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MARKING EXPERIMENTS WITH PLAICE AND LEMON SOLES

AT THE FÆROES IN 1910–1912

BY

A. C. STRUBBERG

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I. Introduction.

A. General Remarks.

Following on the report published 1916 concerning marking experiments with cod at the Færoes in 1909—13 (16), the present account of marking experiments with plaice and lemon sole in the same waters, during the years 1910—12, is now issued. All the experiments were carried out by the Danish institution "Kommissionen for Havundersøgelser".

The experiments of 1910 and 1912 were made in early summer; those of 1911 in late summer, comprising abt. 1200 plaice (*Pl. platessa*) and abt. 400 lemon soles (*Pl. microcephalus*). All of these last, and abt. 700 of the plaice, were captured, marked and liberated in Vestmanhavn in Strømø. Of the remainder, some (abt. 300) were transplanted from Vestmanhavn to a point off the west end of Vestmansund; others (abt. 200), caught and liberated farther to the north, at and off the north end of the sound between Strømø and Østerø. The following table shows the exact numbers marked.

Table 1. Number of each species liberated.

Year and month of liberation	Ordinary Marking Experiments with		Transplanted Plaice
	Plaice	Lemon Sole	
1910 May	498	200	—
1911 Aug.—Sept.	45	184	—
1912 May—June	167 + 200	—	301
Total..	910	384	301

B. The mark, and how affixed.

In all the experiments, both for plaice and lemon soles, marks of the same type were used, viz. two bone buttons with bronze numeral plate connected with a silver wire, the so-called "Danish Type 1908" (16). The mark is affixed close under the middle of the dorsal fin, with the silver wire thrust in between the interspinal bones (15 a). Experience has shown that these marks, when used for plaice, are far more durable than marks of the same type affixed to cod. This is presumably due to the fact that with cod, the mark is so placed that the water from the gill-openings is constantly washing over the bone and bronze, and affects the materials to some extent, which is not the case with the plaice. Another point which may in some way impair the durability is that the cod are in constant movement, so that the mark is continually exposed to further action of the water, whereas the movements of the plaice are far less violent and less extensive. — Apart from this, the structure of the bone used for the marks, as well as the thickness of the bronze and the depth of the lettering cut in the plate, are all of the highest importance as regards the durability of the mark as a whole. Slight differences in these respects between the various series of marks can therefore count for much in the long run.

C. Treatment of the fish before and after marking.

Both plaice and lemon soles were taken in an eel hand-seine drawn either to the shore, or, (in 1910) to a ship at less than 20 metres depth. In some few cases where the fish were not marked at once,

the catch was preserved in a well-boat until wanted. Most of the markings — over half the number — were made by the Captain of the "Thor", Capt. G. HANSEN, working from a hired vessel; the remainder were carried out on board the "Thor" during the stay in Vestmanhavn from the 17th to the 21st May 1910.

As in the case of most of the cod experiments, so also here, the weight (in gr.) and length of all marked fish were noted. The sex also, was noted for all plaice marked.

D. Shrinkage after capture.

A certain amount of shrinkage, apparent both in length and weight, always takes place between recapture and subsequent measurement. In the great majority of cases, the loss in length is so very slight — less than 0.5 cm — that we have disregarded this entirely. Only where it is specially noted that the fish had become dry, or had suffered damage, etc. is the stated length corrected (see lists, and 11 e). — Loss in weight is likewise disregarded in the case of fish taken by Danish or Færoese fishermen and measured whole immediately after. It is otherwise with the large numbers of plaice[1] recaptured and reported by foreign fishermen. In most of these cases, the fish arrive at the office (generally the Board of Agriculture and Fisheries, London) iced and gutted, and not until 10—20 days after their recapture. Only in the very rare cases where weight (and length) of the entire, undamaged fish is stated have we disregarded shrinkage. In all other cases, we have endeavoured to correct the weights given.

In the English marking experiments BORLEY (1 a, p. 20) calculates weight (W) of the recaptured plaice from the stated length (l) by the formula[2]: $W = \frac{l^3}{100} K$, where K is a constant, the length and weight coefficient (coefficient of "condition") varying with the season and region, $\lessgtr 1$. Thus in the southern North Sea, for instance, with the Dogger Bank, the value of K is indicated as fluctuating from 0.89 to 1.17 (1 a, pp. 19 and 20), or about 1.00 February—May, 1.09—1.13 June—December chiefly for sizes < 40 cm (19 p. 26), likewise in the eastern North Sea (11 b, p. 58).

For our present purposes, I have in the first place attempted a determination of K given below for the Færoe waters, and further, endeavoured directly to measure the shrinkage occasioned by gutting and subsequent storage (icing) of the plaice.

The measurements were carried out in May 1910 on board the "Thor" and in the winter 1910—11 on the Inspection vessel; all the remainder by Capt. G. HANSEN, of the "Thor". In calculating K we have throughout reckoned with a "mean length" of 20.5, 21.5, 22.5 cm etc.

Disregarding the sizes most poorly represented, especially those below 20 cm with the often very high values for K, we find (see Table 2) that in all four samples, K in the Vestmanhavn plaice is as a rule $>$ or $= 1.20$, only in a few cases < 1.18 (to abt. 1.13). It further seems, that the conditions of nourishment in summer (June—July 1912) must be particularly favourable for the younger fish (< 25 cm) where K is > 1.22, while for sizes 25—45 cm it lies between abt. 1.18 and 1.20 inclusive. The plaice of Vaag and Ejde appear to thrive still better, K being here abt. 1.30 in over half the cases, and > 1.23 in most of the remainder.

At the Færoes then, we must in all above cases reckon with a higher value for K, than that arrived at in the cited investigations (1 a, 11 b and 19). It is practically only in fish > 40 cm, measured in the eastern North Sea (11 b) and in Area D 2 of the northern North Sea (1 b, p. 86), that we find in late summer similar conditions to most of those from the Færoe waters, *viz.* a coefficient of abt. 1.10—1.20— > 1.28.

With the great fluctuations in K apparent from the above, it will be understood that we do not as yet know enough to give any reliable mean value for this applicable to the Færoe waters as a

[1] No marked *lemon sole* was recaptured by the foreign fishery.

[2] First noted by D'ARCY THOMPSON (HEINCKE, in Die Beteiligung Deutschlands an der internationalen Meeresforschung, IV/V Jahresbericht, Berlin 1908).

whole, and trace its variations with season, area and size. The question might well be taken up by future investigations. For the present, at any rate, we cannot as BORLEY did by means of *K* correct the stated weights of recaptured fish.

The attempts at direct correction for shrinkage are shown in the Table 3 below, where all requisite information is given.

A striking feature, though easily understood, is the fact that the weight of the gut, etc. in the freshly-caught Færoe fish makes up abt. 8—10 % of the total weight, while in the half-starved fish landed in Copenhagen, from the well-boats, the proportion is only abt. 4—6.5 %. The shrinkage for the ten-hour period is inconsiderable, abt. 1—2 %; it is otherwise, however, after the lapse of the longer time when the fish have been iced. In the course of these 21 days, the fish have lost nearly as much in weight (abt. 7—10 %) as the freshly-caught Færoe fish lose by gutting.

Table 2. Value of K, the index of condition of plaice from different localities at the Færoes.

Length in cm	Value of *K*						No. of specimens					
	Vestmanhavn				Vaag June 1912	Ejde June 1912	Vestmanhavn				Vaag June 1912	Ejde June 1912
	Febr. 1911	May 1910	June 1912	July 1912			Febr. 1911	May 1910	June 1912	July 1912		
11	..	..	..	1.31	..	..	..	..	..	1	..	..
12	..	..	..	1.24	..	..	..	..	..	6	..	..
13	..	..	1.63	1.22	..	..	..	..	1	1	..	..
14	..	..	..	1.34	..	..	..	..	..	6	..	..
15	..	..	..	1.14	1.66	..	..	..	..	4	3	..
16	..	..	1.67	1.32	1.38	..	..	..	1	17	5	..
17	..	..	1.68	1.23	1.31	..	..	..	1	22	11	..
18	..	.	1.57	1.28	1.33	1.71	..	..	1	26	12	3
19	..	..	..	1.27	1 34	1.64	..	..	..	22	18	6
20	..	..	..	1.26	1.31	1.52	..	..	..	13	24	14
21	..	1.31	..	1.22	1.29	1.38	..	1	..	4	24	20
22	..	1.21	1.32	1.23	1.27	1.31	..	9	2	1	18	21
23	1.16	1.14	1.35	1 27	1.29	1.27	2	5	2	5	17	24
24	1.36	1.15	1 23	1 22	1.34	1.29	1	11	7	4	3	27
25	..	1.16	1.20	1.24	..	1 30	..	9	8	6	..	21
26	1.21	1.18	1.24	1.28	1.24	1.31	1	6	16	4	1	21
27	1.28	1.24	1.25	1.17	..	1.28	2	6	15	4	..	4
28	1.24	1.16	1.22	1.16	..	1.29	4	7	15	9	..	6
29	1.27	1.22	1.20	1 17	1.32	1.29	16	10	32	9	1	5
30	1.25	1.18	1.22	1.16	..	1.27	13	6	33	5	..	5
31	1.23	1.18	1.19	1.16	1.23	..	36	14	47	3	1	..
32	1.27	1.19	1.20	1.18	1.29	1.23	55	29	68	6	6	2
33	1.21	1.17	1.19	1.15	1.33	1.19	62	35	95	5	8	2
34	1.20	1.18	1.17	1.25	1.36	1.25	55	30	76	5	7	8
35	1.21	1 19	1.20	1.18	1.34	1.28	45	37	75	8	3	9
36	1.20	1.20	1.21	1.20	1.40	1.25	48	27	42	6	1	7
37	1.24	1.20	1.20	1.13	1 38	1.23	28	24	30	6	1	11
38	1.17	1.21	1.18	1.15	1.25	1.23	18	26	23	2	1	4
39	1 15	1.22	1.19	..	..	1.26	22	28	21	..	..	8
40	1.24	1.20	1.16	..	1.40	1.23	17	37	15	..	1	6
41	1.30	1 21	1.20	1.23	..	1.19	11	27	14	1	..	4
42	1.20	1.22	1.15	..	..	1 24	4	35	11	..	..	4
43	1.18	1.21	1.19	..	..	1.32	4	24	3	..	..	3
44	1.25	1.23	1.19	..	..	1.39	3	17	3	..	..	1
45	1.28	1.20	(1.32)	..	..	1.21	4	11	2	..	..	3
46	1.19	1.25	1 13	..	..	..	1	8	1	..	..	..
47	1.24	1.21	1.10	..	..	1.03	2	10	2	..	..	1
48	..	1.20	1.23	..	..	1.38	.	9	1	..	..	1
49	1.17	1.26	1.22	..	..	..	4	1	2	..	..	..
50	..	1.20	1.30	..	..	..	..	1	2	..	..	..
51	1.09	1 35	..	..	..	..	1	1	..	.	..	..
52	..	..	..	..	..	1.43	..	..	..	..	..	1
55	..	..	1.58	..	..	..	.	..	1	...	..	..

As regards those of our marked fish which were recaptured by English fishermen, these were treated in about the same manner as in our experiments. First gutted, then iced in the hold of the trawler for the rest of the voyage, the average duration of which may be taken as abt. 14—16 days[1]. We do not know the exact length of the voyage in each separate instance, nor can we say what time elapsed between the landing of the fish and its arrival at place of registration. In cases where the facts are known, there is

[1] Average duration of the voyage of English steam trawlers in this region being in 1906 and 1912 15.8 and 14 days respectively (Bd. of Agric. & Fish.: Ann. Rep. on Sea Fish.). Aberdeen trawlers have a shorter run, average length is only 10,5 days (18 b—c).

as a rule less than 20 days, often only abt. 8 days, between capture and registration. Thus, though we cannot arrive at any certain determination, we may be justified in reckoning with a total shrinkage according to size amounting to abt. 10—12 % of the gutted weight, and such percentage has accordingly been added in all calculations for increase of weight in the following.

The shrinkage in length is in our experiments so slight, abt. 1—3 mm for the iced fish, that we have, as mentioned above, generally disregarded this in the growth calculations.

The figures found for growth of the marked fish must be taken as minimal values, deviating, however, only slightly from the true value, even in the case of weight increment. As to how far the

Table 3. Loss of weight in plaice by gutting and storage.
The indices denote number of fish measured.

Experiment with Færoe plaice 21 June 1910				Experiment with plaice landed at Copenhagen November 1915				
Length, quite fresh and entire in cm (average)	Weight quite fresh and entire (a) in gr (average)	Loss of weight by gutting (b) in % of a (measured immediately after gutting)	Shrinkage after 10 hours' storage at 8° C. in % of $a-b$	Length, quite fresh and entire in cm (average)	Weight quite fresh and entire (a) in gr (average)	Loss of weight by gutting (b) in % of a (measured immediately after gutting)	Shrinkage after storage on ice from $^{6}/_{11}$—$^{27}/_{11}$ 15 in % of $a-b$	
							after 4 days	after 21 days
51, 58*)	2375_2	11 6	0.8	47.3_1	1410_1	4.04	2.5	9.4
45—49 (47.0)*)..	1323_5	8.9	2.8	(42.5_3)	950_3	6.4	2.7	6.9
40—44 (42.0)*)..	1050_5	9.9	2.3	36.7, 38.8 ...	631_2	4.9	3.2	8.6
35—39 (37.0) ...	662_5	7.9	1.8	30.5, 34.3 ...	430_2	6.4	3.6	10.5
30—34 (32.0) ...	442_5	8.6	1.2					

*) all ♀, exc. one.

growth here may differ from the normal, this is of course another matter. The treatment to which the fish are subjected in course of the experiments will presumably in many cases produce a certain shock calculated to retard growth (6 g) though the effect will probably hardly last for many months. Even where serious infection has arisen in the wound caused by the mark, as is sometimes the case, this has not visibly affected the growth, at any rate, not for any length of time.

E. Records of recaptures.

The plaice fishery at the Færoes is carried on almost exclusively by foreign trawlers, i. e. English and Scottish, and most of the records of recapture are therefore derived from these quarters. Through the Board of Agriculture and Fisheries, and the Fishery Board of Scotland, we have received a very great number of valuable weights and measurements of fish sent in to these institutions. The Marine Biological Association of the United Kingdom, also the Department of International Fishery Investigations, the Scottish North Sea Investigations, represented by Dr. T. W. Fulton, and the Dutch International Fishery Investigations, by Dr. Redeke, have likewise furnished us with a large and valuable material of reliable information concerning recaptured fish. The Færoes themselves have contributed but very little in the case of the plaice. The position here is exactly the reverse of what we found in the case of the marking experiments with cod (16). Nevertheless, we have on this occasion also to thank Hr. Fuldmægtig Øster, of Thorshavn, and Købmand I. Reinert, Vestmanhavn, for valuable information. Most of the recaptures within the territorial limit were made by the Inspection vessel at the Islands, the Danish Government boat "Beskytteren", whose various commanders have kindly undertaken to collect information as to the marked fish taken on board the vessel. That the records thus obtained are unfortunately in many cases of little use is owing to the fact that the crew was changed from time to time, so that it was extremely difficult to get the requisite uniformity and care in handling, especially as regards the measuring and

weighing of the fish. We are, however, gratefully indebted in particular to Capt. RØRBYE and Hr. Underintendant HYRUP, for useful material of weighings and measurements.

Lastly, but by no means least, I have to thank my Chief, Dr. JOHS. SCHMIDT, Head of the Danish Atlantic investigations, in the first place for having entrusted me with the task of dealing with the data here concerned, and I am further indebted both to him and to Dr. A. C. JOHANSEN, Head of the Danish Fishery Investigations, for the kindly interest and valuable advice which both have accorded me throughout the whole course of the work.

II. Experiments with plaice.

The various experiments with plaice are set forth below (see also Fig. 1).

Table 4. Locality and extent of the experiments with plaice at the Færoes 1910—1912.

Series of experiments	Year & Month	Position: fished in (Central position approximately)	Position: liberated in (Central position approximately)	Depth (m) at: capture	Depth (m) at: liberation	No. of fish marked	Total liberated
I Ordinary Marking Experiments	1910 May	Vestmanhavn (62°8.7′ N, 7°9.3′ W)	Vestmanhavn (ibid.)	< 22	< 22	498	710
	1911 Aug.–Sept.	—	—	< 20	. .	45	
	1912 June	—	—	< 11	. . .	167	
II Transplantation Experiments	1912 May—June	Vestmanhavn	at Slettenæs, off Vestmansund (62°10′ N, 7°16′ W)	< 20	55	301	301
III Ordinary Marking Experiments	1912 June	Sundene between Haldorsvig & Eide (62°17.5′ N, 7°0.5′ W)	Sundene (ibid.)	9	9	125	200
IV Transplantation Experiments	1912 June	Sundene	N of Myling (62°20′ N, 7°09′ W)	9	81	75	

It will be as well to begin with the experiments in Vestmanhavn, as being the most extensive.

A. Experiments with plaice from Vestmanhavn.

a. Ordinary marking experiments (Experim. Group I).

1. Locality and date.

Vestmanhavn is a short (length abt. 1 mile) and sharply curved fjord branching off laterally from the sound running NW.–SE. between Strømø and Østerø (Figs. 1 & 2). The outer part of the fjord, reckoned to a line between Stiggjur and the mouth of Gasaa, forms its broad estuary into the sound, the depths here are for the most part between abt. 20 and 50 metres. The middle portion, which runs N-S. up to the line Grænanæs-Næsset, is of more or less equal breadth (abt. 500—700 m) throughout its entire length. On the eastern side there is a bank with up to abt. 5 m of water, this is the Bank ("Pladen") often referred to in the following, where the bottom is suitable for seine fishing (small stones, with some Laminaria vegetation). The inner part of the fjord runs very shallow, especially on the eastern side, where the small rivers, Fosaa and Bredeaa, have their outflow.

In this fjord, "Kommissionen for Havundersøgelser" has instituted a series of investigations, fishery experiments and markings, from the "Thor" in 1903, 1904 and 1910, and also, from a hired vessel under the command of Capt. G. HANSEN, in 1911 and 1912. These investigations have, among other results,

shown that a rich stock of plaice grows up in this fjord; in the innermost, shallow waters we find the two youngest year-classes, farther out, along the north-western side and on "Pladen" the older, but not yet fully grown fish. It is from this group, the plaice mostly of 3—5 years old, that the very great

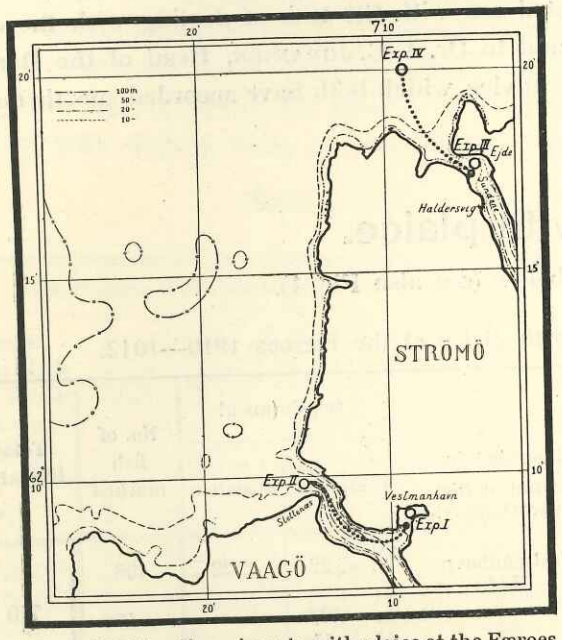

Fig 1. Marking Experiments with plaice at the Færoes 1910—1912. The circles indicate places where marked plaice were liberated (p. 8).

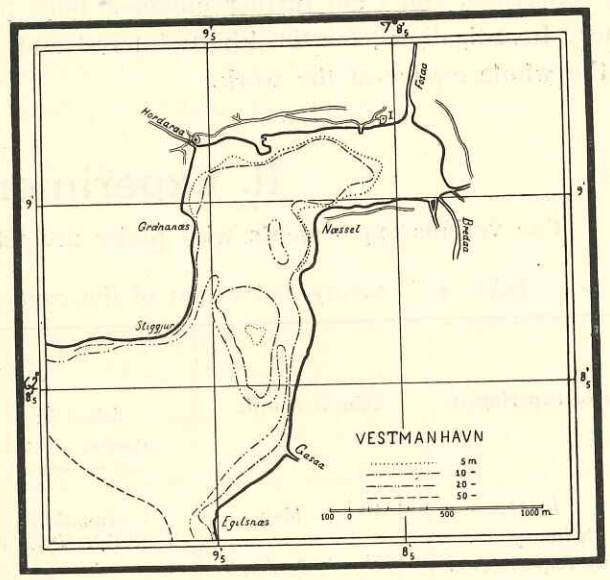

Fig. 2. Vestmanhavn Fjord in the Strømø.

majority of our marked fish were drawn (vide *infra*). And we may here at once point out that most of the experiments reveal a continually increasing emigration of these growing fish during the first, second and third years after marking, out to the sea outside Vestmansund and farther out over the coast bank, where the fish remain as fully-grown and spawning.

Table 5. Marking experiments in Vestmanhavn 1910—1912.

No. of Experiment	Year and Month	No. of plaice liberated	No. of plaice recaptured	Locality of Capture	Locality of Liberation Central Position
1 a	1910 May 17	39	12	At Næsset, 15—0 m	In Vestmanhavn (62°8.7′ N, 7°9.3′ W)
1 b	— — 19	54	18	Between Næs and Egilsnæs, 15—3 m	
1 c	— — 18—21	405	152	— — 22—3 m	
		498	182		
2 a	1911 Aug. 23 — Sept. 2	7	3	On the Bank 20—6 m	
2 b	— Aug. 25 & 26	10	4	Inside Grænnanæs (at I) 3—0 m	
2 c	— — 29	9	0	Innermost part of the Fjord between Fosaa and Bredeaa	
2 d	— Sept. 1	19	6	At Grænnanæs, 12—0 m	
		45	13		
3	1912 June 6, 8	167	60	Inside Grænnanæs	
	Total ...	710	255 *)		

*) + 35 plaice recorded recaptured from the Færoes, but without serial no. etc.

Of the marking experiments during these three years in Vestmanhavn, those of 1910 and 1912 are best comparable, as in both these years, work was commenced in early summer, May and June, whereas the small experiments in 1911 were not carried out until later, at the end of August.

2. Size of the marked fish.

The table below, showing the length of the fish marked in the different experiments, will afford some indication as to the composition of the stock in different parts of the fjord; it should be borne in mind, however, that no fish of less than 20 cm were marked at all.

Table 6. No. and size of plaice, captured and liberated in Vestmanhavn or transplanted to off Slettenæs. 1910—1912.

Initial sizes in cm	Captured by hauls																	
	Around Næsset, 15—0 m Exp. 1 a		At the innermost (east-) end of the fjord, 3—0 m Exp. 2 c		Inside Grænnanæs, 11—0 m Exp. 2 b		At Grænnanæs 12—0 m Exp. 2 d		On the Bank						At different localities. Single catches mixed together, 22—0 m Exp. 3 & II *)	
									<15—3 m Exp. 1 b		22—3 m Exp. 1 c		20—6 m Exp. 2 a			
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
20—24.....	13	11	5	1	3	..	1	..	..	1	1	..	2	..	6 (4)	5 (1)
25—29.....	6	9	3	..	2	..	4	1	5	5	6	7	..	..	53 (6)	27 (3)
30—34.....	..	..	..	..	3	..	1	1	13	9	61	31	..	..	104 (44)	99 (69)
35—39.....	..	..	..	..	..	1	6	2	4	6	73	56	1	2	68 (68)	62 (62)
40—44.....	..	..	..	..	1	..	..	2	2	8	38	92	..	2	7 (7)	29 (29)
45—49.....	..	..	..	..	..	..	..	1	..	1	6	32	..	..	..	5 (5)
50—54.....	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	2 (2)
55—59.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1 (1)
Total ...	19	20	8	1	9	1	12	7	24	30	185	220	3	4	238 (129)	230 (172)
	39		9		10		19		54		405		7		468 (301)	

*) The figures in brackets indicate the plaice transplanted (Exp. II, see p. 22)

Fishing was carried on partly from the "Thor" (in 1910) partly from the shore with eel hand-seines at various places along the fjord, mostly on or near the bank "Pladen", between Egilsnæs and Næsset.

In the innermost part of the fjord, within the line Grønnanæs-Næsset, in 15 m water, most of the fish belong to the size category small; i. e. sizes over 35 cm are rare. On the bank, (Pladen), the great bulk of the stock is composed of a mixture of small and medium plaice, 30—45 cm most with average lengths abt. 38 cm (Exper. 1 c). A mixture of catches from different places inside the fjord limit, but mainly from the bank, as in 1912, (Exp. 3 and II), is seen to consist mainly of small plaice, average length abt. 33 cm or 32.2 (♂) and 34.5 (♀). The limit between small and medium is here taken at abt. 33 cm. Plaice of larger size are not found in any considerable number in the fjord. The full-grown fish live on the coast banks round the islands, or in the more open — and deeper — fjords.

The weight of the fish taken in the innermost waters of the fjord averages abt. 200 gr; that of the bank fish abt. 700 gr.

The ratio between length and weight has been previously referred to (p. 4). Fig. 3 gives a graphical

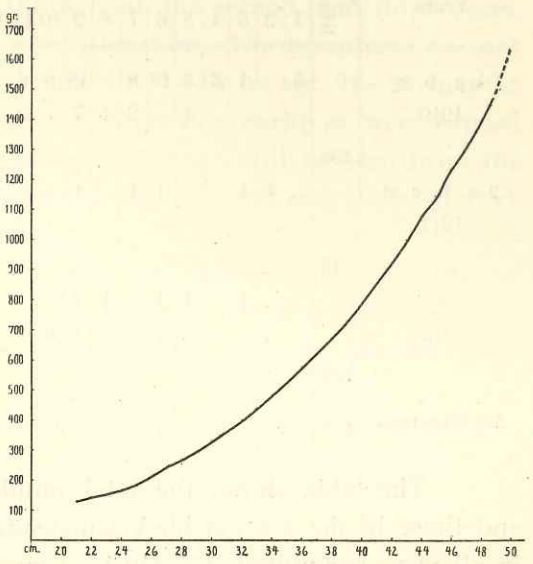

Fig. 3. Ratio between length and weight of the Færoe plaice (1911—1912).

illustration of this, based on measurements from May—June 1910, and 1912, males and females taken together.

For further illustration of what is stated on p. 4 with regard to the considerable weight of the Færoe fish, it will be interesting to compare this curve with a similar one given by FULTON (6 e) for plaice from the northern North Sea.

Making allowance for the different way of classifying the material according to length, and comparing for instance our weight average for the 30 cm fish — i. e. those from 30.0 to 30.9 cm — with his for 30.5 cm — i. e. 30.25 to 30.75 — etc. we find that the curves take more or less the same course, that for the Færoe fish, however, running decidedly higher. The distance between them is from 0.1—0.6 of the distance between the ordinate points, corresponding to a difference in weight of 29—60 gr per length, and thus further confirms the difference already noted between the weights of the fish from the two regions.

As regards the relation between males and females, the table shows — most distinctly in the fish from the bank — that the males are in the majority among smaller sizes, the females becoming continually more predominant among the fish over 40 cm. In Exp. 1 c, the average sizes for male and female respectively are 36.2 and 39.7 cm, resp. 624 and 817 gr (cf. FULTON's figures from East of Scotland).

3. No. of recaptures.

As mentioned above, the Færoe fishermen themselves take practically no plaice at all. Quite locally, stake nets etc., have been tried for a short time, but soon relinquished again. From the Danish Fishery Inspection vessel alone are derived practically all the records of recapture up in the fjord. Not until the plaice have reached the age when their migration to the greater depths on the coast banks outside Vestmanhavn etc. begins, does the foreign fishery commence to take part in the recaptures. We have therefore, in working out the results, to distinguish between these two methods of capture.

Table 7. No. of plaice recaptured from the experiments in Vestmanhavn, 1910, 1911, 1912, within and outside the fjord.

(The figures in heavier type indicate plaice recaptured in Vestmanhavn).

Exp. No. and Years	No. liberated	No. of months between liberation and recapture																																						Total recaptured	% recaptured
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	31	32	33	34	36	37	39	43	48	52		
1 a, b, c		**5**		**1**	**3**	**3**	**19**	**8**		**18**	**8**	**6**	**4**		**6**					**3**				**1**																	**85**	17.1
1910						1		2	1	7	7	9	4	14	7	2	4	1	1	1	1	4	7	3	3	3	1	1	2		1	2	3	1	1		1		1	96	19.5
	498																																							181	36.6
2 a, b, c, d			**1**	**1**			**1**	**1**		**1**						**1**			**1**																					**7**	15.6
1911											1		2					1	1																	1					6	13.3
	45																																							13	28.9
3				**1**		**1**	**4**		**1**	**7**						**1**	**2**	**2**		**1**	**1**	**2**				**1**				**1**										**25**	15
1912							1		2	1	9	1	1		1			1			1	4	4	1	1	1	1		3			1					1			35	21
	167																																							60	36.0
All Experim.	710																																							254	35.8

The table shows the total number of recaptures from all experiments, those in the fjord itself and those in the sea outside Vestmansund being noted separately. Out of 710 fish marked, 254, or 35.8 % in all were recaptured, 137 (19.3 %) outside, and 117 (16.5 %) in Vestmanhavn. The experiments of the three years show, despite the difference in the numbers embraced, a surprising uniformity in the percentage

of recaptured fish, the values being 36.6, 28.9 and 36.0 % of which 17, abt. 16 and 15 % in the fjord itself, and 20, 13 and 21 % outside. It should here be noted, however, that there were doubtless considerably more taken, at any rate from the emigrated fish from these experiments; we have in course of time received from the Færoes alone no less than 35 "returns" with the number lacking or illegible, so

Table 8. Synoptic table showing % of recaptures of plaice, liberated in Vestmanhavn May—July, 1910—11—12.

Initial sizes in cm	No. of each size liberated		Number of years within recapture: < 1				1—2				2—3				3—4		4—5		Total % recaptured*)			
			% recaptured in Vestmanhavn		% recaptured outside V.		% recaptured in Vestmanhavn		% recaptured outside V.		% recaptured in Vestmanhavn		% recaptured outside V.		% recaptured outside V.		% recaptured outside V.		in Vestmanhavn		outside V.	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
20—24	27	17	11.1	17.7	..	..	..	..	4.2	7.1	..	..	8.7	..	9.5	..	..	7.7	11.1_3	17.7_3	18.5_5	11.8_2
25—29	73	46	12.3	17.4	2.7	..	6.5	15.8	8 1	2.7	1.7	..	5.7	6.4	4.5	..	..	..	19.2_{14}	30.4_{14}	16.4_{12}	6.5_3
30—34	138	73	16.0	20.5	13.0	1.4	4.1	5.3	14.3	8.8	..	2.1	5.0	10.2	..	..	.	..	18.8_{26}	26.0_{19}	26.1_{36}	15.1_{11}
35—39	84	67	13.1	14.9	15.5	1.5	1.4	1.8	20.0	14.3	..	..	2.1	4.3	..	..	..	..	14.3_{12}	16.4_7	31.0_{26}	16.4_{11}
40—44	41	102	14.6	4.9	9.8	4.9	..	2.2	12.9	7.6	..	..	..	1.2	..	..	..	..	14.6_6	6.8_{11}	19.5_8	12.7_{13}
45—49	6	34	0	5.9	..	14.7	..	..	16.7	14.8	..	..	..	..	..	..	..	..	..	5.9_2	16.7_1	26.5_9
50—54	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ♂ + ♀	369	341	13.8	12.6	10.0	3.5	3.2	4.2	13.2	9.1	0.4	0.4	4.3	3.9	2.0	0	0	0.4	16.6_{61}	16.4_{56}	25.3_{88}	13.5_{49}
	710		13.2		6.9		3.7		11.1		0.4		4.1		0.88		0.2		16.5_{117}		19.3_{137}	

*) The small indices denote numbers of specimens recorded. 35.8_{254}

that it was impossible to determine how they should be distributed among the various experiments there made (cf. Table 5).

As regards the time the fish have remained in the sea between marking and recapture, we find that in the fjord, the overwhelming majority of the recaptures were made during the first year, and almost all the remainder in the second year after marking. The emigrated fish first reappear in the second half of the first year, and thereafter, we find them distributed throughout the second and third years, with some few recaptures still later, in the fourth and fifth year after liberation. The recaptures are not evenly distributed throughout this period, most of them falling within abt. 9—13 or abt. 21—25 months after marking; in other words, in spring and early summer of each year, as the markings were carried out in May and June (1910 and 1912). The numbers and sizes taken each year will be seen from the table above, showing results of all experiments taken together, the initial size, sex, and migration, (if any), being here noted.

The marked decrease in the number of recaptures in the fjord, and the increase in migration from year to year, have been referred to already. It will further be noticed that while in the first year, it is the medium sized plaice that are chiefly caught, it is, as time goes on, fish of a smaller initial size which are recaptured as emigrated.

The Table 9 here appended illustrates this feature in the separate experiments. It is particularly noticeable that apart from the small 1911 experiments, 2 a—d, the experiments with larger initial sizes 1 c and 3 (1910 and 1912) show a practical cessation of recaptures of emigrants by the end of the third year, in contrast to the 1910 experiments (1 a and 1 b) with plaice of smaller sizes.

Altogether, we find that in the first three years after marking, up to 13.4 % of the stock of plaice in the fjord is annually taken by fishermen of foreign nationality, often, however, less than this, i. e. less

than 10 %. Compared with the Danish fishery, fluctuating as this is during stays of extremely variable duration, we find that the corresponding intensities of capture are only of approximately like value during the first year after marking, decreasing rapidly from then onwards, and falling already in the third year to zero.

As regards the occurrence of males and females among the recaptures, all tables show that there are among the emigrant fish relatively far more males than females retaken, while up in the

Table 9. % of liberated recaptured plaice. Experiments in Vestmanhavn 1910—1912.

No. of experiment	No. of liberated	Recaptured							
		outside Vestmanhavn					in Vestmanhavn		
		No. of years between liberation & recapture					No. of years between liberation & recaptured		
		1	2	3	4	5	1	2	3
1 a—1 b	93	3.2	7.7	5.6	3.0	1.5	12.9	1.3	..
1 c	405	7.2	13.4	3.7	..	1.5	15.2	2.9	..
2a—2d	45	6.7	5.4	..	3.0	..	11.1	5.4	..
3	167	9.0	9.4	5.1	0.9	..	8.4	6.5	1.8

fjord, the values are nearly alike for the two sexes, and further, that the males migrate earlier than do the females. Among the emigrants then, the percentage of males is seen year by year to be continually decreasing in relation to that of the females. This may presumably be explained as due to the fact that the males are older than females of equal size, or at any rate, will at a smaller stage attain maturity and migrate to more suitable surroundings.

It is further apparent from the tables that the proportion referred to between males and females in the recaptures occurs in most of the size groups under 45 cm, apart from the small 1911 experiments. For the still larger fish, small as are the numbers here involved, we yet find the females, even on marking, so decidedly in the majority that the position is altogether different here.

Finally, as regards the intensity of fishing to which the different size groups are subjected — a point which is also dealt with elsewhere — we find from Exp. 1, which is most suitable for this purpose, that in Vestmanhavn, the initial sizes of 25—35 cm are those most intensively fished, and outside the fjord mostly the sizes over 30 cm. The comparatively few observations made up to the present can, however, give us no further information on this head. Taking all sizes of emigrant fish together on recapture, we find that the great bulk of the males are of 35—50 cm, averaging abt. 42 cm and of the females abt. 40—60 with average abt. 50 cm.

4. Nationality of fishermen.

The table below shows the extremely insignificant part played by the Færoe fishermen themselves in the industry here concerned. They have, however, in the 1911 and 1912 experiments, contributed proportionately more to the recaptures than in the previous year. Noticeable also is the dominant position occupied by the English and Scottish vessels. In all, an average of 19 % of the total marked was taken by this fishery.

5. Growth.

Increment of length and weight.

In studying this question it is obviously necessary to distinguish between α) the fish remaining in Vestmanhavn, and β) those emigrating to the waters outside.

Table 10. No. of recaptures made by Færoe and foreign fishing vessels. Experiments in Vestmanhavn 1910—1912.
F. B. = Fishing Boats. S. T. = Steam Trawlers.

No. of Experiment	Færoe F. B.	Danish Fishery	English S. T.	Scottish S. T.	Belgian S. T.	German S. T.	Total recaptured		% recaptured by British S. T.
							No.	%	
1 a—c	4	81	77	17	2	1	182	36.6	18.9
2 a—d	3	4	5	1	..	..	13	28.9	13.3
3	11	14	27	8	..	..	60	36.0	20.9
Total ...	18	99	109	26	2	1	255	35.9	19.0 *)

*) The percentage is really higher, viz. the 35 recaptures without serial no. (p. 11).

a) Growth of the fish remaining in Vestmanhavn.

Below will be found the rate of growth noted for the various size groups, according to all serviceable observations on record. The great majority of the measurements which were of any use were made from fresh material during the winter 1910—11[1]). We may commence with the largest batch of material, that from the 1910 experiments.

Table 11. Rate of growth of plaice liberated and recaptured in Vestmanhavn. May 1910.

Recaptured in	Period of growth Months	Increment in cm			No. of specimens measured	Initial size in cm
		Average	Minim.	Maxim.		
1911 Febr...	9	10	..	..	1 ♂	20—24.5
— March .	10	7.8	6.5 ♂	9 ♀	2	
1910 Nov. ..	6	8.5	..	..	1 ♀	25—29
— Dec....	7	5.5	..	..	1 ♀	
1911 Febr...	9	6.6	5.5 ♀	7.5 ♂	4	
— March .	10	5.5	..	..	1 ♀	
— May...	12	7.0	6	8	3 ♂	
— July ..	14	13.8	13 ♀	14.5 ♂	2	
— Dec....	19	16	..	..	1 ♀	
1910 Nov. ..	6	3.9	2.5 ♂	8.5 ♂	15	30—39
— Dec....	7	4.8	..	..	4	
1911 Febr...	9	4.0	3.5 ♂	5.5 ♀	9	
— March .	10	5.5	3.0 ♀	9.5 ♂	5	
— April ..	11	5.3	4.5 ♀	6 ♂	3 ♂ 2 ♀	
— May...	12	4	..	..	1 ♀	
— July ..	14	8	8 ♂	8 ♀	2	
— Dec....	19	7.8	7.5 ♀	8 ♀	2	
1910 Oct....	5	5.0	..	..	1 ♀	45
— Nov. ..	6	6 ♂	..	..	1	40—44
		4.5 ♀	3.5	5.5	2	
— Dec....	7	2.0	0 ♀	4 ♂	2	
1911 Febr...	9	4.6	3.5 ♂	7 ♂	4	
— April ..	11	5.0	..	..	1 ♀	
— July ..	14	9.0	..	..	1 ♀	

Recaptured in	Period of growth Months	increment in gr			No. of specimens measured	Initial weight in gr
		Average	Minim.	Maxim.		
1910 Nov. ..	6	310	..	..	1 ♀	150—250
1911 Febr...	9	260	225	285	2 ♂	
— March .	10	233	200 ♂	250 ♀	3	
— May...	12	215	200 ♂	230 ♀	2	
— July ..	14	560	..	..	1 ♂	
1910 Nov. ..	6	195	150 ♂	260 ♀	10	250—500
— Dec....	7	215	200 ♂	225 ♀	3	
1911 Febr...	9	205	130 ♀	320 ♂	10	
— March .	10	460	..	..	1 ♂	
— April ..	11	263	220	300	3 ♂	
— May...	12	220	140 ♀	300 ♂	2	
— July ..	14	483	370 ♀	650 ♀	3	
— Dec....	19	720	..	..	1 ♀	
1910 Oct....	5	340	..	..	1 ♀	500—750
— Nov. ..	6	285	170	360	4 ♂	
— Dec....	7	230	210	250	2 ♂	
1911 Febr...	9	200	200	200	2 ♂	
— March .	10	260	200 ♀	300 ♀	3	
— April ..	11	375	300	450	2 ♀	
— Dec....	19	540	..	..	1 ♀	
1910 Nov. ..	6	273	230 ♂	310 ♀	4	800—1000
— Dec....	7	240	..	..	1 ♀	
1911 Febr...	9	260	240 ♂	280 ♀	2	
— March .	10	360	..	..	1 ♀	
— April ..	11	350	..	..	1 ♀	
— July ..	14	670	..	..	1 ♀	
1910 Oct....	5	450	..	..	1 ♀	1000—1100
1911 Febr...	9	400	350 ♀	450 ♂	2	

[1] By Underintendant Hyrup, on board the Inspection boat.

The smallest sizes, below 29 cm, are only slightly represented (Fig. 4). The feature best determined is the increase in length after 19 months for the 25—29 cm fish, this being equal to 7 cm. The sizes below 25 cm grow somewhat more rapidly, presumably abt. 10 cm during the first year. The course of the curve suggests that the growth does not proceed regularly, but with a certain retardation in autumn and winter.

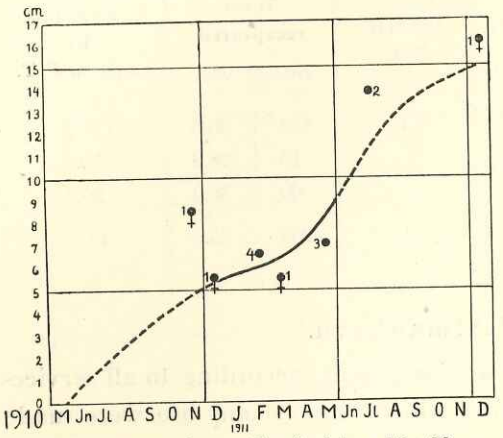

Fig. 4. Rate of growth of plaice, 25—29 cm, liberated and recaptured in Vestmanhavn Exper. May 1910.

The sizes from 30—39 cm (Fig. 5) grow somewhat more slowly only abt. 5.3—5.5 cm in 10—11 months. The growth here shows abt. 4 cm for the first six months, the next four (Nov.—March) giving presumably abt. 1½ cm only, after which the individual measurements seem to indicate a resumption of more rapid growth in the following summer, with abt. 3—4 cm for the four months until August. This is all that can here be said, the material being insufficient for further enquiry.

The largest fish, 40—49 cm. Here also the few measurements on record indicate a relative standstill in the growth throughout the winter, so that we have for the first 19 months an increment of abt. 5 cm. Beyond this, practically nothing can be said. The growth curve (Fig. 6) shows a course similar to that of the preceding group. Nearly all the recaptured fish here are, as already mentioned, females. Up in the fjord, no spawning plaice have as yet been observed. The few examined, (Jan. – Febr.) of abt. 50 cm long, were stated to be only in a state of "incipient maturity".

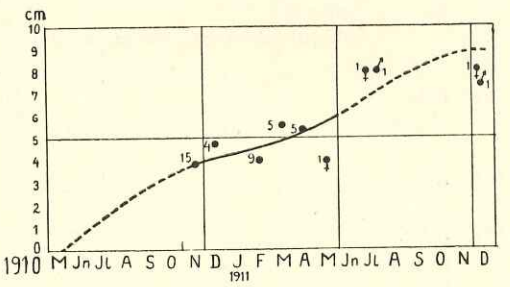

Fig. 5. Rate of growth of plaice, 30—39 cm, liberated and recaptured in Vestmanhavn. Exper. May 1810.

The increment of weight may be seen by dividing the material into groups with initial sizes of under 500, 500—1000, and 1000—1500 gr respectively, answering to lengths of under 35, abt. 35—42 and over 42 cm, each group being then considered separately. In the smallest, the increment is abt. 200 – 300 gr. in the first 7—9 months, alike for larger and smaller fish within this group, i. e. relatively larger for the latter, and here answering to a doubling of the initial weight. The table shows that the weight, like the length, does not increase very much in the following period, and not until the early summer of 1911 do we find a new and distinct increase, so that the largest fish have now also doubled their weight.

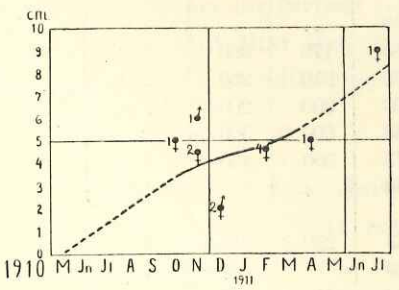

Fig. 6. Rate of growth of plaice, 40 – 49 cm, liberated and recaptured in Vestmanhann. Exper. May 1910.

The medium sized fish, 1000—1500 gr, likewise add abt. 300 gr to their initial weight in the course of the first 6—7 months, i. e. relatively less than the younger fish, and only reach an increment of abt. 500 gr in all by June—July 1911. The very few fish of abt. 1 kg, on the other hand, appear to reach this value already in the course of the first year. There is, as mentioned, no difference apparent from the material between male and female in this respect. We have no later observations on this head.

The 1911 experiments do not call for further remark; the few and scattered measurements agree with what we have found from the 1910 experiments just referred to. For the rest, reference may be made to the table below.

Length increment of plaice remaining in Vestmanhavn was

in 2 months, 3 cm to an initial length of 22 cm (1 ♂)
- 9 — 4 - — — 29 - (1 ♂)
- 15 — 6 - — — 30 - (1 ♂)

The corresponding initial weights and weight increments were:

abt. 150 in 2 months 60 gr (1 ♂)
— 350 - 9 — 80 - (1 ♂)
— 350 - 15 — 200 abt. (1 ♂).

Table 12. Rate of growth of plaice, liberated and recaptured in Vestmanhavn. June 1912.

Recaptured in	Period of growth Months	Increment in cm			No. of specimens of initial sizes			Increment in gr			No. of specimens weighed	Initial weight in gr
		Average	Minim.	Maxim.	20—24 cm	25—29 cm	30—34 cm	Average	Minim.	Maxim.		
1912 September	3	3	..	..	..	..	1 ♂	50	..	..	1 ♂	100—400
— November	5	4	..	..	..	..	1 ♂	135	..	..	1 ♂	
— December	6	7.5	7	8	2 ♀	..	..	162.5	130 ♂	200 ♀	4	
— —	..	5.5	5 ♀	6 ♂	..	2	..	..	..	..	..	
1913 February	8	4	..	..	..	1 ♂	..	120	..	..	1 ♂	
— March	9	5.0	4 ♂	6 ♀	..	2	..	180	170 ♂	190 ♀	2	
— —	..	3.9	1 ♀	9 ♂	..	..	3 ♀ 2 ♂	..	..	..	..	
— September	15	8	..	..	..	..	1 ♀	400	..	..	1 ♀	
— October	16	7.0	6.5 ♀	8.5 ♂	..	2	..	205	180 ♂	230 ♀	2	
— November	17	6.5	..	..	..	1 ♂	..	250	150 ♂	350 ♀	2	
— —	..	6.5	..	..	..	..	1 ♀	..	..	..	..	
1914 January	19	4	..	..	..	1 ♀	..	65	..	..	1 ♀	
— February	20	10	..	..	..	1 ♀	..	370	..	..	1 ♀	
— March	21	10.8	10.5 ♂	11 ♀	..	2	..	400	380 ♂	420 ♀	2	
— July	25	11.0	..	..	..	1 ♂	..	140	..	..	1 ♂	
1915 January	31	9.5	..	..	..	..	1 ♀	550	..	..	1 ♀	

The 1912 experiment was considerably more extensive, and commenced, as in 1910, abt. the middle of May. We have here recaptures throughout a period of 2 years after marking, the fish being chiefly those of 25—29 cm initial size. The growth curve (Fig. 7) for these shows here also an increase during the first summer to abt. 5—6 cm after six months, then a pause until Febr.—March (1913) and a subsequent increase to abt. 11 cm in all by March 1914. There is, then, nothing suggestive of any more rapid growth during the second year after marking, such as was seen from the few recaptures from the 1910 experiment. The growth is as a whole slighter than in that experiment. The few remaining measurements of larger or smaller fish are of less interest; the sizes from 30—34 cm show a growth which in over 2 years has not been found higher than 10 cm. The increment of weight for the 200—300 gr plaice amounts to abt. 200 gr in the first 6—9 months, i. e. the smallest double their weight, and the weight is trebled in the course of abt. 20 months. The weighings unfortunately, are far from reliable.

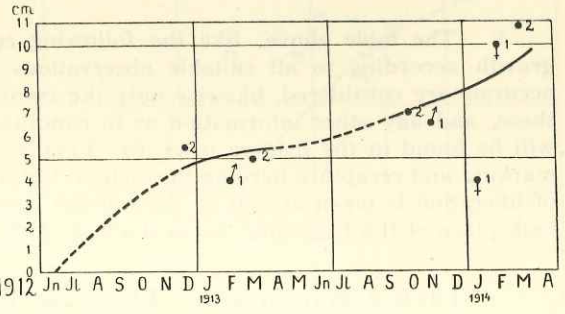

Fig. 7. Rate of growth of plaice, 25—29 cm, liberated and recaptured in Vestmanhavn. Exper. June 1912.

β) Growth of the fish recaptured outside Vestmanhavn.

The following observations are mainly due to information kindly furnished by the Board of Agriculture and Fisheries, London. As regards correction of figures for length and weight, reference may be made to p. 6. In several cases, the degree of maturity is noted on recapture, but by no means sufficiently often to show the duration of spawning time, size of the spawning fish, etc.

It would be natural to expect that the alteration in environment occasioned by migration from the fjord waters should affect the growth to some extent, and as a matter of fact, this seems also, from several of the experiments, to be the case.

Table 13. Rate of growth of plaice, liberated in Vestmanhavn May 1910 and recaptured outside the fjord.

Recaptured in	Period of growth Month	Increment in cm			No. of specimens measured	Initial size in cm
		Average	Minim.	Maxim.		
1912 March .	22	10.7	..	..	1 ♂	20—29
— April . .	23	16 5	..	..	1 ♂	
1913 Febr. . .	33	17.3	..	..	1 ♀	
— March .	34	13.7	..	..	1 ♂	
— May . . .	36	19	..	..	1 ♂	
— June . .	37	16.9	..	..	1 ♂	
— Dec. . . .	43	30	..	..	1 ♂	
1914 Sept. .	52	32.5	..	..	1 ♀	
1910 Oct. . . .	5	5.3	..	..	1 ♀	30—39
— Dec. . . .	7	2.4	..	..	1 ♂	
1911 Jan. . . .	8	2	..	..	1 ♂	
— Febr. . .	9	2.7	2.2	3.0	4 ♂	
— March .	10	5.8	2.9	8.5	3 ♂	
— April . .	11	5.2	3.5	7.7	5 ♂	
— May . . .	12	4.4	3.3	5.5	2 ♂	
— June . .	13	6.5	3.7 ♂	10.1 ♂	11	
		5.6 (6 ♂) 7.6 (4 ♀)				
— July . . .	14	10.8	8.7 ♂	12 ♀	3	
— Aug. . .	15	9.2	..	..	1 ♂	
— Sept. . .	16	8.1	7.5	8.7	2 ♂	

Recaptured in	Period of growth Month	Increment in cm			No. of specimens	Initial size in cm
		Average	Minim.	Maxim.		
1912 Febr. . .	21	17.3	16.1	18.5	2 ♀	30—39
— March .	22	9.2	6.5 ♂	11 0	5 ♂	
— May . . .	24	15.0	10.2 ♂	18.2 ♀	3	
— June . .	25	15.5	12 ♂	19 ♀	2	
— July . . .	26	20.5	.	..	1 ♂	
— Aug. . .	27	16.1	..	..	1 ♂	
— Sept. . .	28	18.5	14	23	2 ♀	
1913 Jan. . . .	32	21.5	..	..	1 ♀	
— Febr. . .	33	18.2	..	..	1 ♀	
— March .	34	20	..	..	1 ♂	
1911 Febr. . .	9	3.9	5 ♀	2.8 ♂	2	40—49
— March .	10	5.6	4.3	6.7	4 ♀	
— April . .	11	5.8 ♀ / 5.0 ♂	5.1	6.4	2 ♀ + 1 ♂	
— May . . .	12	5.3	2	8.5	2 ♀	
— June . .	13	9.1	8.8	9 4	2 ♂	
— July . .	14	9.0	8.5	10	3 ♀	
— Aug. . .	15	8.5	..	..	1 ♀	
— Sept. . .	16	11.8	..	..	1 ♀	
— Nov. . .	18	8.5	..	..	1 ♀	
— Dec. . . .	19	14.5	..	..	1 ♀	
1912 Febr. . .	21	15.3	13 5 ♂	17 ♀	2	
— April . .	23	17.4	17.3	17.5	2 ♀	

The table above, like the following corresponding ones, and the graphs subjoined, illustrate the rate of growth according to all suitable observations on record. Only such measurements as appeared to be thoroughly accurate are considered, likewise only the records with date of recapture known. All others are omitted. Regarding these, and any other information as to condition, sexual maturity etc. of all the recaptures, all particulars to hand will be found in the lists on p. 55—64. Finally it should be mentioned, that the number of months elapsing between marking and recapture here as throughout the whole of the work, is reckoned as follows: Recapture during the month of liberation is taken as = 0, in the months immediately following as = 1 etc., without regard to whether the marking took place at the beginning, or at the end of the month in question.

1910 experiments. The smallest sizes, of abt. 20—29 cm first make their appearance in the hauls of foreign fishermen after two years from date of marking. By the close of the following, third year, these, nearly all males, have grown in all abt. 18—19 cm, and after a further year over abt. 30 cm. The growth of the fish first taken out here seems to agree well with the growth inside the fjord, from the experiments of the same year, as far as we are able to follow this (only to 20 months after marking). The more marked growth of the fish last recaptured may perhaps be accidental; possibly, however, it may be due to the altered, and presumably more favourable conditions encountered by the fish after

Tabel 14. Rate of growth of plaice, liberated in Vestmanhavn, May 1910, recaptured outside the fjord.

Recaptured in	Period of growth Month	Increment in gr			No. of specimens	Initial weight in gr
		Average	Minim.	Maxim.		
1910 Oct....	5	250	..	..	1 ♀	
1911 Febr...	9	100	..	..	1 ♂	
— April..	11	200	..	..	1 ♂	
— June ..	13	413	250	575	2 ♂	
— July...	14	740	730 ♀	750 ♂	2	
— August	15	600	..	..	1 ♂	
— Sept...	16	530	..	..	1 ♂	
1912 Febr...	21	1460	..	..	1 ♀	250
— April..	23	c. 700	..	..	1 ♂	—500
— May...	24	c. 700	..	..	2	
— July...	26	c. 1200	440 ♂	960 ♀	2	
— Sept...	28	c. 1070	900 ♂	1500 ♂	1 ♀	
1913 Jan....	32	1900	..	..	1 ♀	
— Febr...	33	960	..	..	1 ♀	
— March.	34	1250	..	..	1 ♂	
1912 March.	22	330	..	..	1 ♂	
1913 March.	34	540	..	..	1 ♂	
— May...	36	850	..	..	1 ♂	< 250
— Dec....	43	c 1700	..	..	1 ♂	
1914 Sept...	52	c. 2520	..	..	1 ♀	
1910 Dec....	7	60	..	..	1 ♂	
1911 Jan....	8	250	..	..	1 ♂	
— Febr...	9	170	..	..	1 ♂	
— April..	11	320	150	450	3 ♂	530—
— May...	12	120	..	..	1 ♂	750
— June ..	13	265	230	230	2 ♂	
— ..	—	513	500	500	3 ♀	

Recaptured in	Period of growth Month	Increment in gr			No. of specimens	Initial weight in gr
		Average	Minim.	Maxim.		
1911 July...	14	800	..	.	1 ♂	
— Sept...	16	650	..	..	1 ♂	
1912 March.	22	645	480	800	4 ♂	500—
— May...	24	1400	..	..	1 ♀	750
— June ..	25	1150	620 ♂	1670 ♀	2	
— Sept...	28	2550	..	..	1 ♀	
1911 Febr...	9	200	100 ♂	300 ♀	2	
— March.	10	400	..	..	1 ♀	
— April..	11	680	..	..	1 ♀	
— May...	12	c. 250	..	..	1 ♂	
— June ..	13	300	..	..	1 ♂	
— July ..	14	900	600	1200	2 ♀	780—
— Aug....	15	830	..	..	1 ♀	1000
— Sept...	16	c. 650	..	..	1 ♂	
— Oct....	17	c. 560	..	..	1 ♂	
— Nov...	18	800	..	..	1 ♀	
— Dec....	19	c. 1800	..	..	1 ♀	
1912 Febr...	21	1250	1200 ♂	1300 ♀	2	
1911 March.	10	c. 600	270	870	3 ♀	
— April..	11	240	..	..	1 ♂	
— May...	12	840	..	..	1 ♀	
— June ..	13	> 700	..	..	1 ♂	1000—
— July ..	14	c. 950	..	..	1 ♀	1500
— Sept...	16	1260	..	..	1 ♀	
1912 April..	23	2000	..	..	1 ♀	

migration, even though this only takes place abt. 2 years after marking. This might also seem likely, from what is stated in the following with regard to the next size group. There is no difference apparent between the sexes in respect of growth. As to the degree of maturity, a male was taken as "ripe" 23 months after marking, while a female was still immature 37 months after.

Fish of 30—39 cm initial size (Fig. 8) are found to have migrated already 6 months after marking, and thenceforward fairly evenly distributed throughout the following 9 months. The growth after the first year is, as in the fjord, only abt. 6—7 cm. All these recaptures were males. The same rate of growth is noticed as that of the males recaptured in the following year. The females, on the other hand, taken at the same time, i. e.

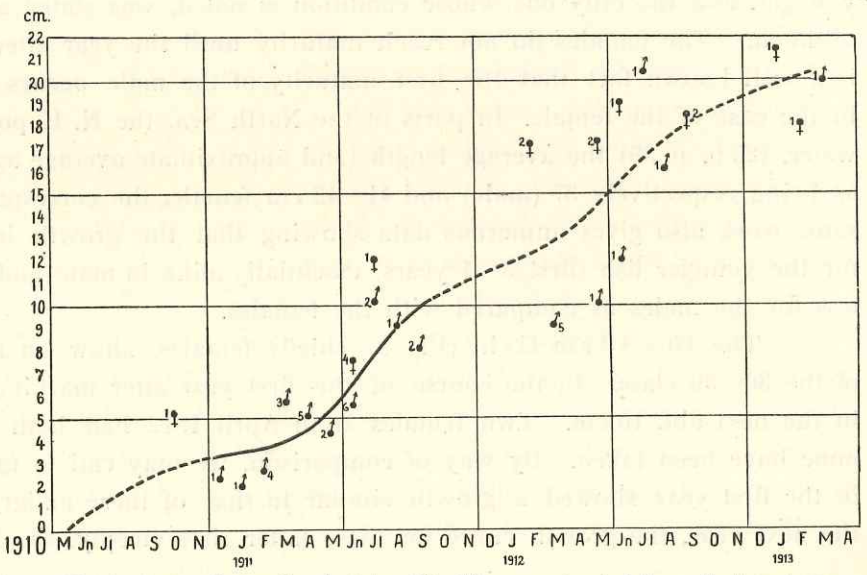

Fig. 8. Rate of growth of plaice, 30—39 cm, emigrated from Vestmanhavn. Exper. May 1910.

21—28 months after marking, have during this period grown on an average almost twice as much, *viz.* 18—19 cm in all, as against abt. 10 cm. The few females previously taken also exhibit a growth considerably better than most of the males taken at the same time, and far beyond that of the females taken at the same time inside the fjord.

Later recaptures are too few to show more than a considerable individual variation in the growth.

The difference observed in rate of growth between males and females must be more than accidental. The earlier emigration of the males from the fjord is beyond doubt. That they should, despite this, yet grow more slowly than the later emigrating females, can only be explained by supposing that the males will already in the course of the first winter after marking (winter 1910—11) or at any rate most of them, attain maturity for the first time, and then, in the period of growth next following, grow relatively less. The maturity investigations required to decide the point definitely have not yet been carried out completely, but the few observations made up to date support the theory here advanced.

Table 15. Condition of plaice, liberated in and emigrated from Vestmanhavn. Experiments May 1910.

Date of recapture	No. recaptured	Initial length and increase in cm	State of maturity	Other remarks
1910 Oct.	1 ♀ (M.)	34 + 5.3	immature	ovary 3.5 cm l. no eggs visible
— Dec.	1 ♂ (M.)	37 + 2.4	spent	
1911 Jan.	1 ♂ (M.)	38 + 2	mature	
— Febr.	1 ♂ (F.)	31.5 + 3.0	? nearly spent	
— —	1 ♂ (M.)	34 + 3.0	ripe	milt flows on pressure
— —	1 ♂ (F.)	39 + 2.2	? ripe (nearly ripe)	
— —	1 ♂ (M.)	38.5 + 2.5	ripe	milt flows on pressure
— March . . .	1 ♂ (F.)	33.5 + 6.0	partly spent	
— — . . .	1 ♂ (F.)	35 + 2.9	ripe	
— — . . .	1 ♂ (F.)	36 + 8 5	ripe	
— April	1 ♂ (M.)	31.5 + 5.5	spawning	
— —	4 ♂ (M.)		?	all gutted

Table 15 is based on records from the Marine Biological Association (M.) or from Dr. T. W. Fulton (F.).

The list includes all recaptures for the period October 1910 to May 1911. It will be noticed that all the males which were investigated at all were found to be mature.

From this, it would seem that the males can attain their first maturity at lengths between abt. 37—40 cm nearly all these being over 35 cm (abt. 3—5 years) at the commencement of the experiment. This is also supported by the fact that a male of 27 cm initial size among the preceding size group, presumably one year younger, and the only one whose condition is noted, was stated as being ripe in April 1912, at a length of 43 cm. The females do not reach maturity until the year after, or even later. In southern waters, it is a well known fact that the first maturity of the male occurs at a smaller size, (an earlier age) than in the case of the female. In parts of the North Sea, the N. E. portion of the Dogger with adjacent deep water, (20 b, p. 39) the average length (and approximate average age) of plaice at first maturity [1]) is stated as being respectively 37 (male) and 41—43 cm female, the corresponding ages being 6 and 7 years [2]). The same work also gives numerous data showing that the growth in other large parts of the North Sea is for the younger fish (first 3—4 years) essentially alike in male and female, but later becomes considerably less for the males as compared with the females.

The 40—49 cm fish, (Fig. 9), chiefly females, show on the whole the same growth as the best of the 30—39 class. In the course of the first year after marking, there is an increase of abt. 6—7 cm, in the next abt. 10 cm. Two females from April 1912 had both grown abt. 17.5 cm in all. Since then none have been taken. By way of comparison, we may call to mind that the few taken up in the fjord in the first year showed a growth similar to that of these emigrant fish. (See fig. 6). In the course of the next year, the growth curve for these latter rises steeply, as also for females of the preceding group.

[1] i. e. the size at which the numbers of mature and immature are equal.

[2] cf. also 11 a p. 17—20 for the Kattegat and the Belt Sea.

In both cases, the cause is probably the same, *viz.* that the emigration from the fjord takes place already at the close of the first year. The males are here, as mentioned, largely in the minority, but of the few specimens recaptured, we find here also most of them showing a poorer growth than the females. This group is presumably one year or two older than the preceding, and accordingly also, we find spawning fish here already nine months after marking, all three females, from 48—52.5 cm long, and again in the year after. April 1912, females of 59.3 and 62 cm. As to the remainder, we have practically no information regarding degree of maturity.

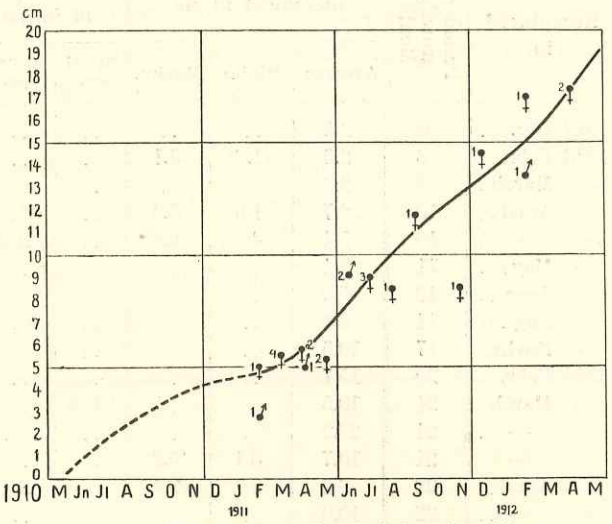

Fig. 9. Rate of growth of plaice, 40—45 cm, emigrated from Vestmanhavn. Exper. May 1910.

As in the fjord experiment, so also here the initial weights under 500 gr are doubled in the course of the first year. By the close of the second year, 3 males showed an increment of in all abt. 1.3 to 2.5 times the initial weight, two females, however, considerably more, *viz.* 2.5 and 4 times the same. The records as to weight are very few for the later recaptures, but there is constantly an indication of difference between the growth of the two sexes. After three years, a male has reached 5 times, after 4 years 12 times its initial weight, a female more than 16 times its initial weight. (150 grown to 1800 gr male; and 160 grown to 2700 gr female).

Among the fish of 500—750 gr, some few males, and the few females recaptured, had, as above, doubled their weight in the first year; most of the males, however, not before the end of the second year, at which time the females have reached twice or three times their initial weight. Two females showed, for 24 and 25 months, an increment of abt. $1^1/_2$ and $1^3/_4$ kg respectively, to 610 and 660 gr initial weight. In 28 months, the only female recaptured had attained five times its initial weight, with an increment of $2^1/_2$ kg.

The fish of 750—1000 gr show somewhat the same for the first year as the preceding class, *viz.* the few recaptured males had even after the lapse of 16—17 months not doubled their weight by increment up to abt. $^1/_2$ kg, while some females, on the other hand, had done so after only 14—15 months, with increments of abt. $^3/_4$—$1^1/_4$ kg; a few females even trebling after 19 and 21 months, increment respectively 1.8 and 1.5 kg.

Table 16. 1911 Experiments.

No. of months between liberation and recapture	Sex	Increment in		Initial size in	
		cm	gr	cm	gr
10	♀	.. 3,5	.. c. 150	41	870
11	♂	1,8 ..	c. 25 ..	36	530
12	♀	.. 10,7	.. c. 845	37	575
17	♀	.. 10,4	.. ..	36	..
18	♂	6,3 ..	c. 300 ..	34	420
39	♂	20 ..	c. 1000 ..	27	265

Of the largest fish marked (1000—1500 gr) only a few were weighed on recapture. These show that here also the weight is doubled in the course of the first year, with increments of abt. $^3/_4$ to abt. 1 kg, and trebled after 2 years.

The 1911 experiments. The few emigrant fish have grown as shown in the accompanying Table 16. Scattered as these observations are, they yet fall in well with the results of the 1910 experiments, as will be seen on comparing the growth of the 34—37 cm fish with the growth curve (Fig. 8). Here also, the growth of the two males is far poorer than that of the females, and that of these again (10.7 cm in 12 months) considerably in excess of that noted for females of the same size up in the fjord. Otherwise, neither these nor the weight increments noted call for further remark. Nothing is known as to maturity.

The 1912 experiments. Here also the growth agrees with the results of the 1910 experiment.

Table 17. Rate of growth of plaice (20—34 cm) liberated in Vestmanhavn and recaptured outside the fjord. Experiments June 1912.

Recaptured in	Period of growth Month	Increment in cm			No. of specimens of initial sizes			Recaptured in	Period of growth Months	Increment in gr			No. of specimens weighed	Initial weight in gr
		Average	Minim.	Maxim.	22—24 cm.	25—29 cm.	30—34 cm.			Average	Minim.	Maxim.		
1912 Dec....	6	2.5	..	..	..	..	1 ♂	1913 Febr...	8	50	..	..	1 ♂	
1913 Febr...	8	2.5	1.8	3.1	..	..	2 ♂	— March .	9	60	..	..	1 ♂	
— March .	9	2.3	..	..	..	..	1 ♂	— May...	11	40	..	..	1 ♂	
— April ..	10	2.7	1.9	3.8	..	..	7 ♂	— June ..	12	c. 200	..	..	1 ♂	
— — ..	10	5.4	4	6.8	..	2 ♂	..	— Aug. ..	14	c. 160	..	..	1 ♂	
— May...	11	3.4	..	..	..	..	1 ♂	— Novb. .	17	460	..	..	1 ♀	
— June ..	12	5.0	..	..	..	..	1 ♂	1914 March .	21	605	310 ♀	900*) ♂	2	200—500
— Aug....	14	8.0	..	..	..	..	1 ♂	— April ..	22	c. 260	100	500	4 ♂	
— Novbr..	17	10.5	..	..	..	..	1 ♀	— May...	23	c. 430	..	..	1 ♂	
1914 Febr...	20	15.7	..	..	..	..	1 ♂	— June ..	24	c. 330	..	..	1 ♂	
— March .	21	10.5	..	..	1 ♀	..	..	— Sept. ..	27	800	..	..	1 ♀	
— — .	21	23.2	..	..	..	1 ♀	..	— Oct....	28	c. 770	..	..	1 ♀	
— — .	21	10.7	6.1	15.2	..	..	2 ♂	— Nov. ..	29	630	435	830	2 ♂	
— April ..	22	6.6	3.7	9.4	..	2 ♂	..	1915 March .	33	c. 670	..	..	1 ♂	
— — ..	22	10.0	..	..	..	..	1 ♂							
— May...	23	9	..	..	..	..	1 ♂	1912 Dec....	6	110	..	..	1 ♂	500—900
— June ..	24	10.5	..	..	..	1 ♂	..	1913 Febr...	8	0	..	..	1 ♂	
— July...	25	9.3	..	..	..	..	1 ♂							
— Sept...	27	14	..	..	..	1 ♀	..							
— Oct....	28	16.5	..	..	..	..	1 ♀							
— Novbr..	29	19.3	..	..	1 ♂	..	..							
— Decbr..	30	13.3	..	..	..	1 ♂	..							
1916 June ..	48	19.1	..	..	..	1 ♂	..							

*) Initial weight 440 gr.

The earliest emigrants, i. e. the 30—35 cm fish, are met with at the close of the first year of the experiment; the smaller sizes at the end of the second, and especially together with the larger, some way on in the third year.

The youngest fish, 20—29 cm, have by the close of the second year after marking grown on an average 11 cm; a single female showed the enormous growth of 23 cm in 21 months, a huge deviation from the average. This is, for the first two years, about equal to the growth noted in this experiment for the plaice of the fjord, and thus also seems to confirm the idea that the migration of these sizes does not begin in earnest until about two years after marking. In the course of the next year — the third — the scattered observations available reveal in some cases an increase in the rate of growth; in others (emigrating later?) a continued and level, but slighter growth.

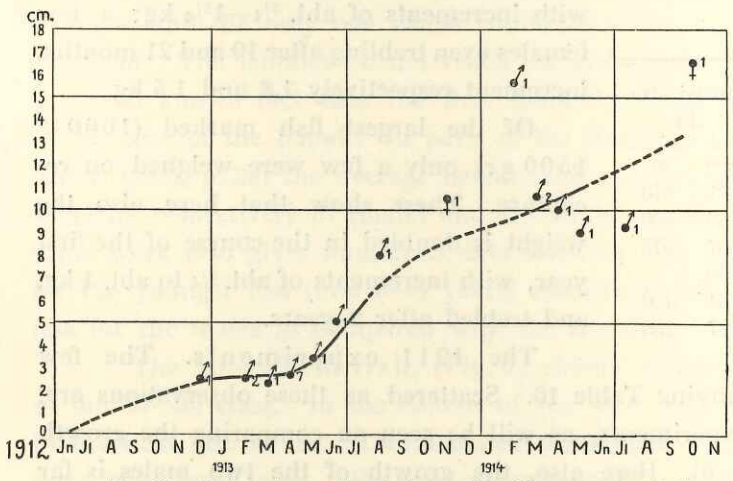

Fig. 10. Rate of growth of plaice, 30—39 cm, emigrated from Vestmanhavn. Exper. June 1912.

The growth is on the whole poorer than that found in the 1910 experiments — the same applies, by the way, also to the fish which had remained in the fjord (1910 and 1912 Expts.).

One of the largest males (initial size 29 cm) is reported as "about ripe" already in April 1913 (growth 4 cm); another. of initial size 22 cm, was taken "ripening" in November 1914 (growth abt. 20 cm) while two females are in March 1914 still characterised as "immature".

The larger fish, of 30—35 cm, (most of which, being presumably 1 year older, commence their migration earlier), present a somewhat different picture. The growth of the first year hardly reaches 5 cm (all ♂); in the course of the second year the recaptures, almost exclusively males, exhibit an average growth of abt. 11 cm (Fig. 10). In two of the males, however, as also the only female taken, the increment is considerable greater, (15.7 cm male, 15.2 cm male, and 10.5 cm female in abt. 20, 21 and 17 months) as also with the only female taken in the third year (16.5 cm in 28 months).

As in the 1910 experiment, (p. 18) so also here, some few of the males were recorded as mature already in the first winter after marking; two others again in the following winter, Febr.—March 1914 though this last is of less importance. As regards the remainder, nothing is known.

The weight of the 200—500 gr fish distinctly shows the poor growth during the first year; not until far on in the second is the initial weight doubled. By the end of this year, when the altered conditions of growth have made themselves felt for some time (?), the best-grown fish have trebled their

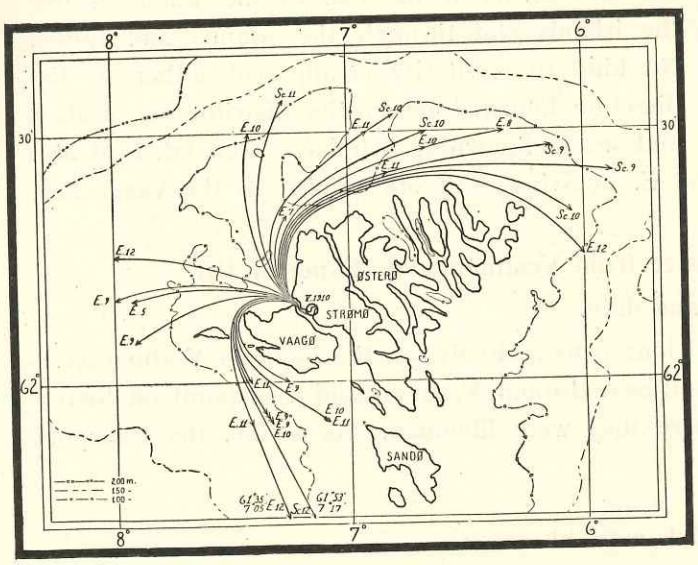

Fig. 11. Recaptures within one year of liberation.

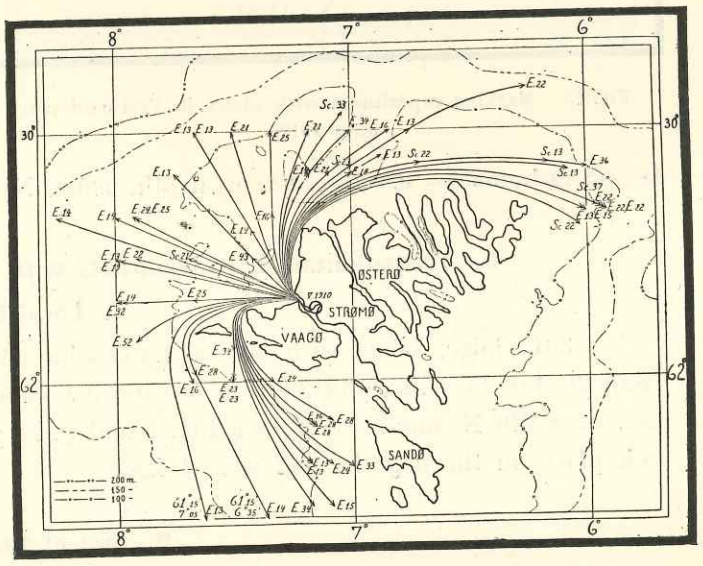

Fig. 12. Recaptures later than one year of liberation.

Marking Experiment with plaice in Vestmanhavn. May 1910. Recaptures made by English (E) and Scottish (Sc) S/T.
The numbers denoting no. of months within recapture.

weight. None of them have attained an increment of 1 kg in the time through which we have been able to follow them, with the exception of the abnormally rapidly growing female, No. 981 (p. 59) of 290 gr initial weight, increment estimated at 1300 gr in 21 months.

In addition to what has been said above as to growth, we may further note that a proper comparison of the conditions affecting growth in and outside Vestmanhavn can first be made until we have, in the following, considered the case of the fish which have been transplanted from the fjord, and thus lived for the entire experimental period outside the same.

6. Migrations.

It was shown in section 3 that migration first commenced at the end of the first year after marking, continuing thenceforward, with constantly younger emigrants, throughout as many years (4 at the outside) as we have been able to follow the career of the fish treated. As regards the question of destination, and supposed direction of migration, reference may be made to the accompanying Figures 11—13.

Practically all the recaptures were made on the main fishing grounds of the foreign trawlers, in a curve from west of Sandø, along the 100 metre limit west of Myggenæs, and northward round Norder-

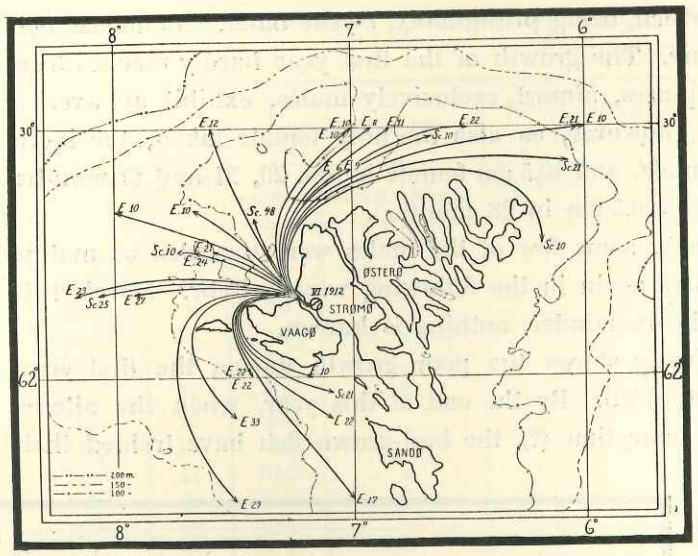

Fig. 13. Marking experiment with plaice in Vestmanhavn. June 1912.

øerne to the grounds north and east of Svinø and Fuglø, which are more especially worked by Scottish vessels. Only very few are seen to have moved out as far as the waters S. of Munken, the southern point of Suderø. It is impossible, of course, here to obtain any strictly accurate view of the migrations as a whole, even if the statements given are quite correct, since in the first place the foreign fishery cannot work every spot in the waters round the islands, and also more particularly because the Færoe fishermen themselves take no part at all in the industry, and we are thus unable to follow the movements of the fish in the waters nearer the islands and through the sounds and fjords. No kind of regularity is apparent either in the direction followed or in the distribution of sizes and sexes. Spawning fish have been taken at abt. 45—65 fathoms (= c. 80—c. 120 m) depth, some N. and E. of Svinø, and others also in the Vaagø Sea.

b. Transplantation experiments with plaice from Vestmanhavn (Experim. II).

1. Locality and date.

301 plaice, taken with the eel hand-seine at various places chiefly on the bank in Vestmanhavn from 30 May to 7 June 1912, were transported in a well-boat through Vestmansund to a point off Slettenæs, at 62°10′ N and 7°16′ W (see Fig. 1 and p. 7) where they were liberated. As a rule, the transport took place on the day the fish were taken.

2. Size of the fish marked.

The great majority of the smaller sizes were liberated up in the fjord; practically speaking, only sizes over 30 cm, chiefly those from 30—40 cm, were transplanted.

Initial size in cm....	20—24	25—29	30—34	35—39	40—44	45—49	50—54	55	Total
No. liberated ♂..	4	6	44	68	7	„	„	„	129
- — ♀..	1	3	69	62	29	5	2	1	172
									301

The average weight is for the great majority abt. 1/2 kg.

3. No. of recaptures.

In these experiments we have to reckon almost exclusively with the recaptures made by foreign fishermen. Altogether, 126 fish were here retaken, or abt. 42 %, of which abt. 37 % by the seagoing boats — i. e. considerably more than with the experiments up in the fjord — naturally enough, since the transplantation took place so near the localities worked by the foreign boats. As regards time elapsing between liberation and recapture, the numbers taken in the first two years were about the same; some few were recaptured 3 years after, none later than these. Here again the recaptures are not evenly distributed over the various months of the year, but most of them fall abt. 9—13 and again abt. 21—23 months after marking, at which times it must be supposed that a particularly intensive fishery takes place, or that the fish keep closer together. That this last should be the case at least with the grown fish is also supported by certain statistics (see p. 40).

Here also, we find in all groups with < 40 cm initial size a higher percentage of recaptures among the males, both as regards the total number taken, and also for the recaptures during the two first years.

Table 18. % of recaptures of plaice transplanted from Vestmanhavn to off Slettenæs June 1912.

Initial sizes in cm	No. liberated at Slettenæs		Recaptured 0—12 months after liberation				Recaptured 13—24 months after liberation				Recaptured 25—36 months after liberation		Total % recaptured by foreign*) fishery	
			outside Vestmanhavn		in Vestmanhavn		outside Vestmanhavn		in Vestmanhavn		outside Vestmanhavn			
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
20—24	4	1	..	..	..	..	..	..	..	..	33.3	..	25.0	..
25—29	6	3	33.3	..	..	33.3	25.0	..	..	..	..	50.0	50.0	33.3
30—34	44	69	25.0	16.0	..	1.5	25.0	12.5	3.0	..	..	6.1	45.5	31.9
35—39	68	62	23.5	16.1	2.9	6.5	18.0	14.6	..	2.1	2.4	..	38.2	27.4
40—44	7	29	28.6	27.6	..	7.0	40.0	21.1	..	..	..	6.7	57.1	44.8
45—49	..	5	..	20.0	..	..	..	25.0	..	..	..	..	..	40.0
50—54	..	2	..	50.0	..	..	..	100.0	..	..	..	..	..	100.0
55—59	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Total...	129	172	24.8	18.0	1.6	4.7	21.3	15.2	1.0	0.8	2.7	4.5	41.9	33.1
	301		20.9		3.4		18.0		0.9		3.8		36.5	

*) i. e. chiefly British.

The percentage of recaptures here is, altogether different trom that in Exp. I, nearly alike for the first year and that following, and also almost alike both for the fairly well represented different size groups. Here also there seems to be a slight indication that the males, among the smaller sizes, move out earlier over the territorial limit, as the percentage of recaptures in the two first years among 30—34 cm fish (males) is 25 and 25 respectively as against 16 and abt. 13 for the females.

4. Nationality of the fishermen.

Below are shown the numbers of recaptures made by Færoe and foreign fishing vessels.

Færoe F. B.	Danish Fishery	English S/T	Scottish S/T	Dutch S/T	Total recaptured	% of recaptures made by British S/T
2	12	92	19	1	126	88.1

Here also the altogether predominant position of the British fishery is apparent. Worth noting also, is the not inconsiderable number of Danish recaptures, all made in Vestmanhavn, whither some of the fish must thus have returned shortly after marking.

5. Growth.

Increment of length and weight.

Of the smallest, youngest fish marked, only the following six specimens of known growth were recaptured.

♂	24 cm	in	5	months	grown	7 cm
♀	28 -	-	7	—	6	-
♂	29 -	-	7	—	7	-
♂	29 -	-	11	—	7	-
♂	28 -	-	20	—	16.6	-
♀	26 -	-	27	—	21.5	-

Only one, the ♂ 28 cm, is recorded as spawning (February 1914); the state of maturity in most of the other cases is unknown.

Table 19. Rate of growth of plaice (30—50 cm l.), transplanted from Vestmanhavn to off Slettenæs. June 1912.

Recaptured in	Period of growth Months	Increment in cm			No. of specimens	Initial size in cm
		Average	Minim	Maxim.		
1912 Oct. . . .	4	4.8	2.5 ♀	7 ♀	3	30—39
— Dec. . . .	6	5.0	3 ♂	7 ♀	2	
1913 Jan. . . .	7	7.7	5.5 ♀	9.8 ♂	2	
— Febr. . .	8	5.5	3.4 ♂	7.6 ♀	2	
— March .	9	6.3	4.2 ♂	9.2 ♀	3♀+6♂	
— April . .	10	6.6	4.8 ♂	9.5 ♀	5♀+7♂	
— May . . .	11	6.7	3.5 ♀	9.4 ♂	5♀+5♂	
— June . .	12	9.9	6 ♂	13 ♀	4♀+4♂	
— July . .	13	8.2	7	10.5 ♂	3	
— Aug. . .	14	9.8	5 ♀	13 ♂	2♀+1♂	
— Sept. . .	15	9.7	8.4	11	2♂ **)	
— Oct. . . .	16	12.7	9.6 ♂	15 ♀	2♀+1♂	
— Nov. . .	17	14.3	11.8 ♂	16.8 ♀	2	
— Dec. . . .	18	15.6	. .	. .	1 ♀	
1914 Jan. . . .	19	13.4	9.8	15.6 ♀	1♀+4♂	
— Febr. . .	20	12.5	11.4 ♀	13.5 ♂	2	
— March .	21	11.5	9.3 ♂	13.9 ♂	2♀+4♂	
— April . .	22	17.0	. .	. .	1 ♂	
— May . . .	23	15.6	15.4	15.7	2 ♀	
— Aug. . .	26	20.0	. .	. .	1 ♀	
— Sept. . .	27	16.8	. .	. .	1 ♀	
1915 Jan. . . .	31	19.3	. .	. .	1 ♂	
1912 Oct. . . .	4	4	. .	. .	. .	1 ♀
— Nov. . .	5	6.9	6.7	7	2 ♀	. .
1913 March .	9	3.0	. .	. .	1 ♂ *)	. .
— April . .	10	7.3	6.5 ♀	8.0 ♂	2	. .
— May . . .	11	7.3	5.5	9.5	3 ♀	. .
— —	11	4.5	. .	. .	. .	1 ♀
— June . .	12	7.0	6 ♂	8 ♀	2	. .
— July . .	13	10.7	10.3	11	2 ♀	. .
— —	13	5.0	. .	. .	. .	1 ♀
— Sept. . .	15	5.0	. .	. .	1 ♂	. .
— Oct. . . .	16	12.0	. .	. .	1 ♀	. .
1914 Febr. . .	20	9.5	. .	. .	. .	1 ♀
— April . .	22	9.0	. .	. .	1 ♂	. .
— Oct. . . .	28	14.3	. .	. .	1 ♀	. .

*) recaptured in Vestmanhavn.
**) Add. ♀ (+ 11 cm) (recaptured in Vestmanhavn).

Table 20. Rate of growth of plaice, transplanted from Vestmanhavn to off Slettenæs. June 1912.

Recaptured in	Period of growth Months	Increment in gr			No. of specimens	Initial weight in gr
		Average	Minim.	Maxim.		
1912 Oct. . . .	4	270	. .	. .	1 ♀	240—500
— Nov. . . .	5	95	0 ♀	185 ♂	2	
1913 Jan. . . .	7	350	200	500	2 ♂	
— March . .	9	190	140	240	2 ♀	
— April . . .	10	275	225 ♀	310 ♂	3	
— May . . .	11	350	210 ♀	450 ♂	4	
— June . . .	12	c. 450	c. 250 ♂	c. 700 ♂	3	
— July . . .	13	c. 430	c. 250	600	2 ♂	
— Aug. . . .	14	500	. .	. .	1 ♀	
— Sept. . . .	15	715	. .	. .	1 ♂	
— Nov. . . .	17	570	400	740	2 ♂	
— Dec. . . .	18	1000	. .	. .	1 ♀	
1914 Jan. . . .	19	920	800 ♂	1035 ♀	2	
— March . .	21	c. 700	570 ♂	820 ♀	3	
— May . . .	23	1000	. .	. .	1 ♀	
— Aug. . . .	26	c. 1410	. .	. .	1 ♀	
— Sept. . . .	27	c. 1350	1330	1375	2 ♀	
1912 Oct. . .	4	250	. .	. .	1 ♂	510—980
— Nov. . .	5	600	. .	. .	1 ♀	
— Dec. . .	6	c. 320	145 ♂	480 ♀	2	
1913 Jan. . .	7	310	. .	. .	1 ♀	
— March .	9	320	20	560	3 ♂	
— April .	10	c. 330	70 ♂	560 ♂	6	
— May . .	11	c. 510	400 ♂	680 ♀	5	
— June . .	12	c. 680	450 ♀	910 ♂	3	
— July . .	13	c. 500	c. 190	c. 870	3 ♀	
— Aug. . .	14	c. 280	. .	. .	1 ♀	
— Sept. . .	15	600	. .	. .	1 ♀	
— Oct. . .	16	970	590 ♂	1150 ♀	3	
— Nov. . .	17	1280	. .	. .	1 ♀	
1914 Jan. . .	19	810	580	1220	3 ♂	
— Febr. .	20	910	840 ♀	980 ♂	2	
— March .	21	500	. .	. .	1 ♂	
— April .	22	c. 630	. .	. .	1 ♂	
— May . .	23	1240	. .	. .	1 ♀	
— Oct. . .	28	1720	. .	. .	1 ♀	
1912 Nov. . .	5	700	. .	. .	1 ♀	1000—1490
1913 May . .	11	c. 650	250	c. 1050	2 ♀	
— July . .	13	1220	. .	. .	1 ♀	
1912 Oct. . .	4	600	. .	. .	1 ♀	1500—1700
1913 July . .	13	725	. .	. .	1 ♀	
1914 Febr. .	20	1600	. .	. .	1 ♀	

The growth is, as will be seen, as good as that of the best grown fish in the previous experiments, and in several cases even considerably better.

The 30—39 cm fish comprise the great majority of the transplanted plaice (Fig. 14 and tables). The average length increment here is abt. 8—9 cm in the first year, with maximum 13 (female) and 10.3 (male) i. e. altogether unparalleled in the Vestmanhavn experiments either among the fish remaining in the fjord or those emigrating thence.

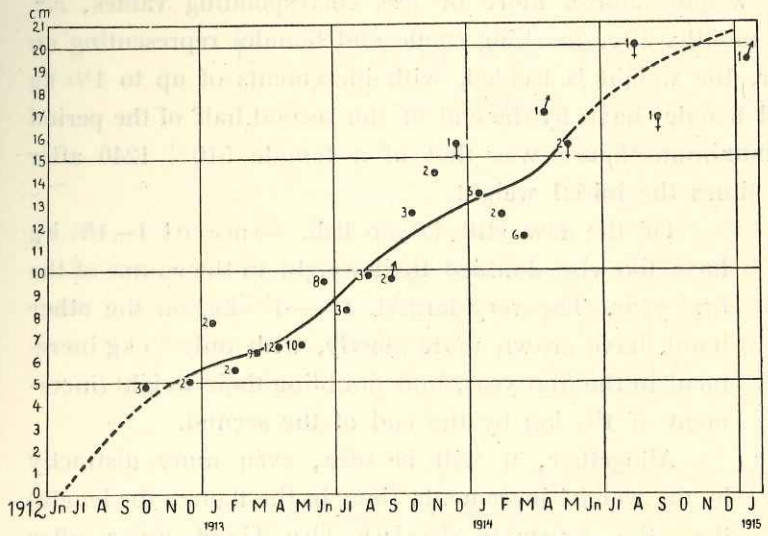

Fig. 14. Rate of growth of plaice, 30—39 cm, transplanted from Vestmanhavn to off Slettenæs. Exper. June 1912.

The curve further shows that a retardation of the growth rate is also here apparent in autumn and winter. The measurements for the following year indicate the same phenomenon, but less reliable, as the number of recaptures are somewhat small. The average growth seems, however, to be abt. 8 cm, but is, as in the first year, distinctly higher in most of the females than in the males. Several females had by the middle of this period already grown 14.5—17 cm, while males captured at the same time showed only 9.5—12 cm The growth can be followed a little way on into the third year; there are two females, for instance, which after 26 and 27 months had grown 20 and 16.8 cm respectively. None were recaptured after January 1915. The growth here, up to the end of the second and some way on in the third year, corresponds nicely to that of the emigrant fish from the 1910 experiment, also up to the end of the second year after marking (see Fig. 8). As to the degree of maturity we have but little information available. Some few males were, however, found spawning already in the first winter after marking, as in the case of the 1910 experiment; several in the course of the following winter and spring (March—April) as also a single female May 1914. It should be noted however, that all these belonged to the largest (oldest) of the group, with initial sizes over 35 cm.

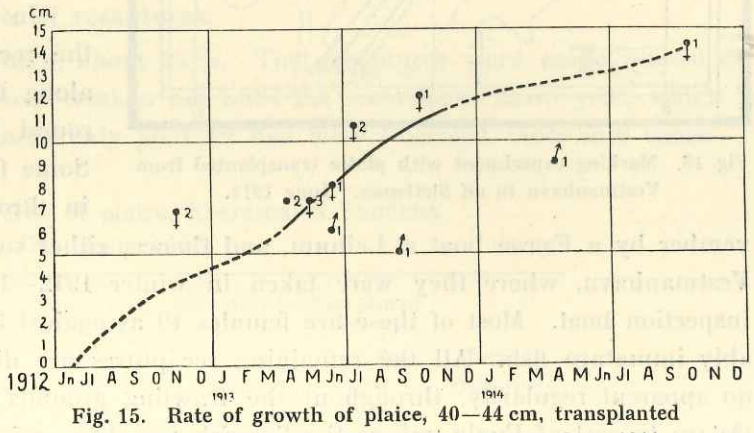

Fig. 15. Rate of growth of plaice, 40—44 cm, transplanted from Vestmanhavn to off Slettenæs. Exper. June 1911.

Among the largest fish, 40—49 cm, the females have grown as well as those of the preceding group; i. e. the length is increased by abt. 8 cm in the first year. A single female was found spent in April 1913, otherwise nothing is known as to maturity. The growth proceeds at the same rate some little way on into the second year, while the males are far behind in this respect (see Fig. 15). One of the largest females again, had also grown slowly, *viz.* only (50 +) 5 cm in 13 months. Finally, comparison with Fig. 15 will show that the 1910 experiment revealed quite the same growth for the emigrant sizes of 40—49 cm in the second year after marking, the first year's growth of these, however, being far poorer.

The weight increment amounts in the first year alone to up to $^1/_2$ kg, i. e. a doubling of the initial weight in some of the smallest fish, 200—500 gr; in the course of the second year, most have

doubled their weight. By the end of this year (second growth period) the increment is abt. 1 kg, i. e. the weight at time of marking is trebled. By the following August—September (1914) the three females recaptured have reached 5 and 7 times their initial weight respectively, which agrees well with the results of the 1910 experiment (p. 19).

The next category (500—950 gr initial weight) shows more or less corresponding values, *viz.* doubling in some by 9—10 months, in most 12 months after marking (male and female) representing an increment of abt. $^1/_2$ to $^3/_4$ kg. In the next year, the weight is trebled, with increments of up to $1^1/_4$ kg in all in the best grown, while others (male and female) have by the end of the second half of the period only reached double the initial weight. The maximum figure was that of a female 510 + 1240 after 23 months, i. e. an increment amounting to $2^1/_2$ times the initial weight.

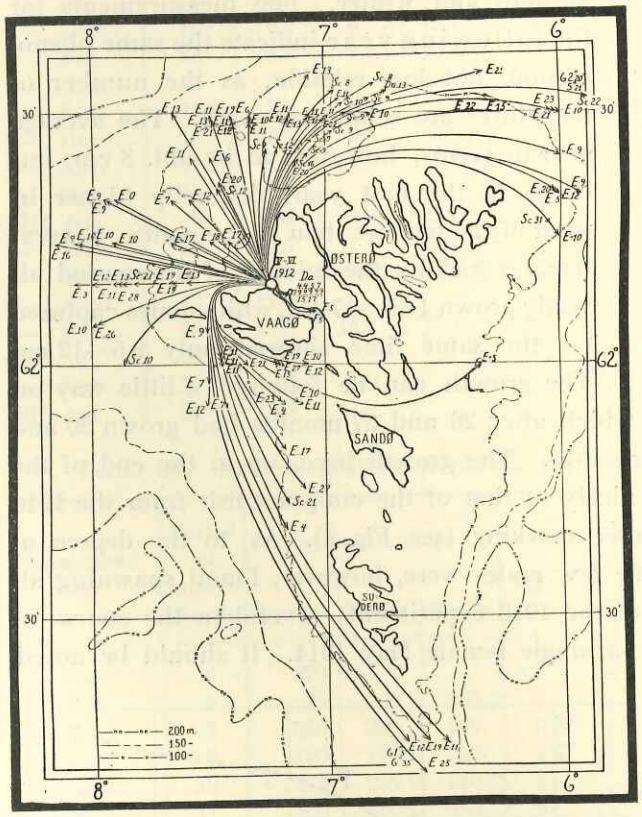

Fig. 16. Marking experiment with plaice transplanted from Vestmanhavn to off Slettenæs. June 1912.

Of the few still larger fish, some of 1—$1^1/_2$ kg have likewise doubled their weight in the course of the first year. The very largest, $1^1/_2$—$1^3/_4$ kg, on the other hand, have grown more slowly, with only $^3/_4$ kg increment in the first year, and doubling their weight (increment of $1^1/_2$ kg) by the end of the second.

Altogether, it will be seen, even more distinctly in the weight increments than in the figures for length, that the growth during the first year after marking is essentially higher in the transplanted fish. In the second year, and also in the year after, the difference between these and the fish which have gradually emigrated out from Vestmanhavn becomes effaced, while those remaining in the fjord continue, as far as we can see, with a considerably lower rate of growth.

6. Migrations.

In the course of the first year after transplantation, the recaptures already appear fairly widely scattered along the open coast from Myggenæs and northward round the islands, along the 100 m curve (Fig. 16). Some few, chiefly those of smaller size, have moved in through the sound, where two were taken in November by a Færoe boat at Leinum, and thence, either southward to south of Sandø, or back again into Vestmanhavn, where they were taken in winter 1912—13 and even as late as November 1913 by the Inspection boat. Most of these are females (9 as against 3 males) of abt. 35—40 initial size, i. e. presumably immature fish. All the remaining recaptures are distributed as usual in these experiments, with no apparent regularity, throughout the trawling grounds from Myggenæs northward round Strømø and Østerø to east of Fuglø, where the Scottish vessels especially work. Some few were taken W. of Suderø and Sandø and in the waters S. of Munken, south of Suderø.

The particularly numerous recaptures referred to as made abt. 8—11 and 14—22 months after marking are chiefly distributed among four areas, *viz.* NW. and W. of Myggenæs (abt. 100—120 m) N. of Østerø and Strømø (similar depth), NE. of Fuglø (do.) and finally, in the water NW. of Sandø, round Guttagrind (depth abt. 80 –100 m). Several of the fish here taken in this period were full. We may therefore conclude that these areas represent at any rate some of the spawning grounds of the plaice round

the Færoes. We know, however, from our other investigations, that spawning also takes place, and perhaps on a larger scale, in other parts of the coastal zone, where the local conditions, however, render trawling impossible, and thus preclude recapture of the marked fish (see p. 33—34).

B. Marking experiments with plaice from Sundene.

a. Ordinary marking experiment (Exper. III).

1. Locality and date.

"Sundene" (The sounds) are the narrow sound running NNW.—SSE. between Strømø and Østerø. In the middle of the fjord there are depths from 50—60 metres, but thresholds with considerably shallower water lie partly in the middle (Sundelagen), partly in the northern mouth between Ejde and Haldersvig, both places with less than 10 metres of water across the fjord. It is at the latter place that the fish here in question were taken (Fig. 1, p. 8).

Of the plaice fished in the sounds June 1912, 125 were marked on the spot.

2. Size of the marked fish.

The numbers liberated are shown below:

Initial size in cm.	20—24	25—29	30—34	Total
♂	32	37	3	72
♀	31	20	2	53

Initial weight in gr..	100—250	300—450	Total
♂ + ♀	112	13	125

The principal interest of this experiment lies in the fact that so many fish of the lengths 20—29 cm were marked, so that we are here probably able to arrive at a correct determination of the growth.

3. No. of recaptures.

The percentage of recaptures is rather high, about 25 %. The recaptures were made almost exclusively by foreign vessels. Most of the fish were retaken not until the second and third year, which is natural in view of the fact that in this experiment only younger fish were liberated, close into shore.

Table 21. % of recaptures of plaice, liberated in Sundene.
Exp. III. June 1912.

Initial sizes in cm	No. liberated at Ejde		Recaptured 0—12 months after liberation		Recaptured 13—24 months after liberation		Recaptured 25—36 months after liberation		Recaptured 37—49 months after liberation		Total % recaptured	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
20—24.....	32	31	3.1	3.2	—	10.0	6.4	7.4	—	8.0	9.4	25.8
25—29.....	37	20	2.7	—	16.3	25.0	3.3	20.0	—	8.3	21.6	45.0
30—34.....	3	2	33.3	50.0	100.0	—	..	..	..	..	100.0	50.0
Total ..	72	53	4.2	3.8	11.6	15.7	4.9	11.6	..	7.9	19.5	33.9
	125		4.0		13.3		7.7		3.1		25.6	

4. Nationality of the fishermen.

The numbers of recaptures made by Færoe and foreign fishing vessels are as follows:

Færoe f. b.	Danish fishery	English S/T	Scottish S/T	Total
1	1	26	4	32

The great majority of the foreign vessels participating are as usual British.

5. Growth.

Increment of length and weight.

Almost exclusively sizes below 30 cm were, as mentioned above marked in the Sundene. We know nothing as to their growth in these waters, as they are not retaken until they have moved out farther

Table 22. Rate of growth of plaice (22—30 cm) liberated between Ejde and Haldorsvig and recaptured by foreign fishermen. Exp. June 1912.

Recaptured in	Period of growth Months	Increment in cm			No. of specimens of initial sizes		Recaptured in	Period of growth Months	Increment in gr			No. of specimens weighed	Initial weight in gr
		Average	Minim.	Maxim.	22—24 cm	25—29 cm			Average	Minim.	Maxim.		
1913 March .	9	5.0	..	..	1 ♀*)	..	1913 April ..	10	c. 150	..	..	1 ♂	350
— April ..	10	6.0	..	..	1 ♂	..	— May ...	11	310	250 ♂	370 ♀	2	350, 390
— — ..	10	7.3	..	..	..	1 ♂	— Sept. ..	15	c. 620	..	..	1 ♀	310
— May ...	11	7.7	7.1 ♂	8.2 ♀	..	2**)	— Dec. ...	18	720	..	..	1 ♀	220
— Sept. ..	15	13.7	..	..	..	1 ♀	1914 Jan. ..	19	320	..	..	1 ♀	270
— Oct. ...	16	13.6	..	..	..	1 ♂	— Feb. ...	20	550	..	..	1 ♂	280
— Dec. ...	18	18.3	..	..	1 ♀	..	— March .	21	c. 475	400 ♂	560 ♂	6	210—350
1914 Jan. ...	19	15.4	..	..	1 ♀	..	— May ...	23	c. 400	250 ♂	530 ♀	2	240—310
— Feb. ...	20	14.2	..	..	..	1 ♂	— June ..	24	775	750	800	2 ♀	180—280
— March .	21	14.5	..	..	1 ♀	..	— Aug ...	26	835	830 ♂	840 ♀	2	145—235
— — .	21	14.4	12.8 ♂	16.4 ♂	..	3	— Nov. ..	29	950	..	..	1 ♀	195
— — .	21	11.9	10.5	13.3	..	2 ♂**)	— Dec. ...	30	1170	..	..	1 ♂	185
— May ...	23	12.0	10.2 ♂	13.8 ♀	..	2	1915 May ...	35	1600	..	..	1 ♀	330
— June ..	24	19.8	..	..	1 ♀	..	1916 Feb. ...	44	c. 1825	1800	1850	2 ♀	205, 170
— — ..	24	17	..	..	..	1 ♀							
— Aug. ..	26	20	..	..	1 ♂	..							
— — ..	26	19	18 ♀	20 ♂	..	2							
— Nov. ...	29	19.6	..	..	..	1 ♀							
— Dec. ...	30	22.1	..	..	1 ♂	..							
1915 Feb. ...	32	22.8	..	..	1 ♀	..							
— April ..	34	25.2	..	..	1 ♀	..							
— May ...	35	24.5	..	..	..	1 ♀							
1916 Feb. ...	44	29.7	..	..	1 ♀	..							
— — ..	44	30	..	..	..	1 ♀							
— July ...	49	33	..	..	1 ♀	..							

*) Recaptured in Vestmanhavn. **) Initial size 30 cm.

from the coast, to the grounds worked by the foreign vessels. As will be seen from the Table 22, and Fig. 17, we can trace the average growth right from the close of the first year to the end of the fourth.

Fig. 17 shows that this is remarkably even, and uniform for practically all the recaptured fish, whence we may conclude that the migration takes place soon after marking, or at any rate that the marked fish have lived for the greater part of the time under uniform external conditions. The length increment averages abt. 9 cm annually during the first and second years after marking, and something similar seems to be the case for the third year; even by the close of the fourth year the only fish then retaken, a female of 23 cm initial length, had attained a total length increment of 33 cm answering to abt. 8 cm per annum throughout the period. Altogether, the growth here agrees well with the results of

the transplantation experiments in 1912, at any rate, as regards the females; the growth of the males is then poorer. During the first thirty months, however, there is here no difference in the growth of the two sexes; after that time, only females were recaptured.

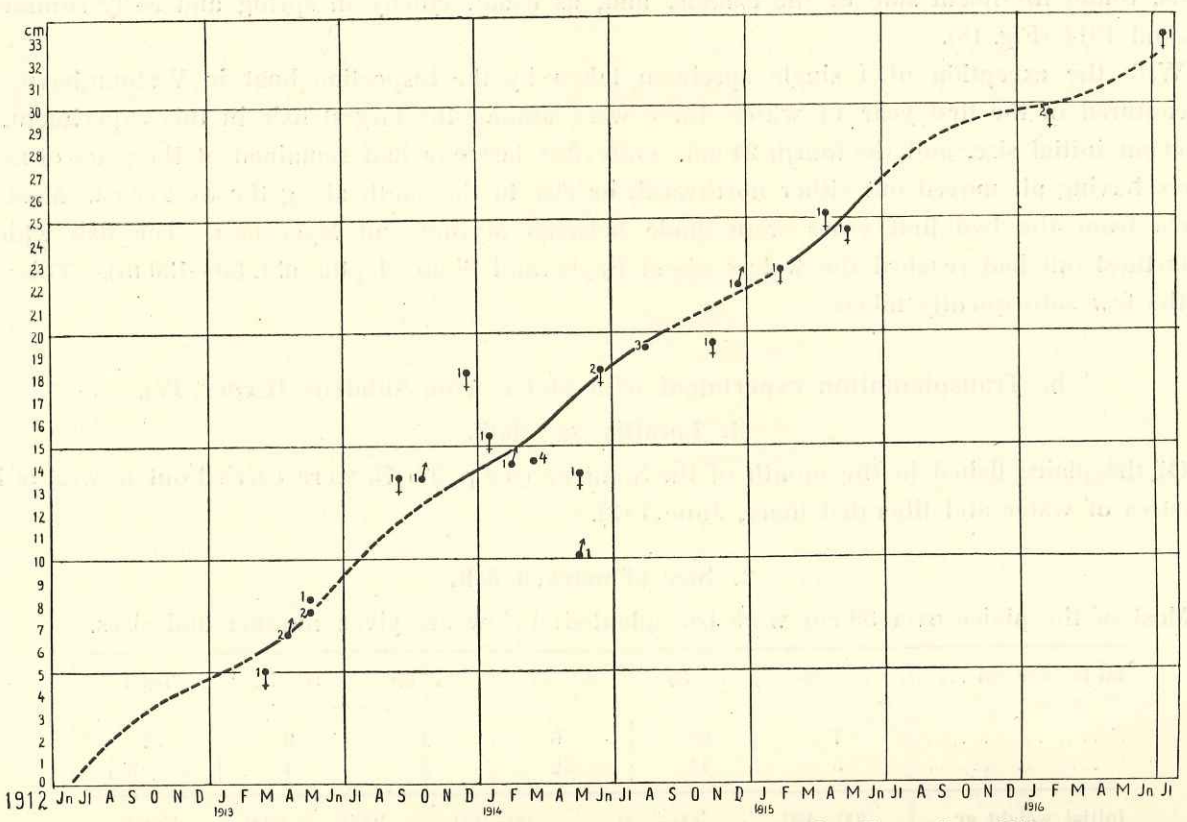

Fig. 17. Rate of growth of plaice, 22—29 cm, liberated at Ejde. Exper. June 1912.

The growth within the single years cannot be followed in detail; there is, however, a suggestion of retardation during winter in the recaptures from 1913 and 1914—15.

The size group 30—34 cm is represented only by a single individual among the recaptures, this showing a growth entirely corresponding to the far more numerously represented 35—29 cm fish, which were transplanted (see p. 31 and Fig. 19).

Weight increment.

The fish marked, practically all between abt. 150—350 gr initial weight, have doubled the weight in 11 months, trebled it in 15—16 (increment abt. 1/2 kg) and have reached four or five times their initial weight at the close of the second year. After a total period of 29—30 months, the weight increment is abt. 1 kg; after abt. 3 years 1 1/2 kg, answering to six or seven times the initial weight. The females are, as mentioned, greatly in the majority among the recaptures.

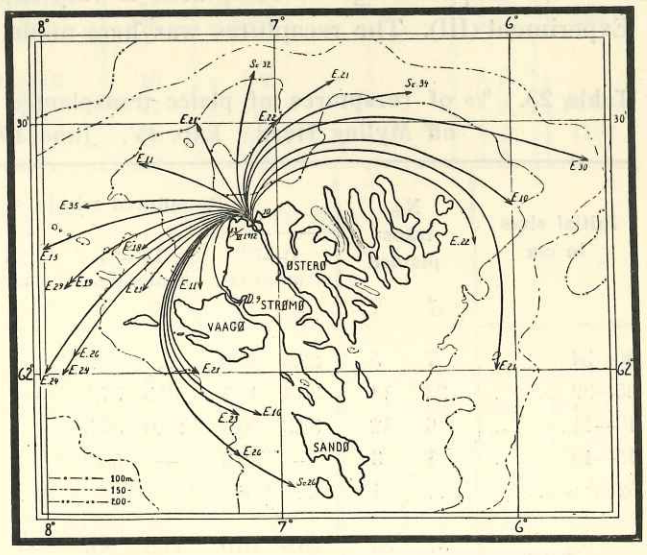

Fig. 18. Marking experiment with plaice in Sundene. June 1912.

6. Migrations.

A single specimen had moved from the sounds in to Vestmanhavn, and one was taken by a Færoe fisherman close to the marking place; otherwise, most of the remainder were taken, as in the earlier experiments, round the north side of the islands, and, as usual, chiefly in spring and early summer both in 1913 and 1914 (Fig. 18).

With the exception of a single specimen taken by the Inspection boat in Vestmanhavn, only 4 were recaptured in the first year of which three were among the largest fish in this experiment, being of 29—30 cm initial size, and the fourth 24 cm. Only this last one had remained at the place of marking, the others having all moved out either northward, or else to the south along the west coast. Most of the recaptures from the two first years were made between Myling and Myggenæs. The fish which had moved farthest out had reached the waters about Fuglø and Skuø (depths abt. 80—130 m). This applies also to the few subsequently taken.

b. Transplantation experiment with plaice from Sundene (Exper. IV).

1. Locality and date.

Of the plaice fished in the mouth of the Sundene (see p. 27) 75 were carried out to west of Myling in 80 metres of water and liberated there, June 1912.

2. Size of marked fish.

Most of the plaice over 30 cm were transplanted; below are given number and sizes.

Initial size cm	30—34	35—39	40—44	45—49	50—52	Total
♂	7	23	6	1	0	37
♀	5	14	12	3	1	35 + 3*)

Initial weight gr ..	300—450	500—750	800—950	1000— > 1200	Total
♂ + ♀	6	42	16	11	75

*) sex unknown.

3. No. of recaptures.

The percentage of recaptures is very high, abt. 50 %, as against about half this in the inshore Experiment (III). The recaptures was here made exclusively by foreign vessels. Agreeing with the previous results, we find also here a gradually decreasing intensity of capture from year to year of the only older fish liberated in this experiment outside the territorial limits, as against Exp. III with the only younger fish, marked close inshore. As in the previous experiments, so also here most of the recaptures fall in the spring and early summer (of 1913 and 1914). This then appears to be a regular phenomenon, most probably connected with the fact, as shown by statistics, that the percentage of large (and medium) plaice in total catch is especially high in the spring.

Table 23. % of recaptures of plaice transplanted from Sundene to off Myling Head. Exp. IV. June 1912.

Initial sizes in cm	No. transplanted		Recaptured within 0—12 months		13—24 months		25—36 months		Total % recaptured by foreign fishermen	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
30—34	7	5	28.6	20.0	..	..	..	..	28.6	20.0
35—39	23	14	30.4	42.7	12.5	37.5	—	40.0	39.1	78.6
40—44	6	12	33.3	50.0	25.0	33.3	..	..	50.0	66.6
45—49	1	3	—	33.3	—	50.0	..	..	..	66.6
52	..	1	..	—	.	—	..	..	..	—
Total ...	37	35	29.8	40.0	11.5	28.6	—	11.1	37.9	62.9
	72 + 3		33.3		20.0		5.0		49.3	

4. Nationality of the fishermen.

The numbers of recaptures made by Færoe and foreign fishermen are as follows:

English S/T	Scotch S/T	Total
29	8	37

Scottish trawlers took the greatest portion of marked fish in this for all experiments. The locality of transplantation here also lies nearer to the areas more particularly worked by the Scottish vessels than in the earlier experiments.

5. Growth.

Increment in length.

The 35—39 cm fish have grown exceedingly well during the first year after transplantation, with an average of abt. 10 cm, i. e. at least as much as the 30—39 cm fish transplanted from Vestmanhavn to the waters off Slettenæs, and better than the somewhat younger fish taken after migration from the

Table 24. Rate of growth of plaice (35—45 cm) transplanted from Sundene to off Myling (62°20′ N., 7°9′ W.). Experiments June 1912.

Recaptured in	Period of growth Months	Increment in cm			No. of specimens of initial sizes		Recaptured in	Period of growth Months	Increment in gr			No. of specimens weighed	Initial weight in gr.
		Average	Minim.	Maxim.	35—39 cm	40—43 cm			Average	Minim.	Maxim.		
1912 Oct. . . .	4	5.2	..	..	1 ♂	..	1912 Oct. . . .	4	300	..	..	1 ♀	
— — . . .	4	4.2	3.5	4.8	..	2 ♀	— Nov. .	5	c. 400	..	..	1 ♀	
— Nov. . .	5	7.2	..	..	1 ♀	..	— Dec. . .	6	c. 400	c. 280	520	2 ♂	
— Dec. . . .	6	4	..	..	1 ♂	..	1913 Febr. . .	8	410	..	..	1 ♀	
— — . . .	6	7	..	..	..	1 ♂	— April . .	10	c. 300	c. 220	c. 320	3 ♂	
1913 Febr. .	8	7.4	..	..	1 ♀	..	— May . . .	11	c. 450	c. 320 ♂	520 ♂	3	
— March .	9	2.9	..	..	..	1 ♀	— June . .	12	c. 410	300	520	3 ♀	500—
— April . .	10	8.2	6.3 ♂	9.5 ♂	5	..	— Aug. . .	14	c. 665	400 ♂	930 ♀	2	950
— — . .	10	4.5	..	..	..	1 ♀	— Sept. . .	15	c. 950	..	..	1	(600)
— May . . .	11	9.3	8 ♂	10.3*) ♀	3	..	— Nov. . .	17	1730	..	..	1 ♀	(760)
— — . . .	11	6.6	..	..	..	1 ♀	1914 Jan. . . .	19	1600	..	..	1 ♀	(630)
— June . .	12	8.7	7 ♀	11 ♀	3 ♀	..	— Febr. . .	20	1200	..	..	1 ♀	(815)
— — . .	12	8.5	7 ♀	10 ♂	..	2	— March .	21	c. 400	..	..	1 ♀	
— July . . .	13	10.2	..	..	1 ♂	..	— July . .	25	c. 1200	..	..	1 ♀	(580)
— — . . .	13	11*)	..	..	..	1 ♀**)							
— Aug. . .	14	7.2	..	..	1 ♂	..	1913 April . .	10	c. 200	..	..	1 ♀	
— — . .	14	9.8	..	..	..	1 ♀	— May . . .	11	c. 500	..	..	1 ♀	1000—
— Sept. . .	15	14	..	..	1	..	— June . .	12	c. 530	..	..	1 ♂	1150
— Nov. . .	17	13	..	..	..	1 ♀	— July . . .	13	c. 800	..	..	1 ♀	
1914 Jan. . .	19	17.3	..	..	1 ♀	..							
— Febr. . .	20	12.5	..	..	1 ♀	..							
— March .	21	8.5	..	..	1 ♀	..							
— July . .	25	16.3	..	..	1 ♀	..							
1915 Febr. . .	32	23.1	..	..	1 ♀	..							

*) Init. size 34 cm. **) Init. size 45 cm.

sounds. The later observations, which are extremely scattered, show that in any case some of the females continue their rapid growth for a time, abt. 16 and 23 cm in 25 and 32 months respectively, but the average seems to decline considerably. The males are too few to permit of comparison between their growth and that of the females; for the first year at any rate it is only slightly inferior (Fig. 19).

The largest fish, of 40—43 cm are likewise all transplanted (Fig. 20). Here also we have only satisfactory growth measurements from the first year of the experiment, and the growth appears to vary considerably, with an average hardly over abt. 9 cm for that period, answering to the transplanted fish

in Exp. II, abt. 10 and abt. 13 cm in the following 14 and 17 months, in two females. Altogether, then, the length increment is here seen to be inferior to that of the 35—39 cm group. Only 2 males were recaptured during the first year, both with a growth equal to the best of the females.

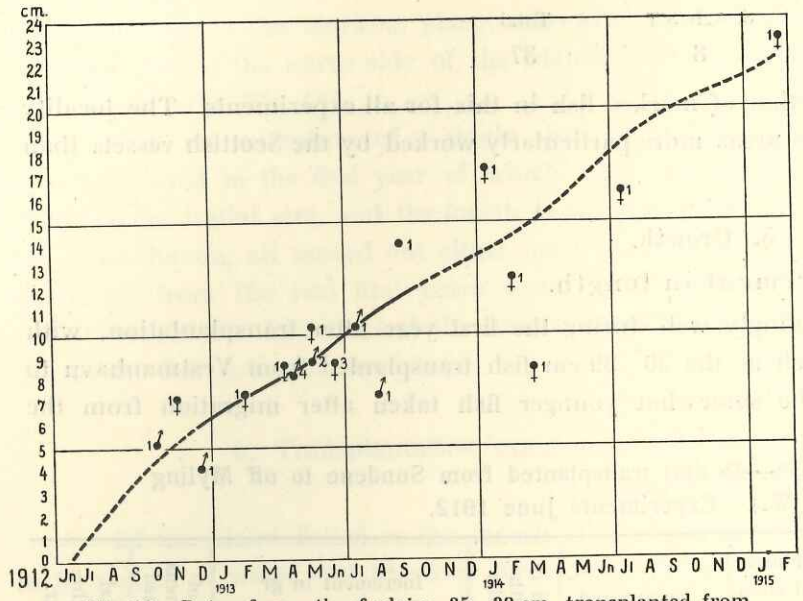

Fig. 19. Rate of growth of plaice, 35—39 cm, transplanted from Sundene to off Myling. Exper. June 1912.

As regards time at which maturity is reached, the few reliable records are all from the early spring (March) and show, after only 9 months from time of marking, females having attained or nearing maturity, and spent males, all over 35 cm; i. e. among the largest (and oldest) of the fish marked.

Weight increment.

The 1/2—1 kg fish, double their weight in the first year, and treble it from about the middle of the second. All this refers to the females. The weight increment of the males (less than 1/2 kg) in the first year only amounts in some few cases to a doubling of the weight at time of marking. Some of the females have reached an increment of 1/2 and 1 kg only 6 and 15 months after marking. The few still larger fish, of 11—1200 gr, naturally show a slower growth also in the weight increment, this being here only a little over 1/2 kg for the whole of the first year (cf. Exp. II).

Altogether then, we find that the growth here and in the inshore experiment in Sundene is as good as or better than that of the best grown in the earlier experiments, i. e. those transplanted to Slettenæs. The annual length increment is abt. 9—10 cm in the 2—3 years for which we can follow at any rate the groups 20—29 and 30—39 cm after marking. It is uniform for male and female in the former category, and lower for the males of the latter.

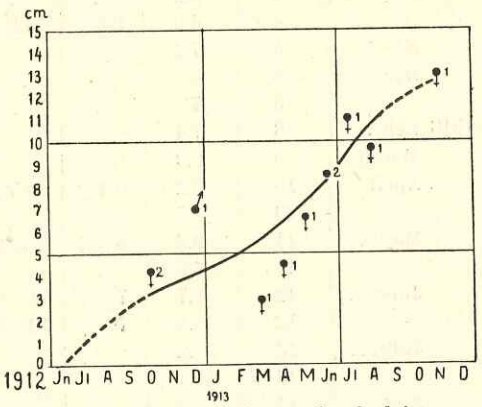

Fig. 20. Rate of growth of plaice, 40—43 cm, transplanted from Sundene to off Myling. Exp. June 1912.

6. Migrations.

Most of the recaptures were made in the waters round Myling and Myggenæs, and between these, from 5 to 20 miles distant from land. Some few had gone to west of Sandø, and several to north of Strømø and Østerø. Males and females appear to move equally far and both without any apparent rule of direction (Fig. 21).

C. Concluding remarks.

1. Growth of the Færoe plaice.

As will be seen from the foregoing, our marking experiments here have cleared up several points in the biology of the Færoe plaice. Taken together with the results of earlier investigations — our own and others — in the coastal waters, they afford an idea as to at any rate the conditions of growth, which may here be briefly described.

The grown plaice are found living round al lthe islands out on the coastal bank to abt. 130—150 m.

Growing fish are met with nearer land, the younger and youngest year classes being taken, for instance, up in the fjords and bays, where the nature of the bottom is such as to allow of fishing being carried on.

Spawning takes place on the coastal bank, and presumably there alone, neither eggs nor the smallest pelagic fry having yet been taken in the fjords[1]. Fig. 22 will show where pelagic eggs have been taken; it should be noted in the first place that no eggs were found outside the 200 metre limit, or inside the 75 metre limit, and further, that none were taken in January-February-early March (1911) at the stations where they were found later on, i. e. from mid March to mid May. All the eggs were taken at surface at 5.8°—7.4° C.

From this, then, the spawning time would seem to lie from March to middle of May, at any rate for the chief-part of the stock in these waters.

This agrees well enough with the scanty information noted above as to degree of maturity in the marked fish recaptured. As spawning or with milt flowing were thus indicated in

February	March	April
4 ♂ 1 ♀	5 ♂ 2 ♀	3 ♂ 2 ♀

May	June
1 ♀	1 ♂

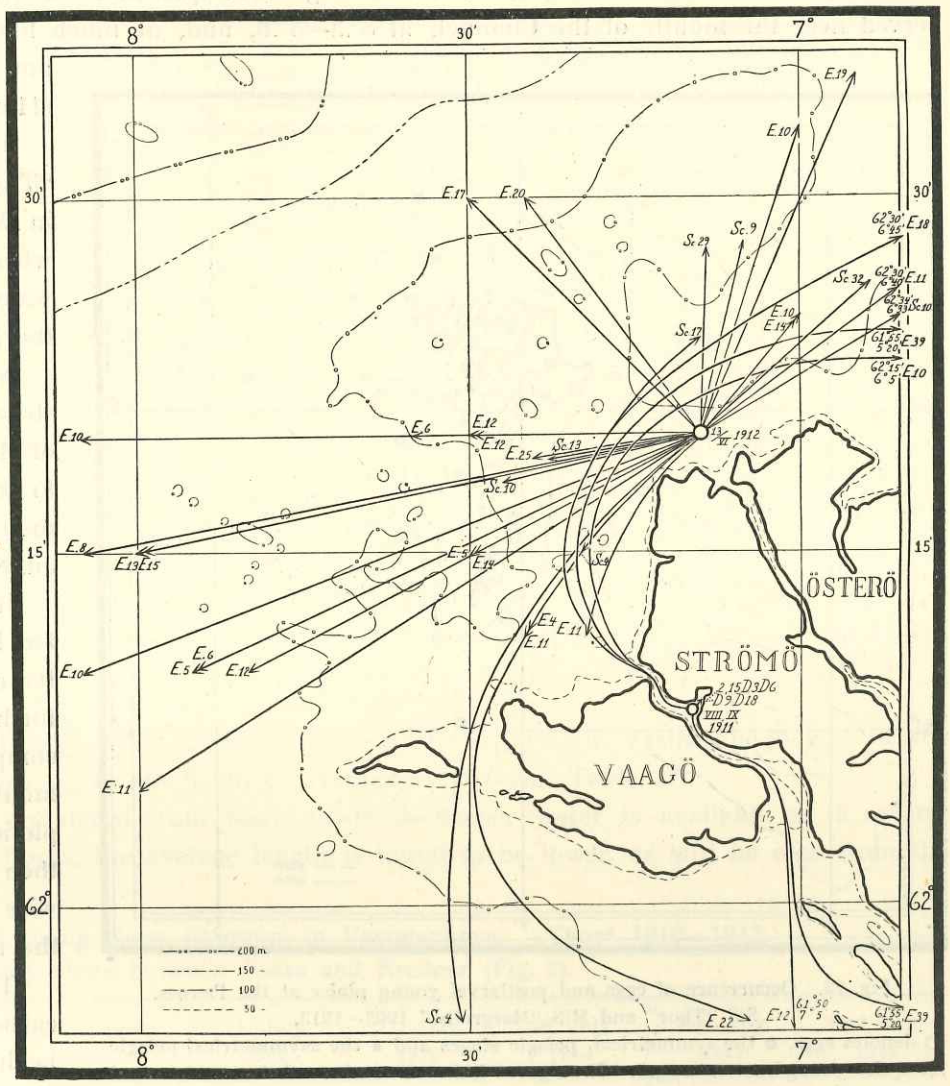

Fig. 21. Marking experiment with plaice transplanted from Sundene to off Myling. June 1912.

Several specimens, especially among the males, are seen to have been mature as early as February. The statistical records available also show, as mentioned, a far higher number of large and medium plaice taken in February, March, April and (sometimes) May than later in the year (see further p. 40) and thus bear out the above.

From all these records, then, the spawning seems to be at an end some time in May, so that the period mid-Feb. to mid-May gives roughly the limits of the spawning time, the average temperature at this period being from abt. 5°.5 to 7°.7 (15 b), almost uniform for 0—100 metres.

At South Iceland (17 a) where the hydrographical conditions are similar to those of the Færoes, the plaice spawn chiefly from mid-March to mid-April, commencing at the end of February, and terminating about the middle of May, the average temperatures (in the waters round the Vestmanna Islands) being abt. 4°.5 to 7°.5, i. e. nearly corresponding to that of the Færoes (15 b).

[1] On the Færoe Bank, SW of Suderø, the plaice, as far as I am aware does not live, at least not spawn.

In more southerly waters, the spawning time falls earlier in the year. In the northern part of the North Sea (6 c) from the end of January to May, with maximum in March; locally, as in the East Scottish fjords (Dornoch Firth) even earlier, *viz.* from end Decbr. to end March (2). Also in the southern North Sea (3), from end Decbr. to early March, with maximum mid-Jan. to mid-Febr., at temperatures of 5—6°, or even lower or higher limits. The greatest quantities of ova hitherto found at all were observed near the mouth of the Channel, at 8°.3—8°.6, and, at much lower temperatures, in the Belt Sea and Western Baltic, in Febr.-March (11 c and 13).

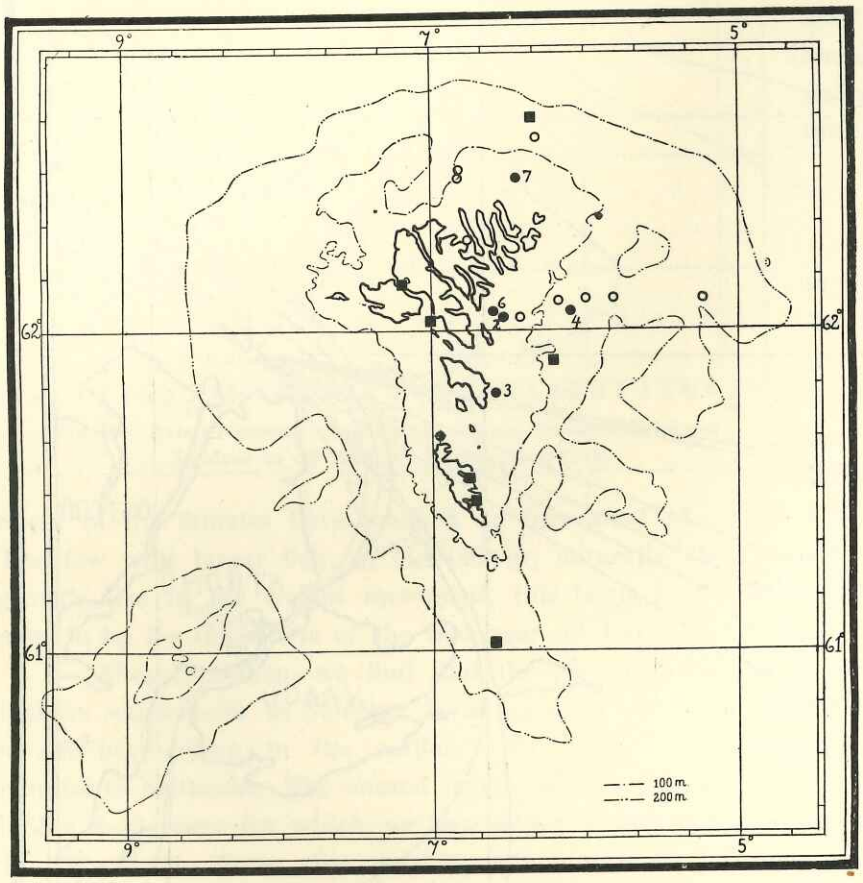

Fig. 22. Occurrence of eggs and postlarval young plaice at the Færoes. S/S "Thor" and M/S "Margrethe" 1903—1913.
o denotes eggs, ● the symmetrical, pelagic stages and ■ the asymmetrical pelagic or quite young bottom stages. The figures indicate number of the symmetrical pelagic specimens pr. ½ hour's-haul with the young-fish-trawl.

Pelagic young were taken by the "Thor" and the "Margrethe" (Table 25) in May and June, i. e. at a season when the fish in more southerly waters are already far advanced in the bottom stages (Fig. 22).

Stage I, the symmetrical pelagic stage is thus found only to the end of May, and is even frequently found to occur together with the asymmetrical pelagic young (Stage II). In June, only the older stages are found.

If we now reckon abt. 14—19 days[1] for hatching the egg, abt. 10 days[2] for reduction of the yolk sac, and a further 22 days or rather more[2] for completion of Stage I, i. e. abt. 1½ months in all from spawning to completion of the symmetrical stage, then the finds of pelagic young likewise suggest that spawning must for the most part be at an end by April.

The young bottom stages were earliest found right in shore, at the beginning of June (in 1912), and at the end of June (in 1913). Not until July were fish of abt. 14 and 28 mm length, presumably at least 2 months old, taken near or on the bottom in abt. 4—5 metres of water or more. We have no pelagic investigations for July from these waters, but some quite small plaice have been taken during this month in shrimp nets close in shore, in shallow water, less than ½ m in Vestmanhavn and elsewhere. Most investigations at different times have been made in Vestmanhavn, and a brief survey of the conditions here is given below in Table 26.

The average sizes found are naturally only an approximate expression of the average length of all the young at the given time, as both the smallest, still pelagic stages and the largest individuals doubtless escape capture (by the shrimp net). Taken together with the catches of age-determined fish made by

[1] at abt. 8° and abt. 6° respectively (3 and 5 a).

[2] cfr. Dannevig (5 b), from experiments at Dunbar, end May—June, i. e. at somewhat higher temperatures than in Færoe waters at the same time.

the eel hand-seine, where only the smallest and smaller sizes of the young escape, the average, as for August 1911, gives a more reliable view.

Table 25. Occurrence of pelagic, postlarval plaice at the Færoes. — S/S "Thor" and M/S "Margrethe" 1904—13.

Year and Date	Locality (Bearing)	Depth in meters	Temperature in C° at surface & bottom	Young-fish-trawl Meters wire out	Number of specimens caught	Length in mm size-limit	Developmental stages
1904. May 14	Off Skaalehoved (Sandø)	50	6.8—6.9	15	3	9—11	I—II
— — 21	Vaagø Fjord	68	6.9— ?	15	4	10—13	II
1905. — 14	E. of Nolsø	86	6.6—6.9	90	10	10—14.5	4—I, 6—II
— — -	—	58	6.5— ?	65	23	10—15.5	6—I, 17—II
— — 16	N. of Fuglø	100	7.2—6.8	65	17	10—16	7—I, 10—II
— — -	NNW. of Fuglø	318	7.8—7.1	120	1	14	II
1910. — 22	Vestmanhavn	22—9	6.8—6.7	70	7	13—16	II
— — 26	SE of Nolsø	166?	6.5— ?	65	2	c. 9—c. 10	I
— — 31	Vaagfjord (Suderø)	35	8.4— ?	36	3	13—14.5	II
— June 1.....	— —	24	8.4—7.1	20	5	14—15.5	II
— — -.....	S. of Munken (Suderø).....	140	7.5—6 8	25	1	11.5	II
1913. May 23	E. of Nolsø	72	? ?	100	1	11—14	II
— — 29, 30 .	Trangisvaag Fjord	14—40	c. 8.5—7.5	25, 50	10	8—13	I—II
— June 6.....	— and Ørdevig ...	11—25	8.8—7.7	20, 30	22	9—12.5	II
— — 16.....	—	9, 30	8.4—8.1	20, 40	2	12, 13	II
— — 20... .	Vaag Fjord (Suderø).....	47, 62	9.5—8.1	40, 50	2	15, 14	II
— — 29.....	N. of Suderø	?	?	65	2	11, 14	II—III
— July 5	Trangisvaag Fjord	4—5	? ?	10	1	28	III. Young bottom stage

The age determinations being correct, then the young of the year in Vestmanhavn will in the course of the summer have grown up to abt. 9 cm, or average abt. 6.5 cm (Table 27).

Where no supplementary material from hauls made in deeper water is available as in several other investigations in different fjords, the average length is found to be lower, as will be seen from the

Table 26. Sizes of young plaice (0-group) in Vestmanhavn. „Thor" 1910—1912. Sandy shore between Fosaa and Bredeaa (Fig. 2).

Month & Year	22. May 1910	6. June 1912	11. July 1912	17. July 1912	26. July 1912	End Aug. 1911	End Aug. 1911
Implement	Young-fish trawl	Shrimp net	Shrimp net	Shrimp net	Shrimp net	Shrimp net	Eel hand-seine
Depth (meters)	22—9	0.5	0.5	0.5	0.5	0.5	5—0
No. of specimens	7	55	165	284	136	58	54
Stage of development	II	II—IV	IV	IV	IV	IV	IV
Size-limits in cm..... ...	1.3—1.6	1.3—3.0	2.0—6.0	2.0—6.0	3.0—6.5	3—7.5	6—9.0
Average length in cm	1.4	2.3	3.4	4.1	4.4	6.6	

figures below. They should at any rate be taken as minimal values, and for the present no more than this can be said.

The following, later year-classes were taken in Vestmanhavn in deeper water out to abt. 25 m, most in May 1910. Table 28, for those of reliably determined[1] age, shows that the first 6 year-classes

[1] By means of the otoliths.

are represented, although not in like degree. For comparison, we may here add all our remaining few and scattered determinations, supplemented with those of JESSEN (10) from September 1908 (Table 29).

Table 27. Sizes of plaice of the 0-group, taken with shrimp net in 1/2—0 m-water. "Thor" 1903—1912.

Locality	Vaag-Fjord		Kollefjord	Ørdevig
Date	Mid-August 1912	9. Sept. 1903	5. Sept. 1903	9. Sept. 1911
No. of hours	1	..	..	2
No. of specimens	131	72	37	30
Size limits (cm)	2—4.5	2—7	2—2.5	3—3.5
Average sizes (cm)	3.3	3.7	c. 3.7	4.3

From this then, we see that the growth of the plaice in Vestmanhavn may be taken as abt. 10 cm annually for the first three years. The average for the I group is, it is true, noted as somewhat higher, 13.6, but this is probably also too high, owing to the implement (eel hand-seine) having sorted off the smallest sizes. In the following year, the rate of growth decreases, though we cannot from the present material say anything further as to this.

The marking experiments here afford a valuable supplement to this, showing, that these 3 and 4 year-old fish, which are chiefly those of 30—40 cm marked in the fjord, really only grow here abt. 5—6 cm in the next year. The smaller and younger fish, however, of 25—29 cm and probably 2—3 years old, continue their more rapid growth throughout the following year.

Table 28. Length and age of plaice in Vestmanhavn, 17.—21. May 1910, 23—0 m. "Thor".

	Probable age in years (and months)					
	0 (c. 2)	I (c. 14)	II (c. 26)	III (c. 38)	IV (c. 50)	V (62)
No. of specimens	7	34	24	29	12	33
Size limits in cm	≤ 1 $\geq$	7—14	14—33	25—36	31—38	38—50
Average size in cm	1.5	13.6	20.8	31.3	35.3	42.5

In the second half year after marking, we already find the fish of 30—39 cm and over moving out of the fjord to deeper water on the coastal bank. In the first period, it is chiefly the (smaller) males, spawning now presumably for the first time, and the larger females, which migrate. Later on come the females — which were smaller at time of liberation — in increasing numbers; their growth is on an average far superior to that of males of the same initial size[1].

Table 29. Average length of the different age groups in Færoe plaice. 1908—1913. The figures in brackets denote number of specimens examined.

Date and Locality		End May			June	mid July	mid September	
		Vestmanhavn	Trangisvaag		Vestmanhavn	Vestmanhavn	Trangisvaag	Kvalvig
		1910	1912	1913	1912	1912	1911	1908
Average sizes (cm) of age-group	I	13.6 (34)	..	..	8 (11)	13.6 (12)	10.5 (28)	..
	II	20.8 (24)	15.1 (21)	16.3 (21)	..	22.6 (13)	22.4 (31)	..
	III	31.3 (29)	28.2 (19)	> 23.7 (15)	31.6 (11)	30.3 (3)	..	♂ 30.5 ♀ 30.6 (93)
	IV	♂ c. 34.5 ♀ c. 36 (12)	..	..	37.0 (5)	..	..	31.1 32.7 (47)
	V	♂ c. 40 ♀ c. 43 (33)	..	..	..	..	..	31.0 (1)

[1] It is worth noting, that in the fish examined by JESSEN from Kvalvig, the difference between growth of males and females is first discernible in Group IV, i. e. in the fifth year of life, (10, plate, p. 252) average sizes respectively 31.1 and 32.7 mid-Sept.

The growth outside the fjord can best be followed among the chiefly 30—39 cm fish, which were transplanted to those waters in 1912. In the first two years, these have grown on an average abt. 9 cm annually, some few much more; at any rate, the growth here is superior to that in the fjord (Fig. 23). A difference between the sexes in respect of the growth rate is noticeable, though less distinctly than among the emigrant fish, the males in some cases being markedly behind the females.

The 35—39 cm fish transplanted from Sundene to the coastal bank have also grown abt. 9—10 cm annually in the two first years; in the third year probably less. The smaller sizes, of 20—29 cm, on the other hand, which had themselves migrated from the sounds, show a decline in the rate of growth in the fourth year, not before, the annual increment also here being abt. 9 cm in the first years. In Fig. 23 is given diagrams of the growth of the 30—39 cm plaice, as found in the different experiments.

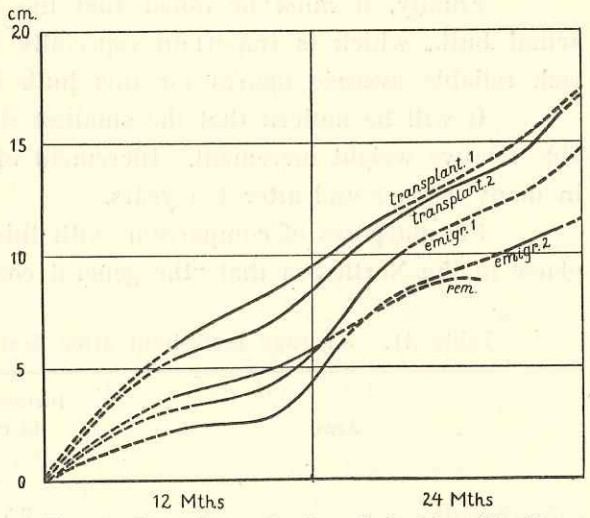

Fig. 23. Rate of growth of marked plaice, 30—39 cm, within the first two years of liberation, rem.; remained in Vestmanhavn, Exper. May 1910, emigrated (1 & 2) from Vestmanhavn, Exper. May 1910 and June 1912, transplanted (1 & 2) from Sundene (1) & from Vestmanhavn (2). June 1912.

In comparing here the slope of the curves for the emigrated and the remained plaice it should however be borne in mind, that only males were recaptured within 12—14 months after liberation (cf. Figs. 5, 8 and 10). There is really a not inconsiderable difference in the annual growth noticeable in several of the experiments (Fig. 23), both from place to place and from year to year. These variations cannot yet be interpreted, as the determinations are not altogether reliable in all cases. Further experiments, together with age determinations, will be required to give a proper idea as to the growth of the older fish.

Despite the incompleteness of our knowledge on this head, however, it is interesting to compare the conditions found here with what is known from other waters. It will then be seen that the Færoe plaice, both the youngest year-classes and the sizes marked, grow excellently; better than most of those

Table 30. Average annual increment in cm of plaice in different waters.

Area	No. of growth periods (years)					
	I	II	III	IV	V	VI
				♂ ♀	♂ ♀	♂ ♀
North Sea — Northern	9	6	6	5	5	..
North Sea — Southern Bight*)	c. 7	c. 7	c. 7	5.7—5.6	c. 3.8—4.6	—
North Sea — South Eastern ɔ: German Bight	c. 6.7	c. 5.5	c. 7.5— 7.8	c. 3.8—4.8	c. 3	..
North Sea — South Dogger Region**)	..	..	..	..	5.0—6.2	2.9—4.4
North Sea — Southern and middle, liberated	..	..	5.6— 5.1	6.4— 8.7	..	..
North Sea — Dogger, transplanted to D.	..	..	10.3—15.0 / 13.1	11.2—11.6 / 14.8	..	..
North Sea — Horn Reef-Area***)	c. 7—8	6	c. 6—7	c. 5—6	3.5	..
Channel, western	c. 9.2	c. 9.2	c. 9.2	4—3.5	c. 2—3.7	..
Kattegat, northern and middle	c. 8	c. 8	c. 8	6—8	4—5	..
Baltic, western****)	c. 7	c. 7	3—4	1—2	1—1.5	< 1
Færoes — Vestmanhavn	c. 9	c. 9	c. 9	c. 5—6	..	..
Færoes — Sundene, transplanted from	..	c. 9	c. 9	c. 9	(< 5)	..

*) Texel-Leman. **) South part of Dogger and Flamborough off-grounds. (cf. Literature No. 7, 11 b, 11 c, 18, 20 b). ***) In the first 4 years, there is no essential difference between the sexes in respect of growth. ****) Between Fehmern-Belt and "Kadetrenden".

elsewhere, where the stock is larger. This applies more particularly to the transplanted fish, though we are here dealing with fish much larger than those marked in most other places.

The Tables 30 & 31 show this clearly enough, though of course annual variations will alter the general effect somewhat, and the averages given are not all of the same value.

Finally, it must be noted that the length increment only gives an incomplete idea as to the actual bulk, which is important especially in the case of the larger and heavier Færoe fish. We still lack reliable average figures for this bulk increment. The Table 32 gives such data as are available.

It will be noticed that the smallest sizes, and the females of the larger, have the most considerable relative weight increment. Increment of over 200 % — i. e. trebling the initial weight — are here in many cases found after $1^3/_4$ years.

For purposes of comparison with this it may be mentioned that Borley (1 a p. 29) states of the plaice in the North Sea that "the general coastal growth" in a 21 cm fish will on an average, in 2 years

Table 31. Average increment after first year of liberation of plaice marked in different waters.

Area		Increment in cm ♂ + ♀	Initial sizes in cm	Age in years	Remarks
Iceland	North	3.5	31—48	?	Experim. 1903, 1905, 1908, 1909
	West	c. 6	27—35	(4—8)	Age of 30—40 cm's fish
North Sea	Middle and southern, excl. Dogger	3.3—8.4	15—30	..	Experim. 1903—09, 1911; ♂ ranging from 3.6—8.4 cm, ♀ ranging from 3.3—7.4 cm, after init. size and month of liberation.
	Horns Reef Area	c. 5.2	c. 20—30	3—6	Experim. 1903—12; variation in growth in the single exp. ranging from c. 3—8 cm.
	Southeastern	c. 2.1—5.1	c. 19—31	..	
	Transplanted to Dogger: English exp.	c. 10.6—15.4	c. 20—30	..	Experim. 1904, 1906, 1907, 1909; ♂ ranging from 10.0—12.4 cm, ♀ ranging from 10.1—15.4 cm, after init. size and month of liberation.
	Transplanted to Dogger: German —	c. 9.6	c. 19—31	..	
Irish Sea		c. 7.2	c. 20—30	..	Experim. 1904—08
Kattegat	northern	6	22—30	..	Experim. 1904, 1915
	middle	4—5	30—34	.	— —
Færoes	Vestmanhavn	c. 5—6	30—39	3—5 (—>?)	— 1910
	Sundene (Transplantation)	c. 9	c. 25—29	2—3 (—4?)	— 1912
	— —	c. 8—9	30—39	3—5 (—>?)	— 1912

List of literature No. 1 c, 11 a, 11 b, 12, 14, 15 a, 17 b.

amount to "abt. 222 per cent of their initial weight", whereas "the average growth of the plaice transplanted to the Dogger" in the same time amounts to abt. 960 %, "over four times as much". For the Færoe plaice in our experiment then, the increment is thus relatively the same as for the far smaller North Sea fish — absolutely, of course, far greater. With regard to corresponding sizes in these waters nothing is known, and our observations are too few to give a reliable picture of the growth in this respect, still less as to the increase in value of the fish here concerned, which is doubtless very great.

2. Intensity and general character of the plaice fishery at the Færoes.

Intensity of the fishery, and nations participating.

The Færoe fishermen themselves take practically no part in this fishery, which is, save for the purely occasional fishery from the Danish Inspection boat, almost entirely in the hands of foreign nations. by far the greatest share falling to the English and Scottish fishing vessels. Though relatively inconsiderable as compared, for instance, with the Iceland plaice fishery, it yet helps, partly on account of the excellent quality of the Færoe fish, to make the voyage a paying one for the foreign vessels, though the

Table 32. Weight increment in all the marking experiments with Færoe plaice.

$$\left(\frac{\text{Increment}}{\text{Initial weight}} \times 100\right)$$

The indices denote number of specimens measured.

Initial weight in gr	Locality of recapture	No. of months since liberation																																					
		♂																	♀																						
		12	13	14	21	22	23	24	25	26	27	29	30	33	34	36	39	43	12	13	14	21	23	24	25	26	27	28	31	32	33	35	44	52						
100—250	Vestmanhavn ..	..	..	224	..	..	..	..	..	..	..	..	..	..	..	..	400	..	121	..	..	140	..	..	..	..	..	..	..	..	..	..	..	..						
	Emigrated from Vestmanhavn.	..	..	..	..	210	..	150	..	..	..	370[2]	..	220	250	470	..	1130	..	..	..	163	..	..	..	..	..	..	..	..	..	..	..	..	1560						
	Emigrated from Sundene	..	..	..	243	..	..	..	..	550	..	..	620	..	..	..	..	..	..	..	..	240	..	420	..	350	..	..	..	..	..	..	..	1000[2]	..						
250—500	Vestmanhavn ..	..	..	105	211	..	..	..	..	..	..	..	..	..	..	..	..	..	30	..	130	..	..	..	..	..	..	..	150	..	..	..	..	..						
	Emigrated from Vestmanhavn.	..	110[2]	110[2]	205	95[3]	180[2]	125	..	270	225	..	.	220	325	..	..	..	..	..	167	..	..	240	..	..	270	250[2]	..	380	370	..	..	..						
	Transplanted to off Slettenæs .	..	100[2]	180	150	..	..	..	..	..	..	..	..	..	..	..	..	..	100	..	140	180[2]	230	..	..	360	470[2]	..	..	..	..	..	..	..						
	Transplanted to off Myling ...	..	..	..	130[3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	180	170	..	290	..	..	..	..	..	..	..	500	..	..						
500—1000	Vestmanhavn ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	70	..	..	..	..	..	..	..	..	..	..	..	..	..						
	Emigrated from Vestmanhavn.	25[2]	40	107	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	90[3]	100[2]	..	..	238	260	..	..	490	..	..	..	..	..	..							
	Transplanted to off Slettenæs .	100	..	70	..	105[4]	..	..	120	..	..	..	..	..	..	..	..	..	95[2]	80[3]	..	..	235	..	..	..	..	170	..	..	..	..	..	..							
	Transplanted to off Myling ...	..	..	64	85	100	..	..	..	..	..	..	..	..	..	..	..	..	75[3]	..	120	150	..	..	204	..	..	..	..	..	..	..	..	..							

cod and haddock and halibut fishery is far more important for them. The Table 33, showing recaptures of our marked fish, bears this out.

The British vessels take up the great bulk of the fish, accounting on an average for abt. 20 % of the fish migrating from the fjord, and abt. 37 and 50 % of the transplanted fish.

The recaptures made in the course of the first year are shown below, and it is only from these figures that we can gain a true idea as to the toll levied on the stock by the fishery. It represents, as will be seen, abt. 1/5 to 1/3 of all the transplanted fish, but naturally the proportion of the fish marked inshore is far lower, abt. 4—7 %. These do not move out in any great numbers till the following years, and are then taken by the foreign vessels, that is to say, the percentage of recaptures for the first year is increased now to from three to six times that amount, whereas it is not even doubled for the transplanted fish throughout the entire period of the experiment (Table 34, p. 40).

Compared with the experiments made elsewhere, our present investigations show that the intensity of the fishery among the stock up here is about equal to that for instance at West Iceland (here averaging abt. 30 % in the first year — 17 b) and in great parts of the North Sea. Only in some parts of this region e. g. west of the coast of Jutland

and in the southern North Sea towards the mouth of the Channel, does the percentage of recaptures often amount to over 50 % (see *inter alia* l. c. p. 116, and 13 a). In many areas, as for instance in the western and northern North Sea, it is far lower, in many cases even falling below 20 %.

Table 33. No. of recaptures of marked plaice. Færoes 1910—1912.

No. of Experiment	Locality of liberation	Total No. liberated	No. recaptured by								% recaptured		
			Færoe f. b.	Danish f. b.	English S. T.	Scotch S. T.	German S. T.	Belgian S. T.	Dutch S. T.	Total	by British fisherm.	by Færoe fisherm.	Total
I	Vestmanhavn 1910	498	4	81	77	17	1	2	..	182	18.9	0.8	36.6
...	— 1911	45	3	4	5	1	..	..	..	13	13.3	6.7	28.9
..	— 1912	167	11	14	27	8	..	..	..	60	20.9	6.6	36.0
III	Sundene 1912	125	1	1	26	4	..	..	..	32	24.0	0.8	25.6
II	Trpl. to off Slettenæs 1912	301	2	12	92	19	..	..	1	126	36.5	0.7	41.8
IV	Trpl. to off Myling 1912	75	..	..	29	8	..	..	..	37	49.3	0	49.3
		1211	21	112	256	57	1	2	1	450*)	25.8	1.7	37.2

*) To this should be added 49 spec. recaptured, without serial number, by English and Scottish boats, 40 and 9 respectively. The percentage of British recaptures thus amounts to 29,8 %.

The males are retaken in greater numbers than the females during more of our experiments, and especially among the smaller sizes. In the southern and middle parts of the North Sea, REDEKE (13 a, p. 25) and BORLEY (1 c, p. 65) give as percentage of recaptures respectively 41.4 (♂) and 37.4 (♀) total recaptured and 20.6 (♂) and 18.6 (♀) for the first year after marking. This indicates a similar superiority to that we often have noted, whereas REICHARD (14, p. 113), again, finds the reverse, *viz.* 21.0 (♂) and 23.2 (♀).

Such total values, however, really tell but little. The question is as a matter of fact far more complicated, being intimately connected with the question of migration — in the case of the Færoes, emigration out from the fjord — and the proportion thus depends on the sizes marked, the place where marking is carried out, and the distribution in regard to sex. Thus among the 30—39 cm fish, for instance up in the fjords, it is chiefly the males that in the first year move out and are recaptured on the coastal bank. Among the transplanted fish, the difference is not so pronounced. This question also will require to be further looked into.

Table 34. % recaptured by foreign fishermen of plaice liberated at the Færoes 1910—1912.

No. of Experiments	% recaptured 1 year after liberation			Total % recaptured		
	♂	♀	♂ + ♀	♂	♀	♂ + ♀
I	10.0	3.5	6.9	25.8	13.5	19.3
III	4.2	3.8	4.0	19.5	33.9	25.6
II	24.8	18.0	20.9	41.9	33.1	36.5
IV	29.8	40.0	33.3	37.9	62.9	49.3

Finally it should be noted that the recaptures are not evenly apportioned throughout the year, but lie for the most part in the spring and early summer months, possibly simply because the fishery then is carried on with greater intensity, but possibly, on the other hand, moreover because the fish keep closer together at that time of year, when most of them are spawning. That this really is the case is also plainly evident from the statistics.

The accompanying figure showing average monthly hauls of large plaice landed in Aberdeen from the region Færoe gives a good idea of this accumulation of adult plaice during a period which we have from other observations seen should be regarded as the spawning time[1] (Fig. 24).

As regards the absolute quantities taken here by the foreign nations, the statistics give the following figures for the last few years.

[1] In the Shetland Area, FULTON finds quite similar conditions, save that the curve has its maximum one month earlier, in Febr.—March (6 g, p. 125).

These hauls were all made from steam trawlers.

The dominant position of the English vessels is clearly apparent. Next in order come the Scottish vessels, with a yield amounting to from 1/10 to — of late years — 1/5th that of the English. These figures agree well with the distribution of the recaptures in our experiments; the English are here first; the proportion between the recaptures made by English and those by Scottish vessels is in the fjord experiment (I) abt. 4:1; in the transplantation experiment IV 3:1. It should here be borne in mind that the fishing grounds of the Scottish vessels, N and NE of Norderøerne, lie farthest from the site of the experiment in the former case. The results of the other nations' fishery are but very incompletely recorded, but the yield is in any case inconsiderable compared with that of the British industry.

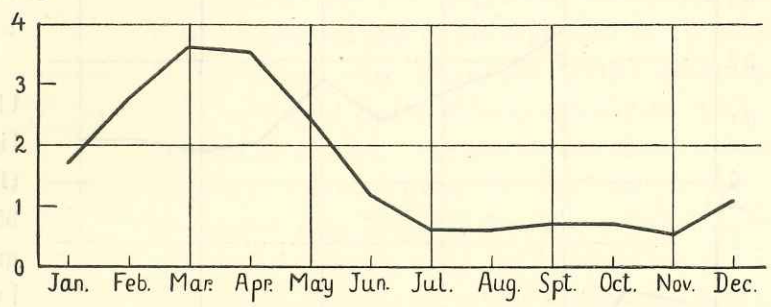

Fig. 24. Average monthly catch of large plaice per 100 hours' trawling during 1905—1913. Aberdeen fishery statistics. Smoothed averages.

As mentioned the plaice here play but an inferior part in themselves as object of the fishery,

Table 35. Total weight in kg. of plaice pr. year fished at the Færoes.

Nation	1906	1907	1908	1909	1910	1911	1912	1913	1914
English	220.980	161.290	84.531	79.146	65.989	62.687	50.241	81.026	69.545
Scotch	20.320	31.420	14.173	22.352	13.866	13.663	13.868	12.000	?
Dutch	1.425	270	915	2.295	105	135	1.780	?	?
Belgian ...	285	451	?	1.527	?	5.224	?	?	?

being caught for the most part while fishing for other sorts. This is illustrated in the following table, for comparison with such decided plaice grounds as the White Sea or the North Sea.

Table 36. Prop. per cent of plaice to quantity of demersal fish from different regions, fished by English vessels 1906—1914.

Area	1906	1907	1908	1909	1910	1911	1912	1913	1914
North Sea..	13.2	14.8	15	15	14	15	14	14	14
White Sea	86	89	85	86	79	68.5	53	48	33
Iceland	11	10	7	7	6	6	8	5	4
Færoe	0.7	0.48	0.4	0.26	0.2	0.2	0.2	0.2	0.3

The actual total catch of plaice from here, i. e. the English yield, is thus comparatively but small. The statistical percentage of plaice taken 1906—1914 in "region Færoe" also fluctuates between such low figures as 0.1 % and 0.5 %, whereas in "Icelandic waters" it goes up to abt. 10—14.6 % (same year) and for the "White Sea" even amounts to between 27.5 (1909) and 3.6 % (1914) the figure for 1913 being 8.2 %. The "North Sea" appears as the principal ground for plaice, making up far over half the total yield, 54—72 %, also for 1906—14 (Bd. of Agricult. & Fisher.: Ann. Rep. on Sea Fisheries. Londov).

As regards the Færoe fishery, it will be seen from the table that the yield decreases very markedly in 1906—08, and has been continually on the decline, albeit not to quite the same degree, ever since. The fluctuations from 1909—14 are not great. Altogether abt. 80000 kg are taken annually in the

statistical "Region Færoe", of which abt. 3/4—4/5 fall to the English industry. This refers to the total yield. In both the English and Scottish Statistics, lying some years back, a marked decline also in the average yield is discernible, and the low value to which it then falls has been more or less maintained since (Fig. 23).

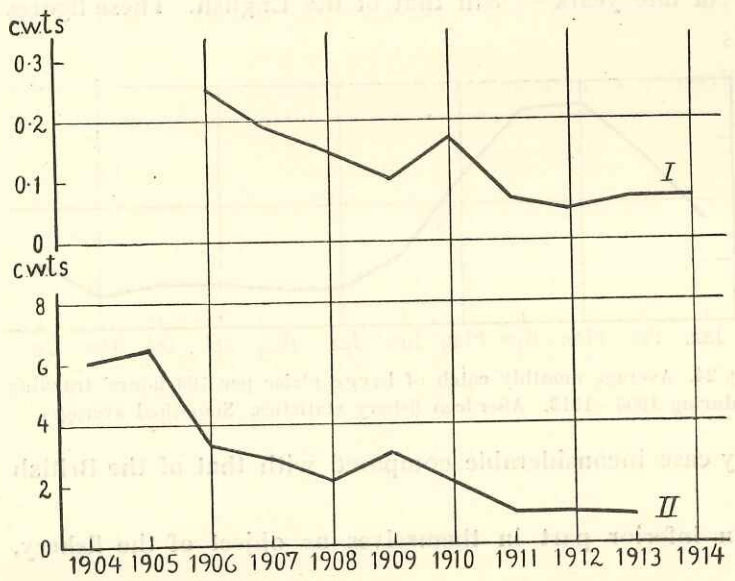

Fig. 25. Average catch of total plaice, I, per day's absence (English Statistics) and II, per 100 hours' trawling (Aberdeen trawlers statistics).

Finally, as regards the composition of the catch, this has not, according to the English statistics, undergone any marked change (Fig. 26). The large fish make up as a rule abt. 95 % of the catch, the small and medium ones growing up in territorial waters being practically lacking.

The Scottish statistics give a somewhat different picture in this respect (18 a). Here we find for the years 1910—13 only abt. half the yield ascribed to the category "large", and in earlier years (1908) 2/3 or more, the "small" here also always making up, as is natural, an insignificant percentage reckoned by weight.

The Scottish method of sorting must thus be different, a larger size being here reckoned as "medium" than in the English reports.

For the North Sea plaice, the limit — varying according to area, port of landing etc. — between "small" and "medium" fish landed at English ports is taken as on average at 26 cm, between "medium" and "large" at 39—40 cm (1 a, p. 30). The principle on which the Færoe plaice are sorted is not known, but the limit undoubtedly lies higher. This is at any rate the case in the measurements of fish from Aberdeen market in Table 37 (18b, p. 42).

In each category, the Færoe plaice make up the largest, heaviest fish of the class, which fact, by the way, is interesting when compared with what we have noted above with regard to the considerable weight of the Færoe fish in proportion to the length[1]. The Iceland plaice are sorted more or less as those of the North Sea.

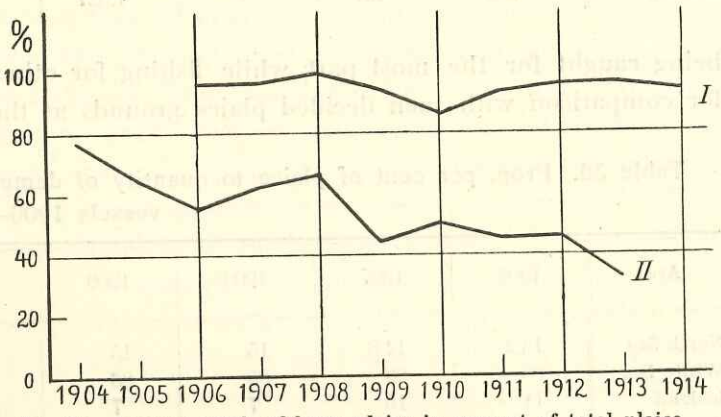

Fig. 26. Average catch of large plaice in percent of total plaice after I: English, II: Scottish statistics.

It would seem natural to consider the decline shown both in the average yield and in the relative quantity of "large" (Scottish statistics) as indicating overfishing of the stock, though this does not appear to have suffered or be suffering serious destruction. Under present conditions, and with the methods at present employed, the fish seem sufficiently protected by Nature.

III. Experiments with Lemon Soles (*Pleuronectes microcephalus* Don).

1. Locality and date.

A number of lemon soles were marked at various times in the Vestmanhavn Fjord, being taken there together with the plaice by "snurrevaad" on the Bank (p. 9) marked and liberated.

[1] The mean length for "small" noted on p. 9 is that here given.

2. Size of the fish marked.

The sizes marked will be seen below; they were almost exclusively older, mature fish Table 39. In 1910, chiefly 30—40 cm average length, in 1911 mostly 27—36 cm i. e. somewhat smaller. The weight seems in particular for the larger fish somewhat less than for Scottish fish of the same size (6 e, p. 268). In 1910, they were taken just in the spawning time, and most could therefore easily be distinguished as to sex. The males are here in the majority, whether from the fact that all indeterminates were actually females, which would make the values equal, or whether the sexes really were represented in the proportions shown (cf. the superiority of the males among the smaller sizes of plaice p. 10).

Table 37. Mean sizes of plaice measured in Aberdeen market 1904—1911.

Region	Trade category	Range in cm	Medium values in cm	Number measured
East coast (Aberdeen grounds)	large	47—67	56	c. 1.000
	medium	24—62	35	c. 48.000
	small	20—37	28	c. 33.000
Northern North Sea & Shetland	large	49—74	58—61	c. 6.000
	medium	28—61	40—42	c. 37.000
	small	22—39	29—31	c. 24.000
Iceland	large	47—71	58	c. 1.000
	medium	26—63	41	c. 9.000
	small	24—39	31	c. 2.600
Færoe	large	44—87	66	c. 700
	medium	33—60	47	c. 750
	small	26—41	33	c. 230

3. No. of recaptures.

All recaptures were made either by the occasional hauls above mentioned as carried out from the Inspection vessel or from the local boat fishery, which is of more importance here than in the case of the plaice, especially as regards the 1911 experiment. It is of course only these last hauls which can give any true idea of the intensity with which fishing is carried on throughout the year.

Table 38. Results of marking experiments with lemon soles in Vestmanhavn 1910 & 1911.

Year and date	No. of lemon soles liberated	No. recaptured	Locality of liberation Centr. Posit.	Depth in metres
1910 May 18—21.....	200	45	62° 8′ 7 N	< 23
1911 Aug. 25— Sept. 2 .	184	17	7° 9′ 3 W	< 20
Total...	384	62		

4. Nationality of fishermen.

In the 1911 experiment, all the recaptures — abt. 9 % — were made by the Færoe fishermen themselves, divided between the first, second and third years, with most in the third. The fish retaken were mostly 30–40 cm, the recaptures of smaller sizes being less numerous. It is interesting to note that while in the 1910 experiment only 1 recapture out of 40 was made by the Færoe fishermen, in 1911 we find 16 out of 17 made by them. Outside Vestmanhavn we have not a single record of any recapture from these experiments.

Table 39. No. of lemon soles liberated and recaptured. Færoes 1910 & 1911.

Sizes in cm	No. liberated		No. recaptured		Total % recaptured (by Faeroes)
	1910	1911	1910 Experim. Total (by Færoe fishermen)	1911 Experim. Total (by Færoe fishermen)	
25	..	1	..	..	..
26—29	15	39	4	2 (1)	c. 12 (2)
30—34	96	120	25	12 (11)	16 (6)
35—39	80	24	15 (1)	3 (3)	c. 16 (3)
40—44	9	..	1	..	c. 11
Total...	200	184	45 (1)	17 (15)	15 (4)

5. Growth.

A striking feature is the extremely slow growth of these fish. In no case does it exceed 2 cm even in 2—3 years, and an increment of 2 cm is itself rare, nor was any considerable weight increment observed. There is no difference either between male and female or between larger and smaller fish in this respect.

Here, in contrast to the plaice experiment, only grown, mature fish were marked.

Marking experiments with lemon soles have but rarely been made. There are only on record the accounts of a group of Scottish experiments (6 g), where 135 specimens, (most 30—40 cm) were marked in the years 1904—09 in East Scottish fjords, the Moray Firth, the Firth of Forth, etc. The total percentage recaptured was 6.7 %. With a single exception, that of a fish 31.5 cm having grown 4.8 cm in abt. 16 months, also in these experiments the growth has been very slow or none at all. Finally, there are the older experiments (1889—92) where 173 fish were marked in the Firth of Forth and St. Andrews, with only one recapture, which had in the course of 127 days hardly grown at all (abt. 33 cm + (2) cm (6 b, p. 195).

In contrast to the plaice, we have here a form which grows, at any rate, from the older stages, exceedingly slowly. Its growth is, however, but little known on the whole, even from southern waters, though it is a common and economically valuable fish at the Færoes and S. of Iceland, as also in the northern North Sea.

At the Færoes, we find the eggs and small pelagic young in the sea over the coastal bank throughout the whole of the summer, i. e. May—August, though nowhere in large quantities, not over 20 per 1/2 hour's haul[1]. Where the youngest year-classes live is still an open question; presumably, they keep to grounds with rocky bottom, where they would easily be able to avoid the nets. The young bottom stages (abt. 20 mm) on the other hand, are occasionally found in the stomachs of other fish (9). The smallest specimen, abt. 103 mm, was taken in Vestmanhavn in less than 2 metres on the 20. May 1910. Judging from the scales, this specimen should be at least two years old. At the same place, but also at greater depths, some few slightly larger fish were taken, abt. 14, 17 and 18 cm. Not until a size of over 20 cm is reached, especially from 25 to 47[2], do they become common, but as to their age very little is known. Maturity is reached at 21 cm length (several ♂ and ♀, May 1904).

This agrees with what was found on the east coast of Scotland, where the limit between mature and immature is also set at 21 cm (6 a). The remarkable dwarf forms from east and west Scotland (6 d, p. 48) which are found "full" at 10—14 cm have not yet been met with at the Færoes. At East Scotland, where the species seems to have its centre of distribution, at east England and some few other places in the North Sea, there are also found, besides the numerous pelagic young of less than 2 cm, some larger young stages of over 10 cm, sometimes in fairly deep water (over 100 m, 6 f, p. 576). The intermediate sizes have only occasionally been observed, in Oct.—Nov. abt. 6.5—9 cm long (8) and in the beginning of June abt. 8—13 cm (4). The age of these would presumably be abt. 1 1/4 and 1 year. That they may, however, be older is evident from the fact that larvæ, apparently of late-spawned eggs, are pelagic until right on in the following spring, ("Thor" 19. and 30. March 1906, northern Kattegat) though this must be regarded as exceptional.

Table 40. Age determination of lemon soles. Vestmanhavn May 1910.

Length cm	Number of summer growth zones in the scales	
	♂ (mature and immature)	♀ (mature & immature)
32	5—6, 6—7, >6, >6, 7, 7—8, 7—8,	5, 5, 5—6, 6, 6
31	5—6, 6, 6, 6, 6—7, 6—7, 7, 6—8,	4—5, 5, 5—6
30	5, 5—6, 5—6, 6, 6, 6, 6—7, 6—6. 8	5, 5—6
29	4—5. 5, 5—6, 5—6	4, 4—5
28	4, 4, 4, 4—5, 5, 5—6, 6, 5—7	4
27	4, 4—5, 4—5, 4—5, 6	3, 4, 4—5
26	4—5, 4—5, 6—7	4
25	4, 4, 5	3

We hope on a later occasion to go further into the biology of this species; for the time being, it

[1] The "Thor"s catches of pelagic stages from West, North and East coasts of Scotland and South and West coast of Iceland, which were much richer. The maxima obtained in these two regions were 450—470 and 50—70 specimens respectively pr. 1/2 hour's haul with the young-fish-trawl.

[2] The two largest fish measured were 48 cm, both females, taken in June 1912 at Ejde. The largest ever known is 48.2 cm, from the east coast of Scotland (Fulton 6 e).

will suffice here to note our age determinations by means of the scales of the smallest sizes which could be determined from the material[1] (Table 40).

Few as these are, it will nevertheless be seen that the growth is evidently far poorer than that of the plaice; this applies especially to the males, the females growing somewhat better. As to the growth of the youngest year-classes, nothing further can be said at present.

6. The lemon sole fishery at the Færoes.

Again in contrast to the plaice, the lemon sole is an object of considerable and steadily increasing importance to the British fishing industry at the Færoes.

During the last few years, the following quantities (in kg) were taken at these islands.

Year	1906	1907	1908	1909	1910	1911	1912	1913	1914
By English S/T	c. 345.300	c. 347.400	c. 267.500	c. 608.400	c. 620.500	c. 556.800	c. 565.600	c. 760.000	(c. 530.000)
- Scottish S/T			c. 25.500	c. 56.700	> 50.000	60.100	108.900	> 115.000	

The fishery of the other foreign nations may be disregarded as quite insignificant.

The proportion between the English and the Scottish yield is here about the same as in the case of the plaice, *viz.* abt. 10:1 in the time prior to 1911, and thereafter abt. 5—6:1.

The yield represents considerable quantities of fish, and is of great value, far exceeding, as mentioned, that of the plaice, and on comparing for instance with the catch of halibut in these waters it will be seen that save for the abnormal year 1908, the yield of lemon soles has constantly increased until in 1913; the English fishery here accounted for about the same weight of lemon soles as of halibut, abt. 800.000 kg. Moreover, the lemon sole is a very valuable fish, only a very few kinds, such as sole and turbot, fetching higher average prices per kg (0.71—1.00 shillings per kg 1904—1910 in England and Scotland). The value of the English fishery here in pounds can be estimated at least as below:

1906	1907	1908	1909	1910	1911	1912	1913	1914
16.000 £	15.000 £	12.000 £	25.000 £	25.000 £	24.000 £	26.000 £	30.000 £	(33.000 £)

In respect of weight, the lemon soles make up but a modest amount compared with the total yield — abt. 2.0—2.5 % — in point of value, however, considerably more, as for instance in 1911 10—11 %. The principal yield is that of cod and haddock (p. 39). According to estimates, the years immediately before 1914 gave a yield for the total English fishery here to the value of abt. £ 300.000, the Scottish £ 65.000 of which abt. 10 % and abt. 3—4 % respectively was made up of lemon soles.

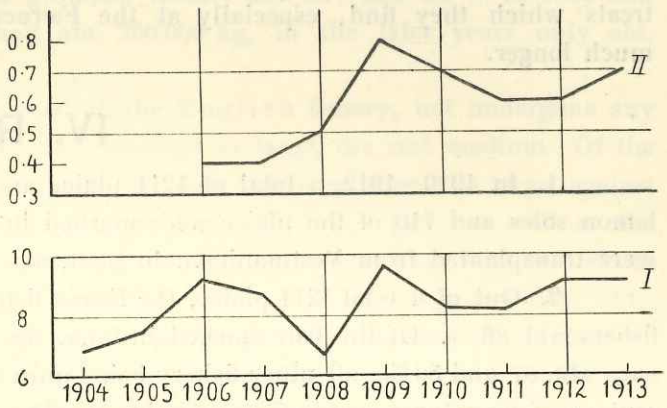

Fig. 27. Average catch of lemon soles at the Færoes in cwts. (II) per day's absence (English statistics), (I) per 100 hours' trawling (Scottish statistics).

The average catch also shows for the fishery of both nations an increase, especially sudden and marked in 1909, followed by a temporary decline, and then again a continued increase (to 1914).

The cause of this increase, which is also observed in the Scottish North Sea fishery for this form, is variously conjectured. Firstly, that lemon soles are now picked off more carefully than before, none being thrown away; then also that the trawl, after the adoption of big-bosomed ground ropes

[1] H. N. Maier: Beiträge zur Altersbestimmung der Fische. Arb Deut. Wiss. Komm. f. d. Intern. Meeresforschung. B. Helgoland, No. 5, 1905. Only some few records of age determinations are here given. A male of 24 cm (spent) was according to this fully 3 years old by end of July; specimens of 40 cm fully 6 years, all ♂ from the south-eastern North Sea.

furnished with rollers, is better able to work over rough bottom, which is probably where the lemon soles more particularly lie (cp. 6 e).

It is indeed surprising to see how important a part the relatively inconsiderable Færoe area plays, according to statistics, in the production of lemon soles, when compared with the far larger Iceland grounds, especially for the English fishery. The graph below illustrates this. In several of the later years, we find abt. 1/4 of all the lemon soles landed in England coming from the Færoes, and less than half that quantity from Iceland, while the Scottish yield is divided more or less equally between the two areas.

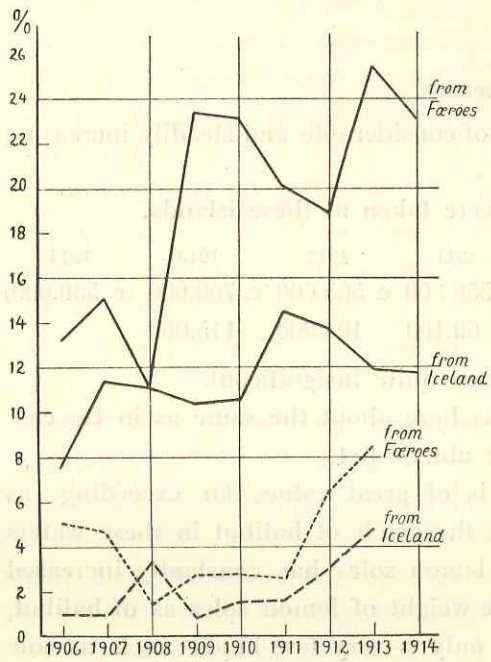

Fig: 28. Total catch of lemon soles at the Færoes and at Iceland in percent of total quantity landed in England (——) and Scotland (- - - -).

The remainder is taken chiefly from the North Sea; this applies especially to the Scottish fishery, for which the lemon soles as a whole play a far more important part[1].

Finally, as regards the composition of the catch, the Scottish statistics for the North Sea fishery show that while the "large" class of lemon soles makes up a constantly decreasing proportion of the total yield, the smallest year-classes, on the other hand, are seen to increase continually in numbers. Even the small figures for the Færoes also reveal the same state of things, and we have here the clearest proof that the catches really represent an overfishing of the stock.

Large Lemon soles in % of total catch at the Færoes.

1904	1905	1906	1907	1808	1909	1910	1911	1912	1913
9.9	9.1	9.0	9.3	9.1	9.3	8.5	8.4	8.0	7.6

From the foregoing, then, there can be no doubt that an overfishing of the stock of lemon soles, especially at the Færoes, has been going on right up to 1914. The decline occasioned by the war in the yield of the British fishery since then has doubtless given these fish, like other forms, a much-needed respite in which to recover. Under ordinary circumstances, they would, with their slow growth, despite the numerous protected retreats which they find, especially at the Færoes, hardly have been able to stand such decimation much longer.

IV. Resumé.

1. In 1910—1912, a total of 1211 plaice and 384 lemon soles were marked at the Færoes. All the lemon soles and 710 of the plaice were marked in Vestmanhavn Fjord, 125 plaice in Sundene. 301 plaice were transplanted from Vestmanhavn to Slettenæs and 75 from Sundene to west of Myling.

2. Out of a total 1211 plaice, the Færoe fishermen themselves recaptured only abt. 2 %, the British fishery abt. 26 %. Of the fish marked inshore, the British took abt. 20 % in all, and of the transplanted ones abt. 37 and 50 %, all other fishery being quite insignificant. In the first year after marking, the percentage of recaptures was 4—7 % and abt. 21—33 % respectively, the migration from the territorial waters proceeding more extensively in the second and third years after marking in the case of the former. The males are recaptured (migrate) especially during the first year far more frequently than the females.

The fishery among the stock of the Færoes is thus as intensive as on the West Iceland grounds or in large parts of the North Sea.

[1] The proportion between the quantities landed in the two countries is about as 3 : 4 or 4 : 5, in contrast to the figures for most other fish.

3. From our investigations, the following summary of the growth of the plaice at the Færoes can be given. After spawning on the coast bank in February—end of April, the pelagic young are found on their migration into the fjords in May and June, the young bottom stages in July and August, right up inshore or near the bottom at greater depths up in the fjords. Next spring, the now one-year-old plaice are found, with an average length of abt. 10 cm. As far as can be seen at present, the growth is continued during the next two years up in the Vestmanhavn fjord, which is the best known water in this respect, likewise with abt. 10 cm average per year. In the fourth year, the markings show that among the 30—39 cm plaice, the increment averages only abt. 5—6 cm and now they commence to migrate out to the coast bank. First the immature males take the lead, often spawning in the first winter after marking (for the first time). Later the females follow, the growth of these being now as a rule far the greater. Outside the fjord, the growth is better, being for the transplanted fish of 30–39 cm (3—4 year-olds) abt. 9—10 cm annually for a further two years, and then decreasing. In Vestmanhavn also the growth varies from year to year, being lowest in 1912 and highest in the 1910 experiment. Growth continues throughout the year, but is in several cases distinctly retarded in autumn and winter, from October to Febr.

The plaice grow then, at any rate in the 3—4 first years, better at the Færoes than at most other places within the area of distribution. Only in some few parts of the middle and southern North Sea, and especially on transplantation from other parts of the North Sea to the Dogger, do we find an annual growth (abt. 8.6—15.4 cm) exceeding that of the Færoe fish.

The proportion $w = \frac{l^3}{100} k$ (coefficient of "condition") is also for the Færoe fish as a rule far above 1; for fish less than 45 cm abt. 1.20, often over 1.22 for the smaller sizes; in other words, a further sign of the favourable conditions in which their growth takes place.

4. The youngest year-classes are fairly stationary in the shallow water of the fjord and near the shore. Save for the migration shown, that of the 3—4 year-old fish from the inshore waters, no regular migration of the older fish is yet known. They move about over the coast bank to abt. 150 m depth.

5. The fishery of the stock of plaice at the Færoes is almost exclusively in the hands of British fishermen. These take the older year-classes on the coast bank, but only, it should be noted, as a "bye-product". In 1908—13, there was an annual yield of 80—100.000 kg plaice, of which the English vessels took abt. 60—80.000, the Scottish abt. 13.000. Altogether, however, the plaice only make up less than 1 % of the total yield — in kg — of fish from these grounds, mostly abt. 0.7, and 0.5 % in 1906 and 1907, when the quantities taken were abt. 240.000 and abt. 200.000 kg, in the later years only abt. 0.2—0.3 %.

The composition of the catch has, in the case of the English fishery, not undergone any change. As a rule, more than 95 % are annually (1906—14) classified as large, the rest medium. Of the fish landed at Scottish ports, on the other hand, from 1910—13, only half were sorted as large, against $^2/_3$ or more previously, practically all the rest being classed medium. This last fact, as well as the gradual decline in the average catch per day's absence of English steam trawlers from 0.25 in 1906 to 0.07 in 1911—14, suggests an overfishing of the stock, or rather, a clearing off of the grown fish. The youngest and younger year-classes will, under the present conditions, be protected against destruction.

6. Of the lemon soles, abt. 9 % were retaken by Færoe fishermen, up in Vestmanhavn. In contrast to the plaice, most of these fish were grown, mature, at time of marking (abt. 30–40 cm). The growth therefore probably is extremely slight, less than 1 cm per annum, as is also known to be the case from earlier experiments in the North Sea.

Not one was taken again outside the fjord, this being probably due either to their not moving out to any degree from the territorial waters, or to their keeping to such bottom as can hardly be fished by the trawl.

In contrast to the plaice, the lemon soles play a considerable part in economical respects for the foreign fishery. The Færoe fishermen themselves take no part in this. In 1909—13, there was an annual yield of 660.000 to 890.000 kg, to the value of abt. £ 28.000—35.000 annually. The English boats take the great bulk of this; so great, that abt. 1/4 of the total quantity of lemon soles landed in England comes from the Færoes. Up to 1914, the yield was increasing, also the average catch, but, as with the plaice, we find a decline in the number of grown (large) fish in proportion to the small. It is therefore to be supposed that this isolated stock, even though its earliest year-classes may be protected by Nature against capture, will soon have reached the limits of its productivity if the fishery be carried on with like intensity in the future.

Dansk Resumé. (2).

Forsøg med Rødspætter (*Pleuronectes platessa*).

I Maj 1910 udsatte "Kommissionen for Havundersøgelser" fra "Thor" ca. 600 mærkede Rødspætter i Vestmanhavn (Fig. 2). Fisken fangedes med Snurrevaad fra Skibet paa Banken ("Pladen") i Fjorden. De levedygtige Fisk mærkedes og udsattes igen straks efter Fangsten. I Maj og Juni, 1911 & 1912, mærkedes yderligere et Antal Rødspætter i Fjorden; i disse Aar fangedes de, ved Hjælp af lejet Skib og Mandskab, dels paa Banken dels med Aalehaandvaad paa ganske lavt Vand længere inde i Fjorden (se Fig. 2 og Tabel 5). Et Antal, ialt 300, flyttedes i en Damjolle ud gennem Vestmansund til udfor Slettenæs, hvor de sattes fri paa c. 55 m Vand 1 Kvartmil fra Kysten (Fig. 1).

Endelig mærkedes der, ligeledes i 1912, Rødspætter, der fangedes oppe i Sundene, mellem Ejde og Haldorsvig paa 9 m Vand. 70 sattes ud igen paa Fangststedet; Resten sejledes ud til NW for Myling paa c. 90 m Vand, omtr. 3 Kvartmil af Land, og udsattes der (Fig. 1).

De mærkede Fisk var af lidt forskellig Størrelse i de forskellige Forsøg, alt i alt mellem 20 og 56 cm lange. Størrelserne ved de enkelte Forsøg fremgaar af følgende Oversigt; de allerfleste var yngre, langtfra udvoksne Fisk.

Mærkede i	Længde i cm				
	20—29	30—39	40—49	50—59	ialt
Vestmanhavn	163	362	183	2	ca. 700
Sundene	14	243	41	3	— 300
Omplantet fra Vestmanhavn	120	5	..	..	— 125
Omplantet fra Sundene	..	49	22	1	— 75
	297	659	246	6	ca. 1200

Mærkerne var af samme Slags som de, der i 1910—12 anvendtes ved Torskemærkningerne heroppe. De bestaar af 2 Benplader og en numereret Bronzeplade, sammenholdt med en Sølvnaal.

Antal af de genfangne, mærkede Rødspætter.

Færingerne selv driver ikke Rødspættefiskeri, i alt Fald intet nævneværdigt. Indenfor Territoriet er et saadant kun dreven fra det danske Fiskeriinspektionsskib, men iøvrigt ikke i saadant Omfang, at det i mindste Maade har Karakter af Erhvervsfiskeri. Mange mærkede Fisk er genfangne her. Udenfor 3-miles Grænsen toges de ved det storstilede Fiskeri, der dreves af fremmede, især britiske Fartøjer. Ved en Opgørelse af Fangstprocenten er det derfor kun de Genfangster, der er gjort ved dette Erhvervsfiskeri, der lægges til Grund. Denne forholder sig saaledes.

Mærkede	Total % genfanget af fremmede Fiskere af Størrelserne (cm)			Gfn.-% i første Aar. Samtlige Størrelser tilsammentaget	Total Gfn.-% 1—52 Mdr. efter Mærkningen
	< 30	30—39	40—50		
I Vestmanhavn	c. 14	e. 24	c. 17	6.9	19.3
I Sundene	- 20	- 60	—	4.0	25.6
Omplantet fra Vestmanhavn	- 33	- 20	- 30	20.9	36.5
Omplantet fra Sundene	..	- 30	- 30	33.3	49.3

Det viser sig da, som man kunde vente, at af Fisken, der mærkedes inde i Fjorden, genfangedes første Aar efter Mærkningen kun ret faa som udvandrede til Farvandet udenfor Territoriet af fremmede Fiskere, derimod langt flere af dem, der udsattes fra aaben Kyst, og des flere jo længere ude de sattes fri. I Løbet af

de 3 næste Aar vandrede flere og flere ud, og flere og flere indfangedes, saaledes at der ialt af disse fiskedes c. 20 og 26 % eller mere end 3—4 Gange saa mange som i første Aar. Der fangedes ogsaa yderligere nogle af de omplantede, men Hovedmassen toges allerede i første Aar, saaledes at den samlede Fangst-Procent af disse knap er det dobbelte af første Aars Fangst, nemlig resp. 49 og 37 %. I disse Forsøg er der fanget forholdsvis omtrent lige mange af de 30—39 og 40—39 cm's Fisk, medens der i de to Fjord-Forsøg er taget relativt flest af de ældre Fisk (Tabellerne 8 og 21).

Af de fremmede Fiskere kommer som sagt alene de Britiske her i Betragtning. De øvrige fremmede Nationer, der (1910—1914) fiskede under Øerne, bl. a. belgiske, tyske, hollandske Trawlere har kun taget forsvindende faa af de mærkede Fisk, ialt kun 4 mod de c. 300 og c. 60, der faldt paa henholdsvis Englændernes og Skotternes Part. Undersøges nu, hvad Statistiken oplyser om Omfanget af de forskellige Nationers Trawlfiskeri heroppe, ser man, der er fisket følgende Kvantiteter Rødspætter (i kg).

	England	Skotland	Belgien	Holland
I 1910.....	65.989	13.866	?	105
1911.....	62 687	13 663	5.224	135
1912.....	50.241	13.868	?	1.780
1913.....	81.926	ca. 12.000	?	..

Forholdet mellem de engelske og skotske Fangster er m. a. O. omtr. som i vore Forsøg, Aar for Aar som 5 : 1, medens de øvrige fremmedes Fiskeri er forsvindende ringe og Færingernes eget lig Nul. Forholdet er et ganske andet for bl. a. Torskefiskeriets Vedkommende. Her siger baade den internationale Statistik og vore Mærkningsforsøg, at Færingernes eget Fiskeri spiller en overordentlig stor Rolle ved Siden af de fremmedes, hvortil yderligere kommer, at Fangsten (i kg) naar ganske anderledes Størrelser end for Rødspættens Vedkommende. Medens der saaledes af Torsken, der mærkedes udenskærs (ca. 950 Stk.), toges omtrent lige mange af Færingerne (ca. 11 %) og Briterne (ca. 10 %), fiskedes de allerfleste af de yngre Torsk, der mærkedes i Nolsø Fjord o. a. Steder indenskærs (ca. 2400 Stk.), af Færingerne selv (ca. 47 %) kun 2.5 % af Briterne. Aarlig (1910—13) fiskede Englænderne 18—21 Mill. kg[1], Skotternc c. 2 Mill. kg. M. a. O. indbragte det væsentligste fremmede Fiskeri ca. 20—23 Mill. kg aarlig eller omtrent saa meget som Færingernes eget.

Sammenligner man her Fangstprocenten for de omplantede Rødspætter (ca. 21—33 % i første Aar) med de nævnte 21 % for Torsken udenskærs, ser man altsaa, at der fiskes noget stærkere paa de ligeledes ældre Rødspætter. Rødspættefiskeriet ved Færøerne er i Virkeligheden ligesaa intensivt som bl. a. ved Vest Island og i store Dele af Nordsøen, men kvantitativt naturligvis betydelig mindre indbringende. Paa den anden Side er de yngre Torsk indenskærs Genstand for et langt voldsommere Fiskeri; stedvis er der saaledes opfisket indtil ¾ af samtlige mærkede. De yngste Aargange af Rødspætten har derimod absolut Ro til at kunne vokse og rekrutere Bestanden. Et Spørgsmaal er det dog, om Bestanden i Længden er stor nok til at taale Fiskeriet, som det dreves i alt Fald op til 1914. Der er Tegn til det modsatte. Den skotske Statistik viser saaledes, at de fuldvoksne Fisk, Handelsklassen "large", i Forhold til de yngre i Aarenes Løb er aftaget i Mængde (se Fig. 26).

Væksten af de mærkede Rødspætter.

Tabellerne (bl. a. 11, 12, 14, 17) og Kurverne (bl. a. Fig. 4—10, 17, 19—21) viser Væksten ved de forskellige Forsøg. Heraf og af vore andre Undersøgelser ved Færøerne fremgaar følgende Overblik over Rødspættens Vækst i færøske Farvande.

Gydningen foregaar paa Kystbanken paa omkring 100 m's Dybde i det tidlige Foraar (Februar—April). I Maj og Juni finder vi Yngelen i det pelagiske Stadium (Flydestadiet) paa Vandring ind mod Fjordene og det grunde Vand. I Juli og August er de unge Bundstadier naaet helt ind paa det lave Vand i Stranden eller træffes nærved Bunden paa noget dybere Vand i Fjordene. Næste Foraar, hvor de smaa Rødspætter er omtr. 1 Aar gamle, er de i Gennemsnit 10 cm lange, og de to følgende Aar fortsættes Væksten med ligeledes i Gennemsnit 10 cm aarlig. Saaledes var det i alt Fald i Vestmanhavn Fjord, hvor de fleste af disse Undersøgelser og Aldersbestemmelser blev gjort.

Derefter ophører den hurtige Vækst, idet de 30—39 cm's Fisk, der mærkedes inde i Fjorden, i Gennemsnit kun lægger c. 5—6 cm til i Vækst i hele det følgende Aar (Fig. 5). Samtidig begynder Udvandringen til Kystbanken. Først vandrer de unge Hanner, der, nylig udvandrede, ofte gyder første Vinter efter Mærkningen. Senere kommer Hunnerne, hvis Vækst nu i Reglen er tydelig stærkere end Hannernes, men ikke saa stærk som i Dyrenes første Aar.

Udenfor Fjorden er Væksten bedre. De omplantede 30—39 cm's, for største Delen 3—4-aarige, Fisk, vokser saaledes endnu i 2 Aar aarlig c. 9—10 cm, først derpaa mindre (c. 5—8 cm). I Fig. 23 er Vækstkurverne for de første to Aar sammenstillede til Sammenligning af Væksten ved de forskellige Forsøg (Fig. 14 & 19).

Sammenlignet med det iøvrigt kendte om Rødspættens Vækst viser det sig, at ved Færøerne vokser Rødspætten bedre end de fleste andre Steder indenfor Artens Omraade. Kun ganske enkelte Steder i Nordsøen og især ved Omplantning fra andre Dele af dette Farvand til Dogger-Banken overgaar Aarsvæksten Færø-Fiskens (Tabellerne 30 og 31). Hertil kommer imidlertid, at der ved Færøerne er mærket Fisk, der gennemgaaende er langt større (se p. 38) end i Nordsøen o. a. sydligere Omraader. Ved Færøerne er Gennemsnitsstørrelsen omtrent 35 cm, og ca. 650 af ca. 1200 mærkede er

[1] 50—60 % af Total-Fangsten fra "Færøerne" er Torsk og ca. 16 % (i Gnsnit.) af samtlige "cod" landet i England kommer fra Færøerne. I Sammenligning hermed spiller Rødspættefangsten kun ganske underordnet Rolle (Aarene 1906—1914).

mellem 30 og 39 cm store, medens der i Nordsøen kun sjældent er mærket Rødspætter større end 30 cm, hyppigst 20—30 cm. Selv om nu Tilvæksten i cm er den samme, hvad den altsaa endda sjældent er, vil dette naturligvis betyde en langt større Masseforøgelse for Færøfisken end for Nordsøfisken i samme Tidsrum. Eksempelvis vil

ved	25 cm's	Længde	et	Længdetillæg	paa	7 cm	betyde en	Vægtforøgelse paa (175 +) 225 gr.
-	30 —	—	—	—	7 —	—	—	— (325 +) 300 —
-	32 —	—	—	—	7 —	—	—	— (400 +) 375 —
-	35 —	—	—	—	7 —	—	—	— (500 +) 425 —

altsaa praktisk talt Fordobling af Begyndelsesvægten selv af de største. Selv om der foreligger meget faa Forsøg med saa store Fisk i sydlige Omraader, kan man dog gaa ud fra, at deres Vækst sandsynligvis er langt mindre end de mærkede, yngres (se Tabel 30). Sammenligningen falder derfor end mere ud i Færøfiskens Favør.

Den overordentlig gode Vækst, de mærkede Rødspætter viser, er endelig ikke noget for dem ejendommeligt. Overalt, hvor der er undersøgt Prøver af Bestanden ved Færøerne, er den præget af de gode Betingelser, den lever under. Man har et Maal derfor i den saakaldte Ernæringskoefficient, k; k er lig $\frac{w \cdot 100}{l^3}$, hvor l er Længden i cm, w Vægten i gr. k er i store Dele af Nordsøen og i Kattegat oftest lig, eller noget nær lig 1, medens den ved Færøerne gennemgaaende er betydeligt over 1, omtr. lig 1.20 eller 1.40 og endda højere (se Fig. 3, Tabel 2).

Vandringerne.

Foreløbig kender vi kun, som andre Steder, de omtalte Vandringer af de spæde Larver (og Æggene) mod det grunde Vand, hvor de yngre Aargange vokser op, og de følgende Vandringer af de opvoksende Fisk, naar Tidspunktet for den første Yngleperiode nærmer sig, bort fra Kysten eller ud af Fjorden. Hannerne synes at være tidligere rejseklare end Hunnerne, som det ogsaa er kendt andre Steder fra. Vandringerne ude paa Kystbankerne, bl. a. til og fra Yngleplads erne, om man da kan tale om saadanne, kan vi derimod endnu ikke følge i Enkeltheder. De ser foreløbig kun ud som regelløs Omstrejfen (Fig. 11, 12, 16, 18 o. a.).

Forsøg med mærkede Rødtunger (*Pleuronectes microcephalus*).

I Maj 1910 & Juni 1911 udsattes inde i Vestmanhavn ialt 384 mærkede Rødtunger. Fisken fangedes sammen med Rødspætterne i Snurrevaad paa Banken i Fjorden eller med Aalevaad paa ret lavt Vand. Af disse toges i Løbet af det følgende Aar c. 9 % igen, alle inde i Fjorden og alle ved Linefiskeri af færøske Fiskere — formentlig fordi denne Art er villigere end Rødspætten til at gaa paa Krog. Ikke een eneste er fundet igen udenfor Fjorden, enten fordi de fleste ikke er vandret synderligt, eller fordi de har holdt sig paa haard Bund, hvor Trawlen ikke gør saa rent Bord, som hvor Rødspætten færdes.

Væksten

er yderst ringe, mindre end 1 cm om Aaret, som man ogsaa har set det ved de Forsøg, der er anstillet i Nordsøen. Aarsagen er tildels, at vi, i Modsætning til Rødspætten, har mærket de 30—40 cm kønsmodne, langsommere voksende Fisk, kun meget faa af de yngre og slet ingen af disse er fanget igen. Aldersbestemmelser ved Skællene har nemlig vist os, at Væksten i de første Aar, ligesom det er kendt fra andre Former, maa være væsentlig større end senere. Af 31 Individer mellem 25 & 29 cm i Maj i Vestmanhavn var saaledes 29 fire Aar og derover, 23 af disse fire eller fire—fem Aar (Tabel 40). De yngste Størrelser er iøvrigt store Sjældenheder. Æggene og den spæde Yngel har vi taget rundt Øerne i Sundene og mange af Fjordene Sommeren igennem; de yngste Bundstadier er derimod saa godt som ukendte heroppe endnu; antagelig findes de paa dybere Vand. Kun enkelte paa ca. 10 cm kendes, og først de 15 cm lange Fisk og større bliver almindeligere; de fleste i vore Fangster er mellem 20 og 40 cm.

Skønt ingen af de mærkede Fisk er taget igen af nogen fremmed Fisker, spiller dog disses Fiskeri efter Rødtungen ved Færøerne en meget stor Rolle, meget større end Tilfældet var med Rødspætten. Det er igen i første Linie engelske, derpaa skotske Damptrawlere, der tager Løvens Part. I Aarene 1909—1913 toges i 1000 kg følgende Mængder:

	England	Skotland
1909.....	c. 609	c. 57
1910.....	- 621	> 50
1911.....	- 557	c. 60
1912.....	- 566	- 109
1913.....	- 760	>115

Siden 1906 har Udbyttet været stærkt stigende, saaledes at, medens (for det engelske Fiskeris Vedkommende) Forholdet mellem Mængden af Rødspætter & Rødtunger i 1906 var ca. 2 : 3, er det i de senere Aar helt anderledes, nemlig i 1913 som ca. 1: 9. I 1912 er der endog fisket lige saa store Kvanta Rødtunger som Helleflynder (af engelske Fiskere), af hvilken Form Udbyttet iøvrigt har været stadig synkende i de senere Aar. Hertil kommer, at det er en meget værdifuld Fisk (omkring 0.7—1.0 sh pr. kg); kun Tungen og Pighvarren opnaar højere Priser paa det engelske Marked. Medens derfor Rødtungen efter Vægt vel kun udgør en relativ ubetydelig Del af Fangsten heroppe (ca. 3—4 %) betyder den dog efter Værdi henved 1/10, 10—11 %, af en Total-Fangst, der skønsmæssig kan vurderes til omtrent 300.000 £ for Eng-

lands og ca. 65.000 £ for Skotlands Vedkommende i Aarene op til 1914. Hovedfangsten er Torsk og Kuller. At Færøerne endvidere er en af de vigtigste Fangstpladser for denne værdifulde Fisk fremgaar af følgende Kendsgerning, at i de senere Aar kommer ca. 1/4 af samtlige Rødtunger, der landes i England, fra Færøerne, under 1/2 af dette Kvantum fra Island. I Skotland derimod landes omtrent lige meget fra begge Omraader og ogsaa relativt langt mindre end i England. Havet N. og V. for Skotland saavel som Nordsøen spiller for Skotterne den største Rolle som Rødtunge-producerende Omraade.

Spørger man nu om Grunden til de senere Aars stigende Udbytte, ligger den formentlig dels i, at man i de senere Aar ved den omhyggeligere Behandling, Fangsten faar, opnaar højere Priser, derfor ogsaa er omhyggeligere med intet at lade gaa til Spilde, der kan bringes i Penge, og dels i, at man i de senere Aar har lært at trawle paa selv ret haard Bund, hvor denne Form netop holder til. Et andet Spørgsmaal er, naar Grænsen for Udbytteforøgelsen vil være naaet, og den maa naas for denne ganske isolerede Bestand paa det relativt lille Færøplateau. At Fiskeriet har været drevet lovlig haardt, ses bl. a. af, at Mængden af Handelsklassen "large" i Forhold til Totalmængden er i Aftagende (p. 46). I Følge den skotske[1] Statistik synker saaledes dette Tal gradvis i Aarene 1909 til 1913, og det er endda lidt lavere i 1909 end i det første Aar, hvorfra der haves Statistik (1904).

Nogen fuldstændig Ruin kan ikke, saa lidt som for Rødspætten, indtræde; længe forinden vil den svigtende Rentabilitet have hæmmet Fiskeriet betydeligt. Saalænge der intet Fiskeri drives og vil kunne drives inde paa Territoriet, har de yngste Aargange Ro nok til at vokse op. Interessant vil det blive, naar normale Forhold ogsaa i Fiskeriforholdene atter indtræder, at se, hvorledes Arten er kommen gennem de sidste Aars relative Fredningsperiode. Man maa da haabe, at det ikke alene, som før, bliver Fremmede, der høster Udbyttet af dette som af andre af Fiskerierne ved Færøerne i Fremtiden.

[1] Tilsvarende engelsk haves ikke.

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Particulars regarding the Danish marking experiments with plaice at the Færoes 1910—1912.

f.-b. = Færoese fishing boat; S/T = Steamtrawler; fms. = fathoms (10 fms. = 18.28 m).

I. Experiments in Vestmanhavn Fjord.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery: Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate Size cm	Weight (gr) initial	Weight (gr) ultimate
Exp. 1. 1910. May 17—21. 498 Plaice liberated (No. 7401—7900) in Vestmanhavn Fjord 62°08.7′ N. 7°09.3′ W. 22 m.	1910 June 15	7452	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. Islands Falk«	1	32	(32)[1]	390	?
	» » »	7630	♀	—	»		6	1	36	(36)	590	?
	» » »	7762	♂	—	»		»	1	37	(37)	670	?
	» » »	7866	♂	—	»		»	1	40	(40)	770	?
	» » »	7872	♀	—	»		»	1	35	(35.4)	480	?
	» Aug. 3	7415	♀	—	»		Færoe f.-b.	3	25	(28)	180	?
	» Sept. 20	7546	♀	—	»		H.M.S. "Islands Falk"	4	33	(35.4)	450	?
	» » c. 20[2]	7567	♂	—	»		»	c. 4	36	(40.5)	600	?
	» » c. 20	7613	♀	—	»		»	c. 4	33	(35.4)	400	?
	» Oct. 13	7871	♀	—	»		Færoe f.-b.	5	33	(36.4)	390	?
	» » 18	7466	♀	9 miles NW½N of Myggenæs, 55 fms.	62°10′	7°55′	English S/T	5	34	39.3	510	762 gut.
	» » 20	7668	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	5	45	50	1090	1540
	» » 20	7896	♀	—	»		»	5	36.5	44	540	880
	» Nvbr 2	7467	♀	—	»		»	6	33.5	38	440	700
	» » 2	7487	♂	—	»		»	6	35	38	510	790
	» » 2	7492	♂	—	»		»	6	39	42	720	890
	» » 2	7548	♀	—	»		»	6	32	37	390	650
	» » 2	7594	♂	—	»		»	6	37	42	670	1000
	» » 2	7776	♂	—	»		»	6	39	43	870	1100
	» » 2	7820	♀	—	»		»	6	25.5	34	235	545
	» » 2	7886	♀	—	»		»	6	31.5	35.5	420	625
	» » 8	7522	♂	—	»		»	6	31.5	34	370	525
	» » 8	7544	♂	—	»		»	6	32	35.5	420	610
	» » 8	7704	♀	—	»		»	6	40.5	44	790	1100
	» » 8	7869	♂	—	»		»	6	33.5	36	460	650
	» » 24	7455	♂	—	»		»	6	42	48	870	1175
	» » 24	7489	♂	—	»		»	6	40.5	46	810	1060
	» » 24	7503	♂	—	»		»	6	36.5	45	590	950
	» » 30	7476	♂	—	»		»	6	32.5	35	380	550
	» » 30	7602	♂	—	»		»	6	32.5	35.5	430	600
	» » 30	7687	♂	—	»		»	6	33	35.5	460	610
	» » 30	7796	♂	—	»		»	6	33.5	38	490	700
	» Decb. 5	7649	♂	—	»		»	7	35	40	545	760
	» » 5	7670	♀	—	»		»	7	40	40	750	650
	» » 5	7676	♀	—	»		»	7	35	40	425	650
	» » 5	7840	♀	—	»		»	7	28.5	34	270	495
	» » 5	7885	♂	—	»		»	7	34	39	460	655
	» » 8	7666	♀	Outside Vestmanhavn, 28 fms.	62°07′	7°10′	Færoe f.-b.	7	46	(49.5)	1130	?
	» » 21	7581	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	7	38	42	670	925
	» » 25	7554	♂	2 miles N½W of Myling 44 fms.	62°20′	7°15′	English S/T	7	37	39.4	580	637[3]

[1]) The numbers in brackets indicate the ultimate size given as length to base of caudal fin; a correction being added. [2]) Date of registration (p. 6) the date of recapture being unknown. [3]) spent.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery											
	Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	Weight (gr) ultimate
	1910 Decb. 29	7456	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	7	40	44	760	1000
	1911 bef. Jan.	7754	♂	?	?		English S/T	c. 7	37.5	?	630	?
	» Jan, 27	7582	♂	9 miles N by E½E of Fuglø, 47 fms.	62°30′	6°20′	»	8	38	40	730	970 gut.[1]
	» Febr. 2	7727	♂	1½ miles SW by W of Trællenipen, 44 fms.	62°00′	7°15′	»	9	40	42.8	870	955 gut.[2]
	» » 6	7686	♂	7 miles NE from Fuglø 56 fms.	62°28′	6°08′	Scotch S/T	9	31.5	34.4	420	?
	» » 7	7442	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	9	38	40.5	660	850
	» » 7	7500	♀	—	»		»	9	42	45.5	940	1225
	» » 7	7598	♂	—	»		»	9	40.5	44	760	1000
	» » 7	7653	♂	—	»		»	9	33.5	37	490	675
	» » 7	7678	♂	—	»		»	9	31.5	37.5	355	675
	» » 7	7805	♂	—	»		»	9	31.5	35	355	500
	» » 7	7838	♂	—	»		»	9	35.5	38.5	535	725
	» » 7	7844	♂	—	»		»	9	29.5	36	360	650
	» » 12	7475	♂	7 miles SW½W of Trællenipen, 55 fms.	61°55′	7°20′	English S/T	9	34	37	500	595[3]
	» » 12	7846	♂	— — 55 »	»		»	9	44	?	1080	?
	» » 14	7648	♂	11 miles NW of Myggenæs, 55 »	62°10′	8°00′	»	9	38.5	41	750	918 gut.[3]
	» » 23	7411	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	9	25	32	175	400
	» » 23	7445	♀	—	»		»	9	43.5	48	1015	1350
	» » 23	7446	♂	10—12 miles E to ENE from Fuglø	62°25′	5°53′	Scotch S/T	9	39	(41.2)	760	? [4]
	» » 23	7511	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	9	30.5	34.5	320	450
	» » 23	7694	♂	—	»		»	9	32	36.5	395	550
	» » 23	7722	♂	—	»		»	9	43	50	1090	1550
	» » 23	7756	♀	—	»		»	9	34	39.5	470	725
	» » 23	7810	♂	—	»		»	9	28.5	36	260	500
	» » 23	7867	♂	—	»		»	9	31	34.5	385	510
	» » 23	7874	♀	—	»		»	9	29	34.5	270	440
	» » 23	7889	♂	—	»		»	9	24.5	34.5	190	475
	» » 27	7875	♀	8 miles WNW½W of Myggenæs, 53-58 fms.	62°05′	7°55′	English S/T	9	43	48	995	1302[5]
	» March 6	7849	♀	7 miles NE by E of Kadlur, 47-52 fms.	62°28′	6°40′	»	10	48	52.7	1450	1720[4]
	» » 16	7596	♂	6 miles ESE of Fuglø	62°20′	6°03′	Scotch S/T	10	35	37.9	490	? [4]
	» » 18	7850	♀	4 miles WNW of Troldhoved, 45 fms.	61°55′	7°05′	English S/T	10	42.5	46.8	985	1380 gut.[6]
	» » 20	7512	♀	7 miles SW½W of Trællenipen, 70 fms.	61°55′	7°20′	»	10	45	51.5	1120	1780 gut.
	» before 28	7535	♀	13 miles N¼W of Myling, 62 fms.	62°30′	7°25′	»	c. 10	44.5	51	1130	2000
	» » 28	7413	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	10	24.5	31	160	365
	» » 28	7430	♀	—	»		»	10	28.5	34	250	490
	» » 28	7461	♀	—	»		»	10	37	40	600	800
	» » 28	7505	♂	—	»		»	10	34.5	39.5	510	790
	» » 28	7585	♀	—	»		»	10	36.5	42	660	965
	» » 28	7586	♂	10 miles NNE of Kalsø, 55 fms.	62°32′	6°48′	Scotch S/T	10	36	44.5	560	? [4][7]
	» » 28	7679	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	10	32.5	42	400	865
	» » 28	7752	♀	—	»		»	10	38.5	43	760	1115
	» » 28	7821	♀	—	»		»	10	22	31	145	390
	» » 31	7506	♂	8 miles N by E of Harald Sund, 58 fms.	62°30′	6°40′	Scotch S/T	10	33.5	39.5	450	? [8]
	» April 1	7558	♀	18 miles NNW of Kalsø	62°34′	7°16′	Scotch S/T	11	45	50.1	1220	? [9]
	» » 5	7570	♂	6 miles S of Munken, 52 fms.	61°15′	6°35′	English S/T	11	37	42.2	630	990 gut.
	» » 6	7496	♂	8½ miles WSW¼S of Trællenipen 58-60 f.	61°55′	7°25′	English S/T	11	34.5	38.3	490	685 gut.
	» » 15	7798	♂	8½ mile N of Kadlur, 56 fms.	62°30′	6°55′	English S/T	11	31.5	37	375	530[2]
	» » 20	7555	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	11	32	42	370	965
	» » 20	7556	♂	—	»		»	11	37.5	38	650	665
	» » 20	7572	♂	—	»		»	11	34	39	440	665
	» » 20	7764	♂	—	»		»	11	30	35.5	320	590

[1]) mature. [2]) spawning. [3]) milt flows on pressure. [4]) ripe or nearly so. [5]) spawned. [6]) feeding on Mactra subtruncata. [7]) slight ulceration at mark. [8]) partly spent. [9]) beginning to spawn.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery											
	Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	Weight (gr) ultimate
	1911 April 22	7565	♂	3 miles N½E of Kadlur, 57 fms.	62°25′	6°50′	English S/T	11	38	41.5	670	825 gut.
	» » 24	7716	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	11	40	45	790	1140
	» » 24	7861	♀	4 miles WNW of Troldhoved, 39 fms.	61°55′	7°05′	English S/T	11	42	48.4	980	1665 gut.
	» » 26	7852	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	11	39.5	45	670	1125
	» » 27	7569	♂	5 miles S by W¼W of Tindholm, 56 fms.	62°00′	7°25′	English S/T	11	36	43.7	610	1065 gut.
	» » end of	7525	♂	At Færoe	?		Scotch S/T	11	44.5	49.5	1160	?
	» » »	7826	♂	13 miles NNW½W of Myggenæs, 60 fms.	62°15′	8°00′	English S/T	11	42	47	890	1125
	» May 2	7497	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	12	33.5	37.5	460	600
	» » 2	7806	♂	—	»		»	12	29.5	36.5	335	645
	» » 2	7811	♂	—	»		»	12	27	33	240	450
	» » 2	7824	♂	3 miles W½N of Kobbetange, 43 fms.	61°35′	7°05′	English S/T	12	35	38.3	535	650
	» » 5	7637	♀	Skuø bearing SE½S, Myggenæs, N by W 64f	61°53′	7°17′	Scotch S/T	12	45.5	54	1230	? [1]
	» » 10	7681	♀	11 miles SSE¾E of Bispen, 58 fms.	62°15′	6°00′	English S/T	12	48	50	1360	2200
	» » 11	7412	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	12	25	33	190	420
	» » 12	7718	♂	Færoe NE	?		Belgian S/T	12	39	44.5	780	?
	» June 2	7642	♀	Westpoint of Færoe	?		»	13	39.5	47.5	720	?
	» » 8	7562	♂	6 miles ENE of Fuglø Head, 48—50 fms.	62°25′	6°05′	Scotch S/T	13	39	44.7	730	
	» » 16	7560	♀	14 miles NNW½W of Myggenæs, 55 fms.	62°15′	8°00′	English S/T	13	46	53.5	1300	1770
	» » 20	7730	♂	8½ miles NW by W½W of Salthoved, 50 f.	61°50′	7°10′	»	13	45	54.4	1040	1745 [2]
	» » 20	7877	♂	—	»		»	13	39	44.3	790	1070
	» » 21	7673	♀	17 miles NW of Myling, 65 fms.	62°25′	7°45′	»	13	36.5	46.2	600	1100
	» » 21	7729	♀	17 miles NNW of Myling, 65 fms.	62°30′	7°40′	»	13	38.5	46.3	740	1265 gut.
	» » 23	7462	♂	14 miles W½S of Munken, 65 fms.	61°15′	7°05′	»	13	37.5	41.5	700	1005 gut.
	» » 24	7590	♂	17 miles NNW of Myling, 60 fms.	62°30′	7°40′	»	13	37.5	41.2	630	865 gut.
	» » 25	7672	♀	?	?		German S/T	13	37.5	42	585	?
	» » 25	7736	♂	6 miles SE from Fuglø, 60 fms.	62°26′	6°10′	Scotch S/T	13	43	51.8	910	? [3]
	» » 27	7533	♀	5 miles N of Kadlur, 55 fms.	62°27′	6°52′	English S/T	13	35	43	520	1020 gut.
	» » 27	7600	♂	8 miles NE by N of Kadlur, 47 fms.	62°30′	6°45′	»	13	34	38.5	480	735 gut.
	» » 27	7842	♂	7 miles ESE of Fuglø, 56 fms.	62°20′	6°00′	English S/T	13	30.5	40.6	350	925 gut.
	» July 3	7860	♀	17 miles N by W of Myggenæs, 54 fms.	62°20′	8°00′	»	14	41.5	51.5	970	2170 gut.
	» » 5	7499	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Ingolf"	14	27.5	(42)	250	810
	» » 5	7553	♀	—	»		»	14	40	?	730	?
	» » 5	7660	♀	—	»		»	14	29	42	350	1000
	» » 7	7818	♂	8 miles NW¾N og Myggenæs, 56 fms.	62°10′	7°55′	English S/T	14	34	45.6	440	1195 gut.
	» » 9	7709	♀	Vestmanhavn 11 m	62°08.5′	7°09′	H.M.S. "Ingolf"	14	43	52	960	1625
	» » 9	7831	♂	—	»		»	14	32	40	405	835
	» » 9	7843	♀	—	»		»	14	33	41	420	790
	» c. 11	7444	♂	6 miles S of Munken, 48-52 m	61°15′	6°35′	English S/T	c. 14	36	39.7	570	795 gut.
	» » 12	7813	♀	6miles WNW of Myling, 53 fms.	62°18′	7°25′	»	14	45	53.5	1040	1990
	» » 17	7547	♀	21 miles NNW½W of Myggenæs, 90 fms	62°20′	8°15′	»	14	33.5	45.4	450	1180 gut.
	» » 21	7671	♂	7 miles NNW of Rivtange, 58 fms.	62°25′	7°10′	»	14	39	47.7	750	1540 gut.
	» » 27	7610	♀	11 miles NW of Myggenæs, 70 fms.	62°10′	8°00′	»	14	40	48.5	780	1380
	» Aug. 16	7870	♂	7 miles W½N of Høvden, 43 fms.	61°45′	7°05′	»	15	32.5	41.7	390	990 gut.
	» » 19	7823	♀	7 miles ESE of Fuglø, 53 fms.	62°20′	6°00′	»	15	40	48.5	800	1630 gut.
	» Sept. 6	7626	♀	6 miles SSW of Myggenæs Holm, 53 fms.	62°00′	7°40′	»	16	46.5	58.3	1210	2470
	» » c. 7	7745	♂	6 miles WNW of Troldhoved, 44 fms.	61°55′	7°10′	»	c. 16	43	49.5	990	1640 gut.
	» » 26	7601	♂	4 miles NW½W of Myling, 51 fms.	62°20′	7°20′	»	16	33	41.7	410	940 gut.
	» » 29	7593	♂	8 miles N by E¼E of Kadlur. 44 fm .	62°30′	6°50′	»	16	37	44.5	600	1250 gut.
	» Oct. c. 4	7725	♂	?	?		»	c. 17	40	47.5	830	1390 gut.
	» Nov. 30	7526	♀	4½ miles N by E¼E of Rivtange, 45 fms.	62°25′	7°00′	»	18	41	49.5	920	1725 gut.
	» Dec. 7	7574	♀	Vestmanhavn. c. 15 fms.	62°09′	7°09.5′	Færoe f.-b.	19	35	43	540	1075

[1]) Immature. [2]) ripe. [3]) slight ulcerations at mark.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery											
	Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	Weight (gr) ultimate
	1911 Dec. 28	7477	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	19	31	(38.5)	300	600
	» » 28	7841	♀	—	»		»	19	27.5	(43.5)	280	1000
	» » 30	7749	♀	13 miles NNW of Myggenæs, 61 fms.	62°15′	8°00′	English S/T	19	42.5	57.0	995	2750
	1912 Jan. 1	7504	♀	?	?		»	20	35	?	520	?
	» Febr. 10	7832	♀	14 miles N by W¼W of Myling, 62 fms.	62°30′	7°30′	»	21	32.5	51	385	1840 gut.
	» » 10	7847	♂	10 miles from Kadlur, 55 fms.	62°25′	7°05′	»	21	40	53.5	780	1970 gut.
	1912 » 23	7697	♀	11 miles N by W of Rivtange, 55, fms.	62°30′	7°10′	English S/T	21	42.5	59.5	860	2170
	» » 24	7644	♀	14 miles W by N from Myling Head, 60 fms.	62°15′	7°41′	Scotch S/T	21	32.5	48.6	410	?
	»early March	7407	♂	9 miles ESE of Fuglø, 60 fms.	62°20′	5°55′	English S/T	22	24.5	35.2	170	505 gut.
	» March 1	7474	♂	14 miles NNE½E of Fuglø, 56 fms.	62°35′	6°15′	»	22	36	42.5	530	1030 gut.
	»early March	7880	♂	9 miles SE by E¾E of Bispen, 58 fms.	62°20′	5°55′	»	22	35	43.5	575	1170 gut.
	» March 4	7609	♂	9 miles ESE of Fuglø, 58 fms.	62°20′	5°55′	»	22	36.5	47	610	1310
	» » 14	7773	♂	5 miles SE from Fuglø, 52 fms.	62°18′	6°02′	Scotch S/T	22	33	42.4	400	? [1]
	» » 21	7507	♂	11,5 miles N by W¼W of Myggenæs, 55 f.	62°15′	7°55′	English S/T	22	35	46	520	1310 gut.
	» » 22	7619	♂	6 miles N from Harold Sound,	62°26°′	6°42′	Scotch S/T	22	39	?	730	?
	» April 2	7484	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	23	39	?	710	?
	» » 5	7471	♀	5 miles SW of Tindholm, 63 fms.	62°00′	7°30′	English S/T	23	45.5	63	1230	3220[1]
	» » 5	7575	♂	—	»		»	23	27	43.5	290	960
	» » 24	7563	♀	12 miles NW by W from Enniberg, 58 fms.	62°26′	7°00′	Scotch S/T	23	42	59.3	970	? [1][2]
	» May 13	7656	♀	16 miles N by W¼W of Myggenæs, 60 fms.	62°20′	7°55′	English S/T	24	32.5	49	405	1370
	» » 20	7793	♂	6 miles SW by W of Troldhoved, 51 fms.	61°50′	7°05′	»	24	30	40.2	315	750 gut.
	» » 21	7854	♀	3.5 miles W of Trællenipen, 44 fms.	62°00′	7°20′	»	24	36.5	54.7	610	2040
	» early June	7501	♀	4 miles NNE of Myggenæs Holm, 53 fms.	62°10′	7°40′	»	25	43.5	?	990	?
	» » 21	7777	♀	16 miles N by W¼W of Myggenæs, 60 fms.	62°20′	7°55′	»	25	38	57	660	2330[1]
	» » 25	7643	♂	12.5 miles N½E of Myling 50-55 fms.	62°30′	7°20′	»	25	35	47	530	1150
	» July c. 11	7887	♂	6 miles WNW of Troldhoved, 35-40 fms.	61°55′	7°10′	»	c. 26	32.5	53	480	1980 gut.
	» Aug. c. 6	7549	♂	— 45 fms.	61°55′	7°10′	»	c. 27	32.5	48.6	400	1290 gut.
	» Sept. 10	7675	♀	3.5 miles WNW of Troldhoved, 35-40 fms.	61°55′	7°05′	»	28	36	59	520	3075 gut.
	» » 16	7898	♀	4.5 miles S by W¾W of Myggenæs, 51 fms.	62°01′	7°40′	»	28	33	47	440	1510 gut.
	1913 Jan. 1	7693	♀	10 miles NW¼N of Myggenæs, 70 fms.	62°10′	8°00′	»	32	33.5	55.0	490	2395 gut.
	» Febr. 16	7612	♀	12 miles N by W of Kalsø, 56 fms.	62°32′	7°02′	Scotch S/T	33	33	51.2	420	? [3]
	» » 17	7807	♀	5 miles SW¼S of Troldhoved, 38 fms.	61°50′	7°00′	English S/T	33	29	46.3	260	1220 gut.
	» March 16	7401	♂	9 miles N by W¼W of Kadlur, 55-58 fms.	62°30′	7°00′	»	34	26	39.7	210	750
	» » 18	7509	♂	9 miles N by W½W of Ørnenipen, 50-53 f.	61°45′	7°10′	»	34	31	50.9	370	1590 gut.
	» » 20	7801	♀	5 miles SE¼E of Myggenæs, 35-40 fms.	62°04′	7°30′	»	34	34	?	495	?
	» May 16	7433	♂	8 miles E by N of Bispen, 53 fms.	62°25′	6°00′	»	36	24.5	43.5	180	1030 gut.
	» June 3	7439	♂	8 miles ESE of Fuglø, 65 fath.	62°20.5′	5°58′	Scotch S/T	37	22	38.9	130	? [4]
	» Dec. 11	7423	♂	11.5 NE by E½E of Myggenæs, 50 fms.	62°15′	7°25′	English S/T	43	23.5	53.0	150	1735 gut.
	1914 Sept. 7	7416	♀	7 miles WNW⅜W of Myggenæs 55 fms.	62°05′	7°55′	»	52	24.5	57	160	2680 gut.
Exp. 2. 1911 August 23 – September 2 36 plaice liberated (No. 8901–8912) (- 8922–8945) in Vestmanhavn Fjord 62°08.7′ N 7°09.3′ W 20 m.	1911 Nov. 14	8909	♂	Vestmanhavn c. 5fms.	62°08.5′	7°09′	Færoe f.-b.	2	22	25	125	185
	» Dec. 28	8942	♀	—	»		H.M.S. "Beskytteren"	3	36	?	550	?
	1912 March 7	8944	♀	—	»		»	6	34	?	545	?
	» April 2	8937	♀	—	»		»	7	32	?	420	?
	» June 4	8938	♂	—	»		»	9	29	33	350	430[5]
	» July 16	8932	♀	7 miles SE by E of Svinø Bygd, 50 fms.	62°15′	6°05′	English S/T	10	41	44.5	870	1005 gut.
	»before S. 10	8924	♂	?	?		»	c. 12	36	37.8	590	620 gut.
	» Sept. 25	8904	♀	6 miles SW by W of Troldhoved, 44 fms.	61°50′	7°05′	»	12	37	47.7	575	1420 gut.
	» Dec. 7	8907	♂	Vestmanhavn c. 5 fms.	62°08.5′	7°09′	Vestmanhavn f. b.	15	30	36	350	490
	1913 Febr. 15	8902	♀	10 miles NW by W from Kalsø, 60-68 fms.	62°24′	7°09′	Scotch S/T	17	36	46.4	580	?
	» March 13	8906	♂	8 miles NE by N of Kadlur 45 fms.	62°30′	6°45′	English S/T	18	34	40.3	420	700
	» » 25	8936	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	18	30	(31.5)	330	?

[1]) ripe. [2]) slight ulceration at mark. [3]) nearly ripe. [4]) immature. [5]) hurt from label.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery: Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	Weight (gr) ultimate
Exp. 3. 1912 June 6.—8. 167 plaice liberated (No. Da8 683 – 892)[1] (No. Da8 954 – 1000) Vestmanhavn Fjord 62°08.7′ N 7°09′ W < 11 m	1914 Dec. 6	8930	♂	35 miles off Nolsø, 98 fms.	61°55′	5°20′	English S/T	39	27	47	265	1430
	1912 Sept. 25	967	♂	Vestmanhavn 7 fms.	62°08.5′	7°09′	Vestmanhavn f.-b.	3	31	34	390	550
	» Nov. 30	748	♂	— c. 7 fms.	»		»	5	32	36	400	535
	» Dec. 5	780	♂	5.5 miles N by W of Rivtange, 52 fms.	62°25′	7°05′	English S/T	6	34	36.5	510	620
	» » 7	807	♀	Vestmanhavn c. 5 fms.	62°08.5′	7°09′	Vestmanhavn f.-b.	6	29	34	320	485
	» » 7	820	♂	— —	»		»	6	25	31	210	340
	» » 7	954	♀	— —	»		»	6	23	31	180	375
	» » 30	972	♀	— c. 5 fms.	»		»	6	23	30	170	330
	1913 Febr. 12	873	♂	8 miles N of Kadlur, 62 fms.	62°30′	6°55′	English S/T	8	32	35.1	450	500 gut.
	» » 24	877	♂	? ?	?		»	8	34	35.8	620	570 gut.
	» » 26	984	♂	Vestmanhavn, 6 fms.	62°09′	7°09,5′	Vestmanhavn f.-b.	8	28	32	255	370
	» March 7	881	♂	4.5 miles N by E¼E of Rivtange, 62 f.	62°25′	7°00′	English S/T	9	30	32.3	365	420 gut.
	» » 13	978	♀	Vestmanhavn, 6 fms.	62°09′	7°09.5′	Vestmanhavn f.-b.	9	29	35	335	525
	» » 15	811	♂	—	»		»	9	28	32	260	435
	» » 25	770	♂	—	62°08.5′	7°09′	H.M.S. "Beskytteren"	9	33	(42)	450	?
	» » 25	805	♀	—	»		»	9	33	(35)	540	?
	» » 25	876	♀	—	»		»	9	34	(35)	480	?
	» » 25	969	♀	—	»		»	9	33	(36)	455	?
	» » 25	965	♂	—	»		»	9	31	(35.5)	370	?
	» April 6	756	♂	3½ miles ESE from Svinø, 43 fms.	62°16′	6°11′	Scotch S/T	10	29	33	330	? [2]
	» » c. 6	843	♂	11, miles NE by E¼E from Bispen, 59 fms.	62°30′	6°00′	English S/T	c. 10	34	37.8	550	665 gut.
	» » c. 7	754	♂	11 miles N½W of Rivtange, 44 Htl	62°00′	7°10′	»	c. 10	32	35.2	385	485 gut.
	» » c. 7	765	♂	14 miles NNE of Myggenæs, 50 fms.	62°20′	7°40′	»	c. 10	32	35.1	440	455 gut.
	» c. 7	799	♂	9.5 miles N by W¼W of Kadlur, 45 fms.	62°30′	7°00′	»	c. 10	31	33	410	500 gut. [3]
	» » c. 11	858	♂	16.5 miles N by W of Myggenæs, 60 fms.	62°20′	8°00′	»	c. 10	33	35.3	500	465 gut.
	» » c. 11	880	♂	9.5 miles N by W¼W of Kadlur, 45 fms.	62°30′	7°00′	»	c. 10	33	36.6	450	530 gut.
	» » 20	829	♂	9 miles N by E of Myggenæs, 50 fms.	62°15′	7°45′	Scotch S/T	10	29	35.8	315	? [4]
	» » 23	892	♂	7 miles NNE from Harold Sound, 65 fms.	62°29′	6°39′	»	10	33	34.9	430	? [2]
	» May c. 17	760	♂	7.5 miles N by E⅜E of Kadlur, 53 fms.	62°30′	6°50′	English S/T	c. 11	32	35.4	440	480 gut.
	» June c. 12	879	♂	15.5 miles N by W⅝W of Myling, 55 fms.	62°30′	7°35′	»	c. 12	31	36	430	605
	» Aug. 26	989	♂	? ?	?		»	c. 14	30	38	390	555
	» Sept. 24	762	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. »Beskytteren"	15	34	(42)	470	875
	» Oct. 2	958	♂	—	»		»	16	25	(32.5)	190	370
	» » 2	959	♀	—	»		»	16	28	(34.5)	270	500
	» Nov. 7	884	♀	—	»		»	17	32	(38.5)	395	750
	» » 7	979	♂	—	»		»	17	26	(32.5)	220	375
	» » 10	985	♀	Skuø in NE, 40 fms.	61°45′	7°00′	English S/T	17	30	40.5	320	785 gut.
	1914 Jan. 20	973	♀	Vestmanhavn, 4 fms.	62°08.5′	7°09′	Vestmanhavn f.-b.	19	28	32	260	325 [5]
	» Febr. 19	819	♀	—	»		H.M.S. "Beskytteren"	20	26	(30)	230	600
	» » 22	759	♂	7 miles E from Fuglø, 52 fms.	62°23′	6°00′	Scotch S/T	20	30	45.7	380	? [6]
	» March 2	771	♂	7—8 miles ENE of Fuglø, 50 fms.	62°26′	6°04′	»	21	31	37.1	410	? [6]
	» » 10	844	♂	11.5 miles NE by E¼E of Bispen, 77 fms	62°30′	6°00′	English S/T	21	32	47.2	440	1340 gut.
	» » 10	981	♀	5 miles WNW of Sandø, 50 fms.	61°58′	7°05′	Scotch S/T	21	27	50.2	290	? [4][5]
	» » 17	828	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	21	28	39	305	725
	» » 17	976	♂	—	»		»	21	25	(35.5)	180	560
	» » 23	862	♀	9.5 miles NE⅝N of Myggenæs, 50-55 fms.	62°15′	7°35′	English S/T	21	24	34.5	190	515 gut. [4]
	» c. April 7	733	♂	Off Sandø, 42 fms.	61°55′	7°05′	»	c. 22	25	39.2	185	590
	» » 7	812	♂	12 miles E by N of Kolter, 60 fms.	62°00′	7°25′	»	22	29	32.7	330	424 gut.
	» » 7	966	♂	—	»		»	22	30	40	360	860 gut.
	» » 9	961	♂	6.5 NE by N of Enniberg	62°30′	6°30′	»	22	28	37.4	285	575 gut.
	» May 16	751	♂	14.5 NW½W of Myggenæs, 65 fms.	62°10′	8°10′	»	23	32	41	440	860 gut.

[1]) Rest of these No. transplanted to Slettenæs. [2]) about ripe. [3]) spent. [4]) immature. [5]) considerable ulceration at mark. [6]) ripening.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery: Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	Weight (gr) ultimate
	1914 June 11	987	♂	9 miles NNE of Myggenæs, 40 fms.	62°15′	7°40′	English S/T	24	26	36.5	230	572 gut.
	» July 1	990	♂	12 miles NW of Myggenæs, 60-65 fms.	62°10′	8°04′	Scotch S/T	25	30	39.3	330	?
	» » 27	993	♂	Vestmanhavn 6 fms.	62°09′	7°09.5′	Vestmanhavn f.-b.	25	26	37	240	380
	» Sept. 22	962	♀	8 miles NW¾N of Myggenæs 55 fms.	62°10′	7°55′	English S/T	27	29	43	300	1096 gut.
	» Oct. 8	739	♀	7 miles off Myggenæs, 60-65 fms.	61°10′	8°00′	»	28	30	46.5	320	1095
	» Nov. 9	808	♂	W. of the Færoes, 76 fms.	?		»	c. 29	27	40.3	235	670
	» » 20	980	♂	12 miles off Skuø, 77 fms.	61°45′	7°30′	»	29	22	41.3	150	975 gut.[1]
	1915 Jan. 13	790	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Islands Falk"	31	30	39.5	370	925
	» March 2	804	♂	11 miles NE from Kolter 55 fms.	61°55′	7°30′	English S/T	33	29	(41)	320	990 gut.
	1916 June 13	834	♂	6 miles WNW from Myling Head	62°18.5′	7°25′	Scotch S/T	48	26	45.1	230	? [2]

II. Transplantation Experiments with plaice from Vestmanhavn. 1912.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery: Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	Weight (gr) ultimate
1912 May 30—June 7 301 plaice liberated (No.Da.8.533—682) (No.Da.8.683—892) (No.Da.8.893—953) transplanted from Vestmanhavn and liberated off Slettenæs 62°10′ N 7°16′ W	1912 June 19	609	♂	15.5 miles N¼W of Myggenæs, 60 fms.	62°20′	7°55′	English S/T	0	31	30	390	220[3]
	» Sept. 16	642	♂	12.5 miles NW¼W of Myggenæs, 72 fms.	62°10′	8°05′	»	3	37	?	630	?
	» Oct. 16	938	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	4	35	40	545	800 gut.
	» » 17	705	♀	6 miles NW¾W of Ørnenipen, 51 fms.	61°40′	7°10′	English S/T	4	50	54	1700	2300
	» » 18	654	♀	6 miles WNW of Troldhoved, 43 fms.	61°55′	7°10′	»	4	32	38	430	700 gut.[4][5]
	» » 25	579	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	4	36	(38.5)	570	?
	» Nov. 13	534	♂	By Leinum	62°06.5′	7°02′	Vestmanhavn f.-b.	5	24	31	150	335
	» » 13	651	♀	On the beach at Leinum	»		Leinum f.-b.	5	30	29	300	285
	» » 19	501	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	5	41	(41)	930	?
	» » 20	906	♀	8 miles E¼S of Nolsø light, 30 fms.	62°00′	6°20′	English S/T	5	40	47	780	1390 gut.
	» » 28	916	♀	7 miles SE by E½E of Bispen, 56 fms.	62°20′	6°00′	»	5	44	50.7	1000	1700 gut.
	» Dec. 4	865	♀	12.5 miles N½E of Myling, 60 fms.	62°30′	7°20′	»	6	35	42	600	1080 gut.
	» » 26	905	♂	10.5 miles NNW¾W of Myling, 45-50 f.	62°25′	7°30′	»	6	37	40	610	755
	1912 c. Jan. 4	907	♂	?	?		»	c. 7	38	?	720	?
	» » 25	630	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	7	28	(34)	275	?
	» » 25	663	♀	—	»		»	7	33	(36)	465	?
	» » 25	931	♀	13 miles S by E of Myggenæs, 65 fms.	61°55′	7°25′	English S/T	7	35	40.5	540	850 gut.
	» » 27	670	♂	9 miles S¾E of Myggenæs ,70 fms.	61°58′	7°30′	»	7	30	39.8	375	870 gut.[4]
	» » 28	679	♂	14 miles NNE of Myggenæs, 40 fms.	62°20′	7°40′	»	7	29	36.0	295	505
	» Febr. 26	564	♀	12 miles N from Kalsø, 55 fms.	62°33′	6°58.5′	Scotch S/T	8	37	44.6	600	?
	» » 28	800	♂	12 miles NNE from Kalsø	62°34′	6°48′	»	8	35	38.4	575	? [6]
	» c. March	576	♂	5′—15′ NNW from Kalsø	ca.62°28′	6°59′	»	c. 9	35	41.4	560	[5][7]
	» March 7	559	♂	14.5 miles NNW of Myggenæs Holm, 70 fms	62°15′	8°05′	English S/T	9	39	46	640	1200 gut.
	» » 12	624	♂	8 miles E by N of Bispen, 53 fms.	62°25′	6°00′	»	9	30	36	320	?
	» » 12	818	♂	9 miles SE by E¾E of Bispen, 58 fms.	62°20′	5°55′	»	9	40	43.0	730	745
	» » 18	602	♀	16.5 N½W of Myggenæs Holm, 64 fms.	62°20′	7°58′	»	9	33	36	420	560 gut.[3]
	» » 18	633	♀	16 miles N¾W of Myggenæs Holm, 65 fms	62°20′	7°58′	»	9	33	38.5	450	685 gut.
	» » 19	545	♂	9 miles N from Kalsø	62°30′	6°55′	Scotch S/T	9	33	40.1	460	? [2]
	» » 20	667	♂	5 miles SE½E of Myggenæs, 37-40 fms.	62°04′	7°30′	English S/T	9	38	43.7	720	1092 gut.
	» » 22	661	♂	11 miles N of Kunø	62°32′	6°49′	Scotch S/T	9	32	37	410	? [1]
	» » 25	640	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	9	39	(35)	730	
	1913 » 25	897	♀	—	»		»	9	42	(45)	850	?
	» » 25	904	♀	—	»		»	9	35	(39)	530	?
	» » 25	921	♀	—	»		»	9	39	(42)	720	?
	» » 25	936	♀	—	»		»	9	35	(38)	485	?
	» » 26	704	♂	7—10′ NW from Kalsø, 42 fms.	62°25′	7°05′	Scotch S/T	9	33	37.2	450	? [1]

[1]) ripening. [2]) immature. [3]) dry. [4]) mature. [5]) tail shruuk. [6]) spawning. [7]) partly spent. [8]) middle rays of caudal fin broken.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery											
	Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	ultimate
	1913 March 26	821	♀	10′ NE from Myling head, 68 fms.	62°27′	7°04′	Scotch S/T	9	35	42.4	560	? [1]
	» » 31	657	♀	8′ E from Myling head, 65 fms.	62°26′	7°15.5′	»	9	34	43.2	500	? [2]
	» April 2	672	♀	14.5 miles NNW of Myggenæs Holm, 65 f.	62°15	8°05′	English S/T	10	37	44.3	630	990
	» » 4	768	♂	9 miles WNW½W of Myggenæs, 62 f.	62°05′	8°00′	»	10	35	40	540	607
	» » c. 6	540	♂	12 miles NE by E½E of Fuglø, 59 fms.	62°30′	6°00′	»	c. 10	35	43.2	530	1090 gut.
	» » c. 7	552	♀	11.5 N by W¼W of Myggenæs Holm, 55 f.	62°15′	7°55′	»	c. 10	34	39.5	470	695 gut.
	» » c. 7	664	♂	3.5 miles NW by W¾W of Troldhoved, 44f.	61°55′	7°05′	»	c. 10	34	38.8	520	660 gut.
	» » c. 7	899	♂	2.5 WNW of Kolter, 35-45 fms.	62°00′	7°05′	»	c. 10	35	42	625	995
	» » c.11	533	♀	7.7 miles N by E¼E of Kadlur, 65 fms.	62°30′	6°50′	»	c. 10	41	47.5	950	1430 gut.
	» » c.18	607	♂	9.5 miles N by W¼W of Kadlur, 45 fms.	62°30′	7°00′	»	c. 10	32	39.2	370	680 gut.
	» » 20	590	♀	13 miles NNW of Myggenæs Holm, 70 fms.	62°15′	8°00′	»	10	34	39.5	470	760 gut.
	» » 20	669	♀	8 miles WSW of Myggenæs, 65 fms.	62°00′	7°52.5′	Scotch S/T	10	40	48	790	? [2]
	» » 21	912	♀	10 miles N from Kalsø, 60 fms.	62°31.5′	6°56.5′	Scotch S/T	10	38	47.5	650	? [2]
	» » 26	569	♂	12.5 miles N½E of Myling, 58 fms.	62°30′	7°20′	English S/T	10	35	40.7	530	740
	» » c.26	944	♀	9 miles SSE½E of Bispen, 58 fms.	62°15′	6°00′	»	c. 10	34	41.4	520	870 gut.
	» May 7	619	♀	11 miles N½W of Rivtange, 53 fms.	62°30′	7°10′	»	11	35	42	490	780 [1]
	» » 7	697	♀	10.5 N⅛W of Kadlur, 50 fms.	62°32′	6°57′	»	11	39	44.3	760	1175 gut.
	» » 8	914	♀	11 miles NNW of Kadlur, 59 fms.	62°30′	7°05′	»	11	40	47	750	1200 [1]
	» » 9	793	♂	8 miles NW¾N of Myggenæs Holm, 55 f.	62°10′	7°55′	»	11	38	43.6	670	?
	» » 10	547	♂	7 miles ESE of Fuglø, 56 fms.	62°20′	6°00′	»	c. 11	29	36	420	570 [1]
	» » 11	581	♂	4 miles WNW of Troldhoved, 40 fms.	61°55′	7°05′	»	11	35	40	520	775 [1]
	» » 12	688	♀	9 miles SSE¼E of Myggenæs, 56 fms.	62°00′	7°26′	»	11	47	51.5	1260	1507 gut.
	» » 12	924	♀	9 miles —	»		»	11	41	46.5	830	1375 gut.
	» » 13	749	♂	9.5 miles N by W¼W of Kadlur, 45 fms.	62°30′	7°00′	»	11	35	42.3	540	940 gut.
	» » c.19	696	♀	9 miles SSE¼E of Myggenæs, 56 fms.	62°00′	7°26′	»	c. 11	33	36.5	410	615 gut.
	» » 22	639	♀	12.5 NW by N of Myling, 45 fms.	62°25′	7°35′	»	11	38	46.8	710	1390 gut.
	» » 25	681	♀	13 miles N¼W of Myling, 56 fms.	62°30′	7°25′	»	11	32	38.5	440	760
	» » 27	588	♂	14.5 miles N by W of Myling, 56 fms.	62°30′	7°30′	»	11	30	39.4	330	750 gut.
	» » 29	565	♂	12.5 miles N½E of Myling, 55-60 fms.	62°30′	7°20′	»	11	32	40.5	400	850 gut.
	» » 31	920	♀	9.5 miles S½E of Akraberg, 70 fms.	61°15′	6°30′	»	11	43	52.5	1070	2100 gut.
	» June 6	923	♂	12 miles S⅛E of Myggenæs, 56 fms.	61°55′	7°30′	»	12	42	48	960	1870 [3]
	» » 8	658	♀	11 miles N½W of Rivtange, 53-55 fms.	62°30′	7°10′	»	12	33	41	440	850
	» » 9	767	♀	2.5 miles WNW of Kolter, 35 fms.	62°00′	7°05′	»	12	35	43	520	975 [1]
	» » 11	635	♂	13 miles N¼W of Myling, 55 fms.	62°30′	7°25′	»	12	34	46	430	1100 [3]
	» » c.11	949	♂	8.5 SSW of Akraberg, 47 fms.	61°15′	6°40′	»	c. 12	33	39	500	840
	» » 14	893	♀	10 miles NW⅛N of Myggenæs, 65 fms.	62°10′	8°00′	»	12	41	49	810	1500
	» » 22	672	♂	15.5 miles N¼W of Myggenæs 55 fms.	62°20′	7°35′	»	12	35	42	470	715
	» » 24	598	♀	8 miles NW from Myling Head, 46 fath.	62°21′	7°28′	Scotch S/T	12	34	47	420	? [2]
	» » 29	615	♂	8 miles NNE from Myling Head, 50 fath.	62°26′	7°12.5′	»	12	36	46.3	580	? [2]
	» July 6	568	♀	17.5 NNW¼W of Myling, 65 fms.	62°30′	7°40′	English S/T	13	36	43	550	980
	» » 8	541	♀	14.5 miles N by W of Myling, 65 fms.	62°30′	7°30′	»	13	40	51	760	1630
	» » 11	600	♂	8 miles NW¾N og Myggenæs Holm, 55 f.	62°10′	7°55′	»	13	33	40	450	705
	» » 12	953	♂	11 miles NNE⅝E of Kadlur, 80 fms.	62°33′	6°45′	Dutch S/T	13	33	43.5	470	1070 gut.
	» » 25	848	♀	11 miles N⅝W of Rivtange, 55 fms.	62°30′	7°10′	English S/T	13	37	39.5	730	915 gut.
	» » 26	684	♀	5 miles NE¾E of Myggenæs, 45 fms.	62°10′	7°35′	»	13	44	54.3	1010	2230
	» » 29	894	♀	15 miles N¾W of Kadlur, 70 fms.	62°35′	7°05′	»	13	50	55	1650	2075
	» Aug. c.5	601	♀	?	?		»	c. 14	31	42.5	360	860 gut.
	» » c.6	901	♀	?	?		»	c. 14	35	40	540	810 gut.
	» » c.19	543	♂	?	?		»	c. 15	31	44	410	1105 [1]
	» Sept. c. 4	896	♂	10 miles N½E of Bispen, 56 fms.	62°30′	6°20′	»	c. 15	41	46	830	1040 [3]
	» » 6	788	♂	10 miles ENE of Bispen 56 fms.	62°28′	6°00′	Scotch S/T	15	37	45.4	660	? [1][4]

[1]) immature [2]) spent. [3]) mature. [4]) ulceration at mark.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery: Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	Weight (gr) ultimate
	1913 Sept. 10	617	♂	10 miles WNW of Kolter, 45-50 fms.	62°00′	7°10′	English S/T	15	35	46	490	1205 gut.
	» » 24	701	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	15	37	48	550	1125
	» Oct. 17	562	♀	? 45 fms.	?		English S/T	16	40	52	600	1750 gut.
	» » 28	538	♀	10 miles NW of Skuø,, 47 fms.	61°50′	7°10′	»	16	34	47.6	510	1580 gut.
	» » 29	646	♀	7 miles NE from Myling Head, 52 fms.	62°25′	7°07′	Scotch S/T	16	34	49	520	? [1]
	» » 31	761	♂	16.5 miles NW by N off Myggenæs, 70f.	62°15′	8°10′	English S/T	16	37	46.6	630	1220 gut.
	» Nov. 13	595	♂	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	17	30	(38.5)	350	750
	» » 15	951	♂	9 miles NNE of Myggenæs, 53 fms.	62°15′	7°40′	English S/T	17	33	44.8	465	1200 gut.
	» » 19	580	♀	6.5 miles NNW¼W of Mulen, 51 fms.	62°15′	7°25′	»	17	37	53.8	650	1930
	» Dec. 11	871	♀	10.5 miles NE½E of Myggenæs, 50 fms.	62°15′	7°30′	»	18	35	50.6	475	1475 gut.
	1914 Jan. 9	546	♂	4 miles NNE of Myggenæs Holm, 50-56f.	62°10′	7°40′	»	19	31	45.8	420	1220 gut.
	» » c.14	772	♂	South of Suderø, 74 fms.	61°15′	6°35′	»	c. 19	35	44.8	565	1140 gut.
	» » 19	950	♀	10 miles NW of Kolter, 40 fms.	62°00′	7°10′	»	19	33	48.6	420	1455 gut.
	» » 20	872	♂	13 miles N¼W of Myling, 60 fath.	62°30′	7°25′	»	19	36	50.5	640	1865 gut.
	» » c.21	945	♂	4 miles NNE⅛E of Myggenæs, 65 fms.	62°10′	7°40′	»	c. 19	34	45.3	540	1170 gut. [2]
	» Febr. 1	570	♂	8 miles ESE of Fuglø, 56 fms.	62°20′	6°00′	»	20	35	48.5	520	1500 gut.
	» » 18	611	♀	8 miles NW¾N of Myling Head, 55 fms.	62°22′	7°28′	»	20	39	50.4	705	1550 gut.
	» » c.20	648	♀	?	?		»	c. 20	49	58.5	1500	3130 gut.
	» » 20	629	♂	Off Hestø	?		Scotch S/T	20	28	44.6	280	? [3]
	» March 5	900	♂	7 miles NNW of northend of Syderø	61°43.5′	7°09′	»	21	39	48.3	740	? [3]
	» » 6	597	♂	4 miles from Kolter, 44 fms.	62°00′	7°20′	English S/T	21	32	43.6	370	940 gut.
	» » 10	563	♂	12 miles NE by E½E of Fuglø, 77 fms.	62°30′	6°00′	»	21	36	45.5	600	1095 gut.
	» » 11	571	♂	6 miles NNW from Myggenæs, 52 fms.	62°10′	7°49′	Scotch S/T	21	35	48.9	550	? [3]
	» » 13	947	♀	14.5 miles N by E of Bispen, Fuglø, 58-60f.	62°35′	6°20′	English S/T	21	33	46.6	435	1250 gut.
	» » 26	623	♀	Off Myling Head, 55 fms.	62°30′	7°30′	»	21	34	45.2	460	1160 gut.
	» April 5	922	♂	9.5 miles N½E of Bispen, Fuglø, 56 fms.	62°30′	6°20′	»	22	40	49	770	1400 [2]
	» » 18	930	♀	9 miles N by W of Kadlur, 45 fms.	62°30′	7°00′	»	22	40	?	780	?
	» » 23	625	♂	25 miles ESE from Fuglø, 93 fms.	62°20′	5°21′	Scotch S/T	22	30	47	340	? [2]
	» May 3	554	♀	6 miles WNW of Troldhoved, 27 fath.	61°55′	7°10′	English S/T	23	33	48.4	450	1420 gut.
	» » 7	537	♀	12 miles NE by E½E of Fuglø, 58-66 fms	62°30′	6°00′	»	23	35	50.7	510	1755 [3]
	» July 16	732	♂	S of Suderø, 60 fms.	61°05′	6°35′	»	25	24	?	165	?
	» Aug. 21	626	♀	9.5 miles WNW½W off Myggenæs, 60 fms.	62°05′	8°00′	»	26	32	52	390	1805 gut.
	» Sept. 1	942	♀	Off Kolter, 4.5 miles WNW of. 46 fms.	62°00′	7°10′	»	27	32	?	420	?
	» » 8	621	♀	7 miles N½W of Ørnenipen, 43 fms.	61°45′	7°05′	»	27	26	47.5	240	1570 gut.
	» » 11	555	♀	?	?		»	27	33	49.8	420	1795 gut.
	» Oct. 18	911	♀	8 miles NW¾N of Myggenæs, 55 fms.	62°10′	7°55′	»	28	43	57.3	980	2700 gut.
	1915 Jan. 23	850	♂	6—8 miles SE from Fuglø, 58 fms.	62°16.5′	6°03′	Scotch S/T	31	35	54.3	530	? [4]

III. Experiments in Sundene.

1912 June 13 125 plaice liberated (No. 2001—2125) Between Ejde and Haldursvig (62°17.5′ N, 7°0.5′ W 9 m.	1913 March 25	2097	♀	Vestmanhavn	62°08.5′	7°09′	H.M.S. "Beskytteren"	9	23	(28)	160	?
	» April 2	2041	♂	Off the landing place by Eyde, 3 fms.	62°17.8′	7°05′	Haldervig f.-b.	10	24	30	205	?
	» » c. 9	2081	♂	7 miles SE by E½E of Bispen Fuglø, 58-45f.,	62°20′	6°00′	English S/T	c. 10	29	36.3	350	500 gut.
	» May 23	2008	♂	12.5 miles NW by N of Myling, 37-45 fms.	62°25′	7°35′	»	11	30	37.1	345	595 gut.
	» » 24	2006	♀	2.5 miles W by N of Mulen, 52 fms.	62°10′	7°20′	»	11	30	38.2	390	760
	» Sept. 23	2121	♀	13 miles NNW of Myggenæs, 70 fms.	62°15	8°00′	»	15	29	42.7	310	930
	» Oct. 15	2053	♂	3.5 miles WNW of Troldhoved, 45 fms.	61°55′	7°05′	»	16	27	40.6	250	635 gut.
	» Dec. 31	2071	♀	Myggenæs, 9.5 miles NE¾N of 53 fms.	62°15′	7°35′	»	18	24	42.3	220	945 gut.
	1914 Jan. 13	2054	♀	8 miles NW¾N of Myggenæs, 53 fms.	62°10′	7°55′	»	19	26	41.4	270	590
	» Febr. c.24	2112	♂	?	?		»	c. 20	27	41.2	280	830 gut.

[1]) immature. [2]) ripening. [3]) spawning. [4]) partly spent.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery: Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) initial	ultimate
	1914 March 3	2020	♂	13 miles NNE½E of Kadlur, 70 f.	62°35′	6°45′	English S/T	21	25	41.4	210	730
	» » c. 4	2096	♂	15 miles E by S of Nolsø light, 50 fms.	62°00′	6°05′	»	c. 21	30	43.3	360	930 gut.
	» » 9	2103	♀	11 miles SE¾S of Myggenæs, 45 fms.	62°00′	7°20′	»	21	26	40	255	705[1]
	» » c. 9	2124	♂	9.5 miles N by W⅛W of Kadlur, 53 fms.	62°30′	7°00′	»	c. 21	26	?	240	?
	» » 12	2095	♂	12 miles N½E of Myling Head, 55 fms.	62°30′	7°00′	»	21	30	40.5	345	750 gut.
	» » 22	2106	♀	4.5 miles NE½E of Myggenæs, 44 fms.	62°10′	7°35′	»	21	24	38.5	210	705 gut.
	» c. » c. 23	2066	♂	6 miles S of Bispen, Fuglø, 45 fms.	62°15′	6°10′	»	c. 21	26	38.8	270	685
	» May 6	2122	♀	6 miles WNW of Troldhoved, 27 fms.	61°55′	7°10′	»	23	28	41.8	310	845 gut.
	» » c. 25	2070	♂	?	?		»	c. 23	26	36.2	240	505 gut.
	» June 18	2064	♀	5 miles S of Myggenæs, 57 fms.	62°00′	8°00′	»	24	26	43	280	1080 gut.
	» » 28	2068	♀	9 miles WSW½W of Myggenæs, 58 fms.	62°00′	7°55′	»	24	23	42.8	180	930 gut.
	» Aug. 8	2035	♂	7 miles W by S of Myggenæs, 73 fms.	62°02′	7°52.5′	»	26	22	42	145	970 gut.[1]
	» » 9	2056	♀	12 miles NW½W of Skuø, 44 fms.	61°50′	7°10′	»	26	26	44	235	1075 gut.[2]
	» » 28	2098	♂	3miles WNW from Skuø, 42 fms.	61°46′	6°57′	Scotch S/T	26	25	44.9	190	? [1][3]
	» Nov. 22	2023	♀	8 miles NW¾N of Myggenæs, 55 fms.	62°10′	7°55′	English S/T	29	25	44.6	195	1125 gut.
	» Dec. 23	2116	♂	17 miles E½S of Bispen, 69 fms.	62°25′	5°40′	»	30	24	46.1	185	1355 gut.
	1915 Febr. 26	2072	♀	18 miles NE by N of Myling Head, 72 fms.	62°36′	7°05′	Scotch S/T	32	24	46.8	200	? [4]
	» April 13	2082	♀	14 miles N from Fuglø Head, 58-75 fms.	62°33.5′	6°25′	»	34	23	48.2	165	? [5]
	» May 5	2099	♀	17 miles NW by W½W of Myling Head, 56 f.	62°20′	7°50′	English S/T	35	29	53.5	330	1930 gut.
	» Febr. 7	2025	♀	9 miles ESE of Fuglø, 56 fms.	62°20′	7°55′	English S/T	44	25	55	205	2000
	» » 18	2115	♀	5 miles ESE of Fuglø, 47 fms.	62°20′	6°05′	»	44	24	53.7	170	2030[6]
	1916 July 26	2021	♀	12 miles N by W of Myling Head, 56-55 fms.	?		Scotch S/T	49	23	56	160	? [7]

IV. Transplantation Experiments with plaice from Sundene. 1912.

1912 June 13. 75 plaice liberated (No. 2126—2200) N. of Sundene 62°20′ N, 7°09′ W 81 m, transplanted from Sundene	1912 Oct. 10	2157	♀	5 miles W of Stakken, 55-60 fms.	62°15′	7°20′	Scotch S/T	4	41	45.8	900	? [1]
	» » 14	2133	♀	1 miles NE½N of Baret, 56 fms.	62°11.5′	7°25′	English S/T	4	42	45.5	930	1240 gut.
	» » 26	2139	♂	12 miles S of Myggenæs, 60 fms.	61°55′	7°31′	Scotch S/T	4	39	44.2	770	? [1][8]
	» Nov. 25	2155	♀	10 miles NE½E of Myggenæs, 52 fms.	62°15′	7°30′	English S/T	5	36	43.2	645	1020
	» » 28	2163	♀	8 miles NW¾W of Myggenæs, 55 fms.	62°10′	7°55′	»	5	45	?	1030	?
	» Dec. 10	2146	♂	10.5 miles NW by W of Myling, 50 fms.	62°20′	7°35′	»	6	38	42	680	910
	» » 13	2131	♂	8 miles NW¾N of Myggenæs, 55 fms.	62°10′	7°55′	»	6	40	47	780	1300 gut.[5]
	1913 Febr. 5	2173	♀	14.5 miles NNW of Myggenæs, 50-60 f	62°15′	8°05′	»	8	37	44.4	620	1030 gut.
	» March 20	2180	♀	10 miles NE by N of Myling Head	62°28′	7°08.5′	Scotch S/T	9	41	43.9	800	? [9]
	» » 31	2194	♂	?	?		»	9	34	(37.9)	570	?
	» April 5	2175	♂	13 miles N¼W of Kadlur, 70 fms.	62°33′	7°00′	English S/T	10	36	45	585	900
	» » c. 7	2132	♀	18 miles N by W½W of Myggenæs, 70 f.	62°20′	8°05′	»	c. 10	42	46.5	1030	1195
	» » c. 9	2141	♂	12 miles NW¼W of Myggenæs, 62 fms.	62°10′	8°05′	»	c. 10	37	44.5	680	1000[6]
	» » 15	2170	♀	16 miles N by W of Fuglø Head	62°34′	6°33′	Scotch S/T	10	37	45.7	650	[8] [7]
	» » 16	2195	♂	?	?		English S/T	10	37	43.3	690	910 gut.
	» » 25	2142	♂	7 miles WNW of Myling Head, 47 fms.	62°18′	7°27′	Scotch S/T	10	36	45.5	630	? [1]
	» May 2	2188	♀	2.5 miles W by N of Mulen, 52 fms.	62°11.5′	7°20′	English S/T	11	34	44.3	505	1015
	» » c.14	2160	♂	7 miles N¼W of Enniberg, 45 fms.	62°30′	6°40′	»	c. 11	36	44	640	955[1]
	» » 15	2143	♀	9 miles WNW⅜W of Myggenæs, 60 fms.	62°05′	8°00′	»	11	43	49.6	1080	1570 gut.
	» » 25	2200	♂	1.5 miles NE⅝N of Baret, 37 fms.	62°13.5′	7°25′	»	11	33	42.5	445	960 gut.
	» June 2	2140	♀	8.5 miles NW¾W of Myling, 54 fms.	62°20′	7°30′	»	12	39	46	750	1060
	» » 10	2178	♀	8.5 miles NW¾W of Myling, 60 fms.	62°20′	7°30′	»	12	35	43	575	960
	» » c.24	2134	♀	at the Færoes	62° ?	7° ?	»	c. 12	40	47	800	1320[1]
	» » c.24	2144	♀	at the Færoes	62° ?	7° ?	»	c. 12	38	49	660	?

[1]) immature. [2]) stale. [3]) ulceration at mark. [4]) near spawning. [5]) nearly ripe. [6]) not quite ripe. [7]) spent. [8]) slight ulceration at mark. [9]) spawning.

Particulars of Liberation. Date, Locality, No. of Fish etc.	Particulars of Recovery										
	Date	No. on Label	Sex	Locality reported	Central Position (Approximately) N.	W.	Fishing vessel	No. of months between Liberation and Recapture	Initial size cm	Ultimate size cm	Weight (gr) Initial	Weight (gr) ultimate
	1913 June 26	2154	♂	6 miles NNW¼W of Myggenæs, 55 fms.	62°10′	7°50′	English SiT	12	43	53	1050	1580
	» July 11	2197	♂	5 miles NW by W of Myling Head, 56 fms.	62°19′	7°23′	Scotch S/T	13	36	46.2	575	? [1]
	» » c.24	2177	♀	13 miles NNW of Myggenæs, 50 fms.	62°15′	8°00′	»	c. 13	45	56	1110	1920
	» Aug. 6	2151	♀	10.5 miles NE½E of Myggenæs, 50 fms.	62°15′	7°30′	English S/T	14	40	49.8	800	1735 gut.
	» » c. 15	2156	?	4.5 miles N by E¼E of Rivtange, 45 f.	62°25′	7°00′	»	c. 14	37	44.2	620	1020 gut.
	» Sept. 23	2191	♀	13 miles NNW of Myggenæs 55 fms.	62°15′	8°00′	»	15	35	49	600	1550
	» Nov. 13	2130	♀	14 miles N by W of Myling Head, 56 fms.	62°30′	7°30′	»	17	41	54	765	2495 gut.
	1914 Jan. 17	2169	♀	13 miles N¾E of Kadlur, 72 fms.	62°35′	6°55′	English S/T	19	37	54.3	630	2220 gut.
	» Febr. 20	2150	♀	13 miles N¼W of Myling, 55 fms.	62°30′	7°25′	»	20	39	51.5	815	2000 gut. [1]
	» March 11	2167	♀	3.5 miles WNW of Troldhoved, 42 fms.	61°55′	7°05′	»	c. 21	35	43.5	580	980
	» » 25	2147	♂	?	?		»	21	42	?	980	?
	» July 16	2158	♀	5 miles W by N of Myling Head, 60 fms.	62°19′	7°24′	»	25	36	52.3	580	1650
	1915 Febr. 16	2183	♀	12 miles ENE of Myling Head, 56 fms.	62°26.5′	6°54′	Scotch S/T	32	37	60.1	650	? [1]

[1]) immature.

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