

Serial No. 372Document No. 13ANNUAL MEETING - JUNE 1956Size Distribution of Haddock caught by Spanish Trawlers in 1955

by Alfonso Rojo

(The following paper is to be considered as an addition to the Spanish Research Report, Document No. 2)

The haddock is the object of a considerable fishery by Spanish vessels. The marketable size is from only 40 cm. and upwards. For this reason and as few specimens of small size are caught, the centimetre is used as the unit of measurement. Each measurement has been done to the half centimetre below.

The method of measuring haddock is the one used in the North American laboratories. The length of the fish is measured from the extreme anterior point of the snout to the fork of the hind margin of the caudal fin.

However, as in many investigations measurements were made to the vertical line uniting the two lobes of the caudal fin, the relation between these two kinds of measurements is shown in Fig. 2, based on a study of 192 specimens.

In the present paper only data from specimens caught by the trawl are used. (The localities from where samples were taken are shown in Fig. 1.) Other individuals caught accidentally in plankton nets or recovered from stomachs of greater fish have been discarded.

In the years 1954 and 1955, several cruises have been made, each of a length of about one month and all in Subarea 3 (the Grand Bank of Newfoundland). The subdivisions studied have been 3O, 3P and 3N. From Subdivision 3N the data are from the summer of 1954 and 1955 and from the winter of 1955.

In Figures 3, 4, 5, 6 and 7 the size-distribution curves (frequency percentages) for these cruises are shown. The curves show two size peaks which correspond to two year-classes. In those curves that correspond to summer and winter of 1955 one finds the two size peaks displaced 3 cm. to the right. As the same year and the same area is concerned, it is clear that the 3 cm. displacement indicates the increase in length during the months of summer and autumn.

However, in the curve from 1954 the two peaks belong to larger (and older) individuals. These differences in form of curves can be explained by a varying strength of recruitment due to yearly changes in climatic conditions for the larvae.

In the attached figures the exact percentages for each 3 cm. size group are presented.

Any of the curves can serve as a means of describing the biology of the species, but as the intensity of the fishery varies from year to year each curve has its own special value varying from year to year.

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The smallest haddock recorded in the measurements is a specimen of 12 cm. (this is excluding smaller specimens down to a size of only 4 cm. found in the stomachs of larger haddock.) The largest size was measured in two specimens of 75 cm. This size is very rarely found.

From this same subdivision (3N) there are for the summer of 1955, frequency curves for successive days (Fig. 8). From these appears the fact that the curves vary in form from day to day, but with only very small oscillations. The two peaks of the size-curves are also clearly apparent.

In Subdivision 3O one of the year-classes which predominates in 3N disappears, and only one peak is found which in 1955 corresponds to the sizes between 40 and 45 cm.

A case nearly analogous occurs in Subdivision 3P. Here the peak is also around 45 cm. leaving the year-classes corresponding to other sizes much reduced in frequency percentage (Fig.3).

In Fig. 9 the frequency percentages of sizes in successive days are shown for this subdivision. From these cruises, as well as for corresponding data for the cod, it becomes apparent that the various shoals of these fishes do not stay for a long time in the same place. The variation of the size-curve from day to day indicates that there are various stocks migrating to and from. It is also observed that the modal length increases and then decreases; however, the diminution always coincides with an emigration from the bank.

Finally in Fig. 10 all specimens from the various subdivisions are summarized in 1 cm. classes. As there is a far greater material from Subdivision 3N, the general curve for the whole sub-area resembles very much the curves characteristic for Subdivision 3N.

The smallest male found was 22 cm. and the largest one 71 cm. The smallest female was 22 cm. and the largest 74 cm. Fig. 11 shows the size distribution of males and females by cm. groups. The individual captures are for both sexes distributed in the same way according to length. The number of males and females are practically the same. Therefore the curve for the females and for the males are parallel to one another. This combined with the fact that sexual maturity for both sexes attained at nearly the same age relieves us of the problem found for other species, that the same size of meshes causes a different selection of males and of females.

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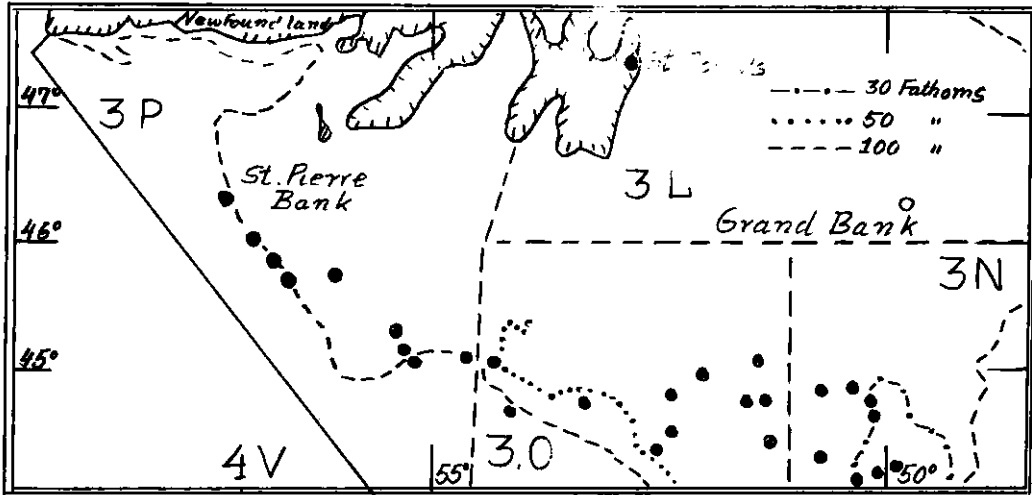


Fig. 1 - Localities in Subarea 3 from where samples of haddock were taken in 1955.

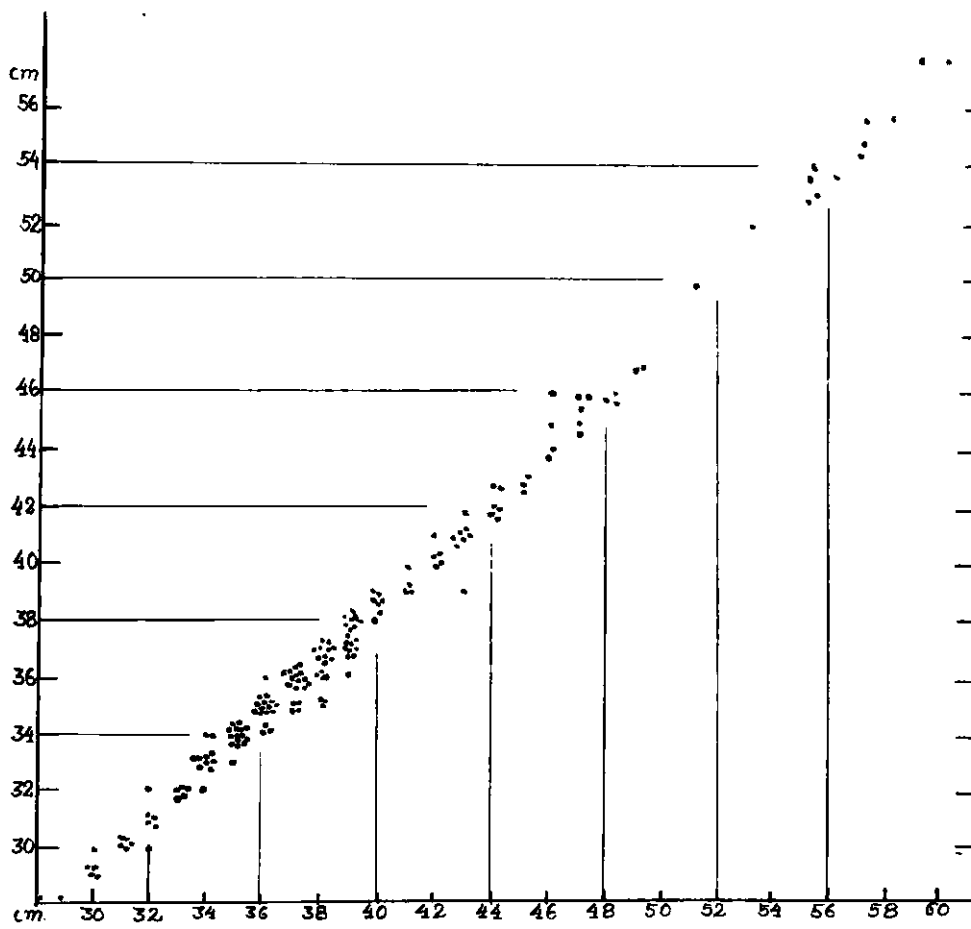


Fig. 2 - Haddock. Relation total length (the abscisse) to length to fork of tail fin (the ordinate).

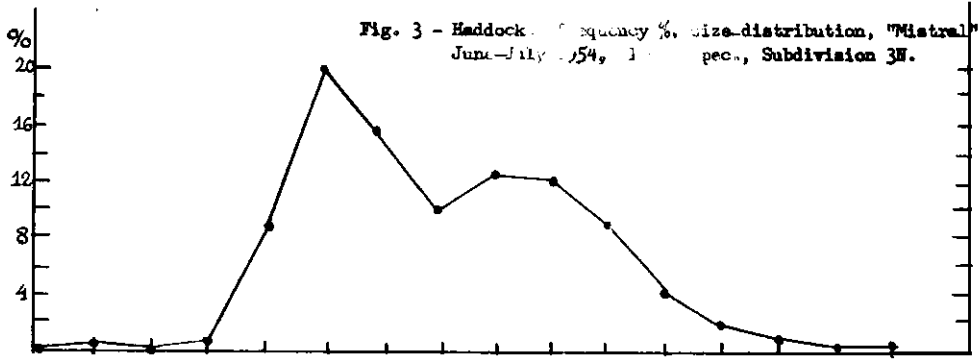


Fig. 3 - Haddock. Frequency %, size-distribution, "Mistral", June-July 1954, 1,000 spec., Subdivision 3H.

Cms.	-	26	29	32	35	38	41	44	47	50	53	56	59	62	65	68	71
%	-	0.2	0.5	0.09	1.9	8.8	20.2	16	10.3	12.8	12.5	9.3	4.5	2.1	0.7	0.18	0.09
Fa	-	4	4	4.5	28.2	102	171	164	130	127	124	93.7	54	25.2	10.5	3.5	1.3
N	-	3	6	1	10	92	212	168	108	134	131	98	48	22	9	2	1

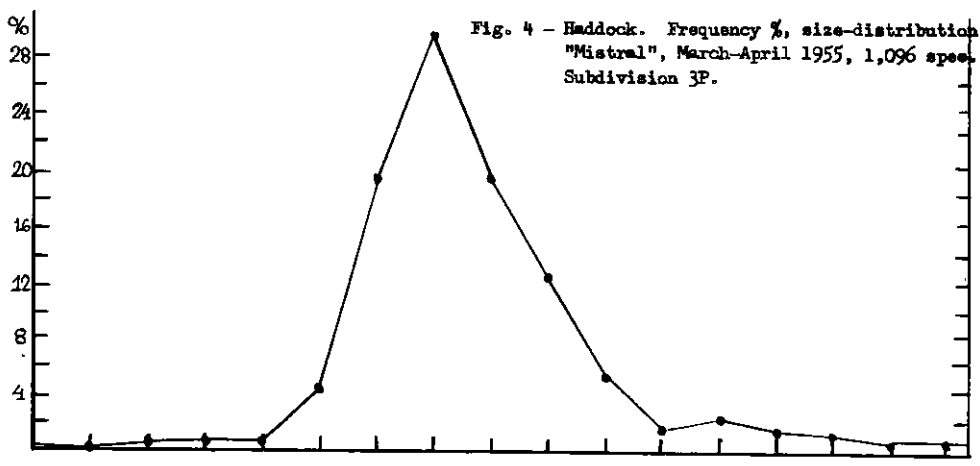
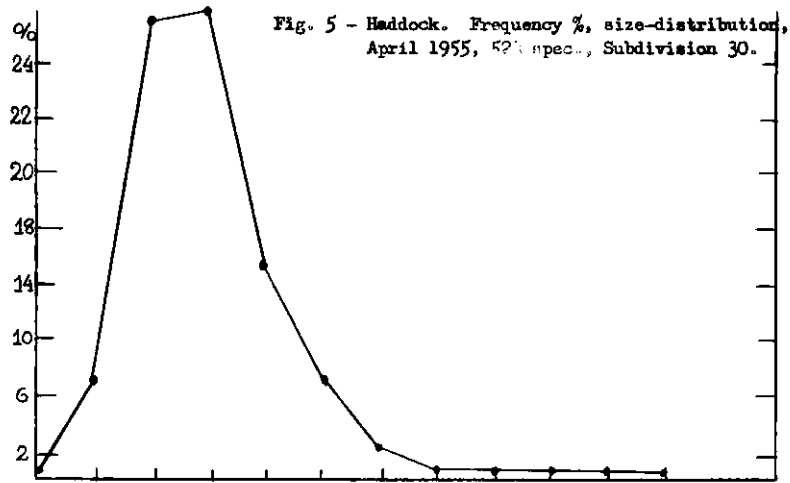
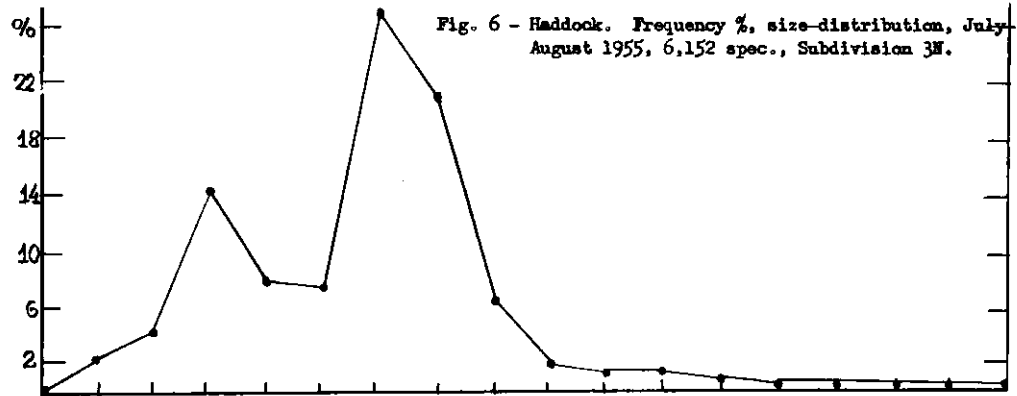


Fig. 4 - Haddock. Frequency %, size-distribution, "Mistral", March-April 1955, 1,096 spec., Subdivision 3F.

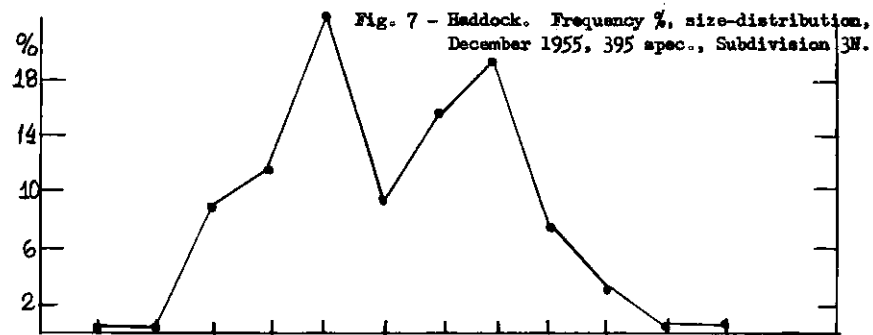
Cms.	-	23	26	29	32	35	38	41	44	47	50	53	56	59	62	65	68	71
%	-	0.05	0.05	0.15	0.2	0.25	4.75	19.4	29.3	19.3	12.8	5.21	1.94	2.55	1.43	1.22	0.61	0.35
Fa	-	1.0	1.5	2.75	4	26.7	143	357	477	386	246	123	57	41.5	32.5	22	13.7	7.25
N	-	1	1	3	4	5	93	380	575	379	251	102	38	50	28	24	12	7



Obs.	-	35	38	41	44	47	50	53	56	59	62	65	68
%	-	0.76	6.88	32.6	33.3	15.1	7.07	2.29	0.57	0.38	0.38	0.38	0.19
Fn	-	14.6	62.8	138	150	92.3	41.3	16	5	2.25	2	1.75	1.3
N	-	4	36	171	174	79	37	12	3	2	2	2	1



Obs.	-	23	26	29	32	35	38	41	44	47	50	53	56	59	62	65	68	71	74
%	-	0.19	2.2	4.17	14.3	8.06	7.89	27.0	21.4	6.56	3.28	1.60	1.77	1.18	0.78	0.21	0.09	0.01	0.03
Fn	-	59	137	383	627	589	783	1,283	1,176	569	199	114	87.5	75.7	46	20	6.5	2.5	1.6
N	-	19	139	257	877	496	486	1,664	1,320	404	147	99	109	73	48	13	6	1	2



Obs.	-	23	26	29	32	35	38	41	44	47	50	53	56
%	-	0.50	0.25	8.86	11.6	22.5	9.3	15.9	19.2	7.8	3.0	0.25	0.50
Fn	-	1.6	9.75	29.3	54	65.2	56.5	59.8	61.5	37.5	14	4	1.6
N	-	2	1	35	46	89	37	63	76	31	12	1	2

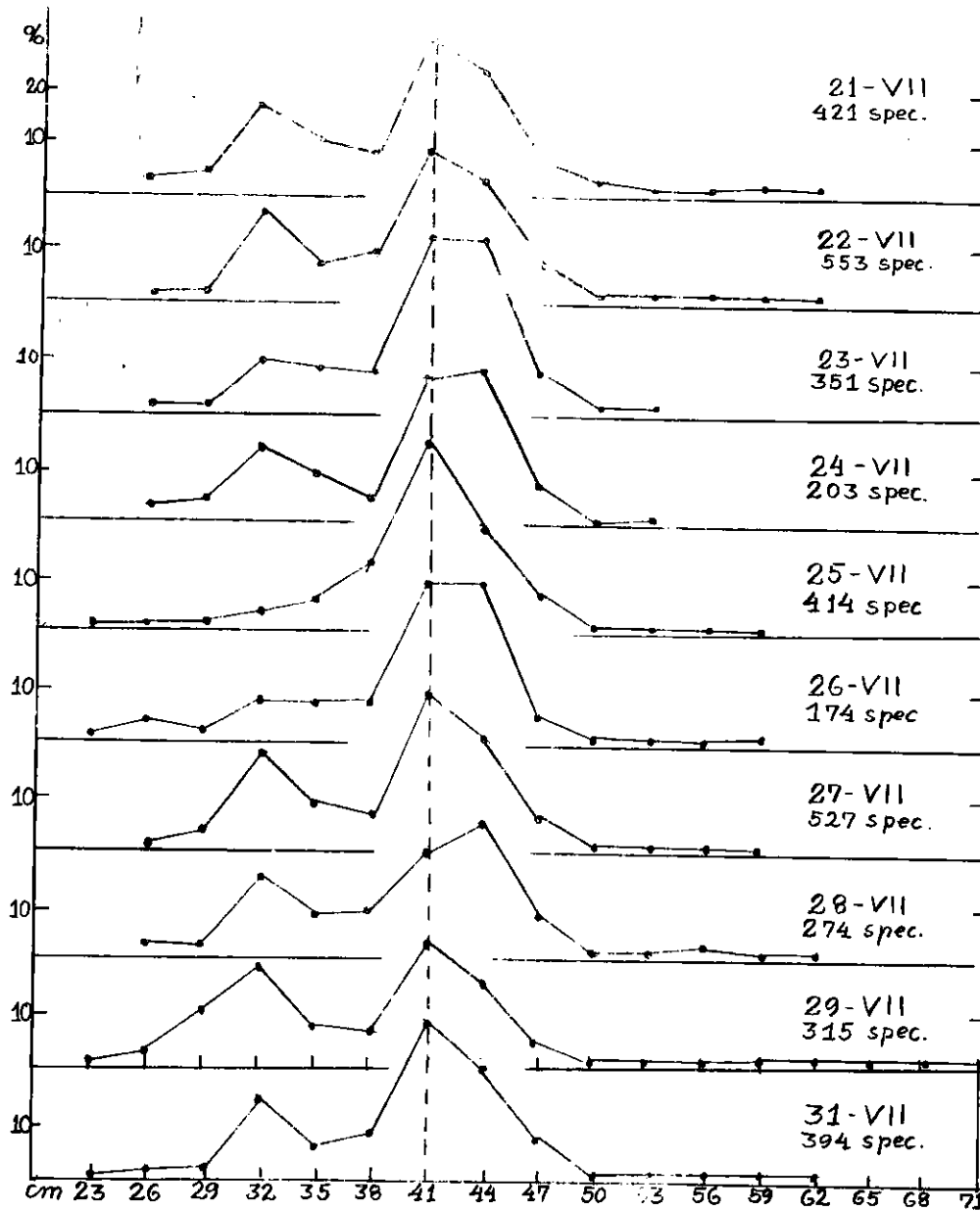


Fig. 8 - Haddock. Frequency %, size-distribution on subsequent days, Subdivision 3N, 21-31 July 1955.

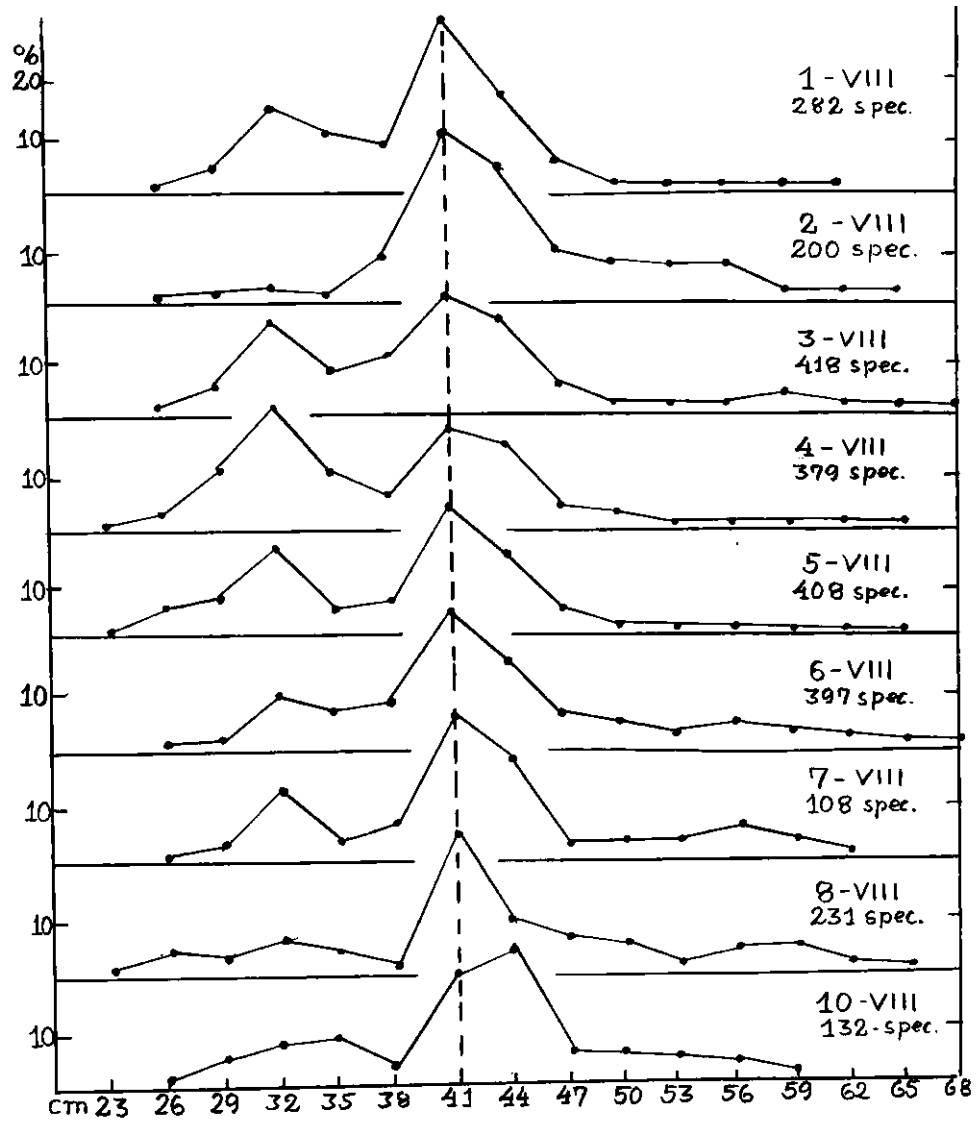


Fig. 8 - Continued. Haddock. Frequency %, size-distribution on subsequent days, Subdivision 3W, 1-10 August 1955.

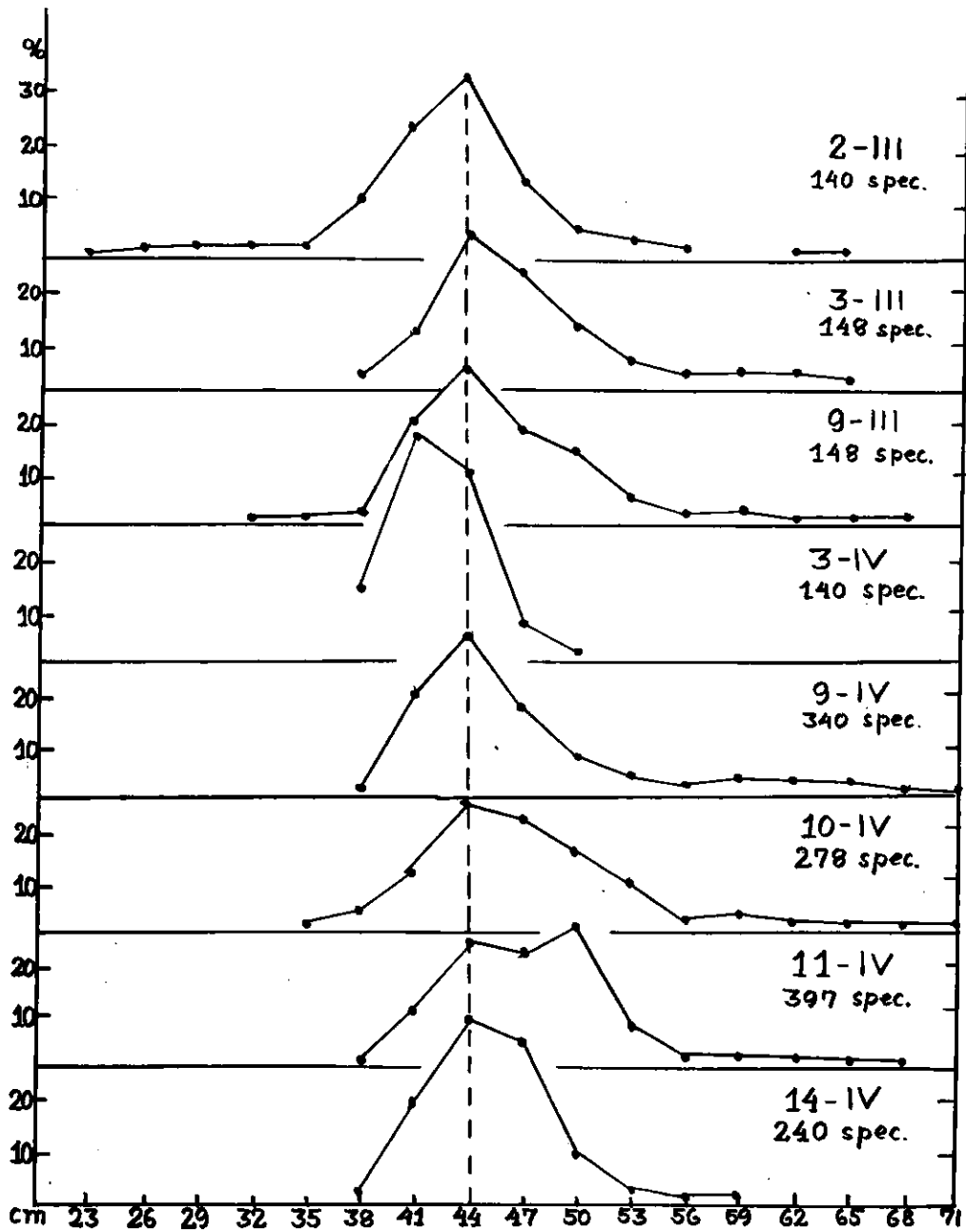


Fig. 9 - Haddock. Frequency %, size-distribution on subsequent days, Subdivision 3P, 2 March - 14 April 1955.



Fig. 10 - Hedlock. Length-distribution of measurements (numbers).  
Subarea 3, 1955. 10,071 specimens.

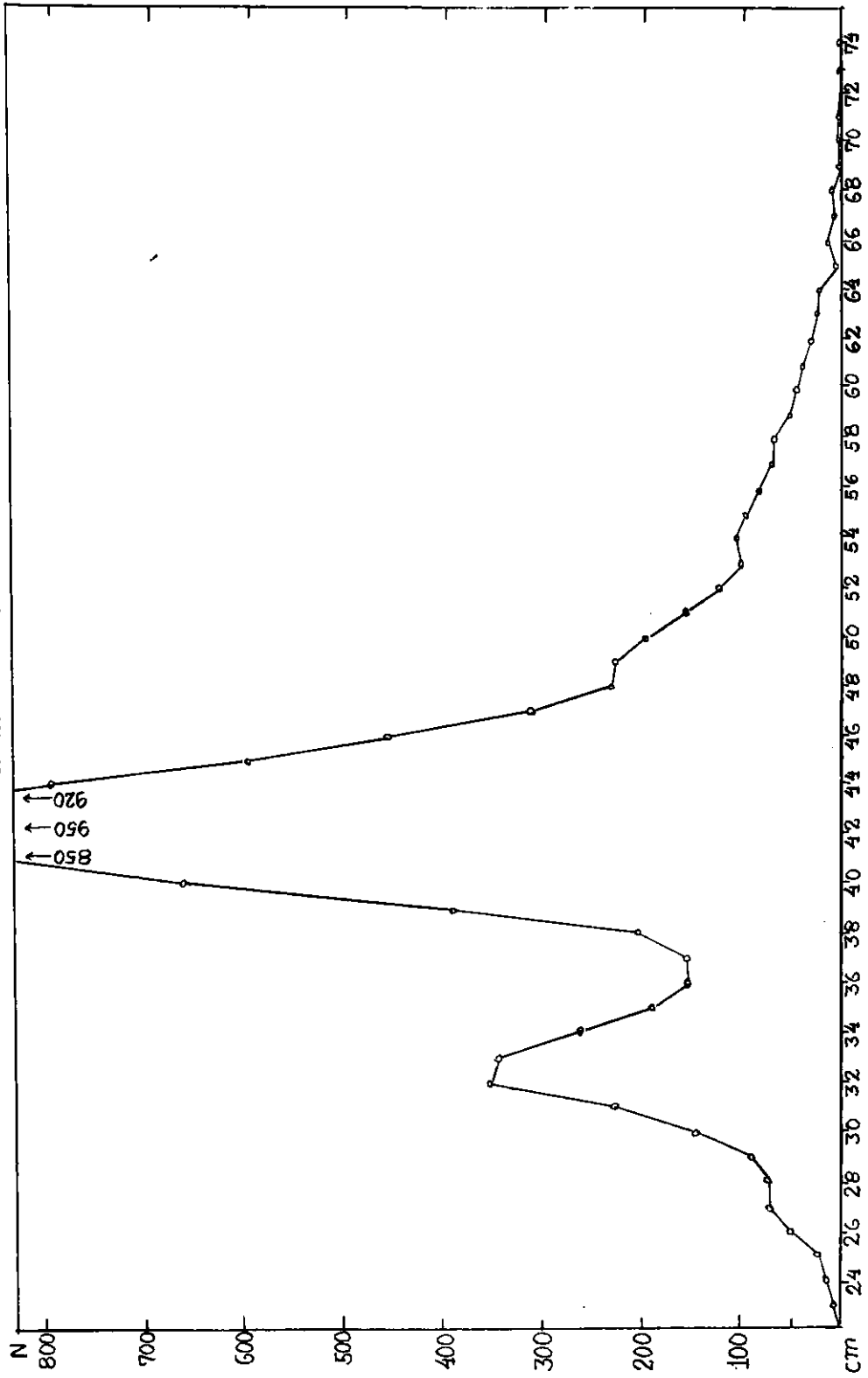


Fig. 11 - Haddock. Length of males (580 spec.) and females (707 spec.)  
Frequency (numbers). Schwarz 3, 1955.

