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Distribution of Silver Hake and Other Fishes on the Scotian Shelf Slopes in 1986, From USSR Observer Data

by

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Abstract

Distribution of silver hake and other fish species in June-July 1986, in the area open for foreign fishery was studied. No considerable differences in the distribution of the species considered have been observed compared with 1985. Simultaneously, a very high abundance of silver hake was recorded on the shelf slopes. The by-catch was mainly represented by saithe, mackerel, argentine and Urophycis spp. For the first time in the entire fishing period a comparatively large by-catch of the Atlantic herring was recorded in some catches.

Introduction

In spring 1986, the Soviet observers continued collecting length-age samples of silver hake, and identified species composition of the fish in commercial catches from the area open for the foreign fisheries. In the present paper the distribution of catches per hauling hour of silver hake and some other species is considered and compared with the similar data for previous years.

Materials and Methods

In 1986, the Soviet observers collected materials on board commercial ships only in June and July. The data on the distribution and fish species composition in the catches for May were kindly submitted by the Canadian observers, who worked as observers on the Soviet commercial ship at that time. The methods of material processing and analysis of distribution were the same

as in previous years. Figures (in denominators) and a table (in brackets) show the number of hauls with the catches of corresponding species. The distribution of hake of the genus Urophycis was analysed without prior classification of species. The observers measured 55 600 specimens and collected 760 pairs of silver hake otoliths for age determinations. The amount of sampling in 1986 by area and fishing period is presented in table 1. As is evident from this table, in 1986 the sampling covered a greater area than in 1985 (Rikhter et al., 1986). The maximum recorded intensity of sampling was during the first ten-day period of July.

Results and Discussion

Silver hake (Merluccius bilinearis)

According to a Canadian observer , in May, silver hake occurred in numbers in the area between 59°00' and 62°00'W. The highest density of aggregations was between 59°00' and 61°00'W. In June, silver hake was distributed between 59°00'and 63°00'W, actually forming a single high density aggregation (Fig.1), which reminds of the situation observed in June last year (Rikhter et al., 1986). In July, the abundance of silver hake on the shelf slopes remained high. As in previous months, the fishery covered almost the entire area south of the SMGL (Fig. 2). Dense aggregations were found between 60°00' and 64°00'W. Catches per hauling hour by month compared with previous years are given in Table 2. Taking into account the range of aggregations, and large catches per unit effort, it can be inferred that during the 1986 fishing season the biomass of silver hake on the shelf slopes was the largest during the whole observation period after introduction of the 200-mile zone. No wonder, the fishing conditions were highly favourable, and the quota was taken earlier than ever before. We believe, that abundant silver hake aggregations south of the SMGL are indicative of a trend to the increase of abundance of this species on the Scotian Shelf in recent years. (Waldron, 1986; Noskov, 1986). Also, the impact of oceanographic factors that might have promoted formation of dense silver hake aggregations on the shelf and slope cannot be rejected.

Haddock (Melanogrammus aeglefinus)

The distribution of this species on the Shelf slope in June and July of 1986 is shown in Figs. 3 and 4. According to the data of the Canadian observer, in May, the haddock was found between 59°00' and 63°00'W. The catch statistics per unit effort by month is presented in Table 2. Judging by these data, the haddock biomass during the 1986 fishing season south of the SMGL maintained at the 1985 level (Rikhter et al., 1986). The distribution was also similar to that in the last year. On the whole, as is evident from Table 3, the haddock by-catch made up 0.8% of the total catch analyzed by the observers in June-July, i.e. it was below the allowable rate.

Saithe (Pollachius virens)

In general, the distribution of saithe in June-July was similar to that in the last year (Figs. 5 and 6). In May, according to the data of the Canadian observer, the species occurred between 59°00' and 63°00'W. In some cases the density of aggregations appeared to be higher than in 1985. The catches per unit effort by month are given in Table 2. The by-catch amounted to 5.2% (Table 3).

Urophycis spp.

The representatives of this genus occurred practically everywhere in the fishing area in May (data of the Canadian observer), and in June - July (Figs. 7 and 8). On the whole, the density of aggregations was higher than in 1985. The catches per unit effort are presented in Table 2. The by-catch amounted to 3.4% (Table 3).

Mackerel (Scomber scombrus)

In May (data of the Canadian observer), June and July (Figs. 9 and 10), this species was also found in the fishing area. No significant differences in the distribution compared with 1985 have been observed. In June 1986, the density of aggregations was higher than in the previous year. The catches per unit effort by month are presented in Table 2. The by-catch amounted to 2.4% (Table 3).

Atlantic herring (Clupea harengus)

For the first time in the observation period (beginning in 1979), a considerably large by-catch of the Atlantic herring was recorded in some catches throughout the fishing season. In May (data of the Canadian observer), this species occurred between 59°00' and 61°00'W, and in June-July (Figs. 11 and 12) between 60°00' and 63°00'W. The aggregations occupied a relatively small area. The catches per unit effort by month are presented in Table 2. The by-catch amounted to 3.8% (Table 3).

Argentine (Argentina silus)

This species was recorded in the catches only in July (Fig. 13), and only in the western part of the fishing area. The argentine aggregation occupied a small area, however, its density was relatively high. The catch per unit effort constituted 541 kg (Table 2), and the by-catch amounted to 4.9% (Table 3).

Other species

As in 1985, the cod and redfish occurred in the catches sporadically, in very small numbers, which is indicative of their limited abundance on the shelf slopes during the inveatigated period.

Conclusion

In 1986, as in the previous year, extremely dense silver hake aggregations were found in the area south of the SMGL throughout the fishing season (May-July), which is consistent with the trend to the increase of abundance of this species on the Scotian Shelf observed recent years. In general, the distribution of the majority of other fish species was actually similar to that recorded in 1985, though the density of saithe and Urophycis spp. aggregations in June-July, and of mackerel aggregations in June appeared to be higher than in the previous year. Since, compared to 1985, no significant differences have been observed in the behaviour and distribution of almost all fish species occurring in the catches, it evidently can be assumed that the oceanographic conditions were similar on the Scotian Shelf in 1985 and 1986. The per cent of the by-catch of all spe-

cies caught in the directed fishery for silver hake in June-July, and most likely, in May 1986, was below the allowable rate.

Acknowledgements

We are most grateful to our Canadian colleague Joan Manuel for information on the distribution and species composition of the fish in the catches gained on board the Soviet commercial ship in May 1986.

Table 1 Distribution of silver hake size samples collected by Soviet observers in 1986 by area and fishing period

Positions, W	Months and ten-day periods					Total
	June			July		
	I	II	III	I	II	
59°40'	-	-	3	-	-	3
50	-	-	2	1	-	3
60°00'	-	-	4	1	-	5
10	2	-	1	8	-	11
20	17	-	1	4	-	22
30	11	2	2	4	1	20
40	13	6	2	10	1	32
50	6	11	4	7	-	28
61°00'	2	4	3	7	1	17
10	1	3	-	-	2	6
20	-	7	1	2	-	10
30	-	7	-	9	-	16
40	-	6	3	10	1	20
50	-	6	3	9	2	20
62°00'	-	6	-	3	1	10
10	2	3	2	-	3	10
20	-	1	-	3	8	12
30	-	7	3	11	11	32
40	-	-	7	10	2	19
50	-	-	9	10	5	24
63°00'	-	-	1	4	1	6
50	-	-	-	-	3	3
64°00'	-	-	-	-	6	6
10	-	-	-	-	8	8
20	-	-	-	-	1	1
Total	54	69	51	113	57	344

Table 2 Catch per hauling hour (kg) by species month and year (brackets include number of hauls)

Species	Months	Year					
		1981	1982	1983	1984	1985	1986
1	2	3	4	5	6	7	8
Silver hake	May	2368 (33)	8654 (34)	2771 (160)	5738 (90)	3094 (131)	-
	June	1121 (69)	5471 (103)	2778 (105)	2783 (57)	3635 (195)	4469 (174)
	July	1909 (68)	1724 (99)	-	3298 (125)	3994 (208)	4372 (170)
		-	-	-	(26)	(81)	
Haddock	May	3 (10)	22 (23)	17 (81)	6 (37)	28 (123)	-
	June	20 (46)	-	40 (90)	17 (53)	54 (190)	43 (119)
	July	8 (37)	10 (74)	-	-	37 (204)	42 (129)
	August	-	-	-	-	59 (80)	-
Cod	May	2 (4)	-	46 (65)	3 (15)	-	-
	June	30 (31)	-	1013 (87)	-	-	-
	July	64 (67)	14 (94)	-	-	-	-
	August	-	-	-	-	-	-
Redfish	May	106 (3)	-	34 (118)	7 (51)	-	-
	June	1 (2)	96 (41)	49 (53)	-	-	-
	August	-	-	-	-	-	-
	July	-	-	-	-	-	-
Saithe	May	-	-	-	-	38 (105)	-
	June	-	-	-	-	22 (123)	417 (63)
	July	-	-	-	-	4 (142)	165 (65)
	August	-	-	-	-	2 (58)	-
Red hake	May	-	-	-	-	39 (125)	-
	June	-	-	-	-	25 (188)	1234 (153)

Table 2 (continued)

1	2	3	4	5	6	7	8
	July	-	-	-	-	32 (206)	147 (136)
	August	-	-	-	-	45 (78)	-
Mackerel	May	-	-	-	-	101 (126)	-
	June	-	-	-	-	53 (180)	154 (68)
	July	-	-	-	-	104 (191)	112 (51)
	August	-	-	-	-	(75)	-
Herring	June	-	-	-	-	-	234 (87)
	July	-	-	-	-	-	193 (56)
Argentine	July	-	-	-	-	-	541 (13)

Table 3 Ratio of species (%%) in catches analysed by Soviet observers in June-July 1986

Species	Months		
	June	July	June + July
Silver hake	80.5	78.5	79.5
Haddock	0.8	0.8	0.8
Saithe	7.5	3.0	5.2
Red hake	4.2	2.6	3.4
Mackerel	2.8	2.0	2.4
Herring	4.2	3.4	3.8
Argentine	-	9.7	4.9

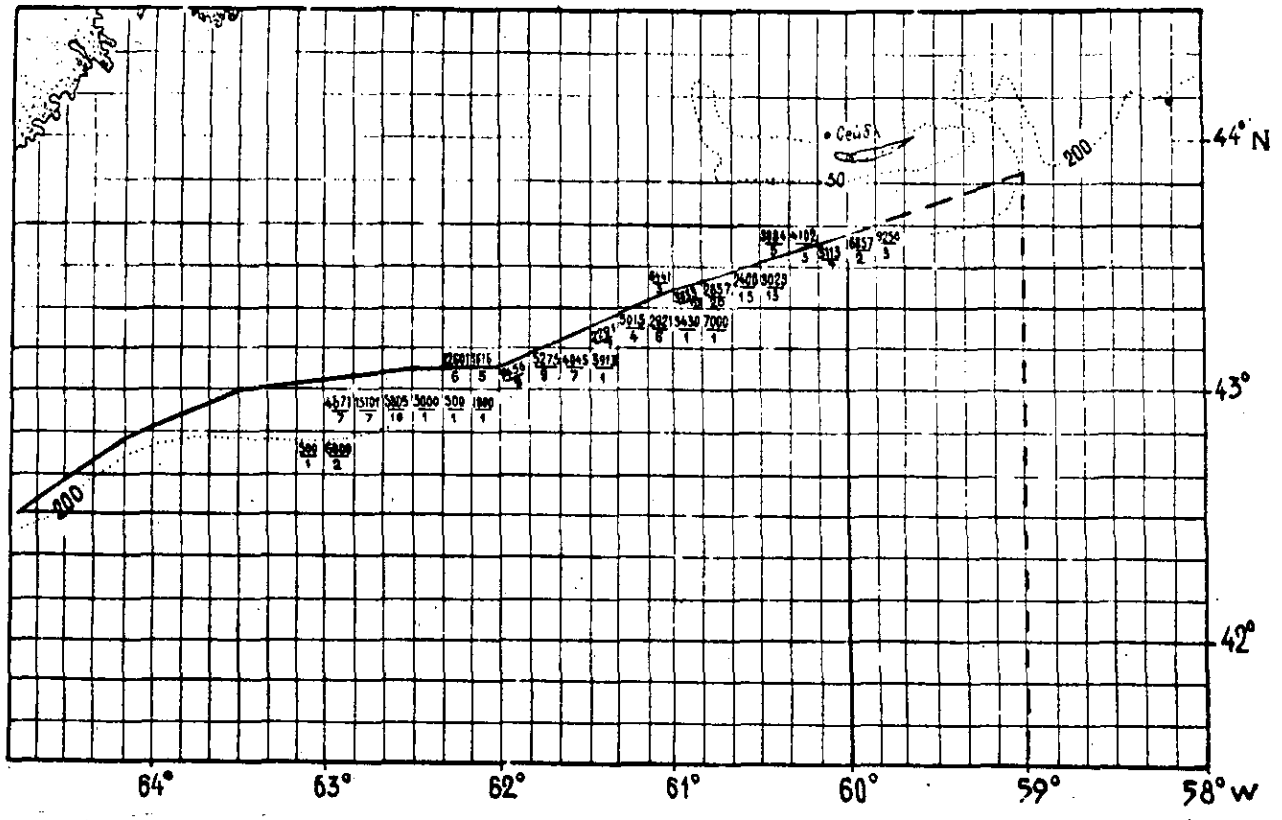

Fig. 1. Catch per hauling hour (kg) of silver hake in June 1986.

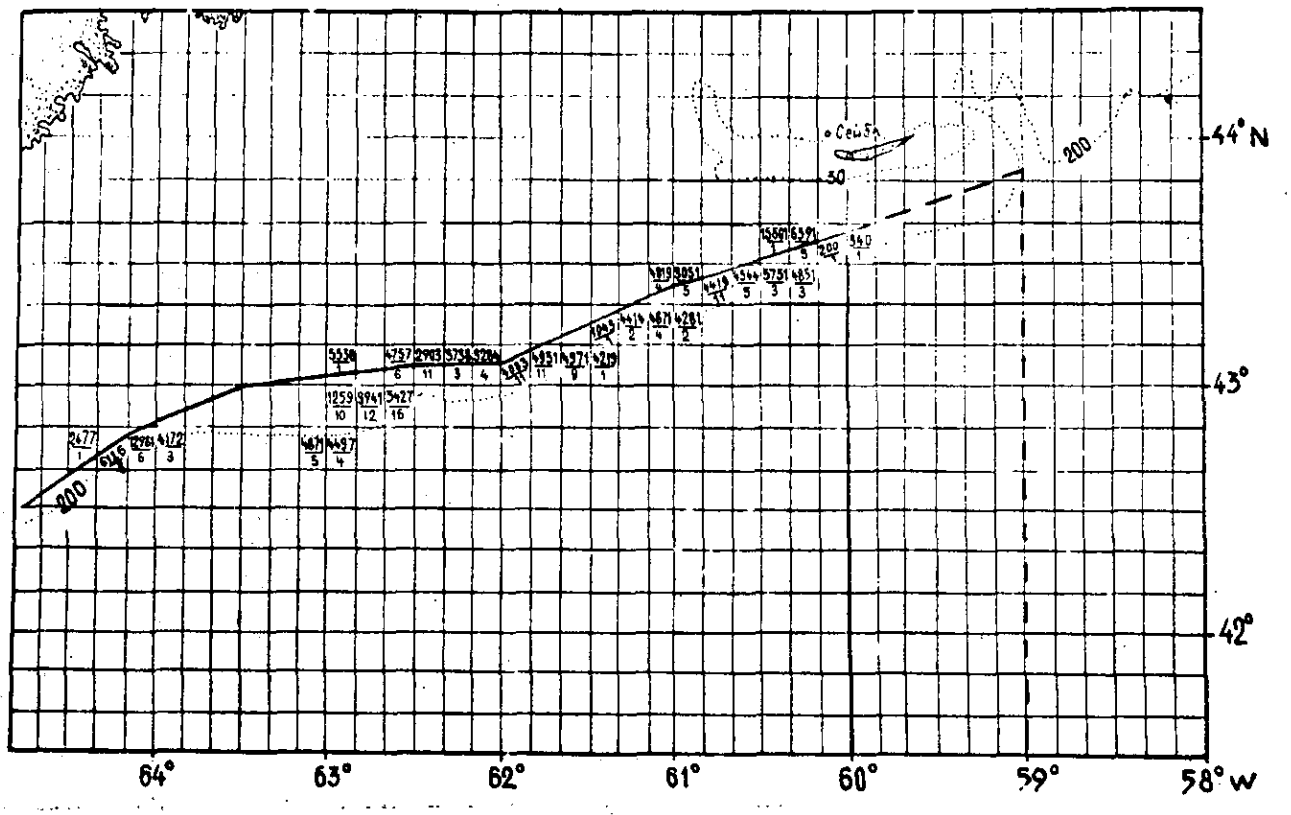

Fig. 2. Catch per hauling hour (kg) of silver hake in July 1986.

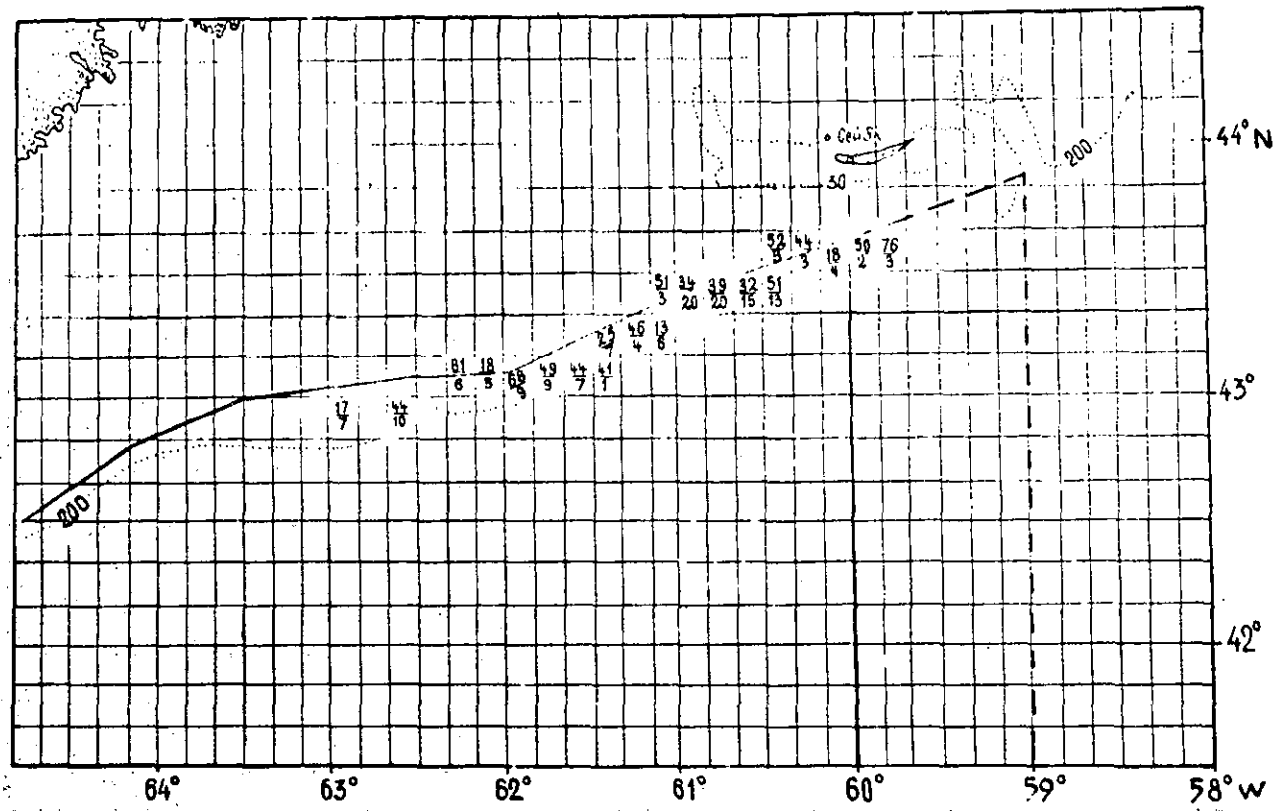

Fig. 3. Catch per hauling hour (kg) of haddock in June 1986.

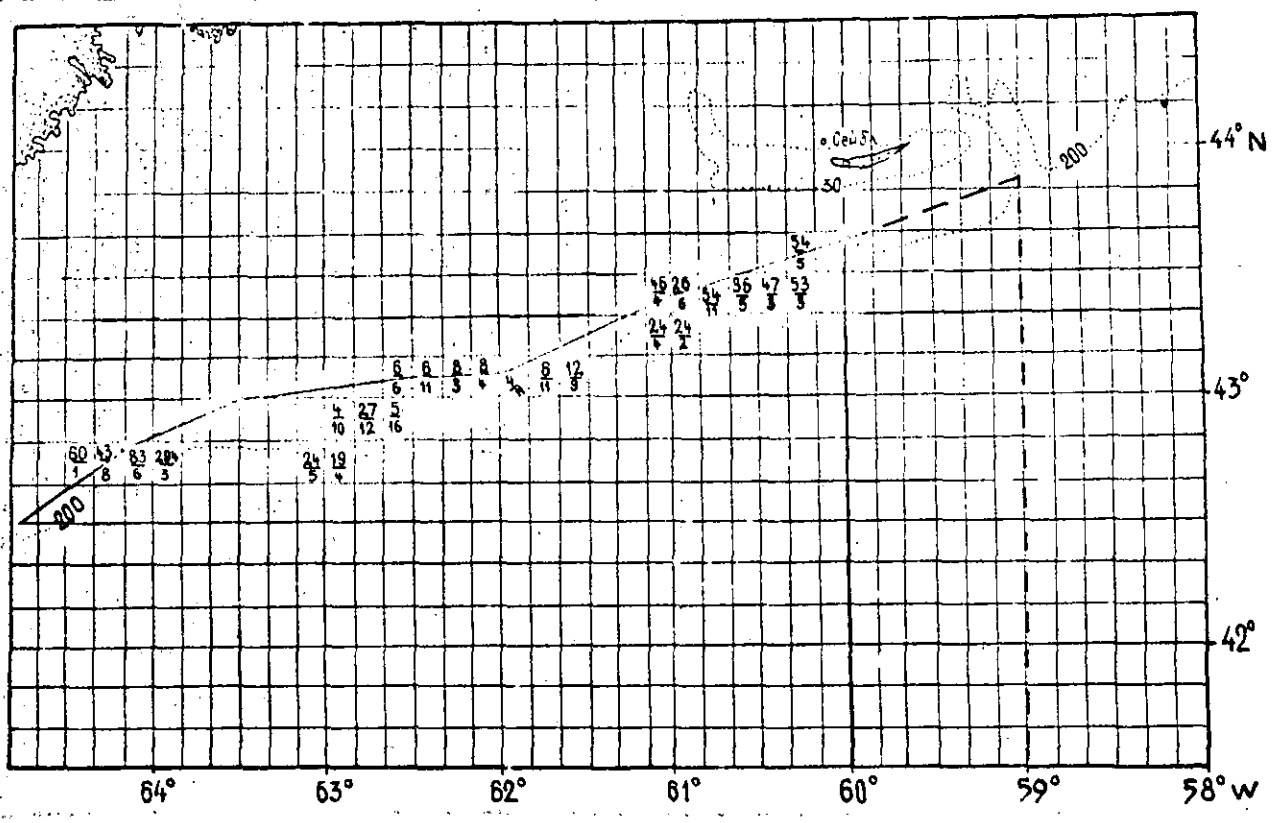

Fig. 4. Catch per hauling hour (kg) of haddock in July 1986.

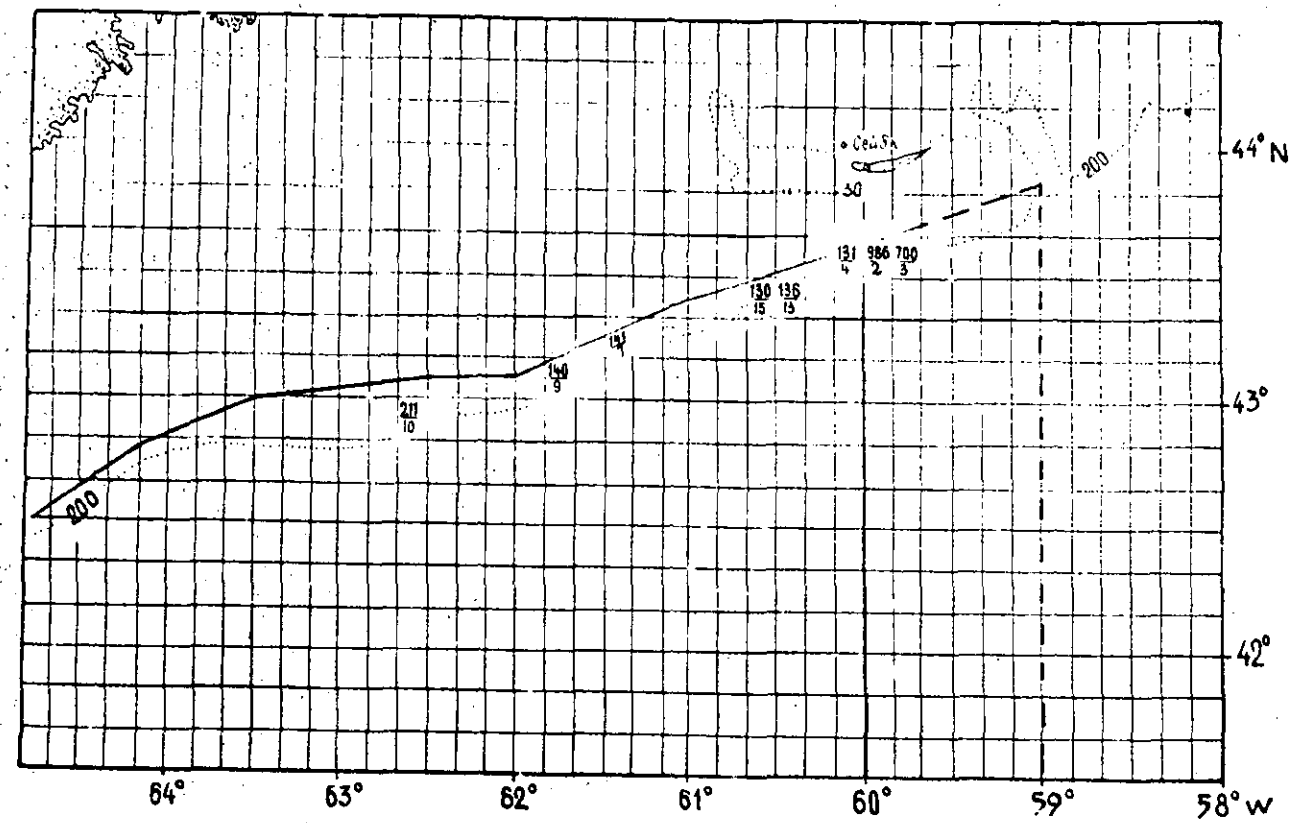

Fig. 5. Catch per hauling hour (kg) of saithe in June 1986.

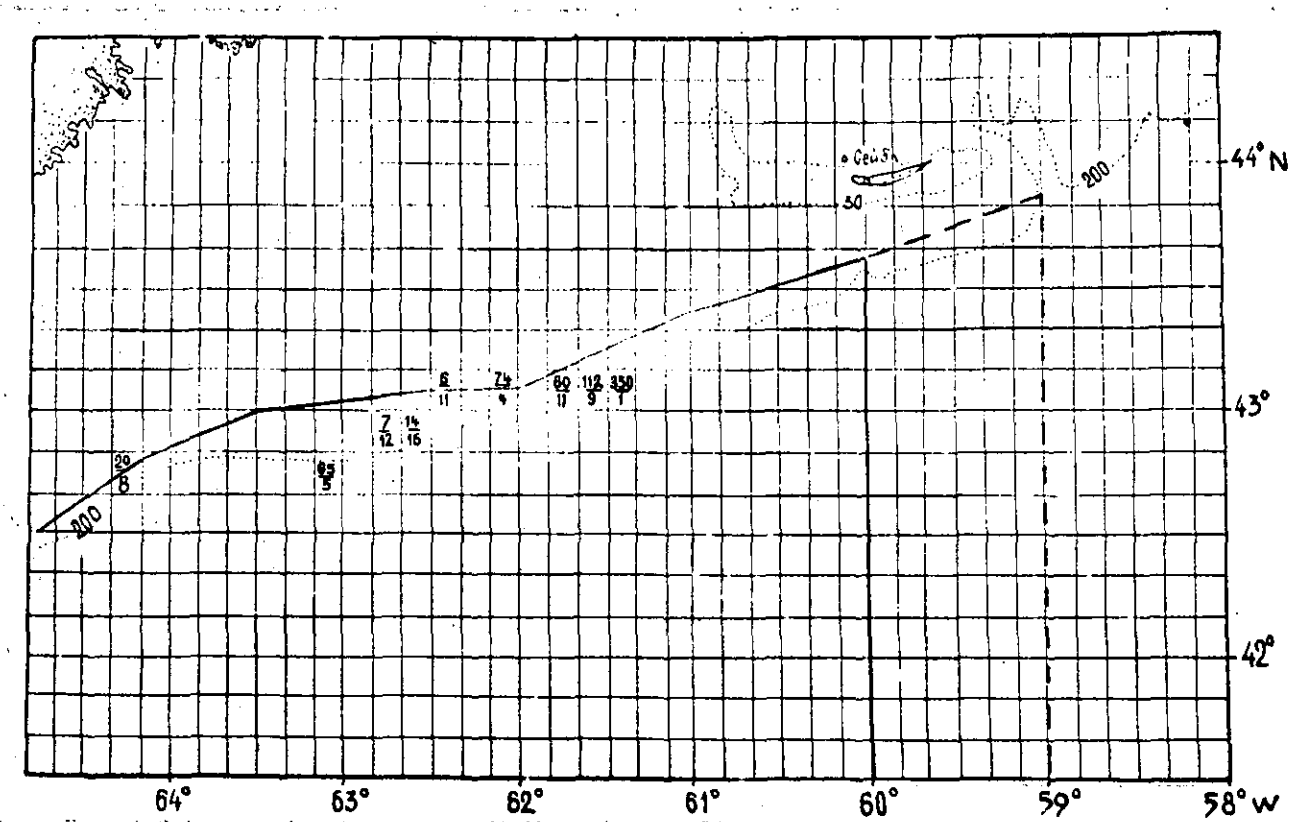

Fig. 6. Catch per hauling hour (kg) of saithe in July 1986.

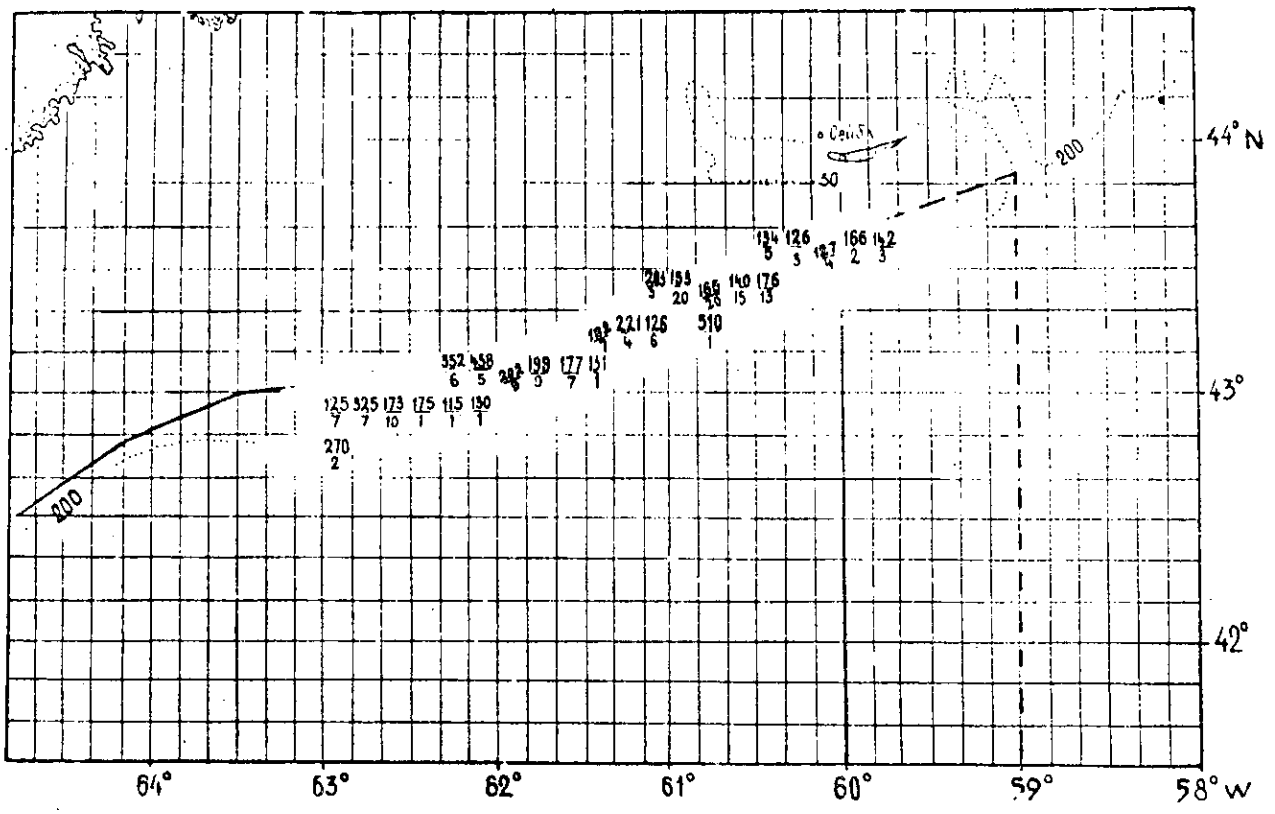

Fig. 7. Catch per hauling hour (kg) of Urophycis sp. in June 1986.

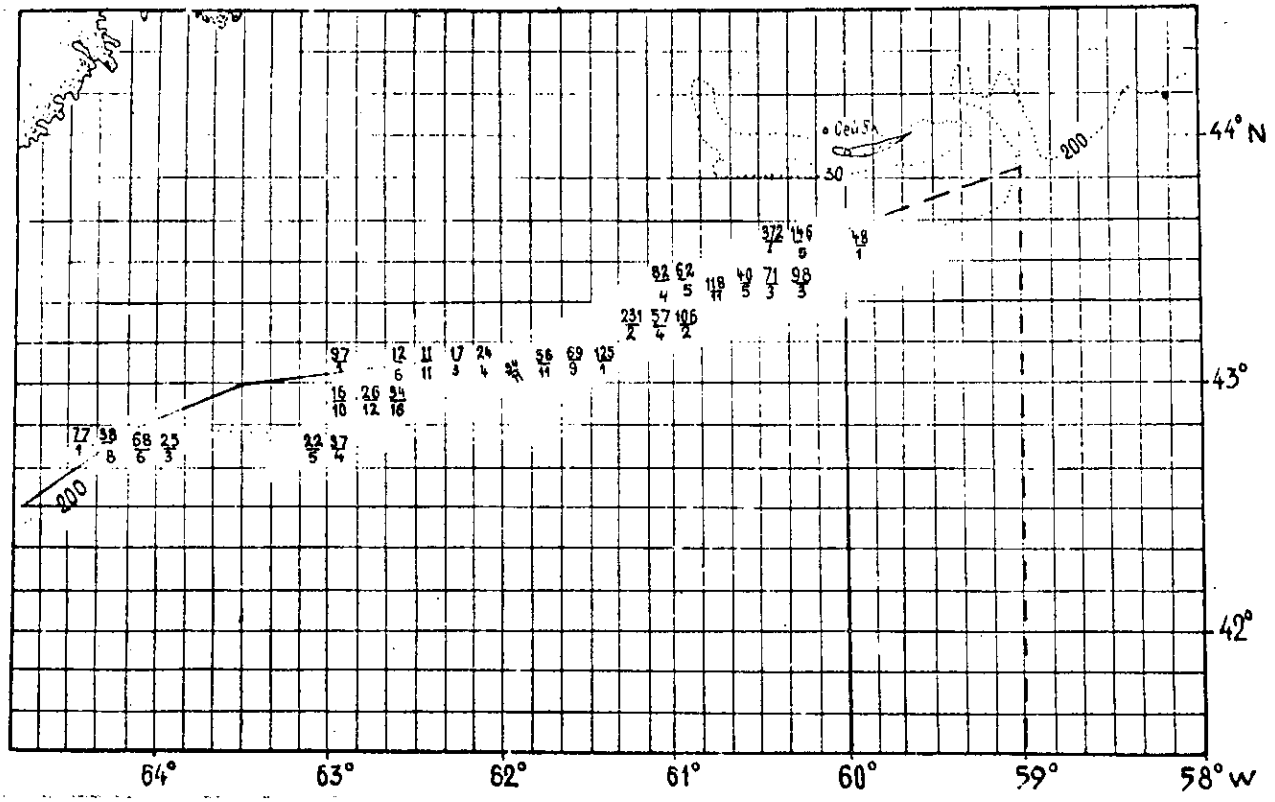

Fig. 8. Catch per hauling hour (kg) of Urophycis sp. in July 1986.

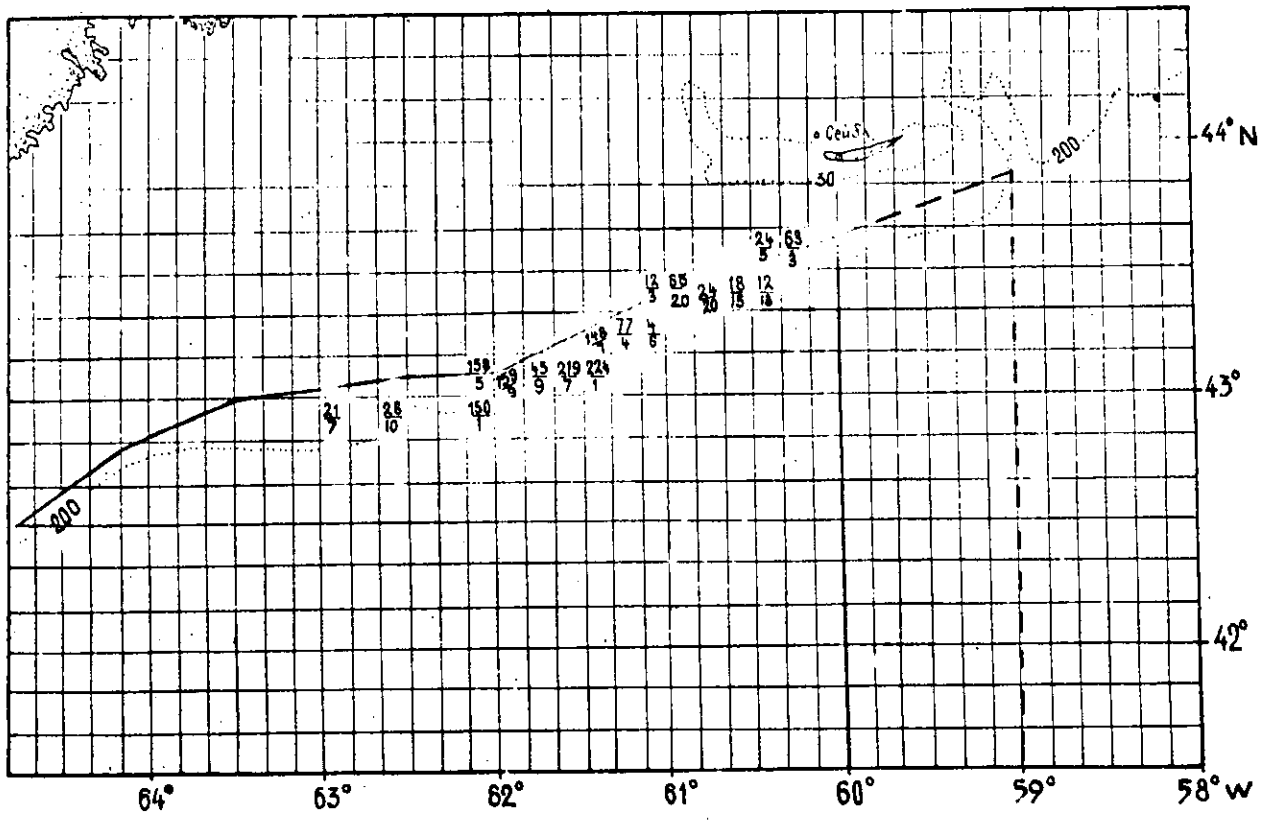

Fig. 9. Catch per hauling hour (kg) of mackerel in June 1986.

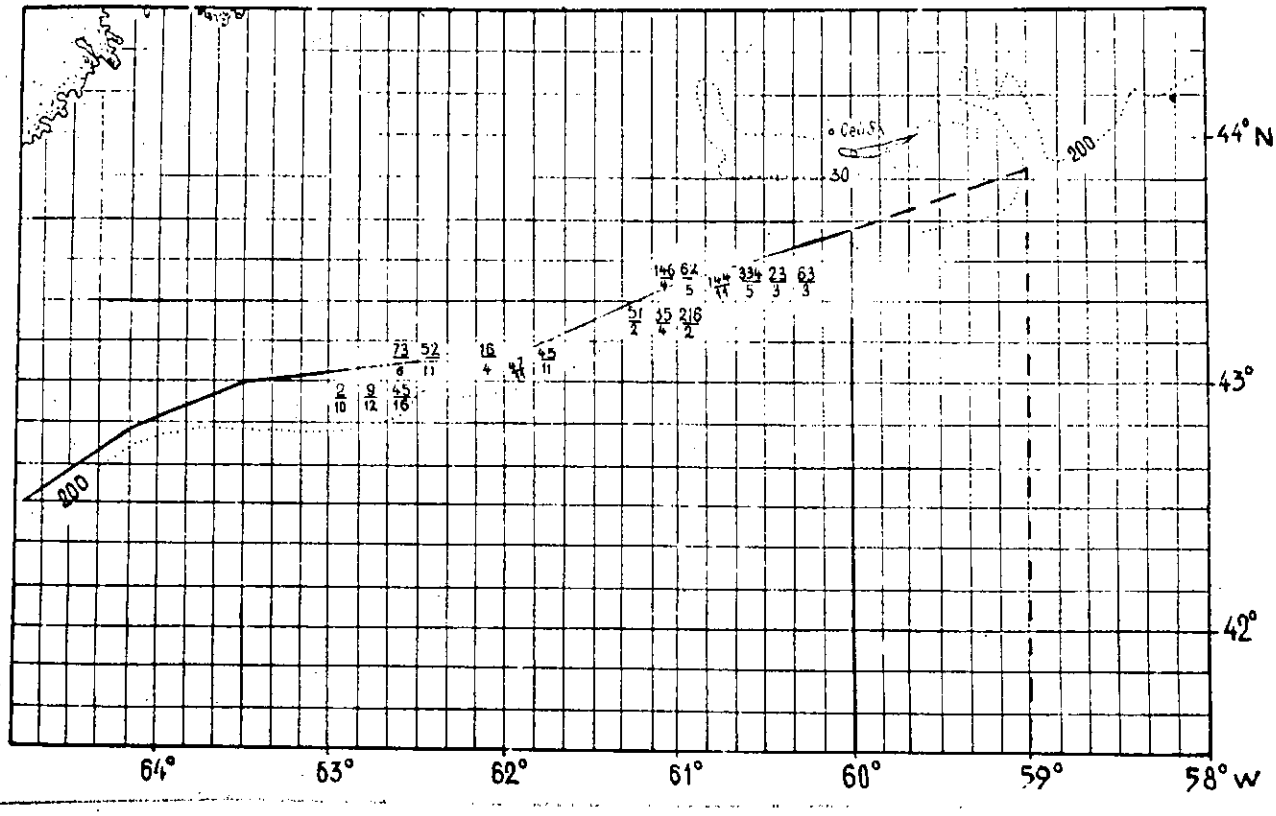

Fig. 10. Catch per hauling hour (kg) of mackerel in July 1986.

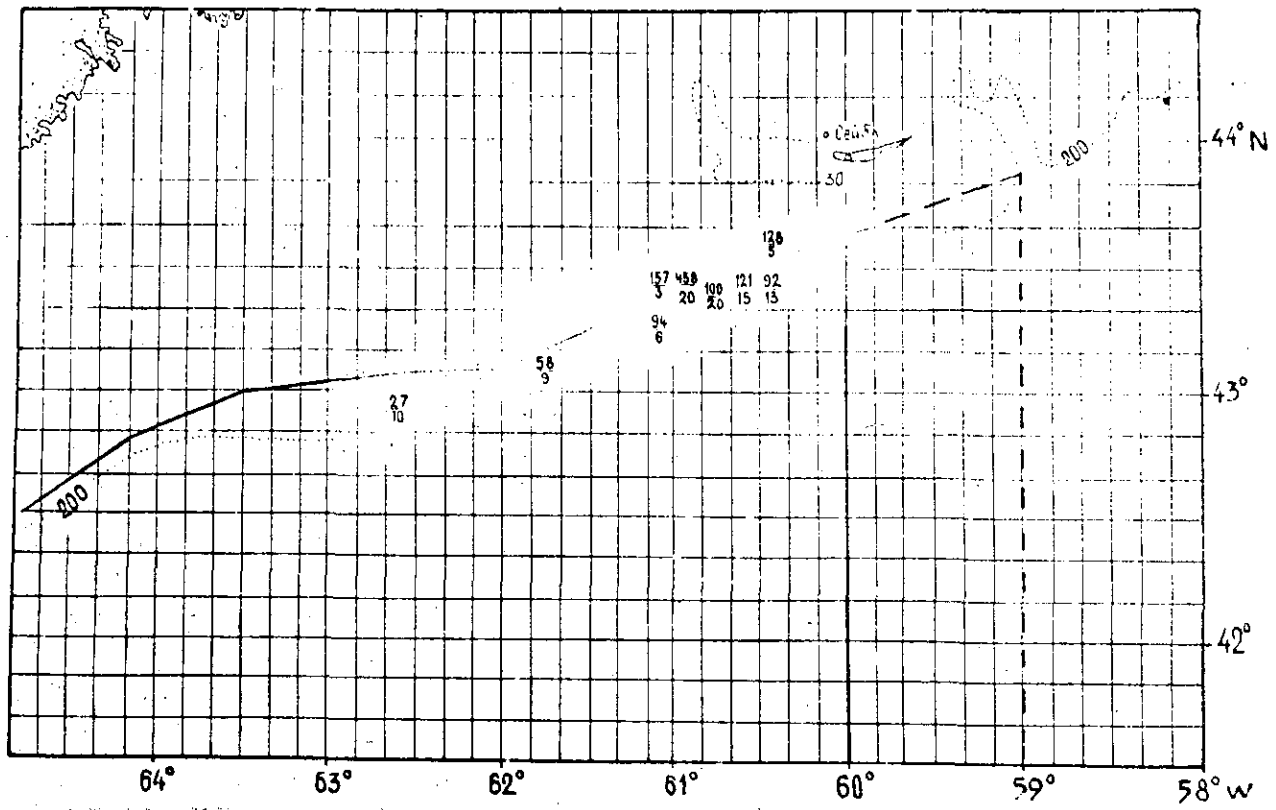

Fig. 11. Catch per hauling hour (kg) of herring in June 1986.

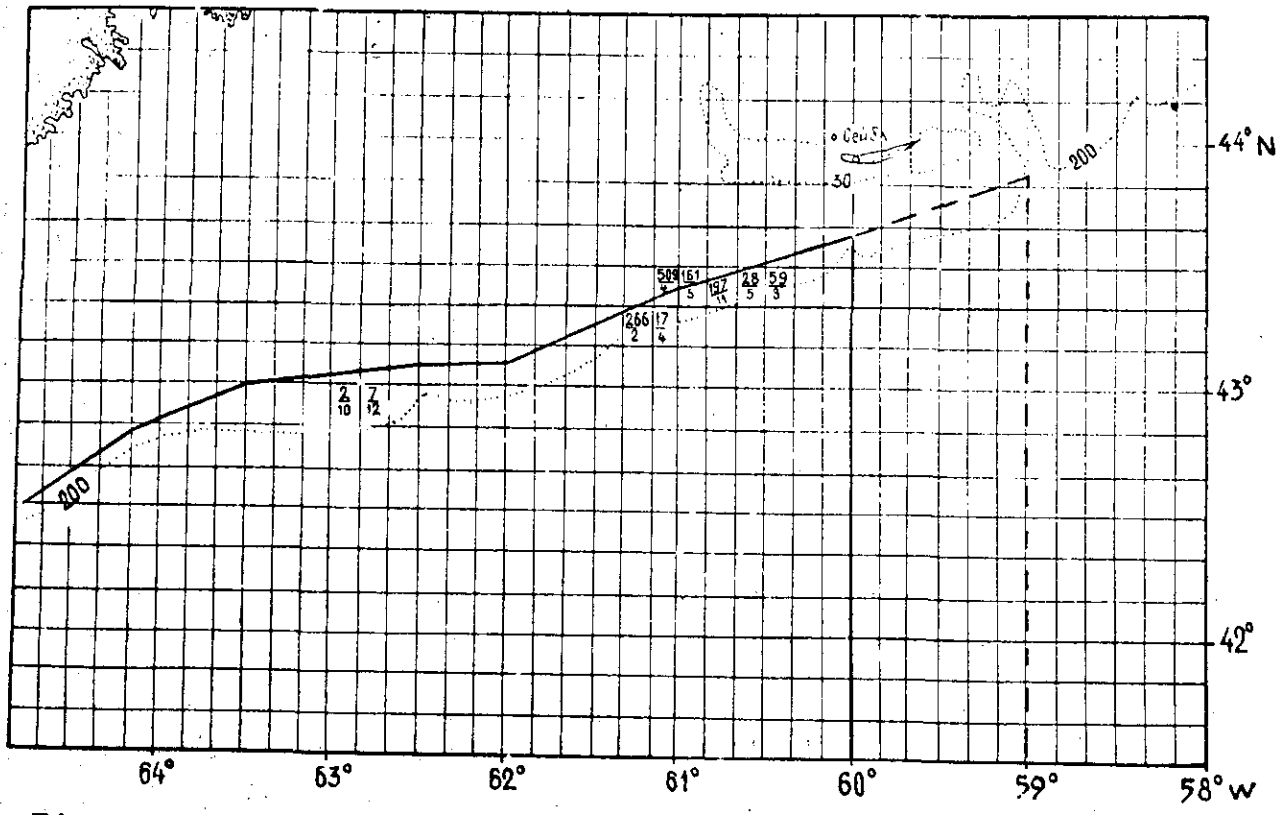

Fig. 12. Catch per hauling hour (kg) of herring in July 1986.

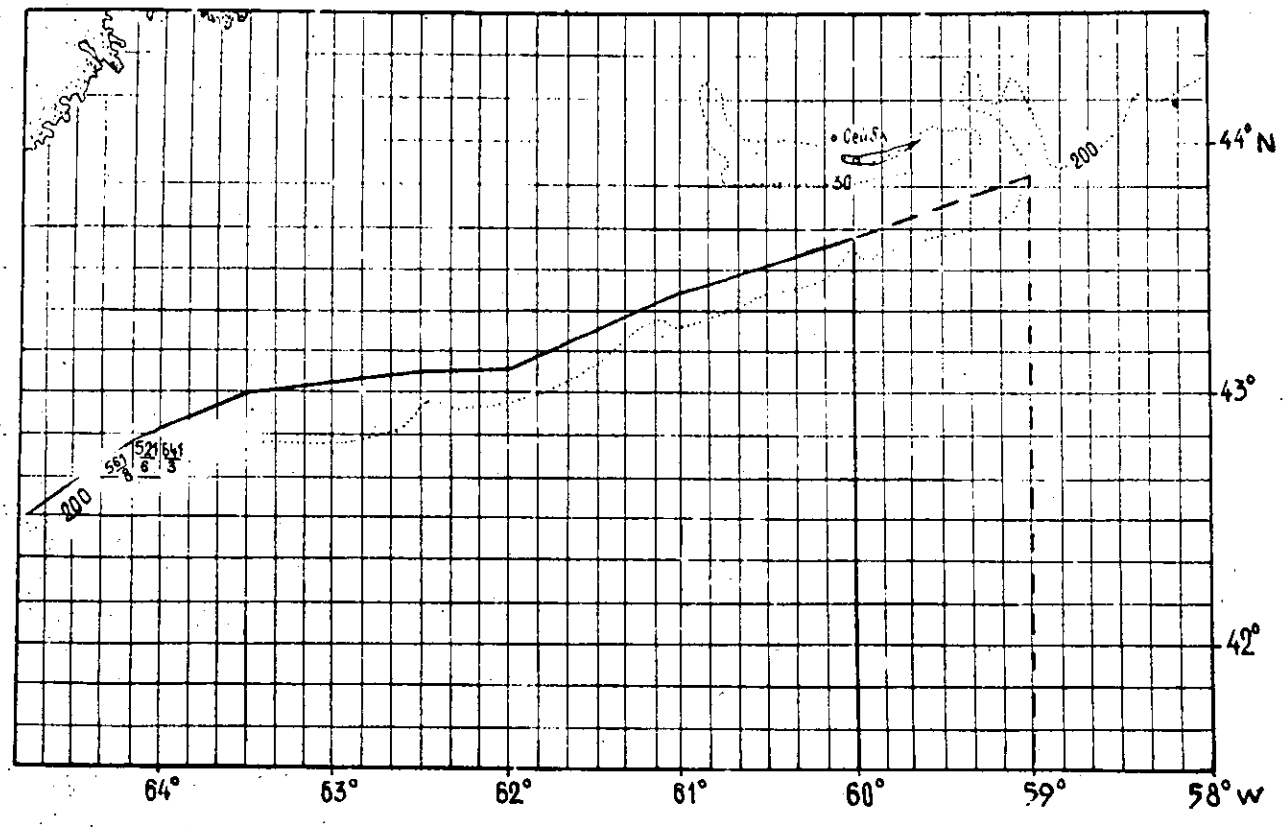

Fig. 13. Catch per hauling hour (kg) of argentine in July 1986.