and that of the Soviet catches from drift nets in the Norwegian Sea. The resemblence of the age compositions is quite evident, and only somewhat higher percentage of older groups in the drift net catches can be noted.

The 1951-1953 year-classes are in equal extent scantily represented both in the winter herring catches and in the drift net catches.

We have available some observations on the size distribution of herring for the past eight months (fig.2) which can be compared to both the direct data for the previous years and the deviations from the total range of variation for the period from 1950 to 1957.

The number of large herring corresponding to the 1943-1944 year-classes is known to become exceedingly small. A high negative deviation with a peak on the curves in group 32cm. can be seen in fig.2. The recruitment to the stock on the account of young immature fish has recently become insignificant.

The positive anomaly in the deviations is extremely small, the peaks being only in group 25 cm. These sizes seem likely to correspond to the 1954 year-class as well as to some specimens of the 1953 year-class originating in the north and having a low rate of growth. Therefore any increase in the stock of the Atlanto-Scandian herring cannot be expected in the nearest future.

Undoubtedly it is the 1950 year-class that both the Soviet and Norwegian fisheries will be based on.

The herring of the 1950 year-class are in the ninth year of life and they have spawned two or three times.

The biological rhythm, and particularly the range of the feeding migrations of the 1950 year-class, appear to be similar to those of the older age groups. They made joint migrations as far northward as the region of the Mohn Ridge and to the west beyond the Jan Mayen meridian.

In 1958, as some years ago, the regions of the Polar Front were of particular importance for the fisheries. The herring concentrations were observed further to the north and west in July-August 1958 than in 1956, the distribution of the fishing areas being similar to that in 1953. The change in the fishing areas shown in fig. 3ABC is likely to be connected with a growth factor. This implies that the shift in the fishing areas may be accounted for the predominance of the 1950 year-class in the catches, since these six-year-old fishes are notable for a narrow range of migrations.

Fig.4 gives an idea about the productivity of the herring fishery in 1958. Here we can see curves of the mean catches by months for the period 1952 to 1957 and the productivity of the fishery for each year as deviations for this period.

In 1958 particularly high catches of herring were taken in January and February, so we can assume that their delayed approach the Norwegian coasts would be responsible for this. The productivity of the fishery remained low in the summer months,

though it was somewhat higher than in 1956 and 1957.

Fig.4 also illustrates that the first years of drift net fishery development the summer catches were much heavier than at the present time. In contrast are the autumn catches, which were relatively small at the beginning of the fishery development and have considerably increased lately.

The cause of the higher efficiency of the summer fishery in the past may be explained by the fact that the density of the stock was greater. The increase in the autumn production which compensated the decline in the summer catches successfully is linked to the development of the drift net fishery at a low depth up to 70-80 m. In past our catches decreased as soon as the shoals sank low, but at present we have obtained fairly good catches throughout the winter.

The mean catch per net per day for the past eight months kept on the former level. However in 1958 we have observed a further decrease in the value of heavy catches and increase in light catches consisted of less than 5 tons (fig.5). Under such conditions much more effort was required to keep the catch per net at the previous level.

The above-mentioned observations allow us to consider that the Atlanto-Scandian herring stock has gone on reducing this year and would be on the lowest level for the nearest two years since the period 1934-1935.

The study of the correlation between the intensity of exploitation of the young immature generations and adult herring suggests an inverse relationship between these elements. From all year-classes which were intensively exploitated by the fishery in their first years of life much fewer large specimens were obtained as compared to the generations which were not affected by the fishery.

Table I.

Correlation between exploitation of young generations and that of adult herring.

y \ x	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	I
0.5				1923		1904	1944	1943		3
1.0					1918 1947					2
1.5					1937					I
2.0		1925	1938							2
2.5	1939			1934		1930				3
3.0			1932							I
3.5										
	I	I	2	2	3	2	I	I		13

x - the catch of each adult year-class: number of specimens in milliards.

y - the catch of each young year-class: million cwt.

$r = -0.56.$

$R_{\frac{y}{x}} = -0.54.$

This conclusion allows us to make assemptions that on condition of a more rational exploitation of the Atlanto-Scandian herring their stock might increase in future and the fishery productivity would rise both in the feeding and pre-spawning periods.

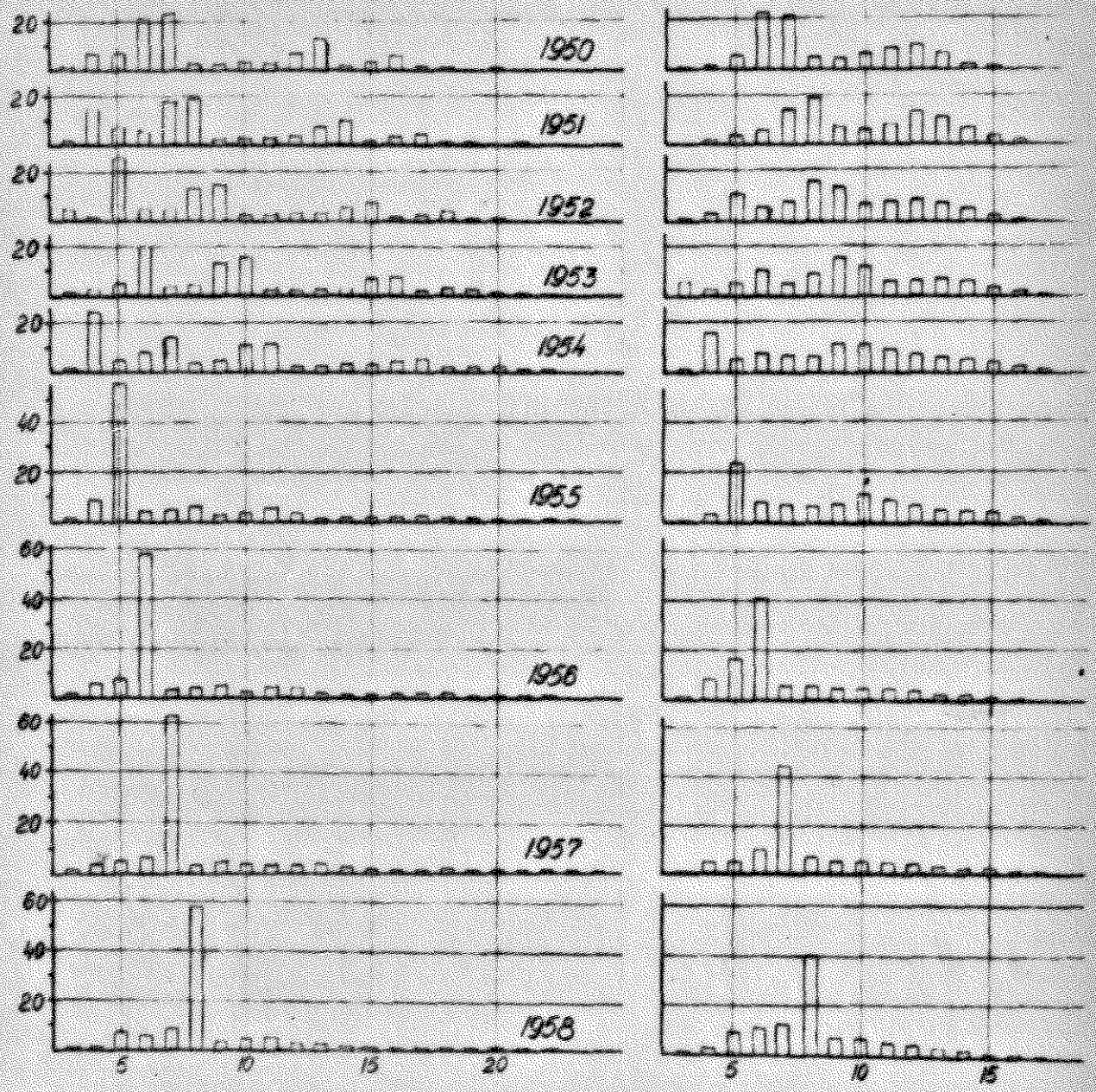

Fig.1.

Age composition of Norwegian winter herring.

Age composition of herring from the drift fishery in the Norwegian sea.

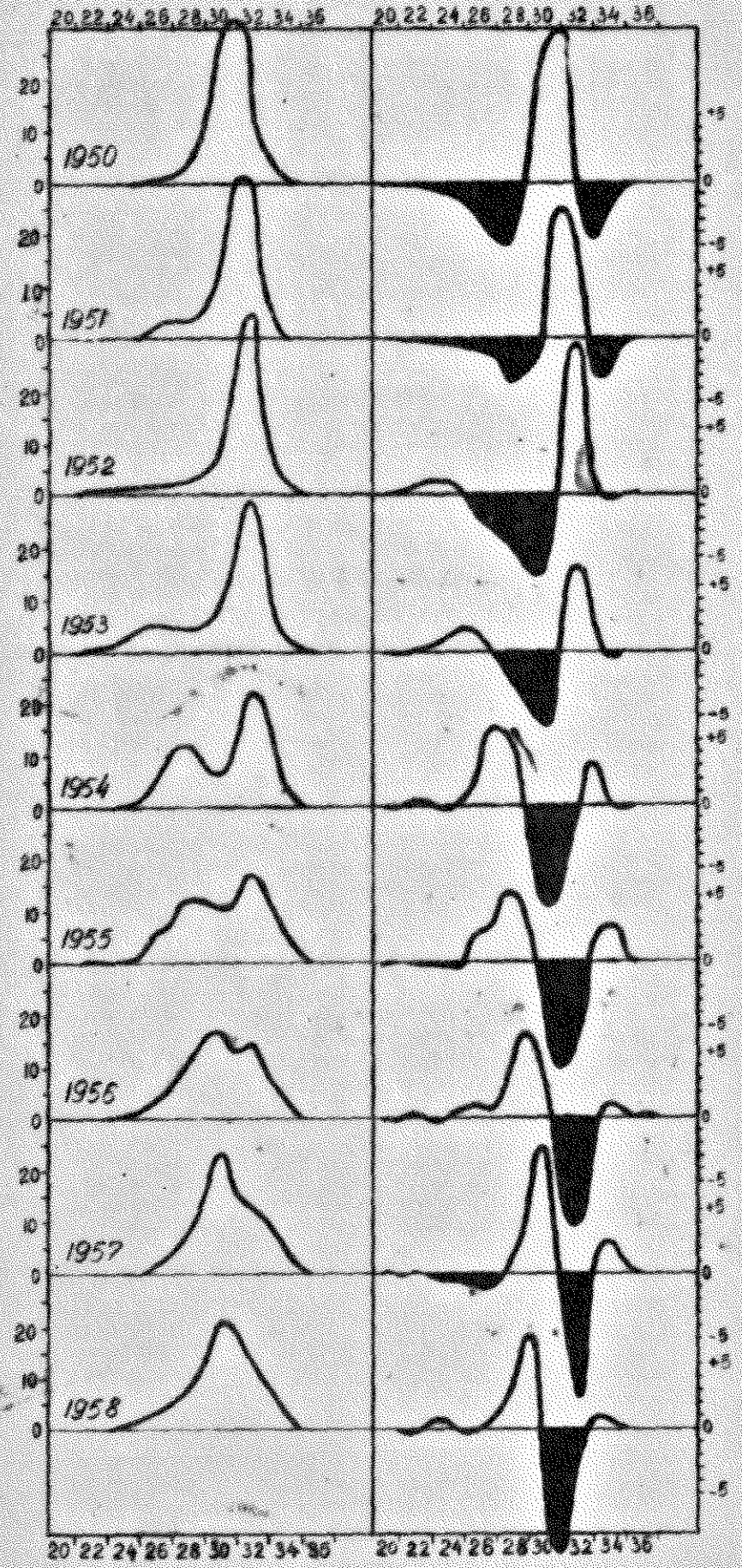

Fig.2.
Size composition in the period 1950-1958.
Left: ranges of variation (%).
Right: deviation from the total mean range.

Fig. 3A. Fishing area, 1953.

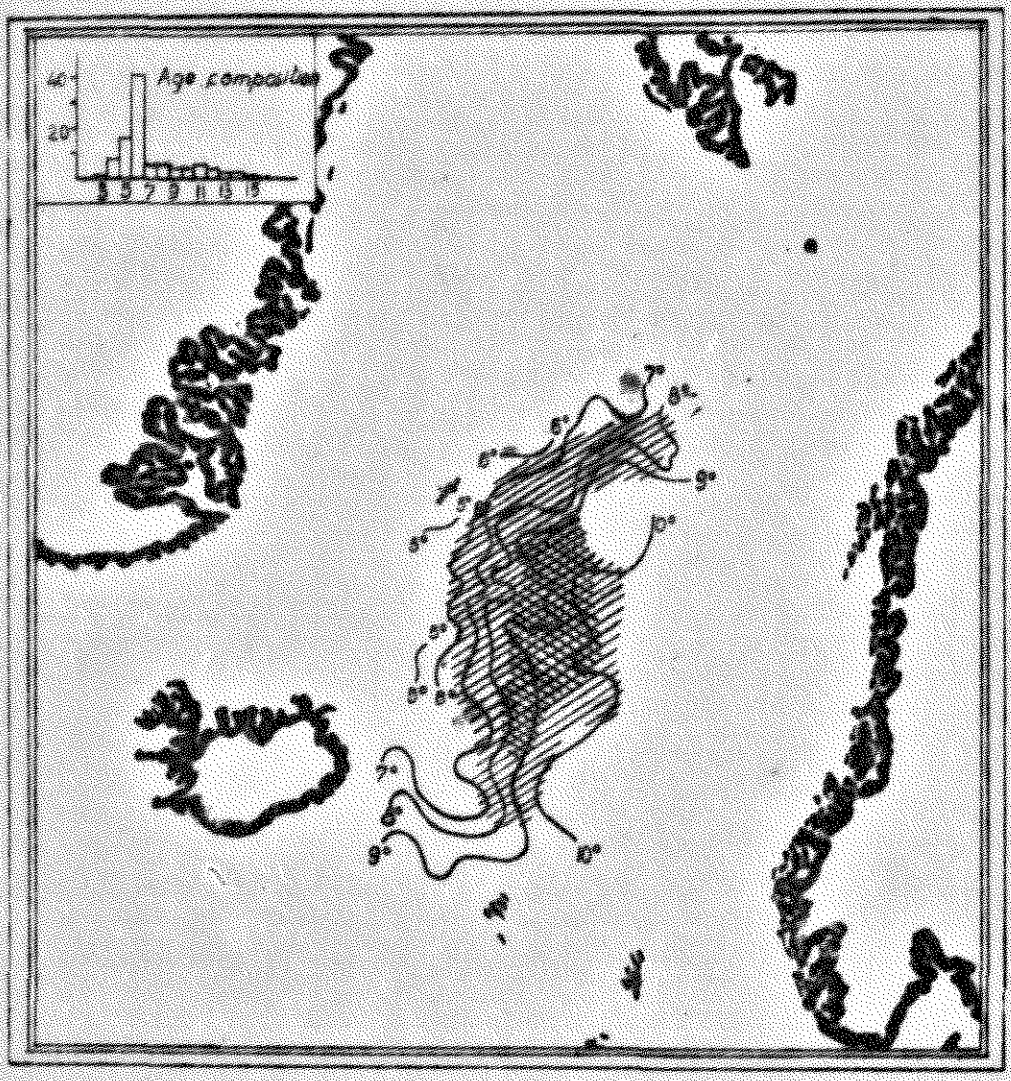

Fig.3B. Fishing area, 1956.

Fig. 30. Fishing area, 1958.

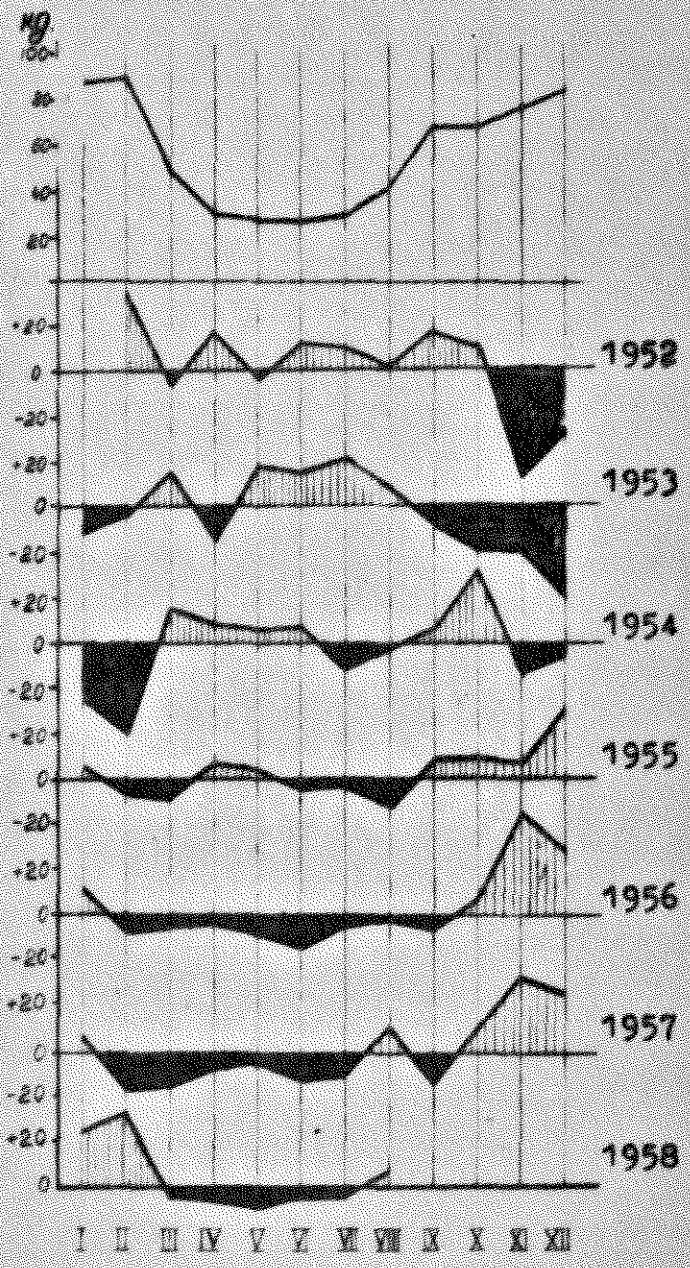

Fig.4. From above:

The mean catch per net per day for the period 1952 to 1958 by months.

Below:

Deviations from the mean catch per net per day for the period 1952 to 1958 by months.

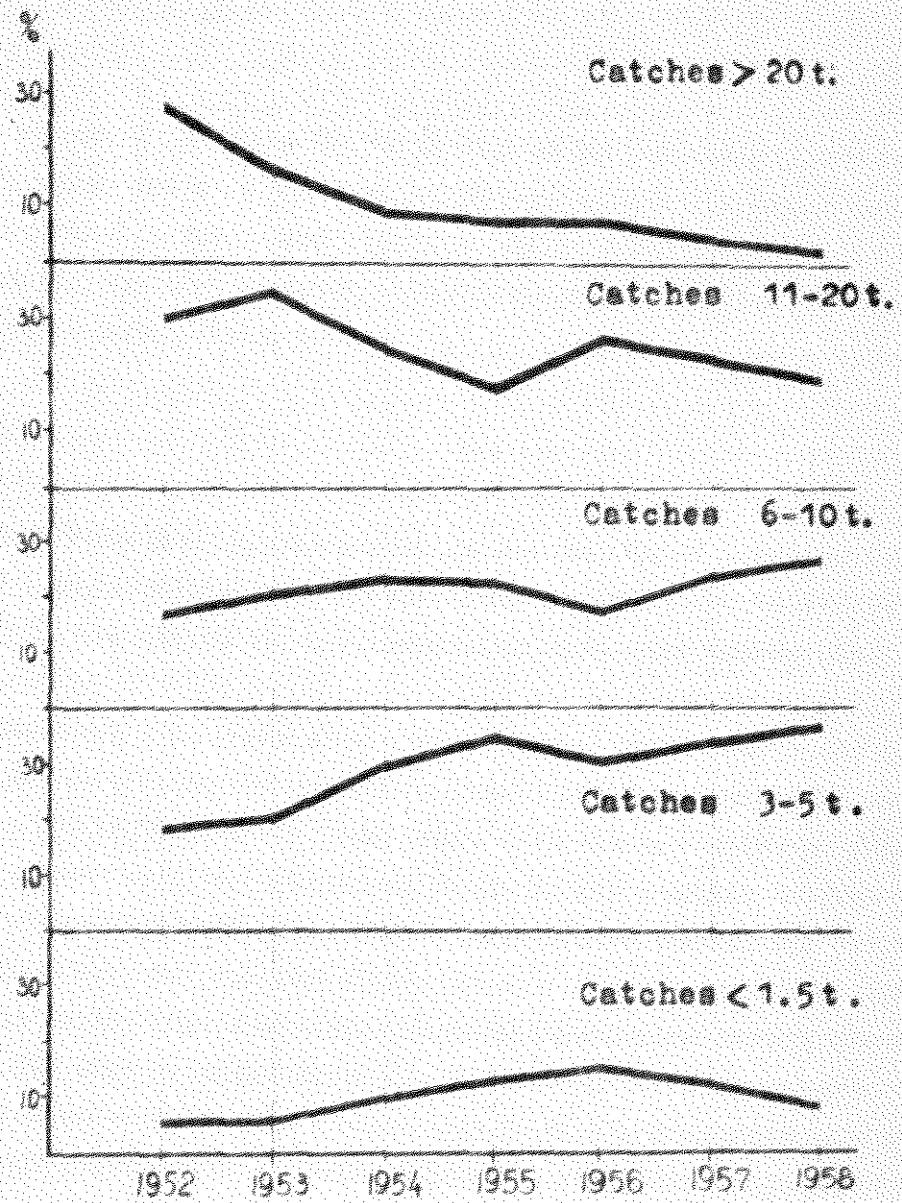

Fig. 5. The value of different catches in the total Soviet herring production in July-August 1952-1958 (%).

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REMARKS ON THE RECOVERY OF TAGS FROM THE NORWEGIAN HERRING FISHERY OFF NORTH AND EAST ICELAND IN 1958 .

by

Olav Dragesund

Introduction.

During this summer, the Norwegian fleet started the herring fishery earlier than usual off north and east Iceland, utilising the fish for the purpose of reducing it into oil and meal. This fishery gave an opportunity for the recovery of tags from this area and enabled to make a comparison of recaptures, with those of the Norwegian winter herring fishery.

The materials.

The fleet started the fishing operations in the middle of June and from this time up to the 10th of July, the fleet was concentrated in the areas 53 and 54 represented in Figure 1, but during the second half of July, the fishing fleet moved over to area 59 (Figure 1).

All the herring caught in these areas were landed in Norway at 24 oil and meal factories, of which 15 possessed tested magnets for the recovery of the tags. The quantity of herring (p) in hectolitres thus reduced at these plants and the efficiency (e) of the magnets used are shown in Table 1. The number of tags recovered in 1958 from the different experiments carried out during the years 1948-1958, and their distribution in the various factories are also presented in Table 1.

A total number of 168 tags recovered from the factories during the above mentioned season and 207 tags obtained from the Norwegian herring season, form the material for the present report. The recaptures from the present years tagging experiments and the tags received from those factories which do not possess magnets have not been taken into consideration.

The observations.

The composition of these recaptured herring from the north and east coast herring season this summer is partcularly noteworthy. The striking point is that out of these 168 tags, 8 were released as spring and large herring at the Norwegian coast, 155 as north and east coast herring, while 5 belong to those herring tagged off south west Iceland.

A comparison of these with those tags recovered during the Norwegian winter herring season in 1958 indicates that the relative proportion between the Norwegian and Icelandic tags is different. Out of the 207 tags from the winter herring season, 125 were Norwegian, whereas only 82 were Icelandic tags (Table 2). The o/oo return per million hectolitres of herring from the different experiments during the two seasons are shown in Table 2 (second part).

If we compare the data from the two seasons it will be seen that the Icelandic tags show higher o/oo return per million hectolitres off Iceland than the recovery during the Norwegian winter herring season. The recaptures off Iceland show a very high o/oo return of herring tagged in 1954 and the subsequent years compared with those tagged in 1953 and the previous years.

If the different age groups of the herring population, spawning at the Norwegian coast this winter, have migrated to the feeding grounds off north and east Iceland in the same proportion as to the other feeding grounds in the Norwegian Sea and without mixing up with the other herring tribes off north and east Iceland, we should expect to find the same proportion in Norwegian and Icelandic tags during the two seasons. However, this is not the case. The probable reason for this disproportion may be explained as follows:

If a relatively large number of Icelandic spring spawners were present during the tagging experiments off north Iceland then a fair number of the Icelandic spring spawners must have been tagged together with the Norwegian spring spawners.

According to Fridriksson (1956) the Icelandic spring spawners contributed only 4.2 - 17.1 per cent of the total catch during the period 1949-53, but the percentage of their contribution in 1954 and 1955 was 39.1 and 39.6 respectively.

This immigration of Icelandic spring spawners to the north coast herring grounds, may explain the relatively high o/oo return per million hectolitres of the taggings carried out in 1954 and the subsequent years and also partly explains the disproportion in the number of Norwegian and Icelandic tags recaptured at the Norwegian coast and off Iceland.

The other reason for this disproportion in number may be that the older age groups of the Norwegian herring population, spawning at the Norwegian coast, segregate to the areas north of Iceland, whereas the younger herring migrate to the feeding grounds farther north and east in the Norwegian Sea. The average age of the Norwegian spring spawners during the period 1948-55 off north Iceland was 14.1 for the northern type and 11.1 for the southern type (Fridriksson 1956). This is fairly higher than the mean age for the herring at the Norwegian coast during the winter herring fishery which was 9.38 for the northern and 6.30 for the southern type during the same period. Then the herring tagged off north Iceland therefore should be composed of relatively older herring. Since this herring return to the areas off Iceland without a contingent of young ones, it may also contribute to the relatively high o/oo return per million hectolitres during the north and east coast herring fishery off Iceland. The Norwegian spring spawners, however, tagged

off north and east Iceland mix with the younger herring in the spawning grounds at the Norwegian coast and the o/oo return per million hectolitres will therefore become lower during the Norwegian winter herring fishery than the north and east coast herring fishery off Iceland.

According to the strong 1950 yearclass, which showed up in the catches during the Norwegian winter herring fishery in 1955, and also partly in 1954, it should be expected that a great decrease in o/oo return per million hectolitres both of Norwegian and Icelandic tags should take place, since the recruit spawners have not been tagged neither off Iceland nor at the Norwegian coast. This decrease in recaptures can be marked with regards to the Icelandic tags, whereas for the Norwegian tags it is not so significant. This can be studied from Figures 2 and 3 and the Table 3.

It can therefore be concluded that both the immigration of spring spawners to the north off Iceland, the segregation of the older age groups from the Atlanto-Scandian herring tribe to the feeding areas off north Iceland together with the strong 1950 yearclass, are the reasons for the decrease in o/oo return per million hectolitres of Icelandic tags in the winter herring fishery during the period 1955-1958. It also partly explains the difference in proportion between Icelandic and Norwegian tags recaptured in the Norwegian herring fishery and the herring fishery off Iceland.

Reference:

Fridriksson, A., 1956. "The Tribes in the North Coast Herring of Iceland with Special Reference to the Period 1948-1955." Rapp. et Proc.-Verb., 143 (2) : 36-44. Copenhagen.

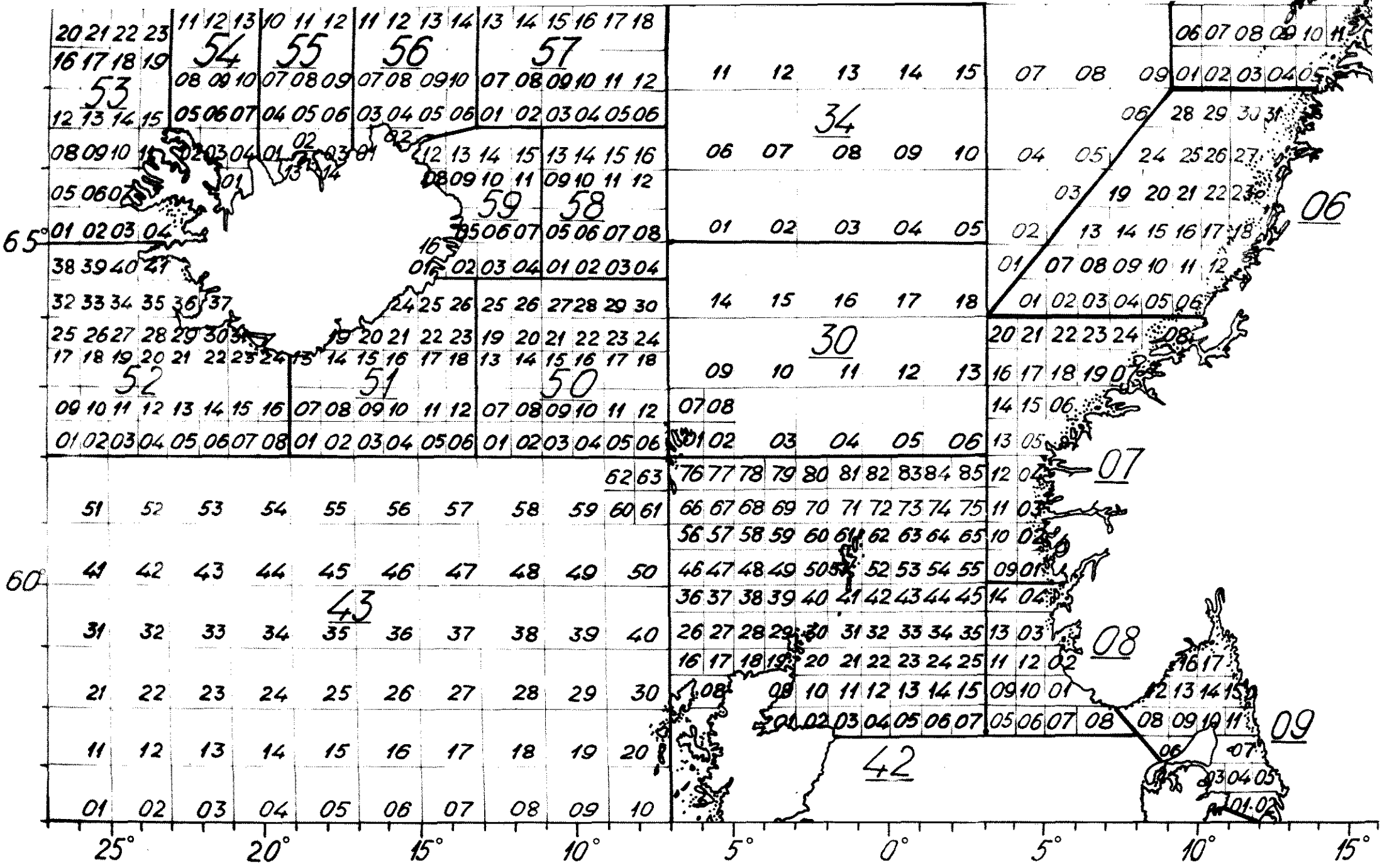
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Figure 1

Table 1. The number of returns during the Norwegian north and east coast herring fishery off Iceland in 1958.

Factory No	p(hl)	e	p e(hl)	Year of tagging 48 NH	49 SH	51 SH	51 NH	52 SH	52 NH	53 LH	53 NH	54 SH	54 NH	55 NH	56 NH	57 NH	58 SH	58 NH	Total
11	6253	0,87	5440,11											2		2	1		5
16	1145	0,96	1099,20												3				3
18	1281	0,94	1204,14													1			1
22	4791	0,70	3353,70								1			1	1	5	1		9
23	21463	0,81	17385,03				1		2		2		3	4	13		4		29
24	449	0,32	143,68																0
28	22886	-	-																0
29	13680	0,96	13132,80	1										2	1	2	1		7
31	42099	0,98	41257,02		1	1	1			1	2	1	1	5	9	7		1	30
32	8513	0,49	4171,37				1							1	1	3			6
33	8264	0,38	3140,32																0
35	31989	0,84	26870,76								3		4	4	9	6			26
38	18578	0,90	16720,20					1	1			1	1	1	1	2			8
41	2598	-	-												1	1			2
42	30692	0,97	29771,24			1			4		1		10	8	6	7			37
43	19371	0,86	16659,06						2				1	4	1				8
47	4260	-	-																0
56	500	-	-																0
62	1938	-	-																0
63	2872	-	-																0
64	3515	-	-																0
66	4572	-	-																0
77	974	-	-																0
80	18007	0,84	15125,88							1			2	2	1	1			7
Total.	270780		195474,51	1	1	2	3	1	9	2	9	2	22	34	47	37	7	1	178

NH : North and east coast herring
SH : Spring herring
LH : Large herring

Table 2. Number of returns in 1958 from the different experiments.

Season	P.e (hl)	Year of tagging and the number tagged. 1948 7475 NH	1950 1321 NH	1951 3065 NH	1952 17308 NH	1953 10181 NH	1954 8783 NH	1955 11732 NH	1956 8443 NH	1957 7899 NH	Total	Year of tagging and the number tagged. 1948 6018 SH	1949 8261 SH	1950 9085 LH	1951 5996 LH	1951 9986 SH	1952 10763 SH	1953 10080 LH	1953 10046 SH	1954 10042 LH	1954 10991 SH	1954 14970 FH	1955 10045 LH	1955 9087 SH	1955 13586 FH	1956 4998 LH	1956 12799 FH	1957 9500 LH	1957 8450 SH	1957 3900 FH	Total
Winter																															
herring	1.098.154	-	1	2	3	10	10	15	20	21	= 82	1	1	1	2	2	17	-	3	2	15	4	16	4	13	4	9	15	15	1	= 125
North and east coast herring	.195.474	1	-	3	9	6	22	33	46	35	= 155	-	1	-	-	2	1	2	-	-	2	-	-	-	-	-	-	-	-	-	= 8

o/oo Returns per mill. hl.

Winter																															
herring	1.098.154	-	0.69	0.59	0.15	0.89	1.04	1.16	2.15	2.63		0.15	0.11	0.10	0.30	0.16	1.44	-	2.71	0.18	1.33	0.24	1.45	0.40	0.87	0.73	0.64	1.44	1.61	0.23	
North and east coast herring	.195.474	0.68	-	5.01	2.66	3.01	12.82	14.39	27.88	22.67		-	0.62	-	-	1.02	0.48	1.02	-	-	0.99	-	-	-	-	-	-	-	-	-	

NH = North and east coast herring

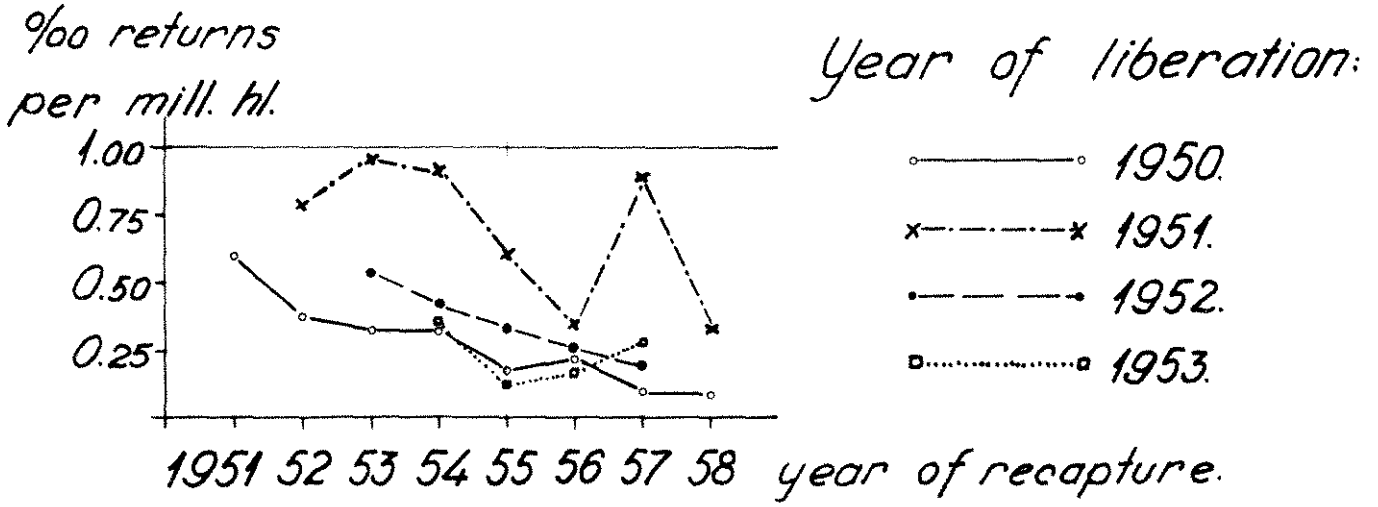
SH = Spring herring

LH = Large herring

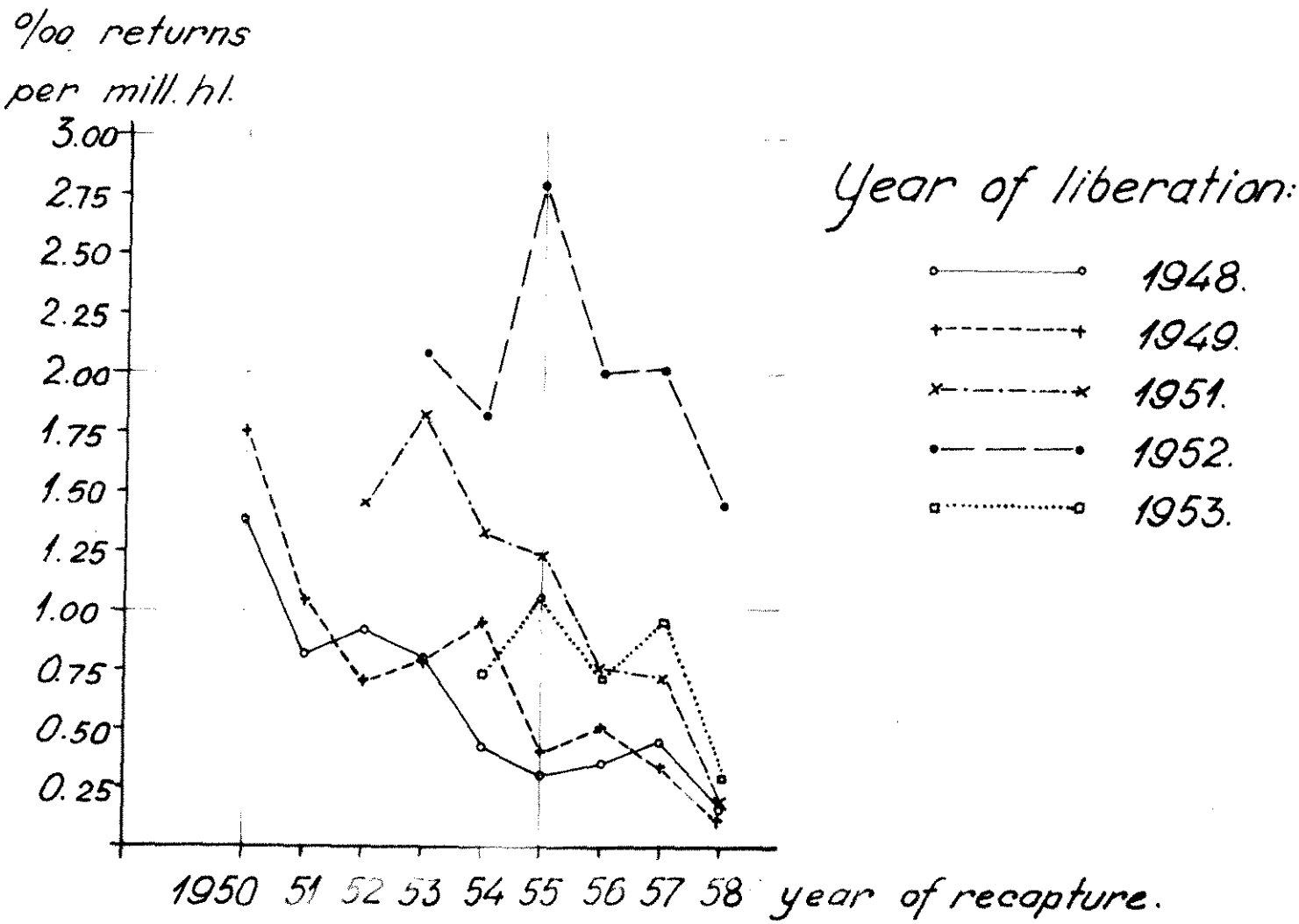
FH = Fat herring and "Forfangstsild"

Figure 2

Norwegian Large Herring.



Norwegian Spring Herring.



North-and East Coast Herring.

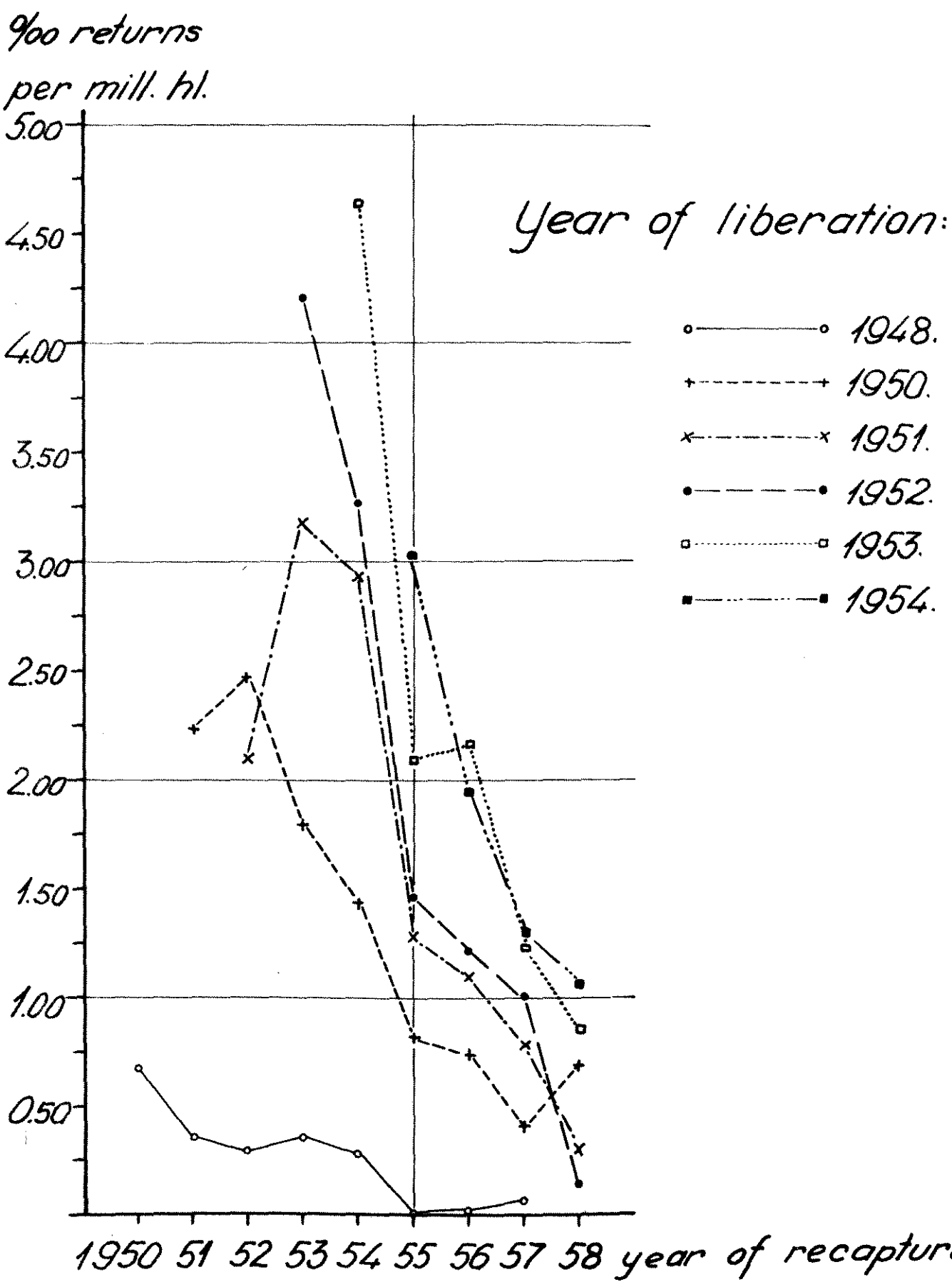


Figure 3

Table 3. Number of returns from reduction plants with tested magnets for the different experiments and returns per million hectolitres in o/oo (in brackets)

Year of tagging	Category	Number tagged	Year of recapture								
			1950	1951	1952	1953	1954	1955	1956	1957	1958
1948	SH	6.018	15 (1.38)	13 (0.80)	24 (0.92)	16 (0.78)	15 (0.43)	8 (0.29)	11 (0.36)	10 (0.44)	1 (0.15)
1948	NH	7.475	9 (0.67)	7 (0.35)	9 (0.28)	9 (0.36)	12 (0.28)	0 (0.00)	1 (0.03)	2 (0.07)	-
1949	SH	8.261	26 (1.75)	23 (1.03)	25 (0.70)	17 (0.80)	45 (0.94)	16 (0.42)	21 (0.50)	10 (0.32)	1 (0.11)
1950	LH	9.085	. . . . .	14 (0.57)	15 (0.38)	10 (0.32)	17 (0.32)	9 (0.22)	11 (0.24)	4 (0.12)	1 (0.10)
1950	SH	11.215	. . . . .	9 (0.30)	9 (0.18)	8 (0.21)	12 (0.19)	5 (0.10)	4 (0.07)	1 (0.02)	-
1950	NH	1.321	. . . . .	8 (2.23)	14 (2.44)	8 (1.79)	11 (1.44)	5 (0.82)	5 (0.74)	2 (0.40)	1 (0.69)
1951	LH	5.998	. . . . .	. . . . .	20 (0.77)	20 (0.98)	29 (0.94)	18 (0.65)	11 (0.35)	2 (0.88)	2 (0.30)
1951	SH	9.986	. . . . .	. . . . .	63 (1.45)	61 (1.80)	75 (1.30)	57 (1.24)	38 (0.75)	27 (0.72)	2 (0.18)
1951	NH	3.065	. . . . .	. . . . .	28 (2.10)	33 (3.18)	52 (2.94)	18 (1.28)	17 (1.09)	9 (0.78)	1 (0.30)
1952	LH	10.295	. . . . .	. . . . .	. . . . .	18 (0.82)	26 (0.44)	14 (0.30)	13 (0.25)	7 (0.18)	-
1952	SH	10.763	. . . . .	. . . . .	. . . . .	76 (2.08)	112 (1.80)	137 (2.77)	110 (2.00)	82 (2.02)	17 (1.44)
1952	NH	17.308	. . . . .	. . . . .	. . . . .	247 (4.21)	327 (3.27)	116 (1.46)	108 (1.22)	66 (1.01)	3 (0.15)
1953	LH	10.080	. . . . .	. . . . .	. . . . .	. . . . .	18 (0.31)	8 (0.17)	10 (0.19)	10 (0.26)	-
1953	SH	10.046	. . . . .	. . . . .	. . . . .	. . . . .	43 (0.74)	47 (1.02)	37 (0.72)	36 (0.95)	3 (0.27)
1953	NH	10.181	. . . . .	. . . . .	. . . . .	. . . . .	283 (4.81)	102 (2.18)	117 (2.25)	49 (1.28)	10 (0.89)
1954	LH	10.042	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	24 (0.52)	18 (0.35)	15 (0.40)	2 (0.18)
1954	SH	10.291	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	86 (1.82)	80 (1.52)	61 (1.57)	15 (1.33)
1954	NH	8.783	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	122 (3.02)	87 (1.94)	43 (1.30)	10 (1.04)
1955	LH	10.045	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	87 (1.70)	55 (1.45)	16 (1.45)
1955	SH	9.087	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	28 (0.60)	31 (0.90)	4 (0.40)
1955	NH	11.732	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	161 (2.69)	82 (1.85)	15 (1.16)
1956	LH	4.998	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	29 (1.54)	4 (0.73)
1956	NH	8.443	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	89 (2.80)	20 (2.15)
1957	LH	9.500	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	15 (1.44)
1957	SH	8.450	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	15 (1.61)
1957	NH	7.899	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	21 (2.63)

LH = Large herring

SH = Spring herring

NH = North and east coast herring