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The North Coast Herring of Iceland in 1955.

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1. The Fishery. Owing to 10 subsequent series of bad seasons, and an exceptionally bad one last year, only 132 vessels participated in this fishery as against 189 last year. The total output of the season, which was a failure, amounted to 226,005 hl. or about 22,600 metric tons. The following figures give a survey of the yields through the six last seasons:-

1950	34,335	metric tons
1951	58,903	" "
1952	11,176	" "
1953	42,568	" "
1954	26,600	" "
1955	22,600	" "

2. The Material. The investigations were carried out, as earlier, on Siglufjord, N-Iceland, and covered the period July-August. 3389 herrings were measured and about 3200 were examined in the usual way, as to weight, sex, maturity, number of vertebrae, etc., and scales were collected for later age- and race-determination. Furthermore, 9203 tagged herrings were measured, before liberation. The map Figure 1 shows the localities from which the samples originated. Special attention will be paid to the samples nos. 30 and 32, which lay outside the proper field of fishing.

3. Length. In Table 1 and Figure 2 a survey is given of the length-distribution. In July (purse-seine) the herring was very large the highest frequency being 36 cm. and the average length 35.90. The purse-seine herring in August was of similar size and showed no pronounced trends to be mixed with smaller herring from the south as last year. All the purse-seine catches were taken between the line B and C on Figure 1. Some samples from drift-nets, taken in August, consisted partly of very large herring with a peak at 37 cm. and smaller fish about 33 cm., probably coming from the south. The catches were taken between the lines A and B on the map. The length distribution and the average length of all north coast herring in 1955, the drift-net catches included, appear from the "Grand Total" column of Table 1. The herring was still larger in 1955 (36.70 cm.) than in 1954 (34.91 cm.) and even larger than the July-herring that year (35.16 cm.). This was at least mainly due to much smaller inflow from the south than in 1954.

Table 1. Length Distribution (cm.)

cm.	A u g u s t				Grand Total	Isafj. No.30	Reydarfj. No.32
	July	purse-seine	drift-nets	Total			
40	+				+		
39	12	6	18	12	12		
38	75	85	78	82	77		
37	250	285	246	265	253		9
36	311	290	210	249	293	24	-
35	151	155	148	151	152	24	13
34	75	81	120	101	83	60	22
33	74	64	126	96	81	74	35
32	41	21	40	31	38	66	102
31	10	11	12	11	10	169	194
30	1	2	2	2	1	337	374
29						192	176
28						42	62
27						12	9
26							-
25							4
Total	1000	1000	1000	1000	1000	1000	1000
Number	2026	470	500	970	7996	166	227
Mean (cm.)	35.90	35.81	35.46	35.63	35.70	30.71	30.41

The two last columns of Table 1 show the length distribution of sample No.30, taken outside the Isafjord-deep of the NW<sub>3</sub> coast, and No.32, caught in Reydarfjord on the east coast. A glance at the table and at the Figure 3 reveals at once that these herring have but little to do with the real north coast stock. The predominating frequency occurs in both cases at 30 cm. and the average lengths are 30.71 (No.30) and 30.41 (No.32). In the east coast sample (32) there is however a clear trace of herrings of 33 cm. length, the same length-group as appears in the north coast herring, and a - very slight - trace of the north coast herring proper, at 36 cm. length. Whereas the main north coast stock always consists, - nearly entirely - of spring spawners, these two samples contained mostly summer spawners, which appeared by about 96% in No.30 and by 87% in No.32.

4. Total Number of Vertebrae (VS.). Table 2 shows the average number of vertebrae and the corresponding mean errors in the north coast herring proper (samples 30 and 32 not included). In July there appeared four stages of maturity, II, III, V and VIII. In July the high number of vertebrae in the herring in stage II, III, and VIII indicate that they are spring spawners. Stage VIII might however include some few summer spawners and the three herrings on V are probably summer spawners as the low number of VS. and the stage itself, at this early time of summer, indicate.

Table 2. Average Values of VS.

Stage of maturity	J u l y			A u g u s t		
	N	M	± m	N	M	± m
II	12	57.250	0.277	9	57.111	0.201
III	719	57.232	0.025	424	57.210	0.025
IV				60	57.283	0.093
V	3	57.000				
VIII	1292	57.185	0.019	477	57.070	0.031
<b>Total</b>	<b>2026</b>	<b>57.202</b>	<b>0.015</b>	<b>970</b>	<b>57.144</b>	<b>0.021</b>

In August 60 herrings on stage IV occur and reveal themselves as spring spawners. The same is of course true for III, whereas II may be mixed and VIII looks like summer spawners, for the greatest part at least. If we compare all the groups in July and August to each other

$$D (=M_1 - M_2) : d = \sqrt{m_1^2 + m_2^2}$$

we get the following results:-

	Aug. VIII	Aug. IV	Aug. III	July VIII
July III	<u>4.0</u>	0.1	0.6	1.6
July VIII	<u>3.0</u>	1.1	0.9	
Aug. III	<u>3.5</u>	0.8		
Aug. IV	2.2			

The herring staying on stage VIII in August must be largely composed by summer spawners as already mentioned, as it is significantly different from all other groups except from IV, which might be mixed. The summer spawning element in Aug. VIII appears clearest in the latest and most western samples showing that they have entered the waters of the north coast from the west (and south) towards the end of the season.

The total number of vertebrae in all north coast herring, which has been increasing during recent years, was exactly the same this year as in 1954 (57.183).

It has already been emphasized that samples No.30 and No.32 consisted mainly of summer spawners. The total number of vertebrae was 57.000 (30) and 56.950 (32).

5. Taggings. In Table 3 a survey is given of all herring, which have been tagged in Iceland during 1948-1955. The number is now 70,264 fish altogether, thereof 57,373 herring from the north coast, all with internal tags. In 1955 there were tagged 9241 herring at this part of the country, and the tagging localities are shown in Figure 3. When the tagging localities are considered it appears that all the north coast taggings have taken place far offshore in the open ocean.

Table 3. Number of Tagged Herring at Iceland.

Tags	Year	N.-coast	SW.-coast	E.-coast	Total
Internal	1948-54	48,132	8,763	-	56,895
	1955	9,241	331	2,491	12,063
	Total	57,373	9,094	2,491	68,958
External	1948-54	-	1,306	-	1,306
Grand Total		57,373	10,400	2,491	70,264

As the fish shrinks a little when dead, it is difficult to compare the length of the alive measured, tagged material to that of herring coming from the catches landed at ports. The size of the tagged herring can, however, be compared from year to year as is done in Table 4 as far as our material reaches. Only N.-coast herring is included in the table. According to the table the length has been very similar through the three years, but there are two peaks in the size frequencies in 1953 (at 31 and 36 cm.) and 1954 (at 33 and 37 cm.) but only one in 1955 (at 37 cm.)

Table 4. Length of Tagged Herring 1953-55 ( $\frac{\%}{100}$ ).

cm.	1953	1954	1955
40		+	1
39	6	17	13
38	91	94	109
37	317	254	330
36	369	244	320
35	160	115	135
34	37	75	52
33	6	87	30
32	5	80	7
31	8	28	2
30	1	6	1
29		+	+
28			+
27		+	+
26		+	
25		+	
24			
23		+	
Total	1000	1000	1000
Number	6379	8758	9203
Mean(cm.)	36.33	36.47	36.21

6. Returns from Taggings. During the season 1955 35 returns were reported altogether from the factories. No recoveries were reported from the SW.-coast, and none from Norway or the open ocean this year. On the other hand all the Iceland experiments were represented in the returns, except the first one (1948), and the distribution of returns between the tagging experiments, were as follows:-

1950	1	1952	6	1954	13
1951	3	1953	7	1955	5

If the returns from the year of tagging are not considered there were 30 returns in 1955 against 97 in 1954 (Iceland records only), corresponding to 800 tags per one million hectolitres in 1955 as compared with 602 in 1954. If we disregard the returns from 1954, in order to get a better comparison with the rate of returns in 1955 we get:-

- 1) 453 tags per million hl. in 1955 (taggings 1948-1953).
- 2) 602 " " " " " 1954 ( " " " ).

If these figures were exact and representative, they would indicate an annual mortality of approximately 25%.

At the last large- and spring herring season in Norway (1955) 387 Icelandic tags were returned representing all tagging years in Iceland, as follows:-

1948	1	1951	19	1953	110
1950	4	1952	132	1954	121

This was much less than in 1954 when 720 Icelandic tags were recovered.

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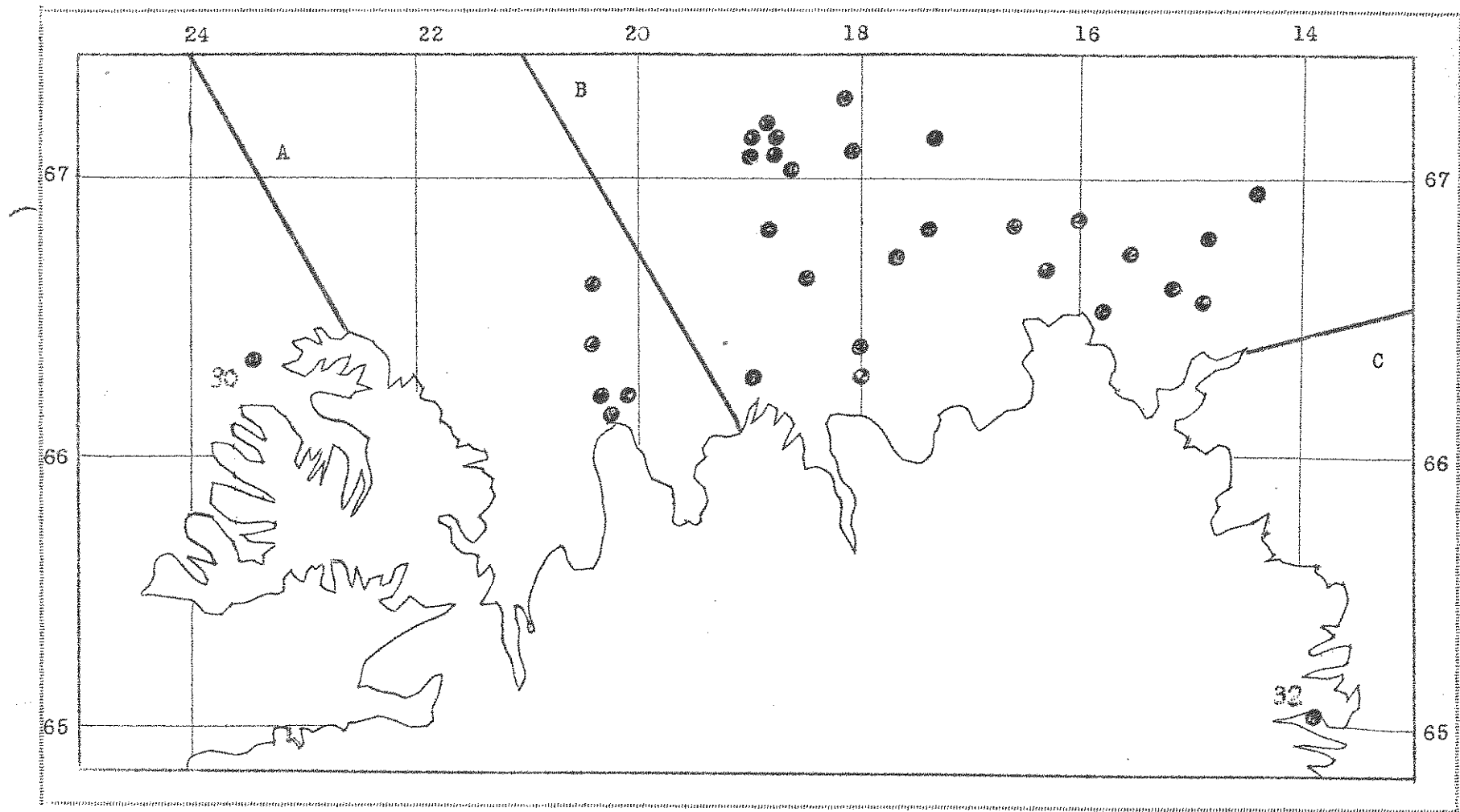


Figure 1. Localities of catches investigated. 1955.

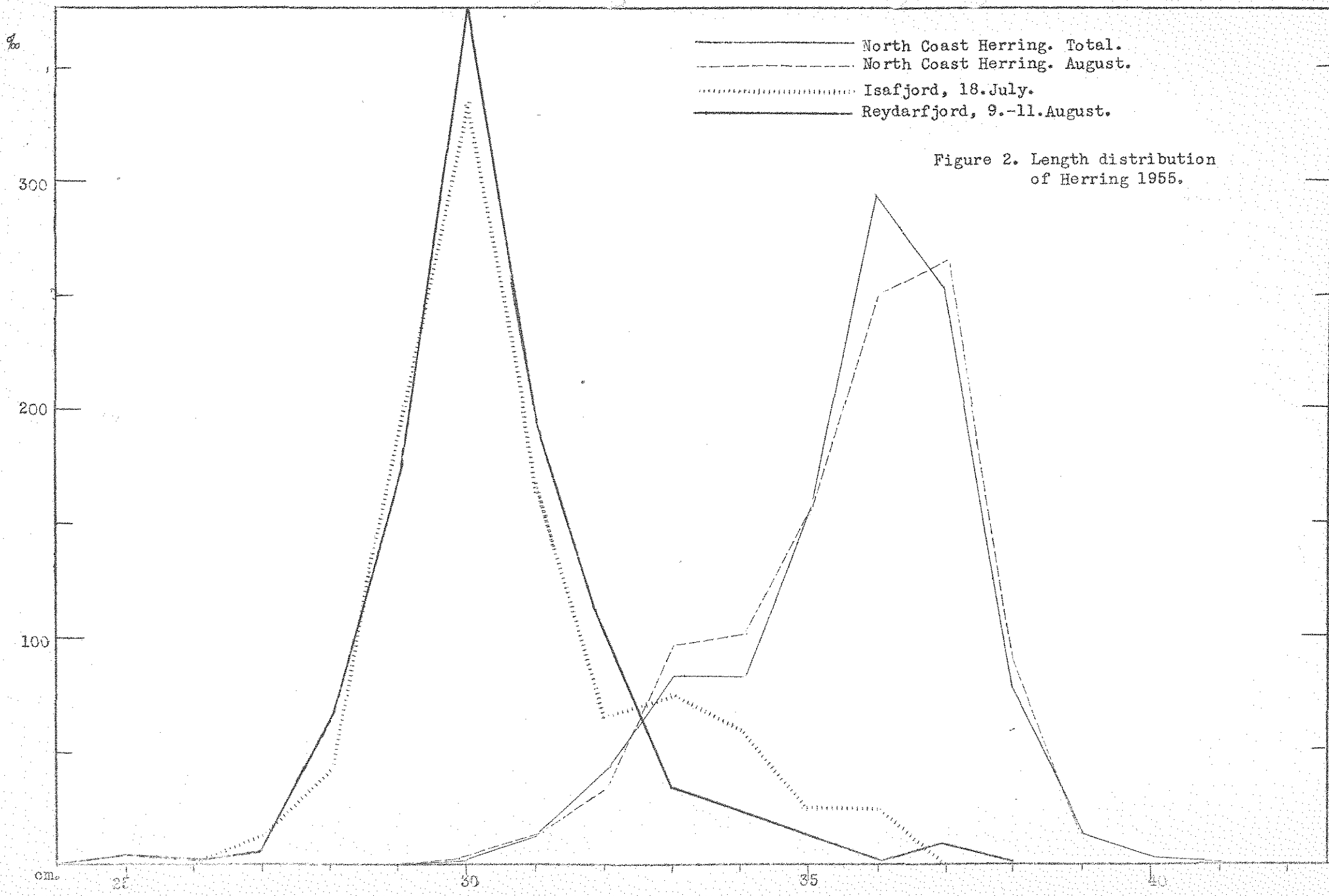


Figure 2. Length distribution of Herring 1955.

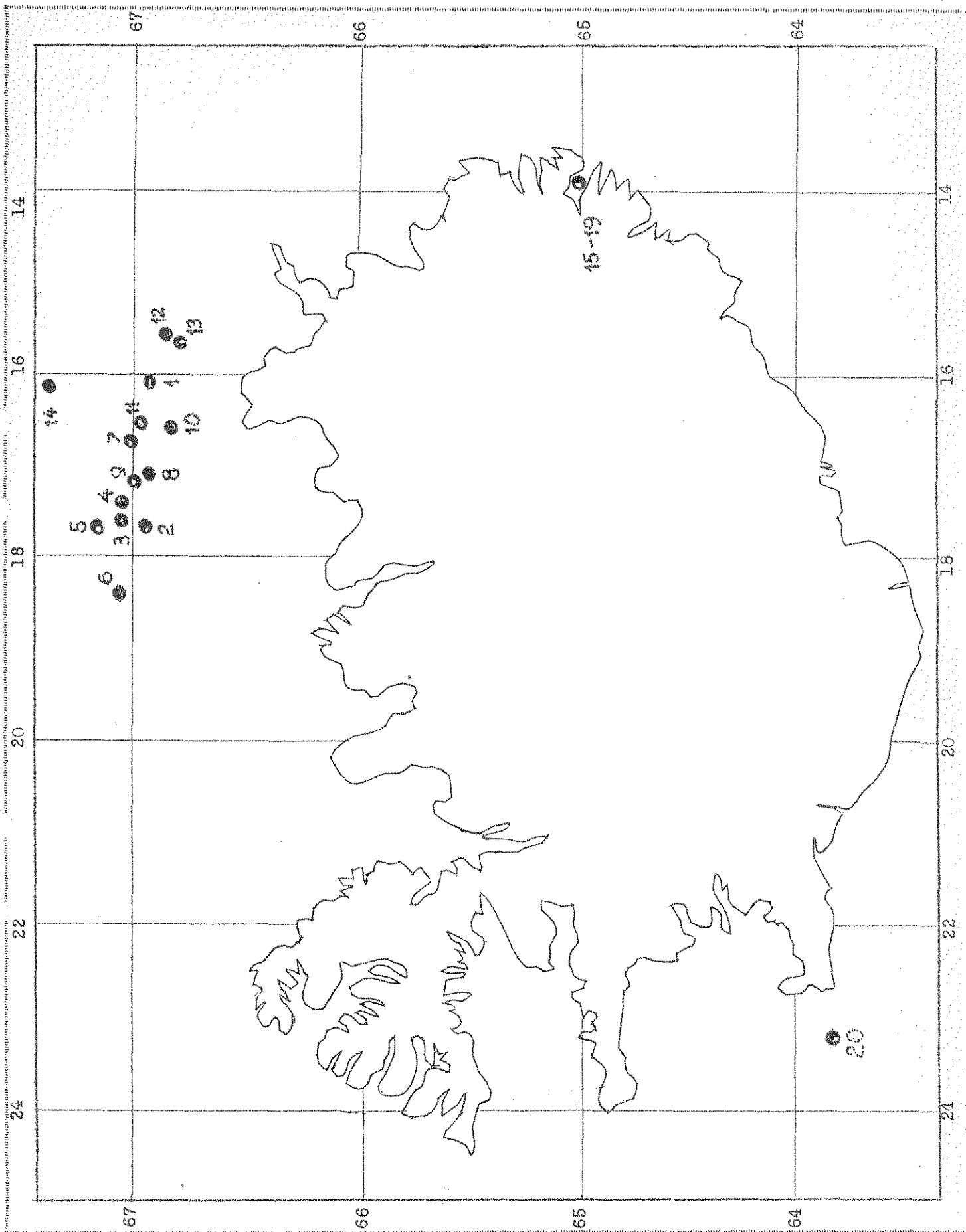


Figure 3. Map showing localities where herrings were tagged in 1955.