ATVINNUDEILD HÁSKÓLANS
RIT FISKIDEILDAR 1952 — NR. 1

The Norwegian — Icelandic Herring Tagging Experiments

Report No. 2

BY
ÁRNI FRIÐRIKSSON
AND
OLAV AASEN

1952

REYKJAVÍK — H.F. LEIFTUR

PREFACE

The present paper is the second account of the Norwegian-Icelandic herring taggings. The first paper on this subject was published in 1950 by the same authors (Friðriksson & Aasen, 1950). Since then a considerable number of returns have been recorded as will be seen from this paper. The authors are indebted to the Icelandic Ministry of Fisheries, Reykjavik, Fiskeribedriftens Forskningsfond, Bergen, and the Director of Fisheries, Bergen, whose grants have made possible the continuation of the herring tagging work. We also wish to express our best of thanks to the owners and managers of the herring reduction plants in Iceland and Norway for their excellent co-operation in the tagging scheme which could not otherwise have been successfully executed. Finally we wish to extend our indebtedness to Dr. William Hodgson, Lowestoft, England, for reading over and amending the English text.

Siglufjord July, 1952.

1. INTRODUCTION

The first report dealt with the history of herring taggings and the preparatory work that was necessary to carry out before the tagging scheme could be put into operation. An essential part of this work was to equip the meal factories with magnet separators if not already installed. A number of fatories have been furnished with magnets during the last two years, but there are unfortunately still some left without any. It is to be hoped that these, in the near future, can also participate in the scheme. The present situation is as follows: In Iceland, all the factories except one have operating magnets and in Norway there are 33 reduction plants equipped with magnet separators.

The efficiency of the magnets has been tested by inspectors by tagging a known amount of herring in the storage bins and counting the recovered tags. The efficiency in most cases runs roughly between 90 and 100%. In cases where the efficiency tends to be low, amendments have been recommended to improve the installations.

2. IMPROVEMENTS IN TECHNIQUE AND TAGGING EQUIPMENT

Since the first report was issued, tagging of herring has been carried out during four fishing seasons so that the whole scheme now covers eight fishing seasons altogether. In that first report, a full description of "Technique and Equipment" was given, and since then, several improvements have been made, the most important of which will now be briefly mentioned.

In Norway a specially designed tagging craft, M/K "Harengus",

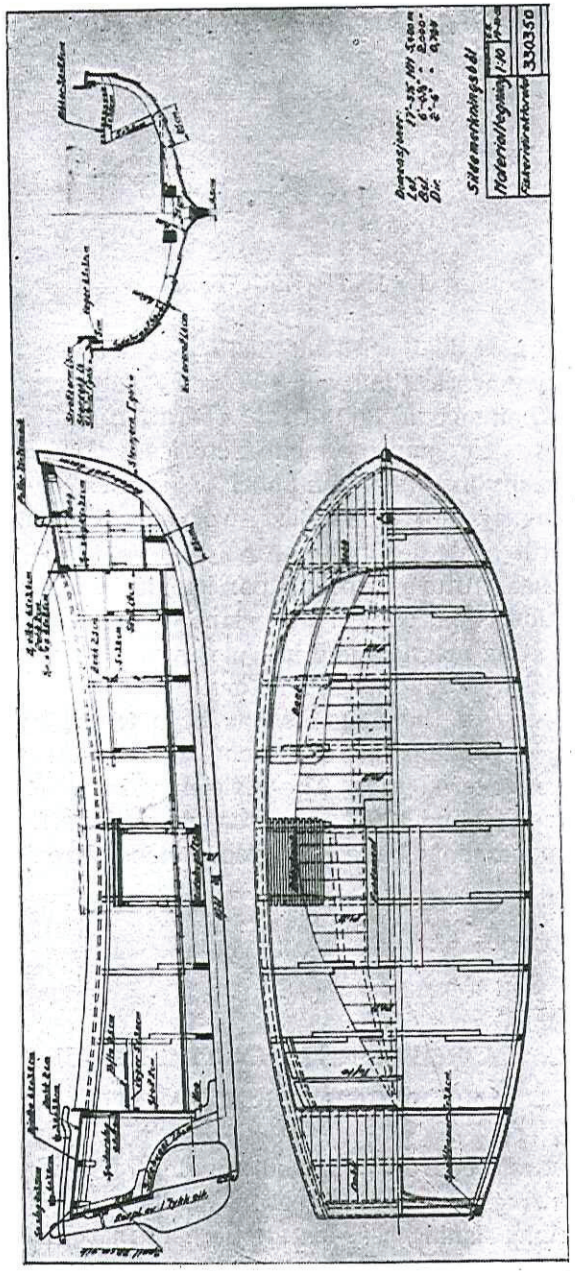

Fig. 1. M/B "Harengus".

has proved a success. The boat is quite small, 5.5 m. long and 2 m. broad, so as to be stable and convenient for work. The boat is open and fitted with a small motor, and to protect the taggers from the weather, the boat is fitted with a removable hood.

For the insertion of the tag into the body cavity of the fish the scalpel-forceps method was formerly used, but in the winter of 1951 a special "tagging gun", designed by Olav Aasen and made by "Bergen Nautik" was introduced. The principle of this implement (Fig. 2) is to combine the functions of the scalpel and forceps, thus speeding up work and at the same time reducing the tagging team by one man.

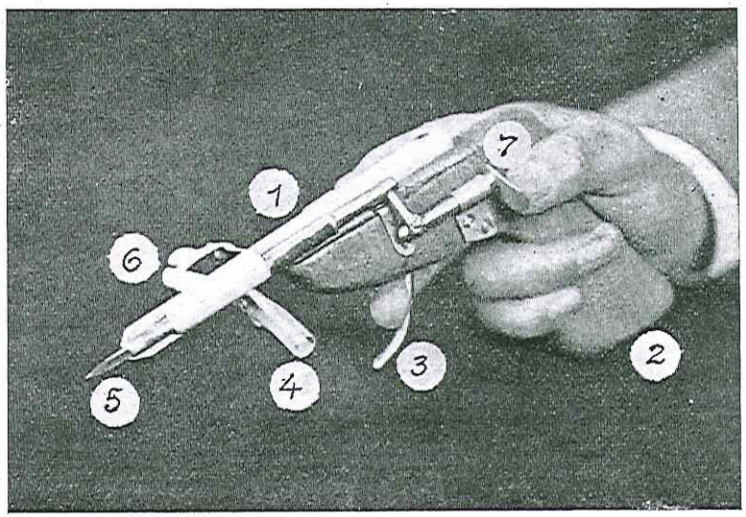

Fig. 2. The tagging gun (For explanation see text).

As will be seen from the Figure, the "tagging gun" consists of a barrel (1) and a butt (2). On the left hand side of the barrel is placed a scalpel (5) fixed to a movable steel rod ending in a button within easy reach of the thumb (7). The scalpel (and the rod) is held normally in backwards position by a spring and is protruded by pressing the button forward. The loading of the "gun" is effected by placing a steel clip or magazine containing 50 tags, in the magazineholder (6) on the right hand side of the barrel. On the left hand side of the barrel is fixed a transverse rod serving as attachment (4) for the feeding-spring which ends in a feeder pressing against the outermost tag in the clip.

The opening in the barrel is rectangular, allowing space for

one tag at the time to pass through. In the backward part of the barrel is placed a movable steel rod (rectangular) which is connected with trigger (3). By pulling the trigger this rod moves forward and pushes a tag into the barrel. Owing to technical difficulties the rod had to be constructed so as to move only the length of one tag, consequently there will always be two tags in the forward part of the barrel during work. To remove these, one has to insert to blanks, but as this happens perhaps only once or twice a day, the drawback is not considered a serious one.

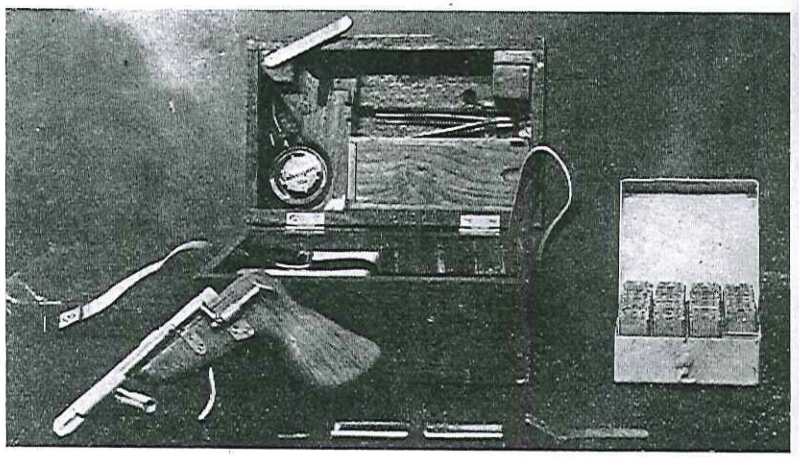

Fig. 3. The tagging outfit (see text).

When operating the "gun" during tagging one first of all presses the button (7) and the incision is made, then, when the trigger is pulled, the tag is inserted.

The "tagging gun", magazines, etc. are kept in a kit box (Fig. 3). The "gun" is removed from the box and placed in the foreground to the left. To the right is seen one of the magazine boxes containing 40 clips, (2000 tags); two of the clips are seen in the foreground. In order to prevent the tags from falling out from the magazine, a small stopper is placed on the top of the clip. The stopper is removed from the magazine when the "gun" is being loaded. For this purpose is used a "stopper remover" seen to the right in the foreground.

By the "scalpel-forceps" method it was necessary to employ a team of four men, of whom one operated the scalpel, and another the forceps. By using the "tagging gun" only one man is

needed for both operations, and at the same time the tagging can be carried out much quicker. If two dippers are employed, it is quite possible under favourable circumstances, to tag 2000—2500 fish a day, the normal working speed being 5—6 seconds a fish.

When working with herring from land seines, it sometimes proved difficult to get the fish from the seine into the live net. To overcome this difficulty a miniature purse seine was used within the land seine, thus saving much time and labour in securing the fish.

As will be seen from Appendix I, individually numbered tags were introduced the last winter, and in the last experiment some 10,000 herrings were measured as to length in order to study if there were any selectivity in the returns according to size, this having an important bearing on the transoceanic migrations.

3. THE TAGGINGS

In this section is given a survey of the various experiments dealt with in the present paper. Further, there is a summary of the different taggings as a whole, with details regarding place of liberation, number of tagged fish etc.

a. *Tagging in the Open Ocean 1950. (6th Experiment)*

During the summer cruise of R/S "G. O. Sars" in 1950 a small batch of herring was tagged at NL 64° 48′, WL 09° 02′ on the 19th of July. The herrings were taken from a purse seine catch made by R/S "G. O. Sars". When the work started, the herrings were in good condition but became comparatively quickly descaled owing to the action of the swell. Otherwise conditions were favourable.

b. *Tagging of North-Coast herring in the summer 1950. (7th Experiment)*

For the purpose of tagging, a small motor vessel M/S "Örn", 33 br.reg.t., was chartered. It had been intended to commence work on July 20th, but as the boat could not be ready in time is was not possible to start before August 1st. As usual, in Icelandic waters, only purse seine caught herrings were used. The taggings

were carried out from a life boat of a commercial trawler. This year, the fishing was very poor, especially in August, and took place mostly in off-shore waters, and in addition, the weather conditions were extremely unfavourable. The tagged herrings were liberated in two localities on the 3rd and 13th of August.

c. *Large herring taggings in 1951.*
(8th Experiment)

This experiment took place in two parts. The first batches were liberated in the Norddalsfjord on January 19th—23rd (part A), this area being situated in comparatively closed waters. The rest (part B) were liberated in five batches during the period January 30th—February 6th on two localities near the open sea. The weather conditions were generally unfavourable. On this cruise the R/S "Johan Hjort" was used.

d. *Spring herring taggings in 1951.*
(9th Experiment)

For this experiment the above-mentioned tagging craft M/S "Harengus" was used. Prior to the tagging work a land-seine of 70 hl had been secured. Crew and equipment were transported to this place by a hired larger vessel. The staff was accommodated on shore. The tagged herrings were liberated in thirteen batches during the period March 29th—April 10th. The weather conditions were good.

e. *Tagging in the Open Ocean in the summer 1951.*
(10th Experiment)

As in the previous year these taggings were carried out on the summer cruise of R/S "G. O. Sars" at two positions, NL 63° 43′, WL 02° 52′ on the 28th of June and NL 66° 07′, WL 10° 25′ on August 15th—16th. Weather conditions were good. The material was purse-seine caught fish in good condition.

f. *Tagging of North-Coast herring in the summer 1951.*
(11th Experiment)

This year the Fishery Department of the University Research Institute (Fiskideild, Reykjavík) had bought a small fishing craft, M/S "Svanhólm", 15 br.reg.t., for the purpose of herring tagging. The work was started on July 17th and continued until the end

of August. Weather conditions were even still less favourable than in the summer of 1950 and the main part of the poor yields was taken in far offshore waters. The tagged herrings were liberated in five different localities situated on the North-East and the East coast. Unfortunately the boat was lost with all hands on its way to Reykjavík after having finished work.

g. *Large Herring taggings in 1952.*
(12th Experiment)

On this cruise R/S "Johan Hjort" was used. The herrings were liberated in two localities and in eleven batches during the period February 1st—14th. Only land-seine-caught herring was used. The weather conditions were partly unfavourable.

h. *Spring herring taggings in 1952.*
(13th Experiment)

As in the previous spring a land-seine containing ca. 70 hl was secured and all the herrings were liberated in the same localities in eleven batches during the period March 31st—April 18th. Here also the staff was accommodated on land and the M/S "Harengus" was used as the tagging craft. Weather favourable.

In Table 1 a survey of all the tagging experiments is given. It is seen to comprise four different tagging regions: The Large herring district and the Spring herring district in Norway, the North and East coast of Iceland and the open ocean. At the top of the Table is given a summary of the earlier experiments dealt with in the first report on this subject.

From the bottom part of the Table it is seen that during the later experiments a total of 49,186 fish has been tagged: 20,536 Large herring, 21,747 Spring herring, 4,385 North-Coast herring and 2,518 herring in the open ocean. The yearly totals amount to 22,127 herring in 1950, 25,303 herring in 1951, and 22,056 herring in 1952. In column three of the Table the localities of the liberations are recorded and the figures in the following column refer to the maps in the Figs. 4—6. In Appendix I, all details of the different liberations are given.

As appears from the Table, a total of 91,240 herring has now been tagged with internal tags.

During the last two years there have been some smaller scale experiments with external herring tags in Norway in the Spring

TABLE 1

Number of Herrings liberated and Localities of Liberation

Year	Date	Place of Liberation	Refer. Fig. 4—6	Spring Herring	Large Herring	N-Coast Herring	Open ocean Herring	Totals	Yearly Totals
			Earlier Experiments						
1948				6018		7475		13493	13493
1949				8261				8261	8261
1950				11215	9085			20300	
		Total:		25494	9085	7475		42054	
1950	19. VII	NL 64° 48′ WL 09° 02′	1				506	506	
	3. VIII	Svínalækjartangi	2			723			
	13. VIII	Mánáreyjar	3			598		1321	22127
1951	19.—23. I	Norddalsfjord	4		4243				
	30. I—2. II	Kjelnesvik	5		4988				
	6. II	Lotra	6		1010			10241	
	29. III—10. IV	Rugsundet	7	9986				9986	
	28. VI	NL 63° 43′ WL 02° 52′	8				1502		
	15.—16. VIII	NL 66° 07′ WL 10° 25′	9				510	2012	
	23. VII	Kjölsenbanki	10			497			
	30. VII	Rifstangi	11			850			
	30. VII	Hraunhafnartangi	12			381			
	2. VIII	Digranes	13			887			
	5. VIII	Kollumúli	14			449		3064	25303
1952	1. II	Bremanger	15		255				
	7.—14. II	Borgundvåg	16		10040			10295	
	31. III—18. IV	Sörvik	17	11761				11761	22056
		Total:		21747	20536	4385	2518	49186	
		Grand Totals:		47241	29621	11860	2518	91240	91240

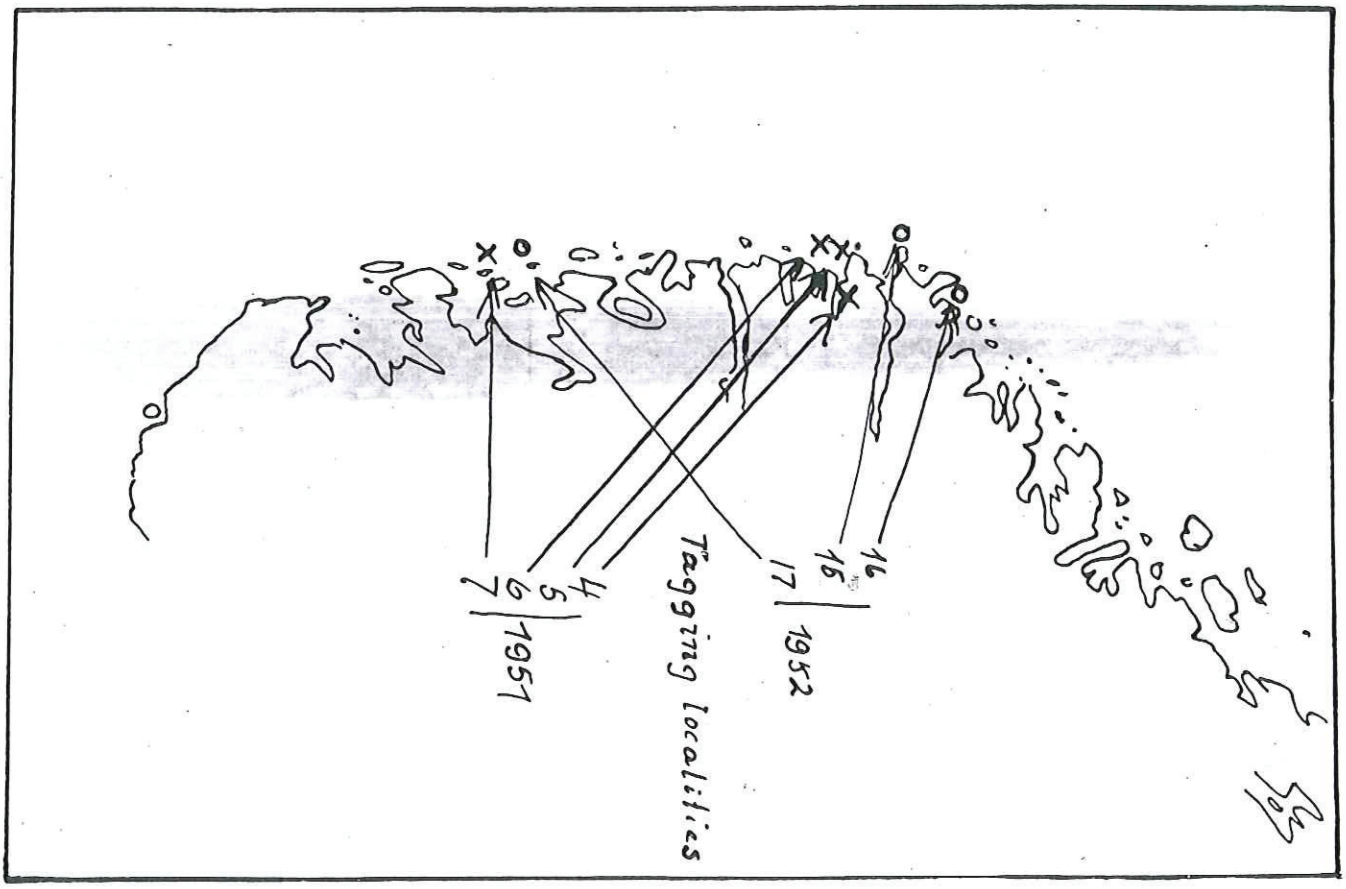

Fig. 4. Tagging localities in Norway 1951—1952.

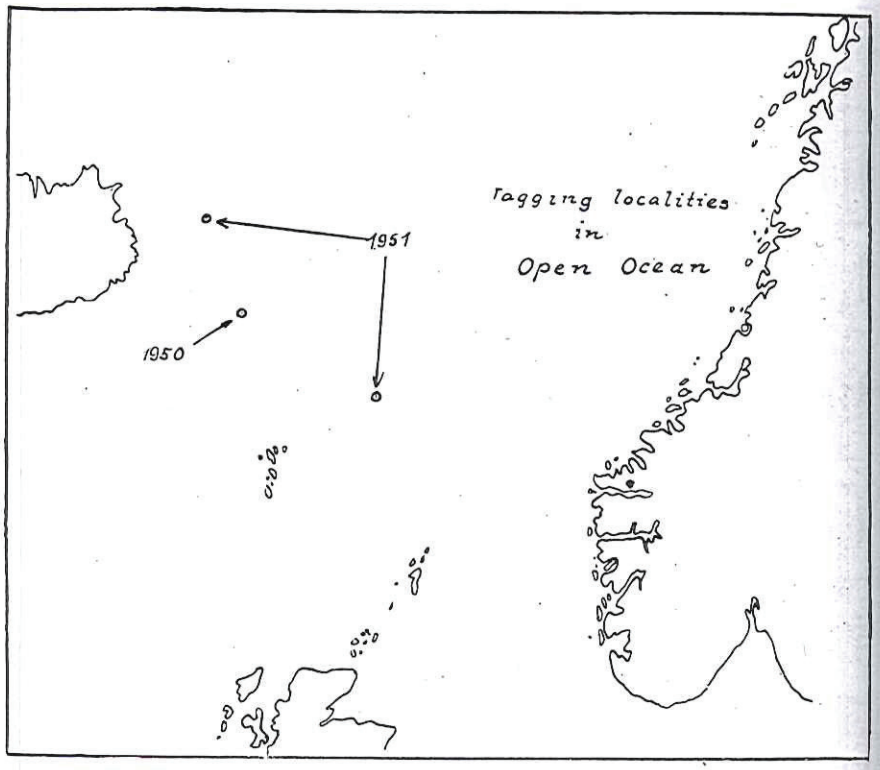

Fig. 5. Tagging localities in the Open Ocean 1951—1952.

herring district. In 1951 two different types of tags were used with different means of attachment.

a) 1. The Lea tag with quick fastener and
   2. The Lea tag with ordinary attachment,
b) 1. Alcathene tag with quick fastener and
   2. Alcathene tag with nylon string attachment.

The liberated numbers were:

a) 1. 300 herrings
   2. 250 „
b) 1. 250 „
   2. 179 „

In all 550 Lea tags and 429 alcathene tags were used this year (1951) the total amounting to 979. Of the herrings tagged with the last type, 335 were also tagged internally. During spring-herring taggings in 1952, 397 herrings were tagged externally with Lea tags and ordinary attachment (steel string loop with

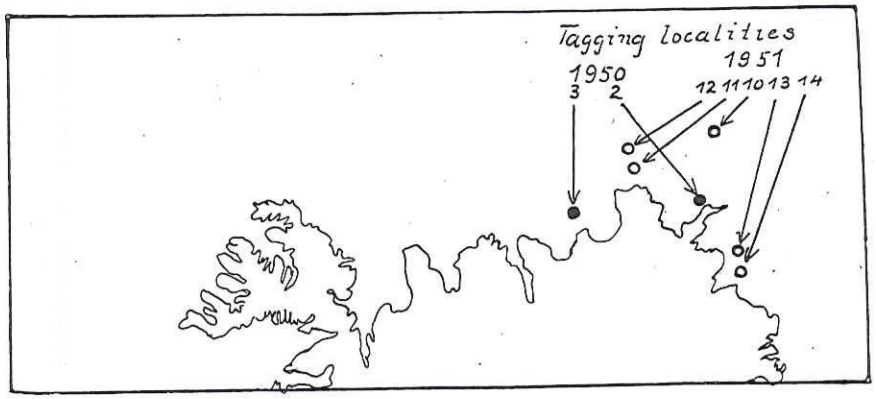

Fig. 6. Tagging localities at Iceland 1950—1951.

transverse rod). Also 898 of the internally tagged herrings were fitted with Lea tags with the same attachment. This last number is included in Table 1. If the externally tagged herrings are included, the total amount of tagged herring runs to 92,616 since the experiments started in the spring of 1948.

In order to test further the rate of mortality due to tagging and the shedding of tags, an experiment was carried out on April 3rd 1951. The herrings were held in a land-seine for 9 days and the results may be briefly summarized as follows:

A. From 100 herrings tagged with alcathene tags attached with nylon string, 5 fish were dead and 1 had lost the tag.
B. From 98 herrings tagged externally with alcathene tags and the same attachment and internally with steel tags, 7 were dead, 2 of which had lost the external tags. 4 additional herrings had also lost the external tag. Owing to the high shedding percentage of the external tags this kind of attachment has been abandoned.
C. From 247 internally tagged herrings, 7 were dead.
D. From 250 untagged herrings, 6 were dead.

Owing to a mishap no shedding test could be carried out on the internally tagged herring.

A new test was arranged this spring (1952) in which an amount of internally and externally tagged herring were placed in a land-seine together with a similar amount of untagged fish. This experiment had to be stopped after one day as the herrings got entangled in the net through the attachment of the tag.

During the last experiment a test was made to investigate

the vitality of scaleless herring. 100 herrings were completely de-scaled and placed in a "live" net on April 9th. At the same time another 100 herrings with perfect scale cover were placed in another "live" net for comparison. The fish were kept under control for one week and the diary of this vitality test runs as follows:

Date	*No scale-cover*	*Perfect scale-cover*
10. IV	No dead	No dead
11. „	2 „	„ „
12. „	3 „	3 „
14. „	3 „	2 „
15. „	No „	2 „
16. „	3 „	No „
Total:	11 dead	7 dead.

During the work with external tags last spring (1952), a peculiar colour adaptation was observed to take place in the herring. To get the herrings more easily into the "cradle" they were transferred from the "live" net into two tubs, one made of zinc and the other one of oak. In some instances when the herrings were in the tubs for some minutes, it was observed that the colour on the back of the herring changed towards green grey in the zinc tub and towards a golden brown colour in the oak tub. On changing from one tub to another, the colours became reversed after a few minutes. This preliminary observation gives some indication on protective colour changes in the herring and the phenomenon deserves to be followed up.

4. THE RETURNS

In Appendix II and its two annexes is given a complete list of all tags recovered during the period summer 1950 until spring 1952. In most cases it has been possible to get information as to the time and place of recapture as will be seen from the Appendix.

In experiment No. 8 (A), 322 tagged herrings were recaught shortly after liberation. As earlier mentioned this experiment took place in rather closed waters, and local fishermen, fishing after herring for home consumption, and knowing that tagging was

TABLE 2
Duration of Liberty

Number of Days at Liberty	*Number of Tags returned Summer 1950 — Spring 1952 from all Experiments*														*Total*
	1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*	*8A*	*8B*	*9.*	*10.*	*11.*	*12.*	*13.*	
0— 30							3	1	22	1		44	10	1	82
31— 60								1	7	1		8		6	23
61— 90												2			2
91— 120															
121— 150															
151— 180							2				5	6			13
181— 210						1	8		1		6	20			36
211— 240						1					13	2			16
241— 270											3	1			4
271— 300										2					2
301— 330					5					30	1				36
331— 360				5	2		10		3	36					56
361— 390				11	1	1	1	2	14	4					34
391— 420								1	4						5
421— 450															
451— 480															
481— 510					1										1
511— 540							4								4
541— 570							7								7
571— 600						2	3								5
601— 630															
631— 660															
661— 690			3		2										5
691— 720		8	7	7	9										31
721— 750			14	9	2										25
751— 780															
781— 810															
811— 840															
841— 870			1												1
871— 900		6	2												8
901— 930		1													1
931— 960															
961— 990															
991—1020															
1021—1050	2	3	2												7
1051—1080	5	7	11												23
1081—1110	6	2	13												21
1111—1140			1												1
1141—1170															
1171—1200															
1201—1230															
1231—1260		4													4
1261—1290		4													4
1291—1320		1													1
1321—1350															
1351—1380															
1381—1410	2														2
1411—1440	8														8
1441—1470	14														14
1471—1500	1														1
Totals:	38	36	54	32	22	5	38	5	51	74	28	83	10	7	483

going on in the area, looked for tags in the herring, and, as will be seen, quite a considerable number of tags was recovered, about 7.5% in all (Table 3). This tagging was carried out before the proper Large Herring season had started and it was doubtful whether or not the material dealt with was the so-called "Fjord-stöing" (Fjord herring), separated from the main herring stock. The recaptures, however, showed that the tagged herring, after liberation, moved outwards and tags vere also recovered on the proper coast both in the same and in the following season (Table 3). With the exception of the fjord recoveries from this experiment, the returns almost exclusively came from the reduction plants.

In Iceland, where the fishing during the last few years has been very poor, difficulties are sometimes encountered in fixing the place and time of the recaptures. The herrings occurred only in small shoals spread over an extensive area, and consequently a "landing" of herrings consisted of small catches from different localities. In Norway, where the fishery at the beginning of the season has been extremely good, part of the landings was stored in a salted conditions for future processing. During the Spring herring fishery, which has been slack in recent years, the salted, stored herring were partly processed together with freshly caught Spring herring. These circumstances evidently make it difficult to determine the place and time of the recaptures in some cases.

In Table 2, a summary of the time at liberty is given, extracted from the last column in Appendix II.[1] Fig. 7 illustrates the main data graphically. The recaptures without sufficiently exact time record are omitted. In the first column of the Table, the time at liberty is grouped into periods of 30 days, and it will be seen that a few tagged herrings have spent well over four years in the sea. This verifies the earlier findings that taggings do not effect the vitality of the herring nor influence its annual cycle of migrations. It is worth noticing that 25 herrings were recaptured after having spent about four years at liberty. At the bottom of the Table the number of returns is given separately for each experiment. Returns recorded in the first paper are excluded, as well as the 322 recaptures from experiment 8 (A) in the Norddalsfjord. The last column in the Table, giving the total of returns from all the experiments, shows a splitting up into groups corresponding to half-yearly sequences according to the fishing sea-

1) The annexes not included.

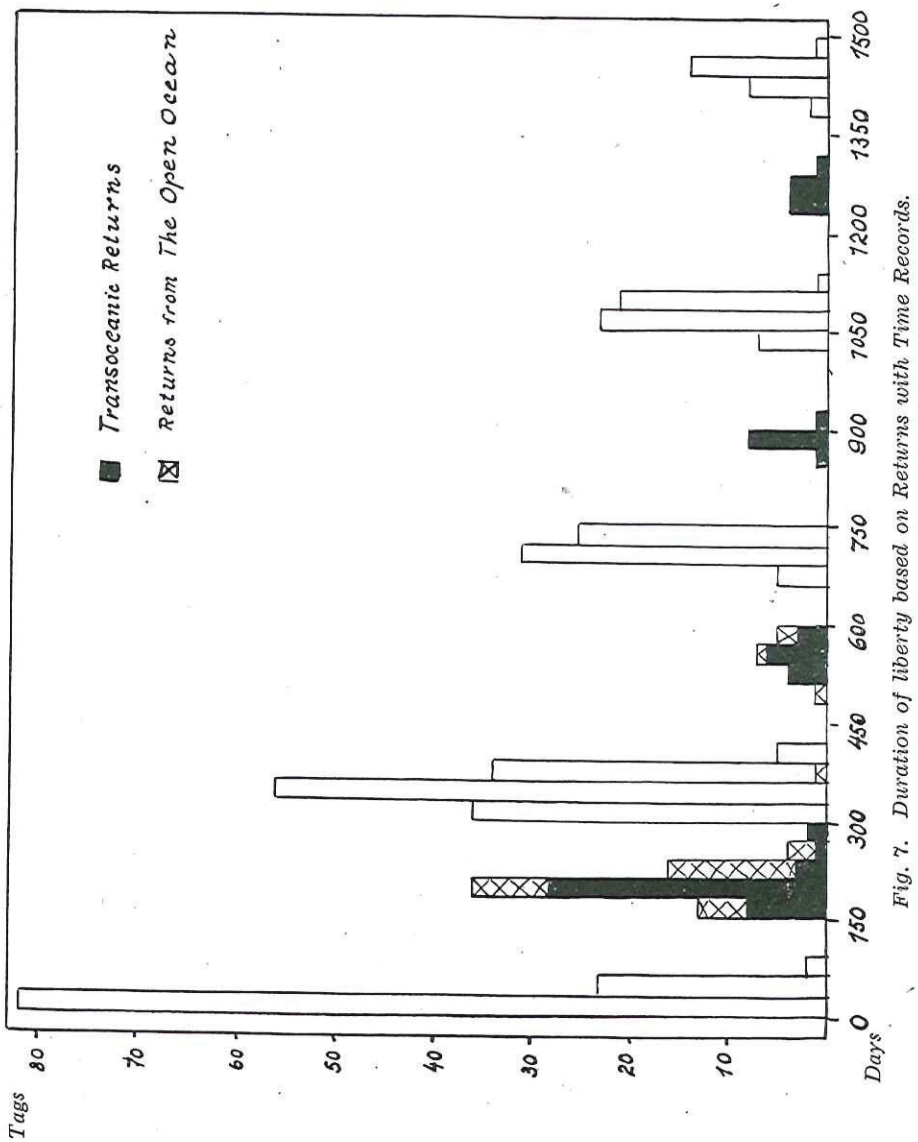

Fig. 7. Duration of liberty based on Returns with Time Records.

sons in Norway and in Iceland. These six-montly periods are due to the transoceanic migrations of the herring between Norway and Iceland. Otherwise one would have returns by yearly intervals only.

Fig. 7 gives an idea of the transoceanic migrations which will be further discussed later on. These returns are symbolized by black columns and the returns from the open ocean by cross-hatched columns.

Experiment No.	Land and Season of Tagging	Localities of Liberation	1948		1949		1950	Returns 1948 Spring — 1950 Spring	1950	1951		1952	Returns 1950 Summer — 1952 Spring	Grand Total	Perc. 1948 Spring — 1950 Spring	Perc. 1950 Summer — 1952 Spring	Perc. of Liberations Total
			Spring	Summer	Spring	Summer	Spring		Summer	Spring	Summer	Spring					
1	Norway Spring 1948	A	1		1		5	7		7		11	18	25	0.69	1.77	2.46
		B	3		2	1	12	18		6		14	20	38	0.35	0.40	0.75
		Total	4		3	1	17	25		13		25	38	63	0.40	0.63	1.05
2	Iceland Summer 1948	C													0.00	0.00	0.00
		D		1		3	2	6	1	1	1	1	4	10	0.42	0.28	0.70
		E		1		5		6	3			3	6	12	0.64	0.65	1.29
		F		1		7	2	10	2	2		1	5	15	0.83	0.41	1.24
		G		3	1	10	1	15			5	2	7	22	1.95	0.91	2.86
		H		12		7	3	22		2	2		4	26	2.20	0.27	2.47
		I		3		15	3	21	2	2	4	2	10	31	1.40	1.00	2.40
		?				2		2						2			
		Total		21	1	49	11	82	8	7	12	9	36	118	1.20	0.48	1.68
3	Norway Spring 1949	J			3		32	35		24	3	27	54	89	0.42	0.65	1.07
4	Norway Spring 1950	K													0.00	0.00	0.00
		L										1	1	1	0.00	0.40	0.40
		M								3		3	6	6	0.00	0.27	0.27
		N								6		3	9	9	0.00	0.40	0.40
		O								7		9	16	16	0.00	0.80	0.80
		Total								16		16	32	32	0.00	0.35	0.35
5	Norway Spring 1950	P					7	7		9	1	12	22	29	0.06	0.20	0.26
	Earlier Experiments Total		4	21	7	50	67	149	8	69	16	89	182	331	0.36	0.43	0.79
6	Open Ocean 1950	1								2	1	2	5	5		0.99	0.99
7	Iceland Summer 1950	2							3	7	4	6	20	20		2.76	2.76
		3								3	7	8	18	18		3.01	3.01
		Total							3	10	11	14	38	38		2.88	2.88
8A	Norway Spring 1951	4								324		3	327	327		7.71	7.71
8B	Norway Spring 1951	5								16	1	21	38	38		0.76	0.76
		6								14			14	14		1.27	1.27
		Total								30	1	21	52	52		0.87	0.87
9	Norway Spring 1951	7								2		72	74	74		0.75	0.75
10	Open Ocean 1951	8										20	20	20		1.33	1.33
		9										8	8	8		1.57	1.57
		Total										28	28	28		1.39	1.39
11	Iceland Summer 1951	10									2	3	5	5		1.01	1.01
		11									1	5	6	6		0.71	0.71
		12										7	7	7		1.84	1.84
		13									4	10	14	14		1.58	1.58
		14										4	4	4		0.80	0.80
		Total									7	29	36	36		1.18	1.18
12	Norway Spring 1952	15										10	10	10		3.91	3.91
		16										48	48	48		0.48	0.48
		Total										58	58	58		0.57	0.57
13	Norway Spring 1952	17										7	7	7		0.06	0.06
	Later Experiments Total								3	368	20	234	625	625		1.64	1.28
	Grand Total		4	21	7	50	67	149	11	437	36	323	807	956			1.05

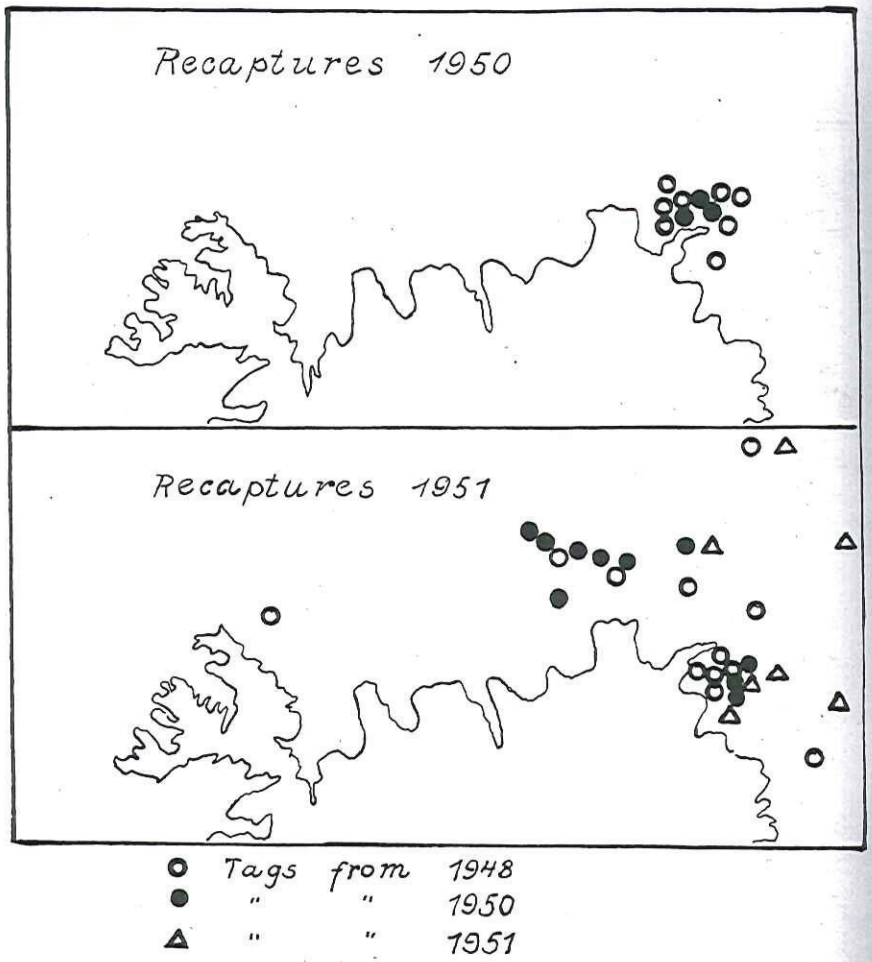

Fig. 8. The Distribution of Recaptures at Iceland in 1950 and 1951.

In Table 3 are summarized the number of returns from the different experiments as recorded in the different seasons. It has been found desirable to include the earlier returns in order to get a more complete survey.

Considering firstly the number of tags returned in Iceland in the summer of 1950, it appears that only 11 tags were found, all of which originated from Icelandic taggings, 8 being from 1948 and 3 from 1950 (see Fig. 8). In the next season, at Norway in the spring of 1951, 437 tags were recovered. Disregarding the 322 tags from the Norddalsfjord area this season, the total of returns amounts to 115. 13 of these originate from the first ex-

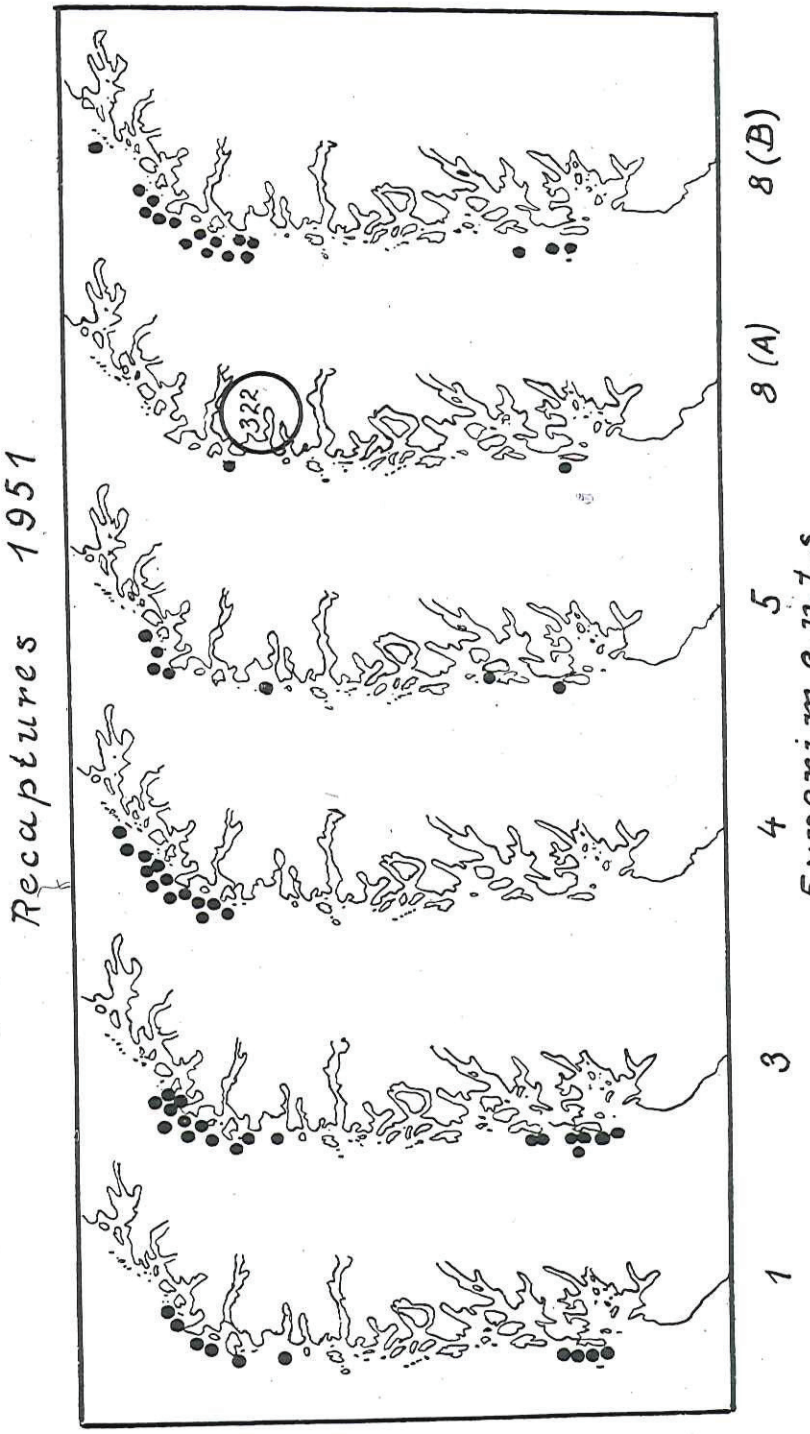

Fig. 9. The Distribution of Recaptures in Norway in 1951.

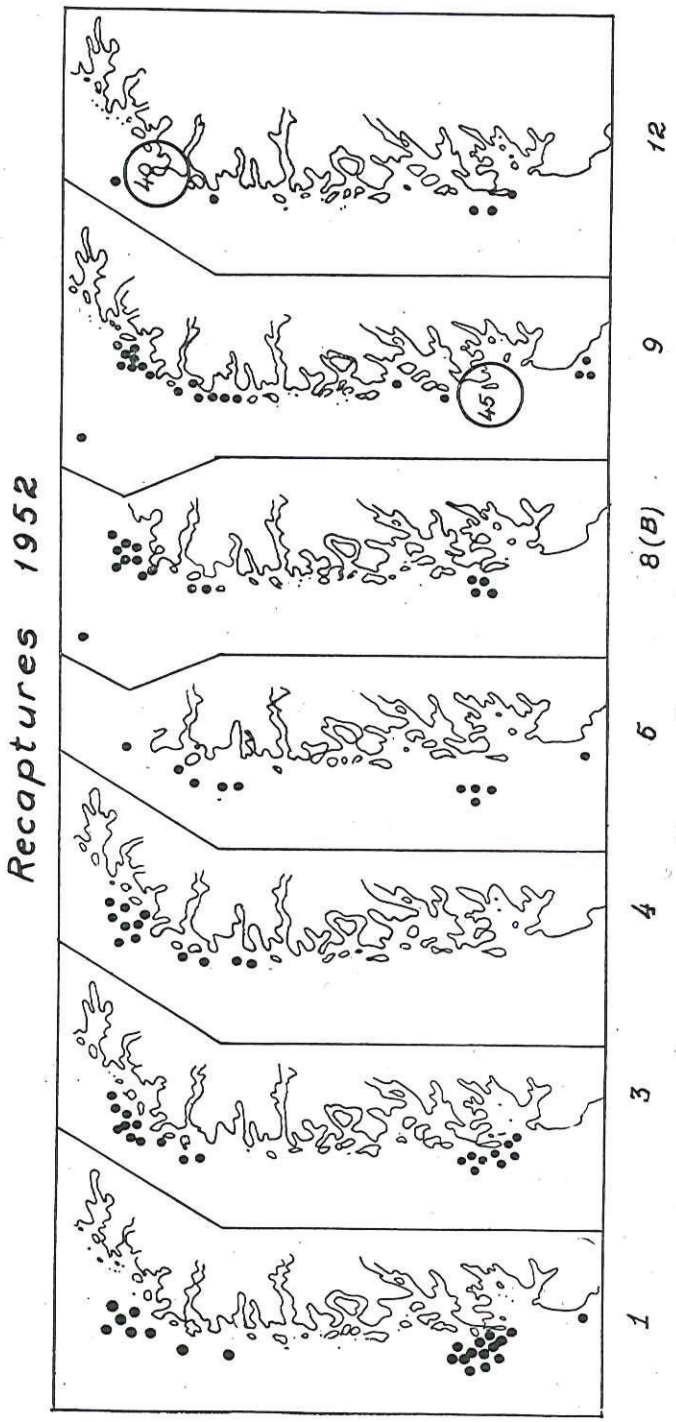

Fig. 10. The Distribution of Recaptures in Norway 1952.

periment in the spring of 1948, 7 from second one in Iceland in summer, 1948, 24 from Norway in the spring of 1949, 16 from the Large Herring taggings in 1950 and 9 from the Spring Herring taggings in the same year (1950). This makes 69 returns altogether from the earlier experiments treated in Report No. 1. During the same season an additional 2 tags were recovered from the open ocean, 10 tags from Iceland 1950, 32 tags from Large Herring taggings in 1951[1]) and 2 from the Spring Herring tagging in the same year (1951 — See Fig. 9).

During the summer of 1951, 36 recaptures were recorded in Iceland. 12 of these originated from taggings at Iceland in 1948, 3 from Norway in 1949, 1 from Norway in 1950, 1 from the open ocean in 1950, 11 from Iceland in 1951, 1 from Norway in 1951 and 7 from Iceland in 1951 (see Fig. 8). The lower part of the Figure (map of the returns in 1951), where only recaptures of herring tagged in Icelandic waters are entered, illustrates the earlier mentioned dispersion of the catches which were taken partially far from the coast. Actually the biggest part of the yields was taken on entirely new grounds. As in the preceding years the catches were centered off the North-East and the East coast.

In the spring of 1952, 323 tags were recovered in Norway. 25 of these had been liberated in Norway in 1948, 9 at Iceland in 1948, 27 in Norway in 1949, 28 in Norway in 1950, 2 from the open ocean in 1950, 14 from Iceland in 1950, 96 from Norway in 1951, 28 from the open ocean in 1951, 29 from Iceland in 1951 and 65 from Norway in 1952 (see Fig. 10). It is whorty of note that a few recoveries have been made at considerable distance from the coast (recoveries from experiment 8 (B) and 9). This is due to the fact that R/S "G. O. Sars" was able to locate and follow the herrings on their track towards the coast and to notify the fishermen of their whereabouts long before they entered the coastal waters.

Finally, in the summer of 1952, 4 tags were recovered, 3 in Norway and 1 in Scotland (Supplement 1 to Appendix II).

Altogether the tagging experiments have yielded 956 returns, 149 of which have already been dealt with (Report No. 1). The remaining 807 returns originate partly from the earlier experiments (182), and partly from the later ones (625). As a percentage, the total number of returns amounts to 1.05%. As will be

1) 2 of which are included in "324" in the Table.

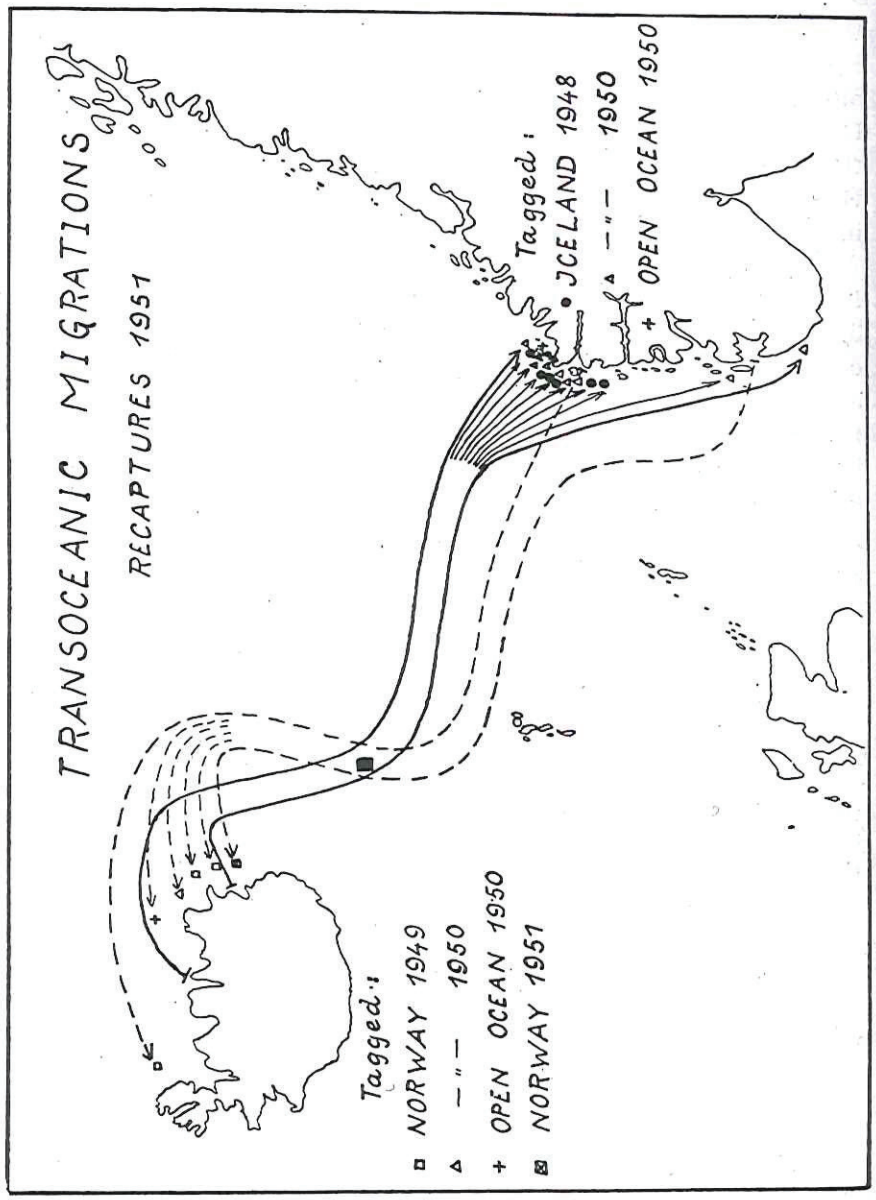

Fig. 11. Migrations of Herring between Norway and Iceland and vice versa.

seen from the last column of the Table, the percentages of recoveries from the different experiments are very varying, the lowest one (Norway, spring 1950) amounts to only 0.26% and the highest one (Iceland, summer 1950) to 2.88%. The variations are greater still if the herrings liberated in different localities are considered, the range being between 0% and 3.01%. As a general rule the taggings at Iceland and in the open ocean give higher percentage returns in Norway than the experiments carried out in Norwegian waters. It is difficult at the moment to offer any explanation of this phenomenon, but future experiments may solve the problem.

Finally, a few remarks must be made on the transoceanic migrations of the herring in which also the returns from the open ocean have been included for the sake of convenience. During the spring of 1951 17 tagged herrings from Iceland were recovered in Norway and two more from the open ocean taggings in 1950. In the summer of the same year 5 tags from Norway were recorded in Iceland and an additional 1 from the open ocean. These migrations are suggested in Fig. 11 (the returns shown here and on Fig. 12 are not included in the maps in Figs. 8, 9 and 10). Only tags with known records are entered on the maps. Black rectangles denote tagging localities in the open ocean.

It appears that the returns in Norway are distributed along the whole winter herring area, but they are chiefly concentrated on the Large Herring grounds (northern part). This may possibly be due to the failure of the Spring Herring fishery. Regarding the returns at Iceland it is particularly interesting to note that a tag was recovered at the most westerly part of the north coast, on Strandagrunn far offshore. This herring had been tagged in the Spring Herring district of Norway in 1949 (Trosnavåg). The other returns came at the north-east coast where the main fishing activities were concentrated.

During the spring of 1952, 52 tagged herrings from Iceland were recaught in Norwegian waters. In addition 30 tags from the open ocean were found. Details of the distribution of these returns are shown on the map (Fig. 12) where the returns from each experiment are illustrated separately. It may be noted that 2 of the herrings tagged in the open ocean in 1951 were also recaptured in the open ocean in 1952. The main distribution will be seen to be about the same as in the previous year. As this report is prepared before the proper fishing season has started in Iceland this year, there are naturally no returns from this country so far.

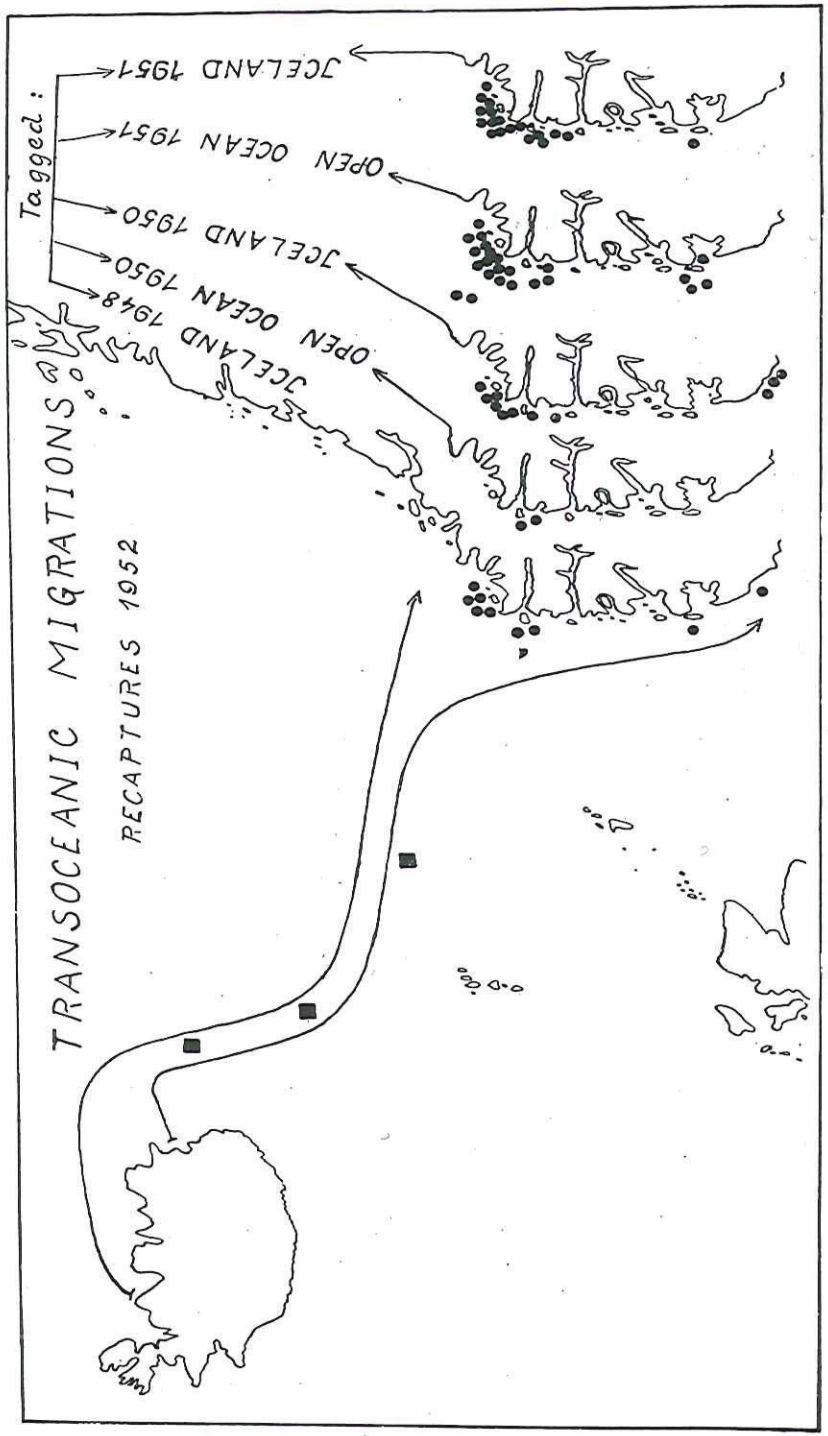

Fig. 12. Migrations of Herring from Iceland to Norway in 1952.

Lastly will be set forth some of the results emerging from the experiments with externally and doubly tagged herring.

Of the external tags, only the Lea hydrostatic tags have given any recoveries. In Supplement 2, Appendix II are listed the recaptures so far made. It is borne out that at least a part of the Norwegian Spring herring migrate into the North Sea and Skagerack after spawning. In Fig. 13 is attempted an illustration of these migrations. In the Figure are also drawn two recaptures of herrings with internal tags only. These recoveries were both made about one year after tagging (see Appendix II). One of them, made at the coast of Bohuslän, April 3rd 1952, is especially interesting. Dr. Høglund remarks when reporting the recovery that: „Fyndplatsen ligger i ett område, där omkring den angivna tidpunkten ett før våra förhållanden icke obetydligt fiske på lekande vårsill försiggick". This indicates that the herring may frequent entirely different spawning grounds in different years. On the other hand, all the available data on age and size of the herrings recaught in the North Sea proper and in the Skagerack, go to show that they are quite small and young fish. At present it is difficult to do justice to the significance of this feature.

One of the objects when tagging the herring with both external and internal tags, was to test the efficiency of the two methods

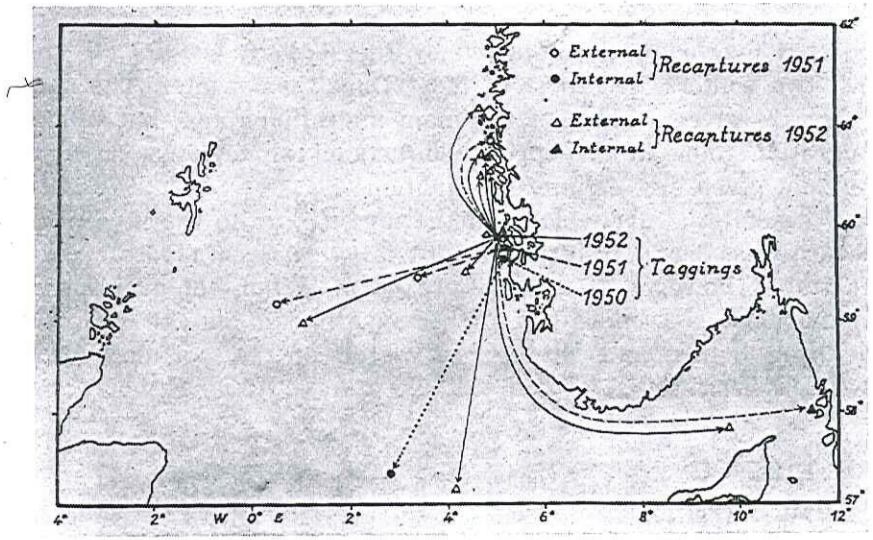

Fig. 13. Migrations of externally and doubly tagged herrings.

directly. As yet none of the recoveries is due to the internal tags of the doubly tagged herrings, but this is only natural as the herrings were liberated after the close of the Winter Herring season, and thus it is too early to expect results in this respect.

Another item on this programme was to investigate the behaviour of the internal tag in the fish. As will be seen, most of the recoveries have been made after a comparatively short time in the sea, and again in most cases only the external tag has been sent in, either because it was found detached and entangled in some fishing gear or because only the tag and not the fish was taken care of when recaptured. In a few cases the whole fish has been returned. In none of these was there evidence of any damage to the fish. In one case the internal tag could not be found. This fish was in "an advanced stage" when returned.

It was, naturally, not known beforehand how the herring could stand up to the treatment of double tagging. Judging by the recoveries, however, the herring is quite capable of taking this handling without serious damage being done. Proportionately the same number has been recaptured of the singly and doubly tagged herrings: in 1952 3 out of about 400 externally and 9 out of about 900 doubly tagged fish have been recovered.

As mentioned in Report No. 1 (page 31), one of the objects when tagging in the open sea was to investigate the migration routes of the herring. The taggings so far carried out, give some idea of the main track from Iceland to Norway, strongly corroborated by the results obtained by the R/S "G. O. Sars" in the last two winters, and those of R/S "Dana" last winter. The map (Fig. 12) gives an idea of the main migration route, but of the migration route in the opposite direction, the taggings have so far, not given any definite information.

The material available from the taggings up to the present is regarded as being insufficient for statistical treatment. It may be stated, however, that there are no indications of overfishing of the stock as a whole, but further experiments may be expected to throw light on this problem as well as on the mortality rates of these herrings.

REFERENCE

Árni Friðriksson and Olav Aasen:
The Norwegian-Icelandic Herring Tagging Experiments. Report No. 1. Rep. on Norw. Fish. and Mar. Investig. Vol. No. 11. Bergen 1950.

ADDENDA

Since this report was prepared the following number of herrings has been tagged:

1) Iceland (N-coast herrings, July—August) 17.308.
2) Norway (Fat herring) 8376.

The total number of herrings tagged in Iceland and Norway during 1948—1952 amounts consequently to 117.903.

Furthermore 5 internal tags were returned from Icelandic reduction plants during the summer of this year, 3 of which had been used at Iceland in 1951, one at Iceland in 1950 and one in Norway in 1952.

THE AUTHORS.

Appendix I. *Records of Liberations*

6th Experiment. Open Ocean 1950

Series	Number	Date	Locality of Liberation	Ref.
NS 7	259	19. VII	LN 64° 48′ LW 09° 02′	1
NS 8	247	19. VII		„

7th Experiment. Iceland 1950

F 4	228	3. VIII	Svínalækjar-tangi	2
F 5	248	„		„
F 6	247	„	„	„
F 7	247	13. VIII	Mánáreyjar	3
F 8	242	„	„	„
F 9	109	„	„	„

8th Experiment (A). Norway 1951

NS 9	201	21. I	Norddalsfjord	4
NS 10	258	„	„	„
NT 9	225	23. I	„	„
NT 10	244	„	„	„
NU 1	79	21. I	„	„
NU 2	227	„	„	„
NU 3	210	„	„	„
NU 4	240	„	„	„
NU 5	249	20. I	„	„
NU 6	190	„	„	„
NU 7	240	„	„	„
NU 8	180	„	„	„
NU 9	230	19. I	„	„
NU 10	232	„	„	„
NV 5	244	23. I	„	„
NV 6	248	„	„	„
NV 7	245	„	„	„
NV 8	252	„	„	„
NV 9	249	„	„	„

8th Experiment (B). Norway 1951

NV 10	238	30. I	Kjelnesvik	5
NW 1	250	„	„	„
NW 2	253	„	„	„
NW 3	251	31. I	„	„
NW 4	251	„	„	„
NW 5	250	„	„	„
NW 6	250	„	„	„
NW 7	250	„	„	„
NW 8	250	„	„	„
NW 9	250	„	„	„
NW 10	248	„	„	„
NX 1	251	1. II	„	„
NX 2	249	„	„	„
NX 3	249	„	„	„
NX 4	250	„	„	„

8th experiment (B) (continued)

NX 5	251	1. II	Kjelnesvik	5
NX 6	249	„	„	„
NX 7	253	2. II	„	„
NX 8	248	„	„	„
NX 9	247	„	„	„
NX 10	247	6. II	Lotra	6
NZ 1	250	„	„	„
NZ 2	254	„	„	„
NZ 3	259	„	„	„

9th Experiment. Norway 1951

Na 1	245	29. III	Rugsundet	7
Na 2	251	„	„	„
Na 3	247	30. III	„	„
Na 4	248	„	„	„
Na 5	250	31. III	„	„
Na 6	249	„	„	„
Na 7	253	„	„	„
Na 8	250	„	„	„
Na 9	248	„	„	„
Na 10	250	„	„	„
Nb 1	251	3. IV	„	„
Nb 2	255	„	„	„
Nb 3	252	„	„	„
Nb 4	208	11. IV	„	„
Nb 5	252	3. IV	„	„
Nb 6	251	„	„	„
Nb 7	246	4. IV	„	„
Nb 8	253	„	„	„
Nb 9	249	„	„	„
Nb 10	253	„	„	„
Np 1	250	5. IV	„	„
Np 2	250	„	„	„
Np 3	249	„	„	„
Np 4	247	„	„	„
Np 5	253	„	„	„
Np 6	248	6. IV	„	„
Np 7	250	„	„	„
Np 8	248	„	„	„
Np 9	257	„	„	„
Np 10	250	„	„	„
Ns 1	254	„	„	„
Ns 2	253	„	„	„
Ns 3	247	„	„	„
Ns 4	245	7. IV	„	„
Ns 5	250	„	„	„
Ns 6	260	9. IV	„	„
Ns 7	256	„	„	„
Ns 8	251	„	„	„
Ns 9	252	10. IV	„	„
Ns 10	255	„	„	„

10th Experiment. Open Ocean 1951

Series	Number	Date	Locality of Liberation	Ref.
Nu 1	248	28. VI	LN 63° 43′	8
Nu 2	258	„	LW 02° 52′	„
Nu 3	200	„	„	„
Nu 4	238	15. VIII	LN 66° 07′ LW 10° 25′	9
Nu 5	247	28. VI	LN 63° 43′	8
Nu 6	251	„	LW 02° 52′	„
Nu 7	247	„	„	„
Nu 8	51	„	„	„
Nu 10	154	16. VIII	LN 66° 07′	9
Nx 1	118	„	LW 10° 25′	„

11th Experiment. Iceland 1951

A 1	248	23. VII	Kjölsenbanki	10
A 2	249	„	„	„
A 3	250	30. VII	Rifstangi	11
A 4	250	„	„	„
A 5	250	„	„	„
A 6	100	„	„	„
A 6	150	„	Hraunhafnar-tangi	12
A 7	231	„	„	„
A 8	248	2. VIII	Digranes	13
A 9	247	„	„	„
A 10	248	„	„	„
B 1	144	„	„	„
B 1	100	5. VIII	Kollumúli	14
B 2	249	„	„	„
B 3	100	„	„	„

12th Experiment. Norway 1952

Series	Number	Date	Locality of Liberation	Ref.
Nx 2	255	1. II	Bremanger	15
Nx 3	246	7. II	Borgundvåg	16
Nx 4	245	„	„	„
Nx 5	246	„	„	„
Nx 6	249	10. II	„	„
Nx 7	250	„	„	„
Nx 8	250	„	„	„
Nx 9	250	„	„	„
Nx 10	246	11. II	„	„
NZ 4	250	„	„	„
NZ 5	248	„	„	„
NZ 6	251	„	„	„
NZ 7	250	„	„	„
NZ 8	245	„	„	„
NZ 9	249	„	„	„
NZ 10	245	10. II	„	„
Nu 9	249	11. II	„	„
NV 3	69	10. II	„	„
NV 3	81	11. II	„	„
NV 4	76	„	„	„
NV 4	172	13. II	„	„
N 1— N 4200	4178	„	„	„[1]
N 4201 —5700	1495	14. II	„	„

13th Experiment. Norway 1952

Series	Number	Date	Locality of Liberation	Ref.
N 5701—N 6750	1049	31. III	Sörvik	17[2]
N 6751—N 7250	495	3. & 4. IV	„	„
N 7251—N 8400	1147	2. IV	„	„
N 8401—N 9800	1390	3. IV	„	„
N 9801—N 10750	949	4.IV	„	„
N 10751—N 12100	1340	5. IV	„	„
N 12101—N 13100	998	7. IV	„	„
N 13101—N 14100	998	8. IV	„	„
N 14101—N 14950	847	16. IV	„	„
N 14951—N 15450	500	17. IV	„	„
N 15451—N 15500	50	16. IV	„	„
N 15501—N 16250	749	17. IV	„	„
N 16251—N 17500	1249	18. IV	„	„

1) From here individually numbered tags were used. Numbers lacking (N): 307, 373, 385, 897, 1555, 1556, 1592, 1671, 1698, 1714, 1809, 1810, 1890, 2152, 2455, 2530, 2686, 2695, 2853, 2863, 3979, 4122, 4616, 4815, 5200, 5426, 5470.

2) Lacking numbers (N): 6080, 6762, 6999, 7012, 7013, 7052, 7262, 7380, 8212, 8576, 8713, 9182, 9213, 9214, 9345, 9445, 9545, 9575, 9735, 10545, 11094, 11313, 11435, 11436, 11442, 11443, 11465, 11466, 12086, 12089, 12645, 12822, 13305, 13349, 14464, 14664, 14809, 16013, 17088.

Appendix II. *Records of Returns*

1st Experiment. Norway 1948.

Recap. No.	LIBERATED Series	Date	Place	Ref.	RETURNED Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring	Nos. of days at liberty
150	A 1	6. III	Hestvik	A	28. II	Florö district		1			1089
151	„	„	„	„	? II	Stadt		1			max. 1089
152	„	„	„	„	28. II	Vest-Karmöy		1			1089
153	„	„	„	„	bef. 15. II	Rundefeltet				1	max. 1441
154	„	„	„	„	ca. 23. II	Urter				1	ca. 1449
155	„	„	„	„	29. II	Boknfjord				1	1455
156	A 2	„	„	„	3. III	Storesund Sildoljef.		1			max. 1092
157	„	„	„	„	ca. 3. III	Röver or Urter				1	ca. 1458
158	„	„	„	„	ca. 3. III	Urter				1	1458
158	„	„	„	„	28. II	20 n.m. W. Runde				1	1454
160	A 4	„	„	„	ca. 3. III	Karmöy		1			ca. 1092
161	„	„	„	„	5.–6. III	Haugesund district		1			ca. 1095
162	„	„	„	„	29. II	Skudesnes				1	1455
163	„	„	„	„	bef. 13. III	Urter or Söröy				1	max. 1468
164	„	„	„	„	ca. 28 II	Urter				1	1454
165	A 5	„	„	„	15.–20. II	Svinöy		1			ca. 1080
166	„	„	„	„	bef. 21. II	Svinöy — Runde				1	max. 1447
167	„	„	„	„	17. III	Klettagrunnen				1	1472
168	A 6	23. III	Breivik	B	30. I	Kvalheimsvik				1	1408
169	„	„	„	„	ca. 10. II	Svinöy — Runde				1	ca. 1419
170	A 8	„	„	„	23. II	Urter — Sve		1			1065
171	„	„	„	„	20.–24. I	Storesund Sildoljef.				1	max. 1402
172	A 9	„	„	„	1.–10. II	Storesund		1			1049
173	B 6	18. III	„	„	12. II	Stadt		1			1062
174	B 7	„	„	„	7.–9. III	Röver				1	ca. 1451
175	B 8	„	„	„	24. I	Vallabåene		1			1043
176	B 9	„	„	„	1. III	Karmöy		1			1079
177	„	„	„	„	ca. 5. III	Urter				1	ca. 1448
178	B 10	19. III	„	„	29. II	Lorenz Nilssen A/S				1	max. 1441
179	„	„	„	„	9. II	Runde district				1	1421
180	„	„	„	„	17. II	Kråkenes				1	1430

Appendix II (cont.). *Records of Returns*

1st Experiment. Norway 1948 (cont.).

Recap. No.	LIBERATED Series	Date	Place	Ref.	RETURNED Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring	Nos. of days at liberty
181	C 1	19. III	Breivik	B	14. II	Målöy district		1			1063
182	C 2	19.–20. III	„	„	1. II	Ryttervik Sildoljef.				1	ca. 1413
183	„	„	„	„	8.–10. II	Folrö district				1	ca. 1421
184	„	„	„	„	ca. 27. II	Urter				1	ca. 1439
185	C. 3	20. III	„	„	28. II	Urter or Bokn				1	1440
186	„	„	„	„	1.–3. III	Röver or Urter				1	ca. 1443
187	C 4	22. III	„	„	28. II	Veavåg				1	1438

2nd Experiment. Iceland 1948.

188	D 3	8. VIII	Skoruvíkurbjarg	D	24.–28. VII	Langanes	1				ca. 720
189	D 4	„	„	„	30. I	Runde district				1	1270
190	D 6	„	„	„	27. I	Florö district		1			902
191	„	„	„	„	2. VIII	Langanes or Digranes			1		1089
192	E 2	17. VIII	Skagi	E	20.–25. VII	Langanes	1				ca. 706
193	„	„	„	„	ca. 25. I	Ålesund district				1	ca. 1256
194	E 3	„	„	„	1.–3. VIII	Langanes	1				ca. 716
195	E 4	„	„	„	4.–5. VIII	Målöy district				1	ca. 1272
196	E 5	„	„	„	ca. 10. II	Langanes or Digranes	1				ca. 718
197	„	„	„	„	ca. 29. I	Ålesund district				1	ca. 1260
198	E 6	20. VIII	Gjögur	F	25.–30. VII	Langanes	1				ca. 708
199	E 9	„	„	„	1.–10. II	Runde district		1			ca. 899
200	„	„	„	„	15.–20. VII	Langanes	1				ca. 698
201	E 10	20. VIII	„	„	ca. 30. I	Ålesund district				1	ca. 1258
202	„	„	„	„	31. I	Svinöyhavet		1			894
203	F 2	27. VIII	Snartastaðanúpur	I	25. VIII	90 n.m. NE Langanes			1		1093
204	F 3	„	„	„	30.–31. VII	Langanes	1				ca. 704
205	„	„	„	„	30. VII–6. VIII	Langanes			1		ca. 1072
206	G 1	22. VIII	Lundey	G	ca. 31. VII	Langanes			1		ca. 1074

Appendix II (cont.). *Records of Returns*

2nd Experiment. Iceland 1948 (cont.).

	LIBERATED				RETURNED							
							1950	1951		1952	
Recap. No.	Series	Date	Place	Ref.	Date	Place	Summer	Spring	Summer	Spring	Nos. of days at liberty
207	G 2	22. VIII	Lundey	G	13.–15. VII	N. Siglufj. or Slétta			1		ca. 1057
208	„	„	„	„	24. I	Runde district				1	1250
209	G 3	„	„	„	10.–11. VII	Húnaflói			1		ca. 1053
210	„	„	„	„	1.–3. VIII	Slétta			1		ca. 1045
211	„	„	„	„	5.–8. VIII	Langanes or Digranes			1		ca. 1048
212	„	„	„	„	1. or 14. II	Eltvik or Bremanger				1	1257/1271
213	G 4	26. VIII	Leirhöfn	H	2.–3. VIII	Digranes			1		ca. 1042
214	„	„	„	„	16. VIII	Glettinganes (offshore)			1		1056
215	G 6	„	„	„	2. II	Stadt		1			890
216	„	„	„	„	3. II	Svinöy or Runde		1			891
217	G 8	27. VIII	Snartastaðanúpur	I	1.–3. VIII	Langanes	1				ca. 706
218	„	„	„	„	ca. 27. I	Runde or Svinöy		1			ca. 886
219	„	„	„	„	30. VII–6. VIII	Langanes			1		ca. 1070
220	„	„	„	„	29. II	Åkra				1	1281
221	„	„	„	„	15. III	Egersund district				1	1296
222	G 9	„	„	„	2. VIII	Digranes or Langanes			1		1070
223	G 10	„	„	„	30. I	Florö		1			889

3rd Experiment. Norway 1949.

224	NG 2	28. II	Trosnavåg	J	1.–10. II	Målöy district				1	ca. 1072
225	NG 4	„	„	„	23. II	Rundefeltet				1	1090
226	NG 5	„	„	„	24. I	Runde district		1			695
227	NG 6	7 III	„	„	Ult. II	Storesund Sildoljef.		1			max. 723
228	NG 7	2. III	„	„	30. VII–6. VIII	Langanes			1		ca. 884
229	NG 8	„	„	„	13. II	Olderveggen		1			713
230	NG 10	4. III	„	„	Primo III	Storesund Sildoljef.		1			ca. 730
231	„	„	„	„	3.–6. III	Haugesund district		1			ca. 730
232	NI 2	„	„	„	ca. 5. II	Florö — Målöy		1			ca. 703

Appendix II (cont.). *Records of Returns*

3rd Experiment. Norway 1949 (cont.).

	LIBERATED				RETURNED						
							1950	1951		1952	
Recap. No.	Series	Date	Place	Ref.	Date	Place	Summer	Spring	Summer	Spring	Nos. of days at liberty
233	„	4. III	Trosnavåg	J	bef. 10. III	Rundefeltet		1			max. 736
234	„	„	„	„	30. I	Kråkenes				1	1062
235	„	„	„	„	28. II	Urter or Bokn				1	1090
236	„	„	„	„	ca. 8. II	Möre				1	ca. 1070
237	NI 3	5. III	„	„	8. III	Espevær		1			733
238	NI 4	„	„	„	2. II	Klovningen				1	1063
239	NI 5	„	„	„	ca. 10. VII	Strandagrunn (offshore)			1		ca. 857
240	„	„	„	„	5. III	15 n.m. W. Runde				1	1096
241	„	„	„	„	bef. 16. V	Fjellberg Bruk A/S				1	max. 1137
242	NI 6	„	„	„	22. I	Runde district		1			688
243	„	„	„	„	14. II	Kråkenes		1			711
244	„	„	„	„	30. I	Stadt				1	1060
245	„	„	„	„	9. III	Svinöyfeltet				1	1070
246	„	„	„	„	ca. 26. II	Urter				1	ca. 1088
247	NI 7	6. III	„	„	3. III	Espevær		1			727
248	NI 10	„	„	„	bef. 20. II	Fjellberg Bruk A/S				1	max. 1080
249	„	„	„	„	bef. 14. III	Urter or Söröy				1	max. 1104
250	NH 1	9. III	„	„	ca. 1. III	Karmöy				1	ca. 1088
251	NH 3	„	„	„	1.–2. III	Karmöy		1			ca. 722
252	„	„	„	„	Primo III	Storesund Sildoljef.		1			ca. 730
253	„	„	„	„	bef. 8. II	Fjellberg Bruk A/S				1	max. 1066
254	„	„	„	„	12. II	Vallabåene				1	1069
255	NH 4	„	„	„	16. II	Svinöy district		1			709
256	NH 5	„	„	„	ca. 1. III	Karmöy		1			ca. 722
257	„	„	„	„	bef. 19. III	Runde		1			max. 740
258	„	„	„	„	bef. 22. II	Haugesunds Sildoljef.				1	max. 1080
259	„	„	„	„	bef. 26. II	Haugesund district				1	max. 1084
260	NH 6	„	„	„	25. I	Svinöy district		1			686
261	NH 6	„	„	„	ca. 16. II	Målöy district		1			ca. 709
262	„	„	„	„	27.–28. III	Urter — Sve				1	ca. 1086
263	NH 7	10. III	„	„	ca. 5. III	Karmöy		1			ca. 725

Appendix II (cont.). *Records of Returns*

3rd Experiment. Norway 1949 (cont.).

LIBERATED					RETURNED						Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring	
264	NH 8	10. III	Trosnavåg	J	20. II	Svinöy district		1			712
265	„	„	„	„	ca. 1. III	Haugesund district		1			ca. 721
266	„	„	„	„	5. III	Rövær or Ferkingstad				1	1091
267	NH 10	„	„	„	Ult. I	Storesund Sildoljef.				1	max. 1057
268	„	„	„	„	5.–6. III	Aakra — Espevær				1	ca. 1091
269	NJ 1	„	„	„	7. III	Runde district		1			727
270	„	„	„	„	Primo III	Storesund Sildoljef.		1			ca. 730
271	„	„	„	„	24. I	Målöy district		1			685
272	„	„	„	„	5.–8. VIII	Langanes or Digranes			1		ca. 880
273	„	„	„	„	21. I	Stadt — Svinöy				1	1047
274	„	„	„	„	23. I	Runde				1	1049
275	NJ 4	„	„	„	25. II	Skudefjord				1	1082
276	„	„	„	„	ca. 1. III	Karmöy				1	ca. 1087
277	NJ 6	„	„	„	Ult. II	Runde district				1	ca. 1086

4th Experiment. Norway 1950.

278	NJ 5–0	8. II	Torskangerpoll	L	1. or 14. II	Eltvik or Bremanger				1	722/736
279	NK 4	13. II	Fåfjorden	M	bef. 21. II	Svinöy — Runde				1	max. 738
280	NK 5	„	„	„	13. II	Stadt				1	730
281	NK 6	„	„	„	2. II	Runde district				1	719
282	„	„	„	„	bef. 9. III	S. F. Horsöy		1			max. 389
283	NK 7	„	„	„	bef. 27. II	Runde district		1			max. 379
284	NK 10	14. II	„	„	? II	Möre — Romsdal		1			max. 379
285	NL 4	15. II	Vågsvågen	N	bef. 12. II	S.F. Horsöy		1			max. 362
286	„	„	„	„	ca. 20. II	Ålesund district		1			ca. 370
287	NL 5	16. II	„	„	17. II	Kråkenes		1			ca. 366
288	NL 7	15. II	„	„	6. II	Stadt		1			356
289	„	„	„	„	ca. 18. II	Runde		1			ca. 368
290	„	„	„	„	12. II	Vallabåene				1	727

Appendix II (cont.). *Records of Returns*

4th Experiment. Norway 1950 (cont.).

LIBERATED					RETURNED						Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring	
291	NL 8	15. II	Vågsvågen	N	26. I	Svinöy — Runde				1	710
292	NL 9	16. II	„	„	7. II	Stadt		1			356
293	„	„	„	„	bef. 2. II	Haugesunds Sildoljef.				1	max. 716
294	NM 3	18. II	Batalden	O	15. II	Svinöy district		1			362
295	NM 3	„	„	„	26. I	Svinöy district		1			342
296	„	„	„	„	15. II	Kråkenes		1			362
297	„	„	„	„	bef. 9. III	S. F. Horsöy		1			max. 386
298	„	„	„	„	medio II	Svinöy — Runde				1	ca. 730
299	NM 4	„	„	„	26.–27. I	Florö district				1	ca. 707
300	NM 6	„	„	„	23.–24. I	Svinöy district		1			ca. 340
301	„	„	„	„	ca. 13. II	Florö district				1	ca. 725
302	„	„	„	„	1. II	Runde — Svinöy		1			348
303	„	„	„	„	28. I	Runde — Svinöy				1	709
304	„	„	„	„	ca. 28. I	Svinöy district				1	ca. 709
305	„	„	„	„	27. II	20 n.m. NW Runde				1	739
306	„	„	„	„	bef. 29. I	Haugesunds Sildoljef.				1	max. 710
307	NM 9	19. II	„	„	? II	Möre — Romsdal		1			max. 374
308	„	„	„	„	13. II	Runde district				1	736
309	NM 10	„	„	„	ca. 10. II	Målöy district				1	ca. 721

5th Experiment. Norway 1950.

310	NN 2	11. III	Vespestadvågen	P	bef. 15. II	Haugesunds Sildoljef.				1	max. 706
311	NN 7	13. III	„	„	29. II–1. III	Rövær				1	ca. 718
312	„	„	„	„	ca. 1. III	Urter				1	ca. 719
313	NN 8	„	„	„	ca. 25. I	Ålesund district				1	ca. 683
314	NO 5	10. III	„	„	bef. 12. II	S.F. Horsöy		1			max. 704
315	„	„	„	„	10. II	Målöy district				1	702
316	NO 6	„	„	„	ca. 2. II	Florö district		1			ca. 329
317	NO 7	„	„	„	11. III	Brandasund		1			366

Appendix II (cont.). *Records of Returns*

5th Experiment. Norway 1950 (cont.).

LIBERATED					RETURNED						Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring	
318	NO 7	10. III	Vespestadvågen	P	26.–27. I	Florö district				1	ca. 687
319	„	„	„	„	bef. 13. II	Urter or Söröyene				1	max. 733
320	NO 8	„	„	„	27. I	Stadt		1			323
321	„	„	„	„	22.–27. I	Runde — Stadt		1			ca. 320
322	NO 10	11. III	„	„	ca. 13. II	Florö district				1	ca. 704
323	„	„	„	„	17. III	Klettagrunn				1	737
324	NP 1	14. III	„	„	ca. 20. II	Ålesund district		1			ca. 343
325	NP 3	„	„	„	26.–27. VII	Melrakkaslétta			1		ca. 499
326	NP 4	„	„	„	ca. 1. III	Urter — Rövær				1	ca. 718
327	NP 6	16. III	„	„	26. I	Svinöy district		1			316
328	NP 9	„	„	„	2. or 15. II	Svinöy or Bueland				1	688/701
329	NR 2	18. III	„	„	3.–6. III	Haugesund district		1			ca. 352
330	NR 6	20. III	„	„	bef. 5. III	Urter or Bokn				1	max. 716
331	NR 7	„	„	„	22.–27. I	Runde — Stadt		1			ca. 310

6th Experiment. Open Ocean 1950.

332	NS 7	19. VII	NL 64° 48′	1	bef. 27. II	Runde — Stadt		1			max. 233
333	„	„	WL 09° 02′	„	26. VII	20 n.m. N Hraunhafnart.			1		372
334	„	„	„	„	bef. 16. II	Målöy district				1	max. 587
335	NS 8	„	„	„	ca. 1. II	Runde — Svinöy		1			ca. 206
336	„	„	„	„	10. II	Målöy district?				1	581

7th Experiment. Iceland 1950.

337	F 4	3. VIII	Svínalækjartangi	2	3.–6. VIII	Langanes	1				max. 3
338	„	„	„	„	3.–6. VIII	Langanes	1				max. 3
339	„	„	„	„	ca. 20. VII	Slétta			1		ca. 351
340	„	„	„	„	bef. 12. II	Fjellberg Bruk A/S				1	max. 558

Appendix II (cont.). *Records of Returns*

7th Experiment. Iceland 1950 (cont.).

LIBERATED					RETURNED						Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring	
341	F 5	3. VIII	Svínalækjartangi	2	3.–6. VIII	Langanes	1				max. 3
342	„	„	„	„	ca. 27. I	Runde — Svinöy		1			ca. 178
343	„	„	„	„	1. II	Stadt		1			183
344	„	„	„	„	primo II	Storesund Sildoljef.		1			ca. 183
345	„	„	„	„	bef. 19. II	Målöy district		1			max. 202
346	„	„	„	„	bef. 3. II	Bjelland & Co.		1			max. 185
347	„	„	„	„	16. VII	40 n.m. NE Grímsey			1		347
348	„	„	„	„	16. VII	40 n.m. NE Grímsey			1		347
349	„	„	„	„	27.–31. VII	Slétta or Kjölsenbanki			1		ca. 360
350	„	„	„	„	1.–10. II	Målöy district				1	ca. 553
351	„	„	„	„	12.–13. II	Ålesund district				1	ca. 560
352	„	„	„	„	ca. 12. II	Målöy district				1	ca. 560
353	F 6	„	„	„	23. I	Runde				1	538
354	„	„	„	„	29. I	Stadt — Svinöy		1			180
355	„	„	„	„	8. II	Kråkenes		1			190
356	„	„	„	„	17. III	Klettagrunn				1	593
357	F 7	13. VII	Mánáreyjar	3	24. II	Runde district		1			195
358	„	„	„	„	8.–9. III	Espevær — Skudesnes		1			ca. 208
359	„	„	„	„	17.–19. VII	Grímsey			1		ca. 337
360	„	„	„	„	3.–5. VIII	Langanes or Digranes			1		ca. 356
361	„	„	„	„	2.–4. VIII	Digranes			1		ca. 355
362	„	„	„	„	14.–16. VIII	Glettinganes (offshore)			1		ca. 367
363	„	„	„	„	22. I	Runde — Svinöy				1	527
364	„	„	„	„	20. I	Runde district				1	525
365	„	„	„	„	bef. 8. II	Fjellberg Bruk A/S				1	max. 544
366	„	„	„	„	bef. 29. II	Lorenz Nilssen A/S				1	max. 565
367	„	„	„	„	16. III	Egersund district				1	581
368	F 8	„	„	„	26.–27. I	Florö district				1	ca. 531
369	„	„	„	„	ca. 27 II	Ålesund district		1			ca. 198
370	„	„	„	„	20. VII	Slétta			1		341
371	„	„	„	„	22.–24. VII	Slétta			1		ca. 344

Appendix II (cont.). *Records of Returns*

7th Experiment. Iceland 1950 (cont.).

LIBERATED					RETURNED							Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950	1951		1952		
							Summer	Spring	Summer	Spring		
372	F 8	13. VII	Mánáreyjar	3	4.–6. VIII	Digranes			1			ca. 357
373	„	„	„	„	13. II	Stadt				1		549
374	„	„	„	„	15. III	Klettagrunn				1		580

8th Experiment (A). Norway 1951.

375	NU 5	20. I	Norddalsfjord	4	20.–24. I	Ålesund district				1		ca. 367
376	NU 7	„	„	„	27.–29. II	Olderveggen				1		ca. 404
377	NU 8	„	„	„	ca. 3. III	Karmöy		1				ca. 42
378	„	„	„	„	5. II	Runde — Svinöy				1		381
379	NU 9	19. I	„	„	medio II	Målöy district		1				ca. 26
380–381	NS 9	21. I	„	„	? I	Norddalsfjord		2				
382–410	NT 9	23. I	„	„	„	„		29				
411–450	NT 10	„	„	„	„	„		40				
451	NU 2	21. I	„	„	„	„		1				
452–454	NU 3	„	„	„	„	„		3				
455–460	NU 4	„	„	„	„	„		6				
461–468	NU 5	20. I	„	„	„	„		8				
469–475	NU 6	„	„	„	„	„		7				
476–495	NU 7	„	„	„	„	„		20				
496–501	NU 8	„	„	„	„	„		6				
502–509	NU 9	19. I	„	„	„	„		8				
510–521	NU 10	„	„	„	„	„		12				
522–553	NV 5	23. I	„	„	„	„		32				
554–589	NV 6	„	„	„	„	„		36				
590–622	NV 7	„	„	„	„	„		33				
623–655	NV 8	„	„	„	„	„		33				
656–701	NV 9	„	„	„	„	„		46				

Appendix II (cont.). *Records of Returns*

8th Experiment (B). Norway 1951.

LIBERATED					RETURNED							Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950	1951		1952		
							Summer	Spring	Summer	Spring		
702	NV 10	30. I	Kjelnesvik	5	30. I	Olderveggen		1				0
703	„	„	„	„	10. II	Kvalheimsvik		1				11
704	„	„	„	„	ca. 18. II	Florö or Ålesund		1				ca. 19
705	„	„	„	„	13.–14. II	Målöy district				1		ca. 379
706	„	„	„	„	bef. 15. III	Fröysjöen?				1		max. 410
707	NW 1	„	„	„	ult. I	Målöy district		1				max. 1
708	„	„	„	„	ca. 15. II	Runde — Svinöy		1				ca. 16
709	„	„	„	„	5.–8. VIII	Digranesflak			1			ca. 189
710	„	„	„	„	26. I	Ålesund district				1		361
711	„	„	„	„	30. I	Stadt				1		366
712	NW 2	„	„	„	19. I	Ca. 80 n.m. W Stadt				1		354
713	„	„	„	„	26.–27. I	Florö district				1		ca. 361
714	„	„	„	„	14.–15. II	Målöy district				1		ca. 380
715	„	„	„	„	ca. 19. II	Utsira district				1		ca. 385
716	„	„	„	„	29. II	15 n.m. NW Runde				1		395
717	„	„	„	„	ca. 9. III	Urter				1		ca. 404
718	NW 3	31. I	„	„	17. II	Kråkenes		1				17
719	„	„	„	„	30. I	Stadt				1		365
720	NW 4	„	„	„	medio II	Svinöy — Runde				1		ca. 380
721	NW 5	„	„	„	primo I	Storesund Sildoljef.		1				?
722	„	„	„	„	16. II	Stadt		1				16
723	„	„	„	„	bef. 6. III	Fjellberg Bruk A/S		1				max. 34
724	NW 7	„	„	„	ca. 3. III	Karmöy		1				ca. 31
725	NX 1	1. II	„	„	7. II	Stadt		1				6
726	„	„	„	„	medio II	Storesund Sildoljef.		1				14
727	„	„	„	„	28. I	Svinöy				1		362
728	NX 2	„	„	„	bef. 10. III	Gerh. Voldnes A/S		1				max. 38
729	„	„	„	„	bef. 13. III	Moksheim Sildoljef.		1				max. 41
730	„	„	„	„	ca. 31. I	Ålesund district				1		ca. 366
731	„	„	„	„	27. I	Svinöy — Runde				1		360
732	„	„	„	„	ca. 3. III	Rövær — Urter				1		ca. 396

Appendix II (cont.). *Records of Returns*

8th Experiment (B). Norway 1951 (cont.).

LIBERATED					RETURNED							Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring		
733	NX 4	I. II	Kjelnesvik	5	bef. 23. II	Runde — Stadt		1				max. 22
734	„	„	„	„	6. II	Målöy district				1		370
735	NX 5	„	„	„	ca. 24. I	Runde				1		358
736	NX 6	„	„	„	ca. 1. III	Haugesund district		1				ca. 29
737	NX 7	2. II	„	„	13. II	Stadt				1		376
738	NX 8	„	„	„	ca. 10. II	Svinöy — Runde				1		ca. 373
739	„	„	„	„	ca. 23. II	Urter				1		ca. 386
740	NX 10	6. II	Lotra	6	ca. 7. II	Florö — Målöy		1				ca. 1
741	NZ 1	„	„	„	ca. 14. II	Florö — Målöy		1				ca. 8
742	„	„	„	„	medio II	Målöy district		1				ca. 8
743	„	„	„	„	27. II	Runde district		1				21
744	NZ 2	„	„	„	bef. 23. II	S.F. Horsöy		1				max. 17
745	„	„	„	„	bef. 6. III	Fjellberg Bruk A/S		1				max. 28
746	„	„	„	„	15. II/9. III	Kråkenes or Stolmen		1				9 or 31
747	„	„	„	„	bef. 9. III	S.F. Horsöy		1				max. 31
748	„	„	„	„	15. II	Kråkenes		1				9
749	„	„	„	„	bef. 2. IV	Kopervik Sildoljef.		1				max. 55
750	NZ 3	„	„	„	ca. 8. II	Florö — Målöy		1				ca. 2
751	„	„	„	„	1. III	Espevær		1				23
752	„	„	„	„	27. II	Romsdal district		1				21
753	„	„	„	„	bef. 6. III	Storesund Sildoljef.		1				max. 28

9th Experiment. Norway 1951.

754	Na 1	29. III	Rugsundet	7	24. I	Runde district				1		302
755	Na 2	„	„	„	bef. 9. IV	Oslo		1				max. 11
756	„	„	„	„	27. II	Bokn				1		335
757	„	„	„	„	7. III	Rövær — Åkra				1		344
758	Na 3	30. III	„	„	7. III	Rövær				1		343
759	„	„	„	„	10. III	Rövær — Åkra				1		346

Appendix II (cont.). *Records of Returns*

9th Experiment. Norway 1951 (cont.).

LIBERATED					RETURNED							Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring		
760	Na 4	30. III	Rugsundet	7	26. I–2. II	Florö — Målöy				1		306
761	Na 5	31. III	„	„	ca. 4. III	Karmöy				1		ca. 339
762	„	„	„	„	ca. 8. III	Urter				1		ca. 343
763	Na 6	„	„	„	bef. 26. III	Urter — Söröyene				1		max. 361
764	Na 7	„	„	„	30. I	Runde district				1		305
765	„	„	„	„	29. II	Skudesnes				1		335
766	„	„	„	„	1. III	Urter — Skudesnes				1		336
767	„	„	„	„	ca. 8. III	Rövær				1		343
768	Na 8	„	„	„	26. I	Storesund Sildoljef.				1		301
769	„	„	„	„	7.–9. III	Rövær				1		ca. 343
770	Na 9	„	„	„	25. II	Skudefjord				1		331
771	„	„	„	„	ca. 4. III	Rövær — Urter				1		ca. 339
772	Na 10	„	„	„	primo III	Karmöy — Bokn				1		ca. 350
773	Nb 1	3. IV	„	„	10. III	Espevær				1		342
774	„	„	„	„	bef. 12. III	Urter				1		max. 345
775	Nb 2	„	„	„	21. I	Runde district				1		293
776	„	„	„	„	medio II	Fjellberg Bruk A/S				1		ca. 317
777	„	„	„	„	ca. 22 .II	Urter				1		ca. 330
778	Nb 4	11. IV	„	„	10. II–28. II	Målöy or Rövær				1		305/324
779	Nb 5	3. IV	„	„	ca. 10. II	Målöy district				1		ca. 330
780	Nb 6	„	„	„	15. –16. II	Fröysjöen				1		ca. 348
781	„	„	„	„	ca. 27. II	Urter				1		ca. 330
782	„	„	„	„	ca. 4. III	Rövær — Urter				1		ca. 335
783	Nb 7	4. IV	„	„	5. III	Rövær				1		336
784	„	„	„	„	15. –16. III	Fröysjöen				1		347
785	Nb 8	„	„	„	15. III	Egersund district				1		340
786	Nb 9	„	„	„	ca. 27 II	Urter				1		329
787	Np 1	5. IV	„	„	30. I	Stadt				1		301
788	Np 2	„	„	„	ca. 27. II	Urter				1		ca. 328
789	„	„	„	„	ca. 28.II	Urter				1		ca. 329
790	„	„	„	„	primo III	Karmöy — Bokn				1		ca. 345

Appendix II (cont.). *Records of Returns*

9th Experiment. Norway 1951 (cont.).

LIBERATED					RETURNED							Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950	1951		1952		
							Summer	Spring	Summer	Spring		
791	Np 3	5. IV	Rugsundet	7	28. I	Runde district				1		ca. 298
792	„	„	„	„	1. III	Ferkingstad				1		331
793	„	„	„	„	27. III	Vanylvsgapet				1		357
794	„	„	„	„	primo III	Karmöy — Bokn				1		ca. 345
795	Np 4	„	„	„	bef. 1. III	Urter				1		max. 330
796	„	„	„	„	ca. 3. III	Rövær — Urter				1		ca. 333
797	„	„	„	„	17. III	Egersund district				1		347
798	„	„	„	„	18. III	Klettagrunn						343
799	Np 5	„	„	„	ca. 1. II	Storesund Sildoljef.				1		ca. 302
800	„	„	„	„	ca. 10. II	Målöy district				1		ca. 311
801	Np 5	5. IV	„	„	Ult. II	Runde district?				1		ca. 326
802	Np 6	6. IV	„	„	ca. 28. II	Urter				1		ca. 330
803	Np 7	„	„	„	bef. 4. III	Urter or Bokn				1		max. 333
804	„	„	„	„	ca. 8. III	Rövær				1		ca. 337
805	„	„	„	„	bef. 10. III	Urter?				1		max. 339
806	Np 9	„	„	„	ca. 1. III	Urter				1		ca. 330
807	„	„	„	„	ca. 6. III	Urter				1		ca. 335
808	Np 10	„	„	„	ca. 27. II	Urter				1		ca. 329
809	Ns 1	„	„	„	bef. 13. III	Urter — Söröy				1		max. 342
810	Ns 2	„	„	„	ca. 7. II	Möre				1		ca. 307
811	Ns 3	„	„	„	28. II	Rövær				1		328
812	„	„	„	„	5.–6. III	Åkra				1		ca. 345
813	Ns 4	7. IV	„	„	19. I	80 n.m. NW Svinöy				1		378
814	„	„	„	„	ca. 22. II	Urter				1		ca. 321
815	Ns 6	9. IV	„	„	ca. 18. II	Stadt				1		ca. 315
816	„	„	„	„	27. II	Urter — Sve				1		324
817	„	„	„	„	27. II	Sovlandsvik				1		324
818	„	„	„	„	27. III	Vannylvsgapet				1		353
819	Ns 7	„	„	„	ca. 14. II	Florö district				1		311
820	„	„	„	„	ca. 25. II	Bokn				1		ca. 322
821	„	„	„	„	primo IV	Vanylvsgapet				1		ca. 360

Appendix II (cont.). *Records of Returns*

9th Experiment. Norway 1951 (cont.).

LIBERATED					RETURNED							Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950	1951		1952		
							Summer	Spring	Summer	Spring		
822	Ns 8	9. IV	Rugsundet	7	27. II	Bokn				1		324
823	„	„	„	„	1. III	Ferkingstad				1		327
824	„	„	„	„	10.–11. III	Söröyene				1		337
825	„	„	„	„	7. IV	Kvitnes				1		364
826	„	„	„	„	24. IV	Vartdal				1		381
827	„	„	„	„	21. V	Bremnes		1				42

10th Experiment. Open Ocean 1951.

828	NU 1	28. VI	NL 63° 43′	8	25.–26. I	Runde district				1		ca. 212
829	„	„	WL 02° 52′	„	5. II	Målöy district				1		222
830	NU 2	„	„	„	20.–24. I	Storesund Sildoljef.				1		ca. 209
831	„	„	„	„	29. IV	Böfjorden				1		305
832	„	„	„	„	13. II	Runde district				1		230
833	NU 3	„	„	„	20. I	Runde district				1		206
834	„	„	„	„	30. I	Stadt				1		216
835	„	„	„	„	6. II	Målöy district				1		223
836	NU 4	15. VIII	NL 66° 07′	9	24. I	Ålesund district				1		162
837	„	„	WL 10° 25′	„	30. I	Stadt				1		168
838	„	„	„	„	26.–27. II	Rövær				1		195
839	NU 5	28. VI	NL 63° 43′	8	ca. 28. I	Svinöy				1		ca. 214
840	„	„	WL 02° 52′	„	27. I	Svinöy — Runde				1		213
841	NU 6	„	„	„	19. I	45 n.m. NW Runde				1		205
842	„	„	„	„	25. I					1		211
843	„	„	„	„	ca. 3. III	Rövær — Urter				1		ca. 249
844	„	„	„	„	1.–10. II	Målöy district?				1		ca. 222
845	„	„	„	„	medio II	Svinöy — Runde				1		ca. 231
846	NU 7	„	„	„	ca. 25. I	Ålesund district				1		ca. 211
847	„	„	„	„	13. II	Klovningen				1		230
848	„	„	„	„	medio II	Kvalheimsvik?				1		ca. 231

Appendix II (cont.). *Records of Returns*

10th Experiment. Open Ocean 1951 (cont.).

LIBERATED					RETURNED						Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring	
849	NU 7	28. VI	NL 63° 43′	8	26. II	Bokn				1	243
850	„	„	WL 02° 52′	„	7.–9. III	Røvær				1	ca. 254
851	NU 10	16. VIII	NL 66° 07′	9	19. I	50 n.m. NW Runde				1	157
852	„	„	WL 10° 25′	„	1.–10. II	Målöy district?				1	ca. 174
853	„	„	„	„	3. III	15 n.m. NW Svinöy				1	201
854	Nx 1	„	„	„	22. I	Runde district				1	160
855	„	„	„	„	bef. 15. II	Karmöens Sildoljef.				1	max. 184
11th Experiment. Iceland 1951.											
856	IA 1	23. VII	Kjölsenbanki	10	ca. 14. II	Florö district				1	ca. 206
857	„	„	„	„	? 22. III	Svinöy district				1	? 243
858	IA 2	„	„	„	25. VIII	100 n.m. NE Langanes			1		33
859	„	„	„	„	28.–30. VIII	Kjölsenbanki			1		ca. 6
860	„	„	„	„	2. II	Stadt				1	194
861	IA 3	30. VII	Rifstangi	11	bef. 21. II	Svinöy — Runde				1	max. 206
862	IA 4	„	„	„	14. II	Runde district				1	199
863	„	„	„	„	bef. 6. III	S.F. Horsöy				1	max. 220
864	IA 5	„	Hraunhafnartangi	12	ca. 24. I	Vonnylvsgapet				1	ca. 178
865	„	„	„	„	22. II	Røvær — Sve				1	207
866	IA 6	„	Rifstangi	11	4.–6. VIII	Digranes			1		ca. 6
867	„	„	Hraunhafnartangi	12	ca. 28. I	Svinöy district				1	181
868	„	„	Rifstangi	11	ca. 31. I	Ålesund district				1	184
869	„	„	„	„	2.–6. II	Målöy district				1	ca. 188
870	„	„	Hraunhafnartangi	12	ca. 10. II	Målöy district				1	ca. 195
871	„	„	„	„	13. II	Stadt				1	198
872	IA 7	„	„	„	5.–6. II	Ålesund district				1	ca. 190
873	„	„	„	„	ca. 12. II	Storesund Sildoljef.				1	197
874	IA 8	2. VIII	Digranes	13	15.–16. VIII	60 n.m. NE Langanes			1		18
875	„	„	„	„	23. VIII	60 n.m. NE Langanes			1		21

Appendix II (cont.). *Records of Returns*

11th Experiment. Iceland 1951 (cont.).

LIBERATED					RETURNED						Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950 Summer	1951 Spring	1951 Summer	1952 Spring	
876	IA 8	2. VIII	Digranes	13	ca. 20. I	Ålesund district				1	ca. 171
877	„	„	„	„	23. I	Runde district				1	174
878	„	„	„	„	29. III	Vanylvsgapet				1	240
879	IA 9	„	„	„	2.–3. VIII	Digranesflak			1		max. 1
880	„	„	„	„	1. II/14. II	Eltvik or Bremanger				1	184/197
881	„	„	„	„	bef. 28. II	Fjellberg Bruk A/S				1	max. 210
882	IA 10	„	„	„	8.–10. VIII	Digranes or Vopnafj.			1		ca. 7
883	„	„	„	„	28. I	Svinöy — Runde				1	179
884	„	„	„	„	5.–6. II	Stadt				1	ca. 187
885	„	„	„	„	12. II	Runde district				1	194
886	„	„	„	„	15. II	Målöy district				1	197
887	IB 1	5. VIII	Kollumúli	14	bef. 27. I	Clupea A/S				1	max. 175
888	„	2. VIII	Digranes	13	2. II/15. II	Svinöy or Bueland				1	184/197
889	„	5. VIII	Kollumúli	14	bef. 9. II	Haugesunds Sildoljef.				1	max. 188
890	IB 2	„	„	„	21. I	Stadt — Svinöy				1	169
891	„	„	„	„	ca. 13. II	Florö district				1	ca. 192
12th Experiment. Norway 1952.											
892	Nx 2	1. II	Bremanger	15	2. II	Stadtlandet				1	1
893	„	„	„	„	17. II	Kråkenes				1	16
894	„	„	„	„	bef. 13. III	Målöy — Florö?				1	max. 41
895	„	„	„	„	bef. 13. III	Målöy — Florö?				1	41
896	„	„	„	„	bef. 13. III	Målöy — Florö?				1	41
897	„	„	„	„	bef. 13. III	Målöy — Florö?				1	41
898	„	„	„	„	bef. 15. III	Målöy — Florö?				1	43
899	„	„	„	„	medio II	Svinöy — Runde				1	ca. 15
900	„	„	„	„	? 15.–16. III	Fröysjöen				1	ca. 44
901	„	„	„	„	29. IV	Vanylven				1	88
902	Nx 4	7. II	Borgundvåg	16	ca. 19. II	Utsira				1	ca. 12

Appendix II (cont.). *Records of Returns*

12th Experiment. Norway 1952 (cont.).

LIBERATED					RETURNED						Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950	1951		1952	
							Summer	Spring	Summer	Spring	
903	Nx 4	7. II	Borgundvåg	16	bef. 23. II	Eggesbönes Sildoljef.				1	max. 16
904	Nx 5	„	„	„	12.–13. II	Ålesund district				1	ca. 5
905	„	„	„	„	1. III	Skudesnes				1	23
906	Nx 7	10 II	„	„	primo II	Stadt				1	?
907	„	„	„	„	ca. 15. II	Möre				1	5
908	„	„	„	„	bef. 21. II	Haugesunds Sildoljef.				1	11
909	Nx 8	„	„	„	bef. 21. II	Runde district				1	11
910	Nx 9	„	„	„	13. II	Stadt				1	3
911	„	„	„	„	medio II	Svinöy — Runde				1	ca. 5
912	„	„	„	„	bef. 26. II	Runde				1	max. 16
913	Nx 10	11. II	„	„	1. III	Skudesnes				1	19
914	Nx 10	11. II	„	„	29. IV	Vanylven				1	78
915	NZ 4	„	„	„	23. II	Runde district				1	12
916	NZ 5	„	„	„	bef. 23. II	Runde district				1	max. 12
917	„	„	„	„	bef. 29. II	Stadt				1	max. 18
918	„	„	„	„	bef. 22. II	Stadt				1	max. 11
919	NZ 6	„	„	„	bef. 26. II	Runde district				1	max 15
920	„	„	„	„	bef. 22. II	Stadt				1	max. 11
921	NZ 7	„	„	„	medio II	Svinöy — Runde				1	ca. 4
922	NZ 8	„	„	„	bef. 20. II	Stadt				1	max. 9
923	NZ 9	„	„	„	bef. 23. II	Runde district				1	max. 12
924	NZ 10	10. II	„	„	bef. 21. II	Stadt				1	max. 11
925	„	„	„	„	ca. 10. II	Möre				1	0
926	„	„	„	„	14. II	Svinöy — Runde				1	4
927	„	„	„	„	4. III	20 n.m. NW Svinöy				1	23
928	NU 9	11. II	„	„	11. II	Möre				1	0
929	„	„	„	„	ca. 12. II	Möre				1	ca. 1
930	N 115	13. II	„	„	medio II	Svinöy — Runde				1	ca. 2
931	N 491	„	„	„	13. II	Stadt				1	0
932	N 921	„	„	„	13. II	Stadt				1	0
933	N 928	„	„	„	medio II	Svinöy — Runde				1	ca. 2

Appendix II (cont.). *Records of Returns*

12th Experiment. Norway 1952 (cont.).

LIBERATED					RETURNED						Nos. of days at liberty
Recap. No.	Series	Date	Place	Ref.	Date	Place	1950	1951		1952	
							Summer	Spring	Summer	Spring	
934	N 1006	13. III	Borgundvåg	16	13. II	Ålesund district				1	0
935	N 1466	„	„	„	bef. 22. II	Haugesunds Sildoljef.				1	max. 9
936	N 1936	„	„	„	bef. 20. III	Målöy — Florö				1	max. 36
937	N 2387	„	„	„	13. II	Stadt				1	0
938	N 2787	„	„	„	bef. 23. II	Stadt				1	max. 10
939	N 2977	„	„	„	14. II	Svinöy — Runde				1	1
940	N 2992	„	„	„	bef. 23. II	Stadt				1	max. 10
941	N 3121	„	„	„	bef. 1. III	Runde				1	max. 17
942	N 3301	„	„	„	bef. 26. II	Haugsholmens Sildoljef.				1	max. 13
943	N 3445	„	„	„	13. II	Stadt				1	0
944	N 3449	„	„	„	22. II	Runde district				1	9
945	N 3454	„	„	„	bef. 23. II	Stadt				1	10
946	N 3690	„	„	„	22. II	Haugesund district				1	16
947	N 4040	„	„	„	bef. 23. II	Stadt				1	max. 10
948	N 4420	14. II	„	„	14. II	Vanylvsgapet				1	0
949	N 4934	„	„	„	3. III	Mögster				1	18

13th Experiment. Norway 1952.

950	N 6528	31. III	Sörvik	17	bef. 21. V	Fjellberg Bruk A/S				1	max. 51
951	N 7090	3. IV	„	„	25. IV	Stolmen				1	22
952	N 8447	„	„	„	6. V	Hordabö				1	33
953	N 8931	„	„	„	19. V	Solund				1	46
954	N 9081	„	„	„	12. V	Rognevær				1	39
955	N 10576	4. IV	„	„	6. V	Solund				1	32
956	N 17482	18. IV	„	„	bef. 20. V	Fjellberg Bruk A/S				1	max. 32

Supplement 1 to Appendix II[1])

LIBERATED				RETURNED					Nos. of days at liberty
Series	*Date*	*Place*	*Ref.*	*Date*	*Place*	*1951* Spring	*1952* Spring	*1952* Summer	
		3rd Experiment		*Norway 1949*					
NH 4	9. IV	Trosnavåg	J	31. V	Stord Sildoljef.		1		max. 1183
		5th Experiment		*Norway 1950*					
NP 7	16. III	Vespestadvågen	P	ca. 16. V	*Ca. NL 57° 20′ EL 02° 50′	1			ca. 426
		8th Experiment		*Norway 1951*					
Nb 10	4. IV	Rugsundet		3. IV	*NL 58° 00′ EL 11° 22′		1		365
		12th Experiment		*Norway 1952*					
NZ 10	10. II	Borgundvågen		28. V	*Sande		1		108
		13th Experiment		*Norway 1952*					
N 8584	3. IV	Sørvik, Stolmen		24. VI	*Storesund, Fjell			1	82
N 9427	„ „	„ „		„ „	* „ „			1	82
N 10173	4. IV	„ „		26. VI	Solund or Kinn			1	83
N 10350	„ „	„ „		„ „	*Solund			1	83
N 14083	8. IV	„ „			Turøy				
N 14708	16. IV	„ „		24., 27. or 28. V	Between 59°40′ and 60°35′ N Lat. and between E-Coast of Shetland and 0°30′ W Long.			1	max. 41
N 16401	18. IV	„ „		31. V	*Stord Sildoljef.		1		max. 43

1) The returns recorded in the supplements are not included in the text-tables.

Supplement 2 to Appendix II. *Recaptures of doubly- and externally tagged herrings.*

LIBERATED					RETURNED			
Serial Number		*Date and year*	*Place*	*Ref.*	*Date and year*	*Place*	*Nos. of days at liberty*	*Remarks*
External	*Internal*							
Lea 1147		6. IV '51	Rugsundet		9. VIII '51	NL 59° 10′ EL 00° 30′	125	Quick fastening
„ 1152		„ „ „	„		2. V '51	NL 59° 25′ EL 03° 25′	26	„ „
„ 1452		11. IV '51	„		18. V '51	Fensfjorden	42	Ordinary fastening
Lea N9		4. IV '52	Sörvik		9. V '52	Austevoll	35	„ „
„ N10		3. IV '52	„		16. IV '52	Solund	13	„ „
„ N124	N6774	„ „ „	„		15. IV '52	Fjell	12	„ „
„ N304		5. IV '52	„		10. V '52	5′ W t S Skarvøy	36	„ „
„ N446	N12741	7. IV '52	„		15. IV '52	Fjell	8	„ „
„ N557	N13351	8. IV '52	„		2. V '52	22′ NNW Røvær	22	„ „
„ N622	N14192	16. IV '52	„		13. V '52	200′ E Aberdeen	27	„ „
„ N638	N15456	„ „ „	„		9. V '52	7′ W Slotterøy	23	„ „
„ N725	N14808	„ „ „	„		17. IV '52	Fugløy	1	„ „
„ N809	N15586	17. IV '52	„		25. IV '52	Sørvik	8	„ „
„ N836	N15719	„ „ „	„		30. VI '52	22′ NNW Hirtshals	74	„ „
„ N1060	N17227	„ „ „	„		13. VI '52	NL 58° 58′ EL 01° 00,5′	56	„ „

CONTENTS