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Distribution of Silver Hake, Other Fish Species and Squid
on the Nova-Scotian Shelf in 1989 by USSR Observers' Data

by

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INTRODUCTION

This paper is a continuation of the series which describes silver hake and other abundant fish species and squid distribution in NAFO zones 4 VWX, to the south of limitation line. It is based exclusively on the Soviet observers' data collected on board fishing vessels in the above-mentioned area.

MATERIAL AND METHODS

In 1989 sampling was realized on board two vessels by four observers from April through July. There were measured some 90 thousand silver hake individuals and 1300 otolith pairs sampled for age determinations. Samples collected in different locations and fishing seasons in 1989 are shown in Table 1. The data given indicate that sampling intensity greatly increased in that year as compared to 1988 (Rikhter and Turok, 1989). Methods of data processing and analysis did not change as compared to the previous years. Numbers in figures (denominator) and tables (in brackets) indicate trawl catches of corresponding species. The distribution of Urophycis genus hakes and flatfish is described without specific differentiation because of their insignificant quantity in catches. Fishery statistics of Tables 2 and 3 are exclusively based on information obtained by the observers on board fishing vessels.

RESULTS AND DISCUSSION

Silver hake (Merluccius bilinearis)

Silver hake dense concentrations were found still late in March (experimental fishing) at considerable depths (about 400 m) in 1989.

In April silver hake were mainly found at the depths of 200 through 300 m and between 61°00'W and 63°20'W (fig.1). In May concentrations were observed in the whole area destined for fishing (Fig.2). One could observe the same situation in June. However, the density of concentrations was considerably reduced (Fig.3). In the first ten-day period of July hakes were mainly concentrated in the western area (Fig.4). In the second ten-day period hakes evidently migrated in their majority to the north of SMGL. On the whole fishing situation resembled that of 1988, with the exception of July (Rikhter and Turok, 1989). Catches per trawling hour are represented by years and months in Table 2. Sexual maturity rate of hake turned to be higher in 1989 by the observers' data than in the previous one.

Haddock (Melanogrammus aeglefinus)

Distribution of the species in April through July is shown in Figs.5-8. Haddock were most frequently found in May and June, as in 1988. However, their total by-catch did not exceed 1% for a season.

Saithe (Pollachius virens)

According to the observers' data saithe abundance was of the largest value in April through May (Figs. 9, 10) with its subsequent decrease in June and July (Figs. 11, 12). Density of concentrations and by-catch amount were markedly lesser as compared to 1988 (Tables 2, 3).

Sea hakes (Urophycis sp.)

Representatives of this genus were rather numerous in the fishing ground in April through June (Figs. 13, 14, 15), being observed a considerable decrease in July (Fig.16). Concentration densities and therefore by-catch amount of hakes slightly exceeded the 1988 level (Tables 2, 3).

Cod (Gadus morhua)

As in 1988, cod were found rather frequently in catches, although in smaller number (Figs.17, 18, 19). The species was evidently the most abundant in the fishing ground in May (and in June in 1988).

Flatfish (Hippoglossoides platessoides, Glyptocephalus cynoglossus, Limanda ferruginea)

Flatfish distribution in the area to the south of SMGL in 1989 is shown in Figures 20, 21 and 22. Their abundance looked like approximately the same as in the previous year. By-catch amount slightly decreased as compared to 1988 (Table 3).

Atlantic herring (Clupea harengus)

The species was found in contrast to 1988 in the catches only in May and June (Figs. 23, 24). Concentration densities also decreased which resulted in a considerable reduction of by-catch (Table 3).

Squid (Illex illecebrosus)

As it was to be expected, the species was absent from the shelf in April. However, since May the squid abundance began rapidly increasing in the area of the continental slope (Figs. 25, 26, 27). In July there were created conditions for the squid specialized fishing on the Nova Scotian Shelf for the first time after a prolonged interval.

Other species

Redfish (Sebastes mentella), atlantic mackerel (Scomber scombrus) and cusk (Brosme brosme) were found as a by-catch in some periods of fishing season. These species distribution according to the observers' data is shown in Figures 28, 29 and 30.

CONCLUSION

Fishing season of 1989 showed that the silver hake abundance was maintained at a high level of recent years. It was obtained the information which is indicative of the fact that the hake dense concentrations can be found on the continental slope already in March. It was also confirmed that the most favourable period for fishing quota taking fell on April and May. Most of the adult hake individuals obviously inhabit the area to the south of SMGL for the above-mentioned months. Other species by-catch turned to be minimum in April, and did not exceed the sustainable quota.

The main feature of the 1989 season was squid abundance sharp increase on the Nova Scotian Shelf. It appeared for the first time after almost total squid lack for 6 years the opportunity of the species specialized fishing.

REFERENCES

1. Rikhter V.A. and Turok V.F., 1989. Distribution of Silver Hake, Other Fish Species and Squid in 1988 on the Scotian Shelf Slopes from Data Obtained by USSR Observers. NAFO SCR Doc. 89/16, 17p.

Table 1
Distribution of silver hake samples collected
by the Soviet observers in 1989, by areas and
fishing seasons

	: April			: May			: June			: July			: Total
	: I	: II	: III	: I	: II	: III	: I	: II	: III	: I	: II	: III	
59°20				2	I								3
38				6	2						2		10
40				6							7		13
50				6							5		11
60°00				4	I								5
10				I							I		2
20				2	9								11
30				2	5								7
40					2		7	2					11
50							8		2				10
61°00							2	2					4
10					I		2						3
20					2	2	10	2	I		I		18
30	5	2			2	I	7			I	7		25
40	6	I			2	2	3				2		16
50		10			2		4			I			19
62°00		6			I		3				2		12
10		8	I		I		3			2			16
20	I	I					9			5			16
30		5	I		2	12	7	15	5		I		48
40		I	3		2	3	3	13	6		I	I	33
50			4		4	6	3	10	3	23	2		55
63°00			20		6	13	I	I	I	25			67
10			9	3	2	2							16
20													
30													
40													
50									5				5
64°00									3				3
10									I				I
20									8				8
30									I				I
40													
Total	12	34	38	32	47	42	72	45	44	50	33		449

Table 2

Catches per trawling hour (kgs) by species,
months and years

Species	Months	Years				
		1985	1986	1987	1988	1989
Silver hake	April	-	-	-	4260 (61)	6426 (84)
	May	3094 (131)	-	5988 (47)	3671 (103)	3324 (115)
	June	3635 (195)	4469 (174)	2957 (74)	2085 (114)	2173 (161)
	July	3994 (208)	4372 (170)	3610 (77)	-	3901 (83)
Haddock	April	-	-	-	1 (10)	24 (41)
	May	28 (123)	-	21 (39)	28 (72)	56 (116)
	June	54 (190)	43 (119)	18 (60)	29 (114)	30 (161)
	July	37 (204)	42 (129)	16 (60)	-	57 (80)
Saithe	April	-	-	-	8 (42)	63 (70)
	May	38 (105)	-	22 (46)	213 (72)	105 (82)
	June	22 (113)	417 (63)	25 (57)	216 (84)	36 (109)
	July	-	-	-	36 (59)	11 (75)
Urophycis sp.	April	-	-	-	36 (59)	55 (81)
	May	39 (125)	-	53 (42)	39 (99)	56 (121)
	June	25 (188)	191 (153)	42 (73)	21 (111)	47 (161)
	July	-	-	39 (73)	-	44 (79)

Table 3

Specific catch composition (%) analysed by the
Soviet observers in 1989

Species	Months				
	April	May	June	July	April-July
Silver hake	97.3	90.4	87.8	82.6	90.4
Haddock	0.2	1.5	1.2	1.2	0.9
Saithe	0.8	2.0	1.0	0.2	1.0
Redfish	0.8 0.9	1.6 -	1.8 -	0.9 -	1.2 0.3
Flatfish	-	0.6	0.6	0.2	0.3
Mackerel	-	-	1.4	-	0.3
Herring	-	2.6	2.1	-	1.1
Cod	-	0.2	0.6	0.3	0.2
Squid	-	1.1	3.5	14.6	4.3

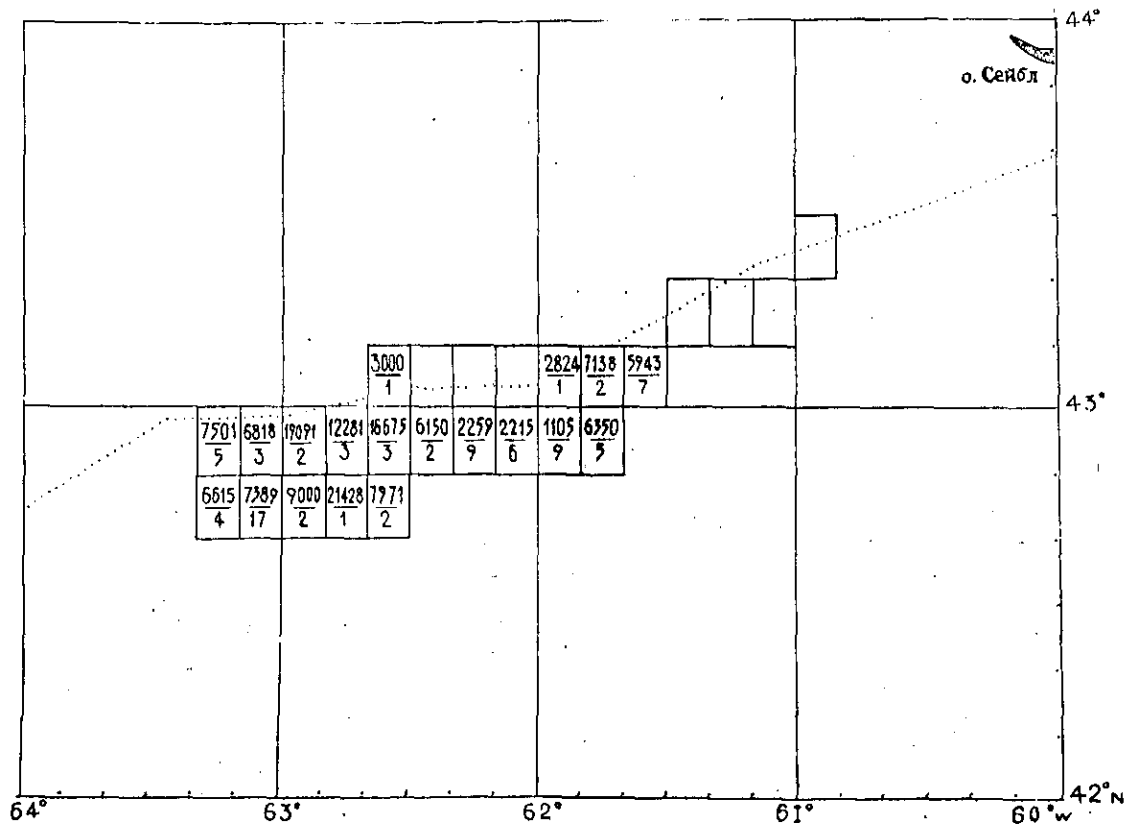


Fig. 1. Silver hake catches per trawling hour (kg) in April 1989

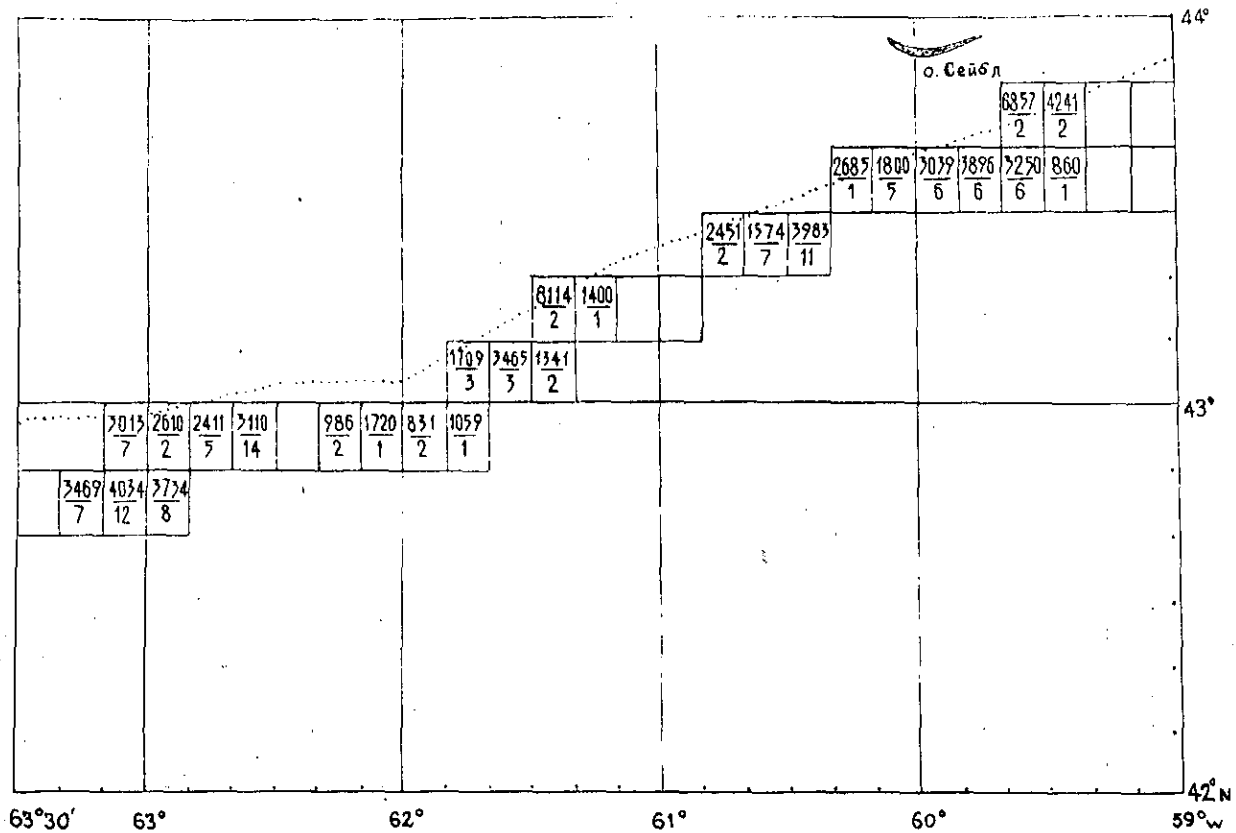


Fig. 2. Silver hake catches per trawling hour (kg) in May 1989.

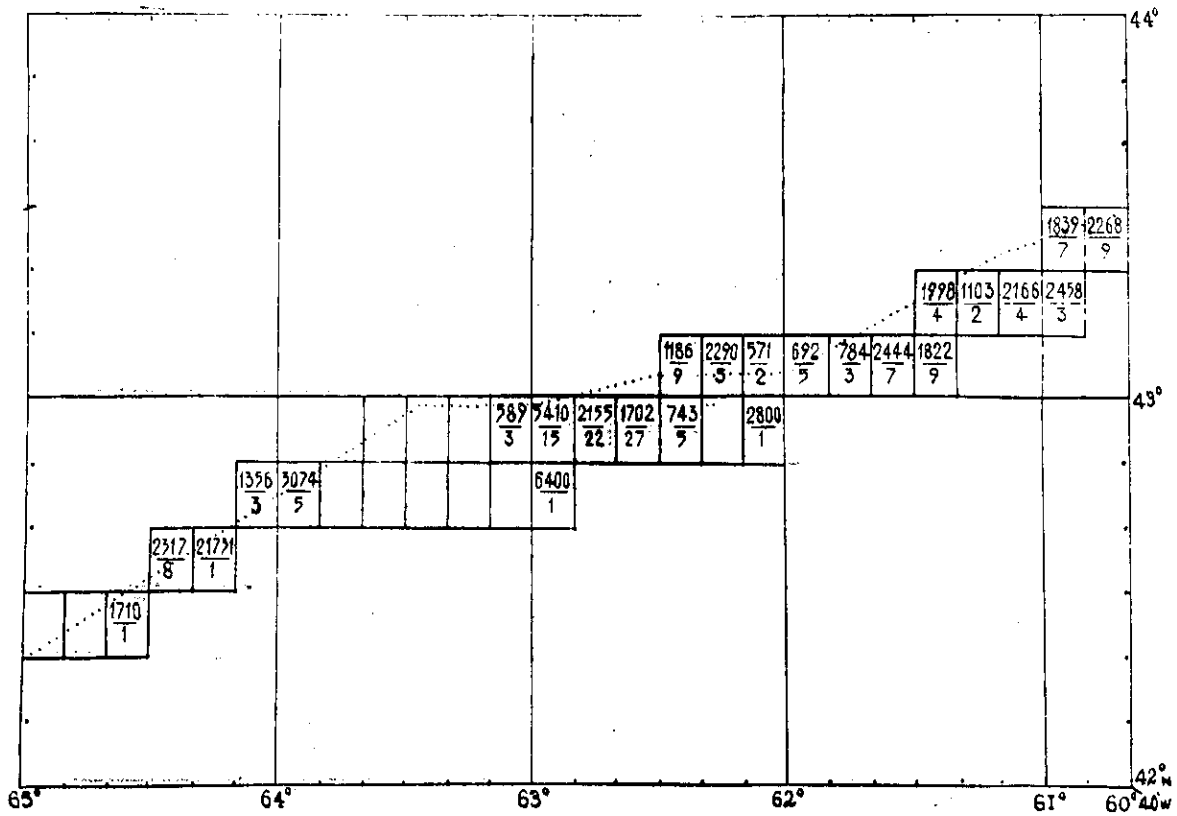


Fig. 3. Silver hake catches per trawling hour (kg) in June 1989.

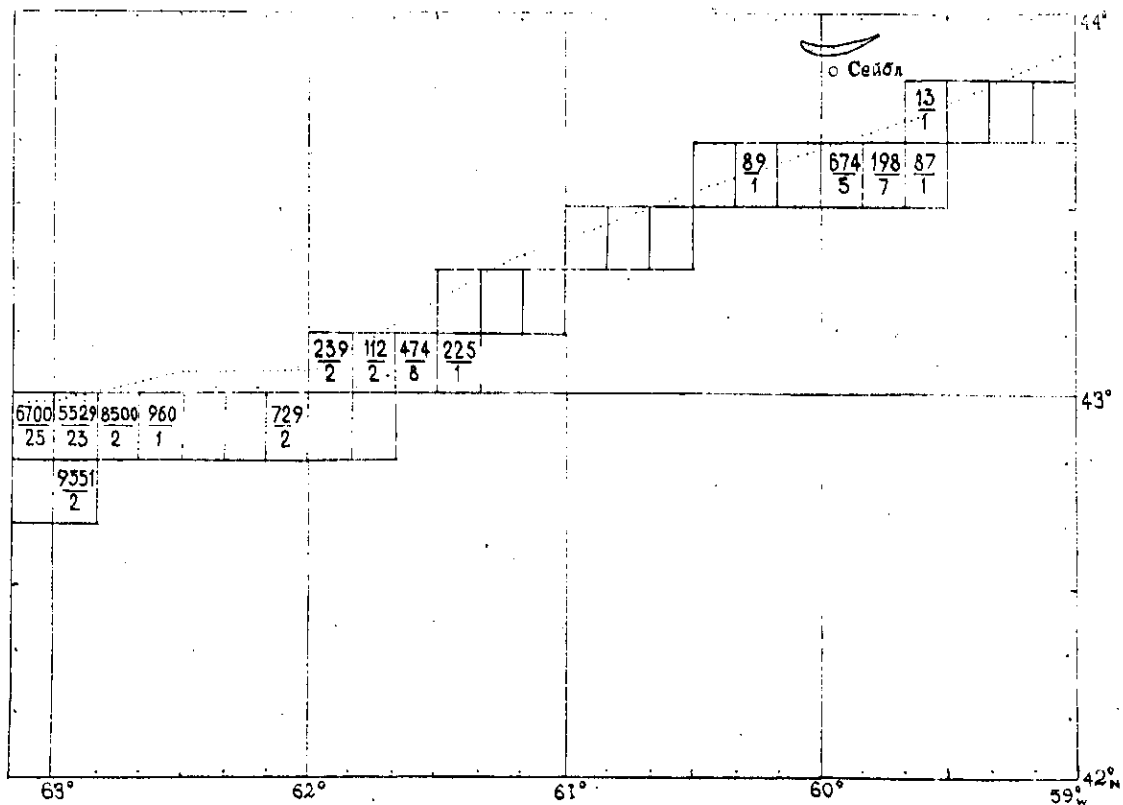


Fig. 4. Silver hake catches per trawling hour (kg) in July 1989.

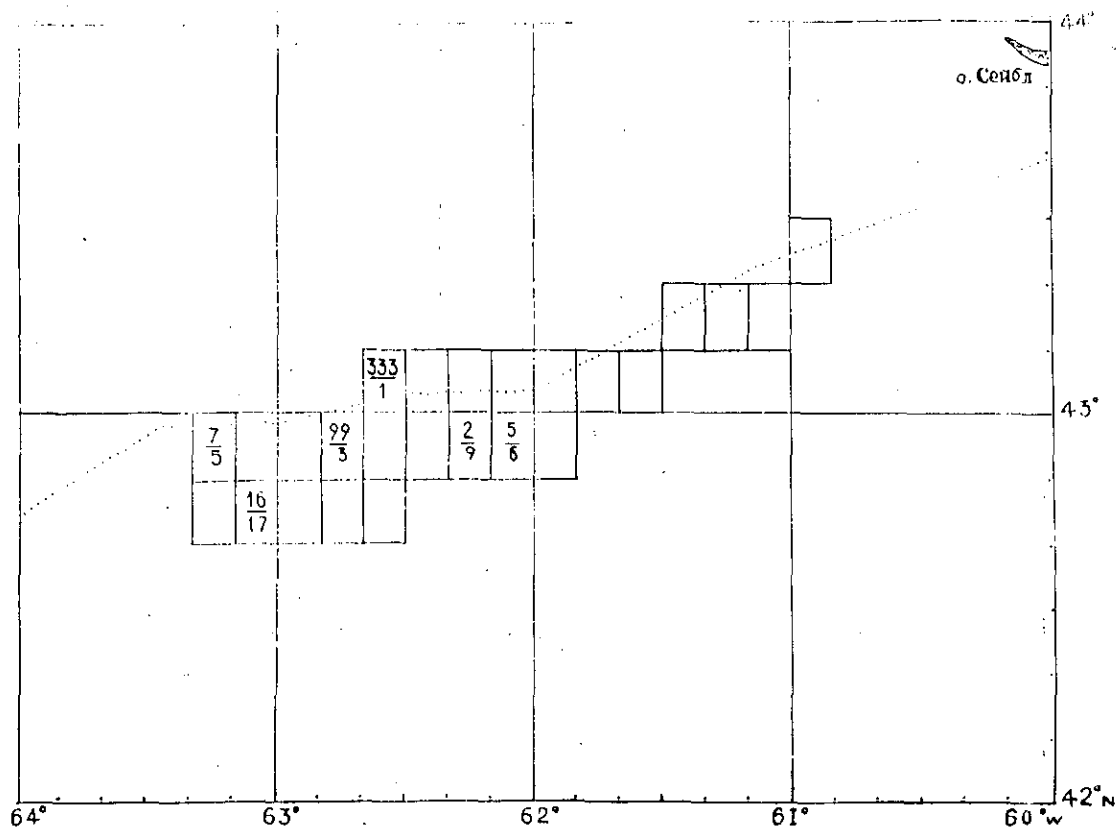


Fig. 5. Haddock catches per trawling hour (kg) in April 1989.

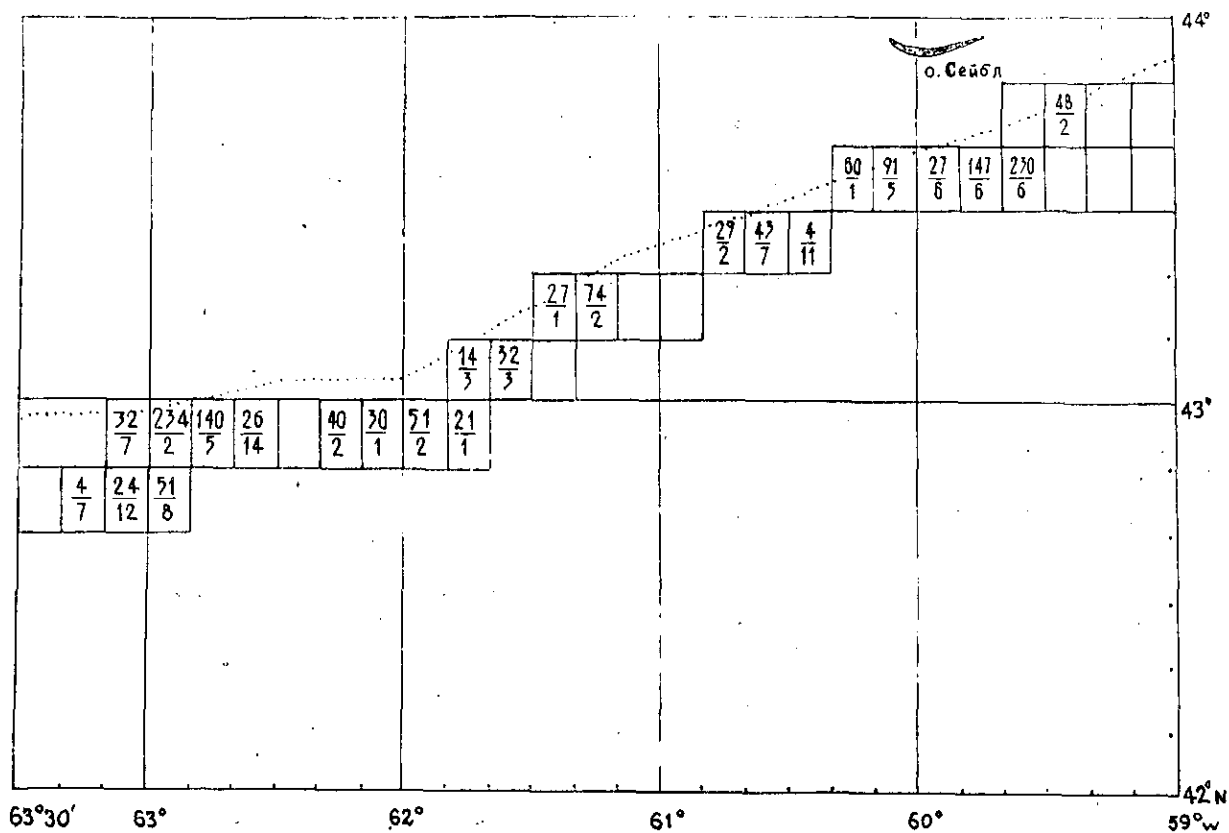


Fig. 6. Haddock catches per trawling hour (kg) in May 1989.

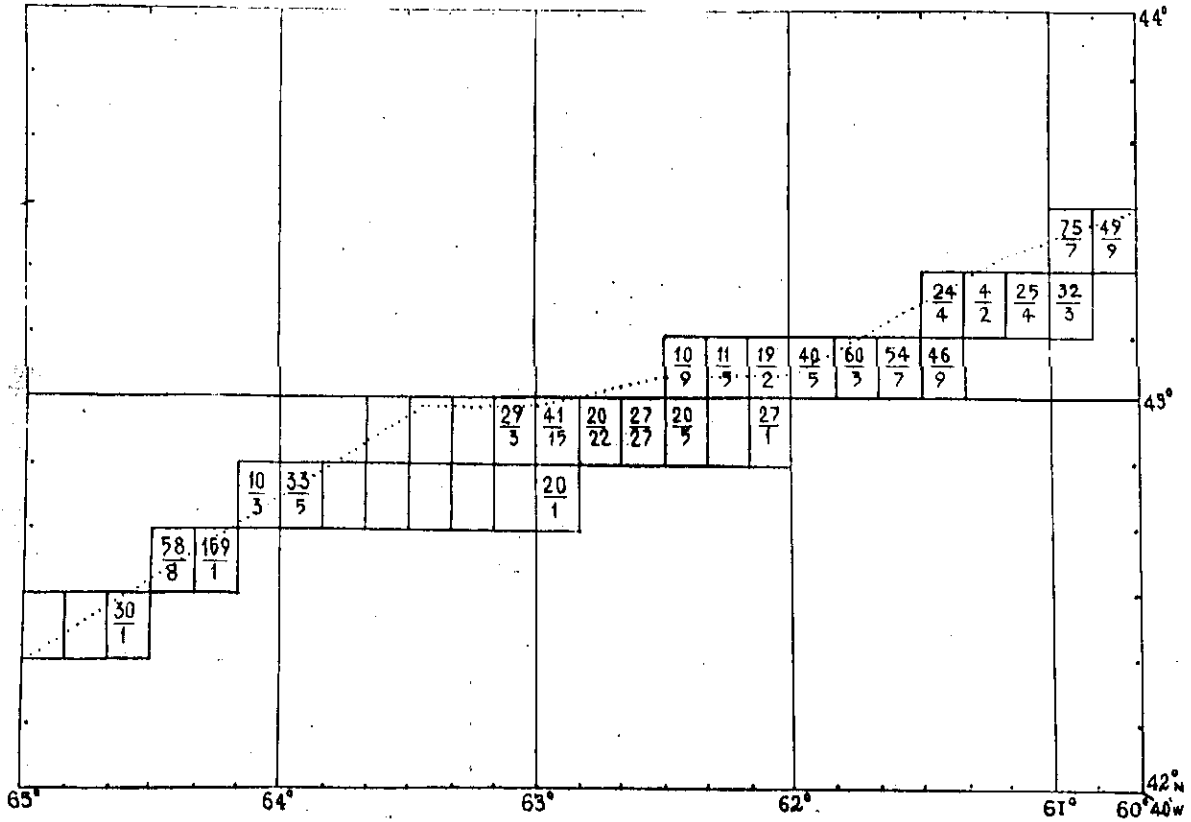


Fig. 7. Haddock catches per trawling hour (kg) in June 1989.

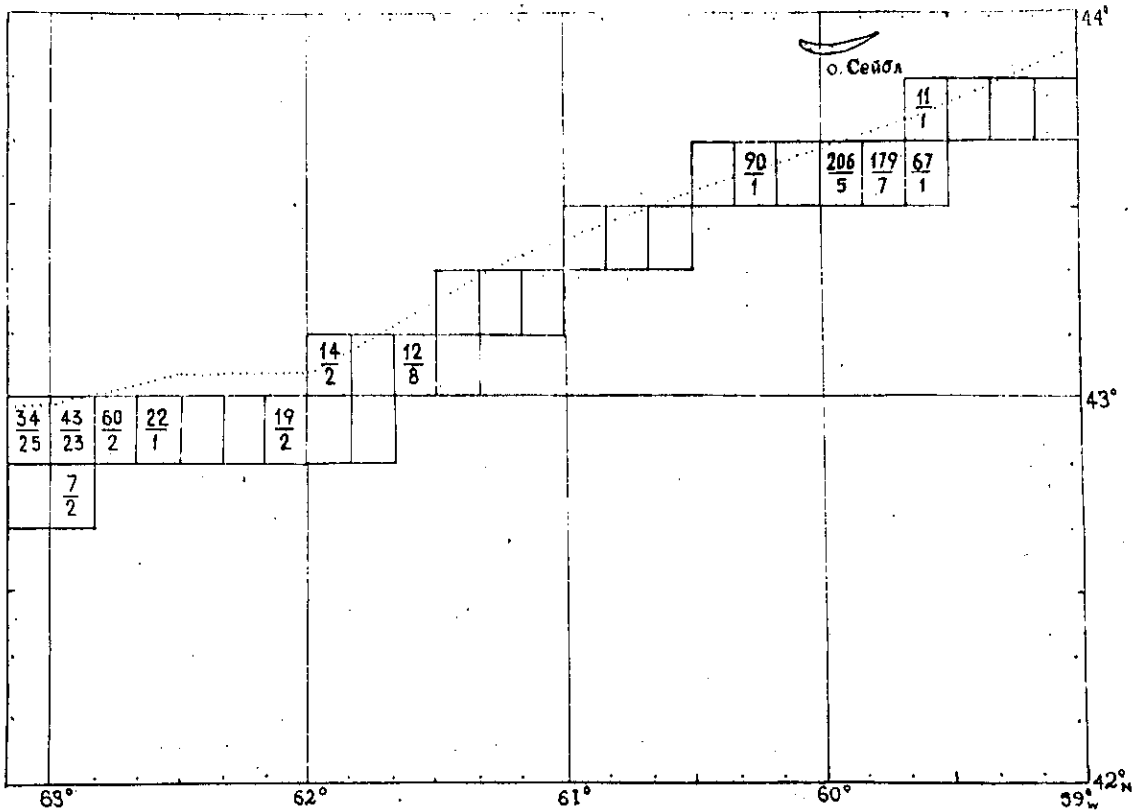


Fig. 8. Haddock catches per trawling hour (kg) in July 1989.

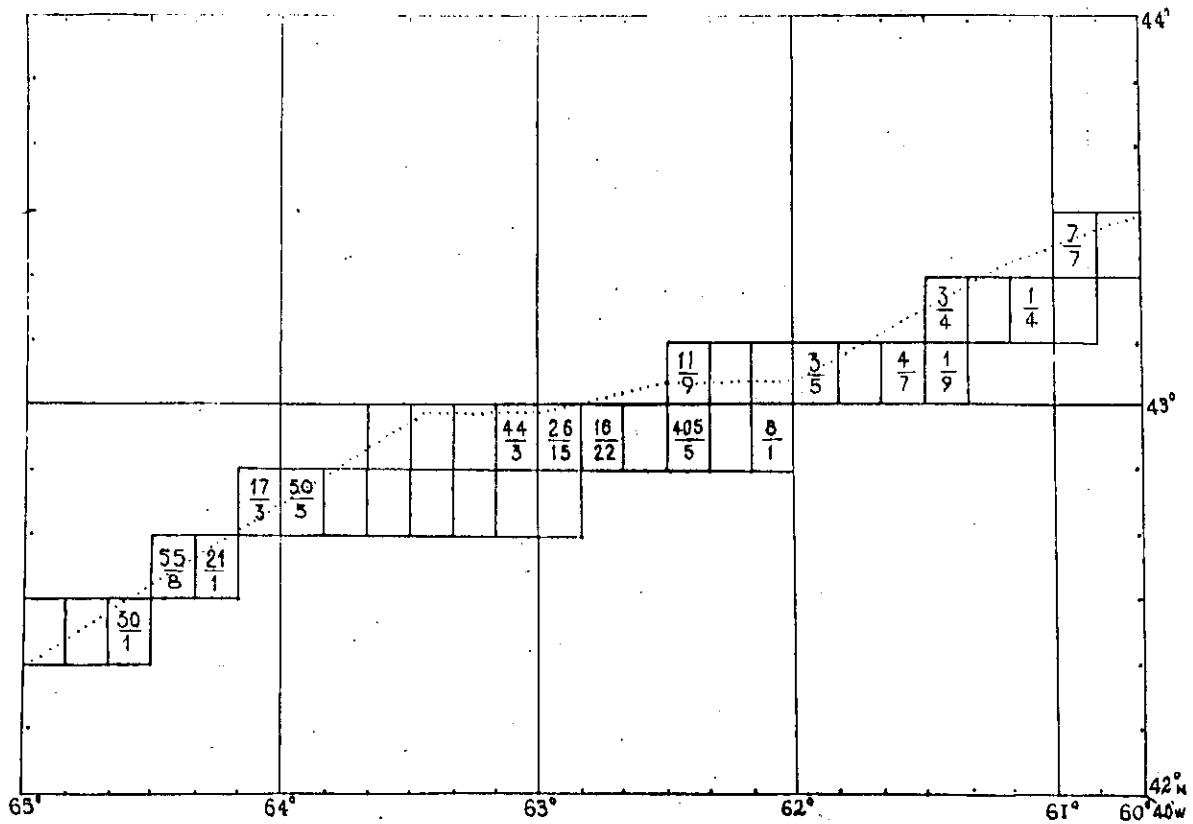


Fig.11. Saithe catches per trawling hour (kg) in June 1989.

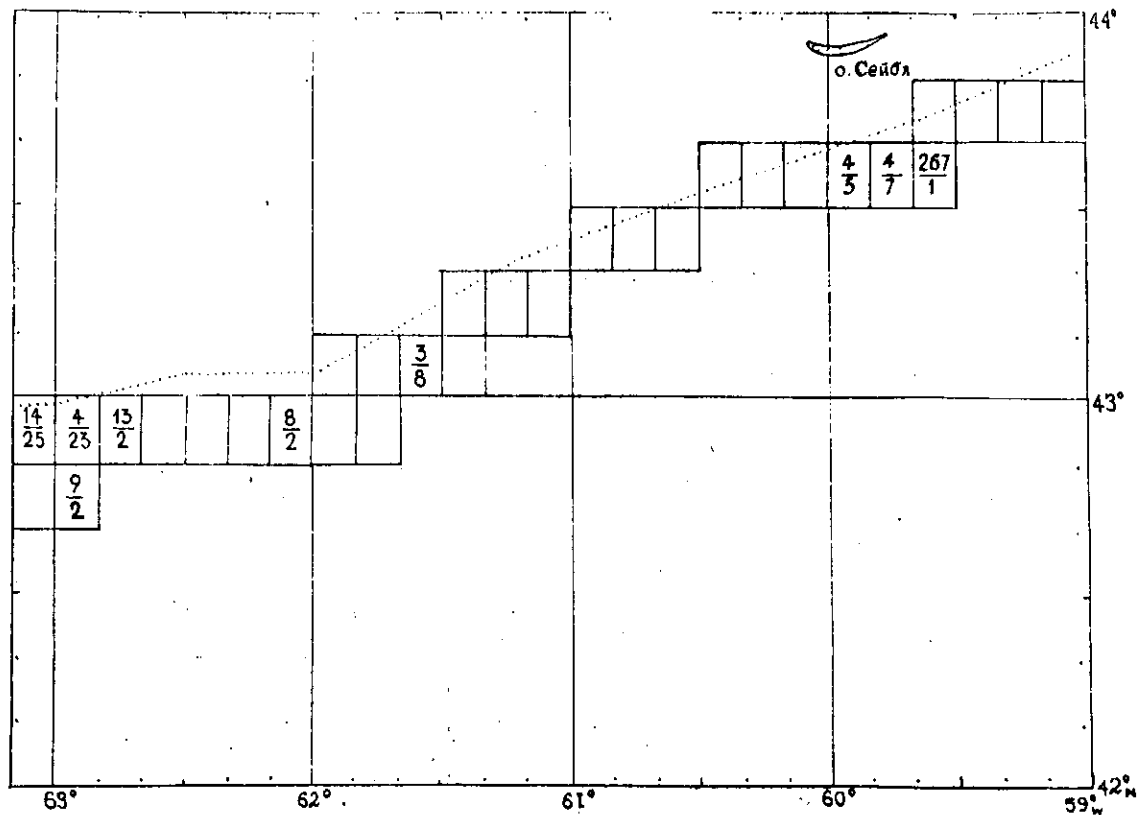


Fig.12. Saithe catches per trawling hour (kg) in July 1989.

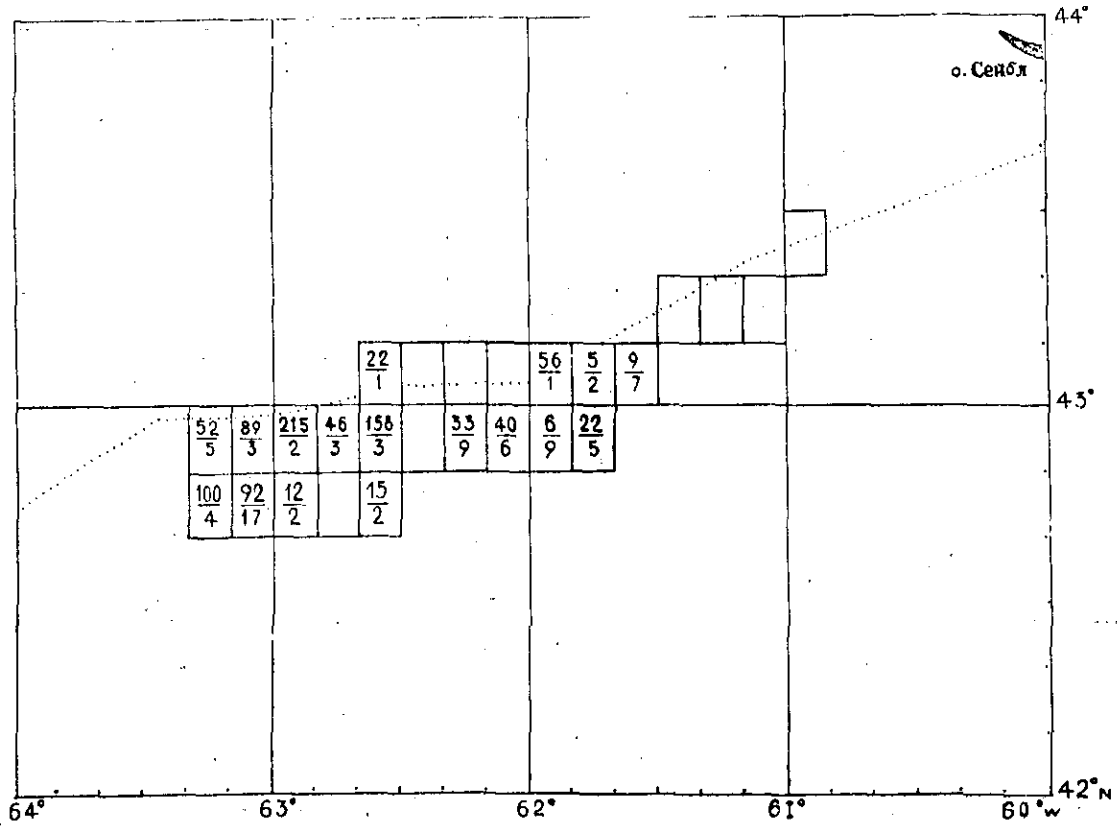


Fig.13. Hakes (*Urophycis* sp.) catches per trawling hour (kg) in April 1989.

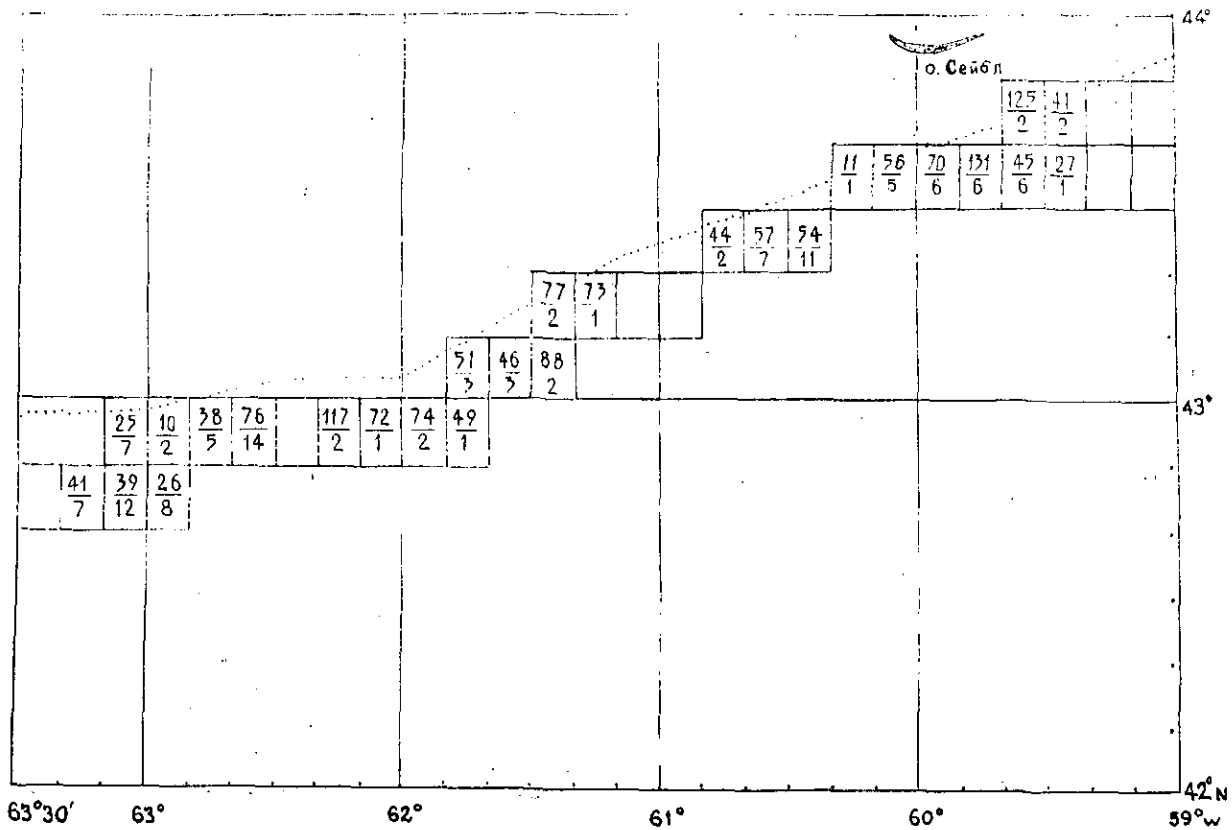


Fig.14. Hakes (*Urophycis* sp.) catches per trawling hour (kg) in May 1989.

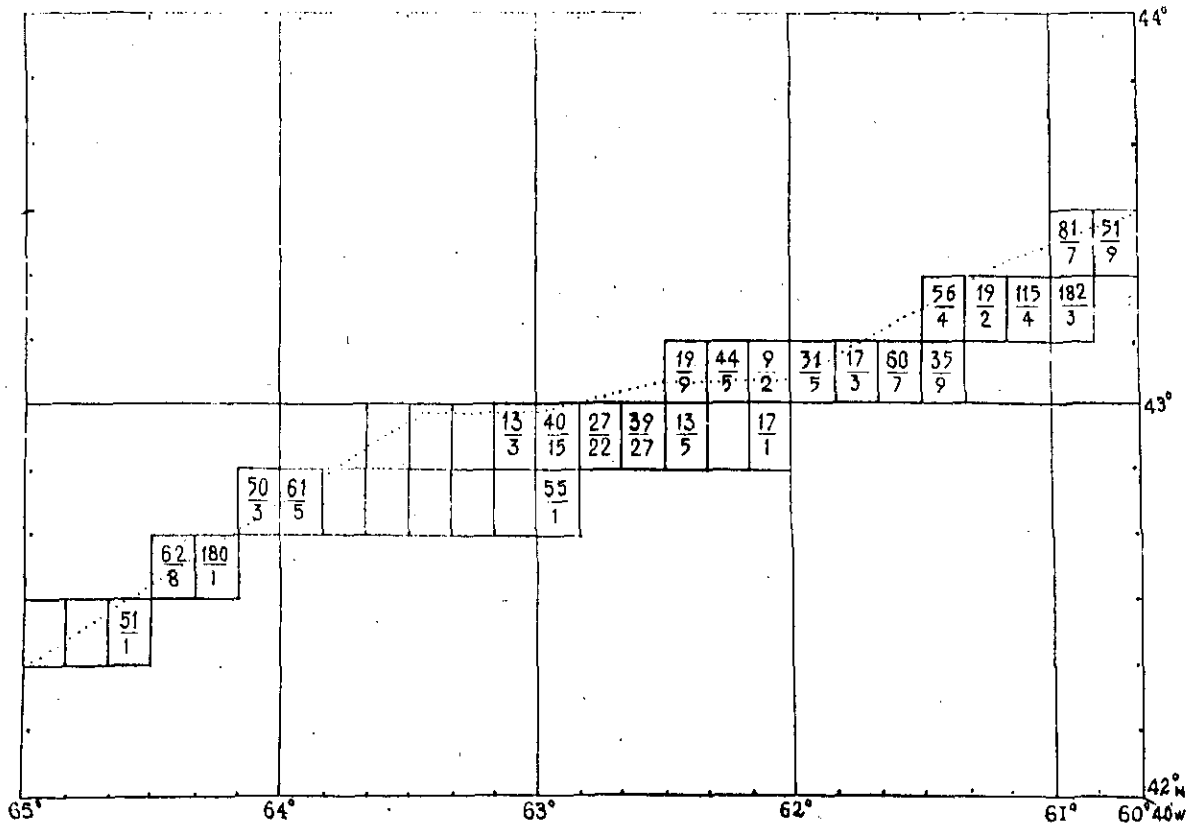


Fig.15. Hakes (*Urophycis* sp.) catches per trawling hour (kg) in June 1989.

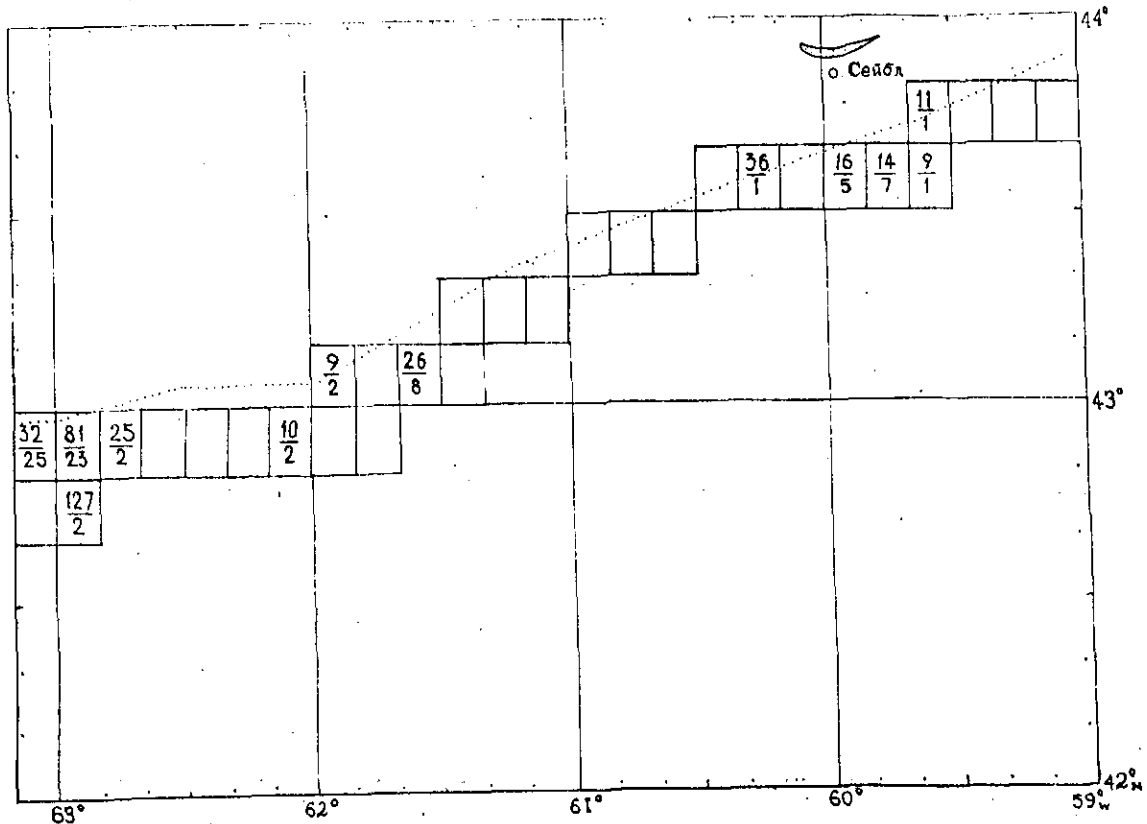


Fig.16. Hakes (*Urophycis* sp.) catches per trawling hour (kg) in July 1989.

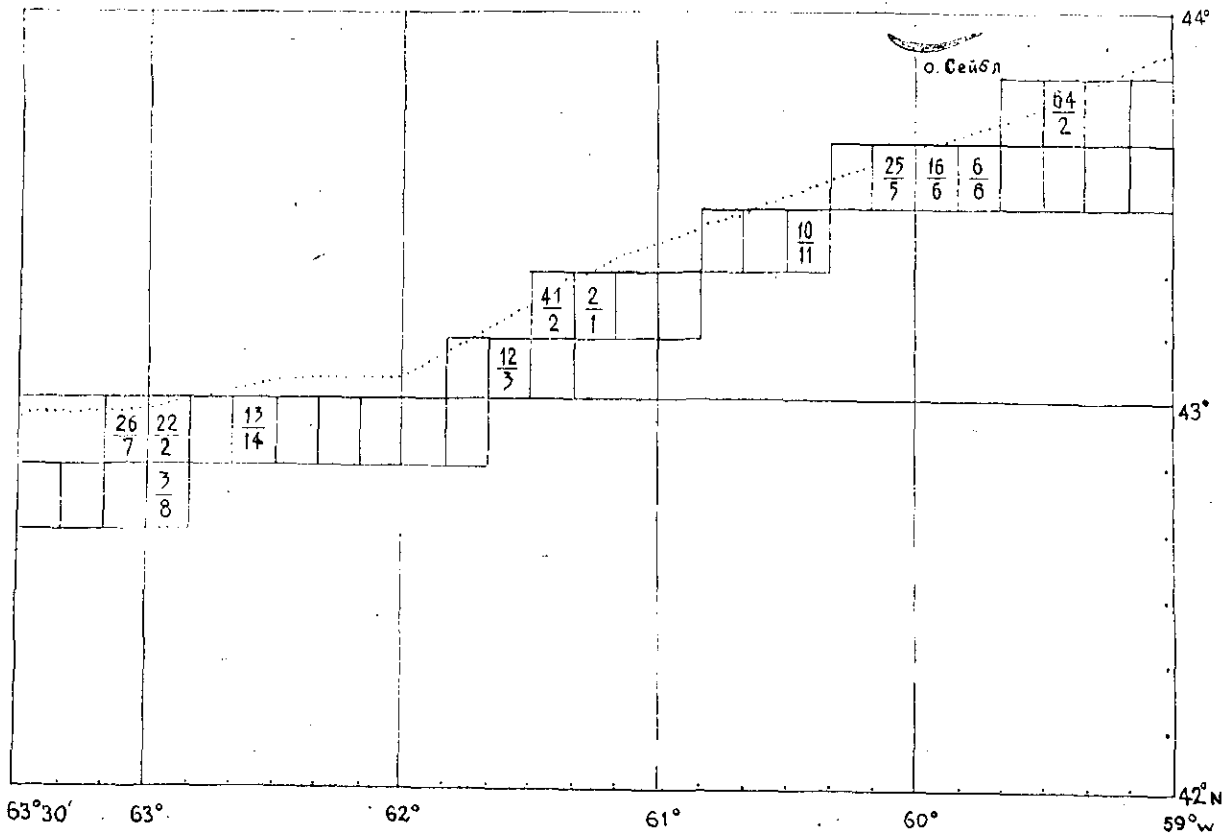


Fig.17. Cod catches per trawling hour (kg) in May 1989.

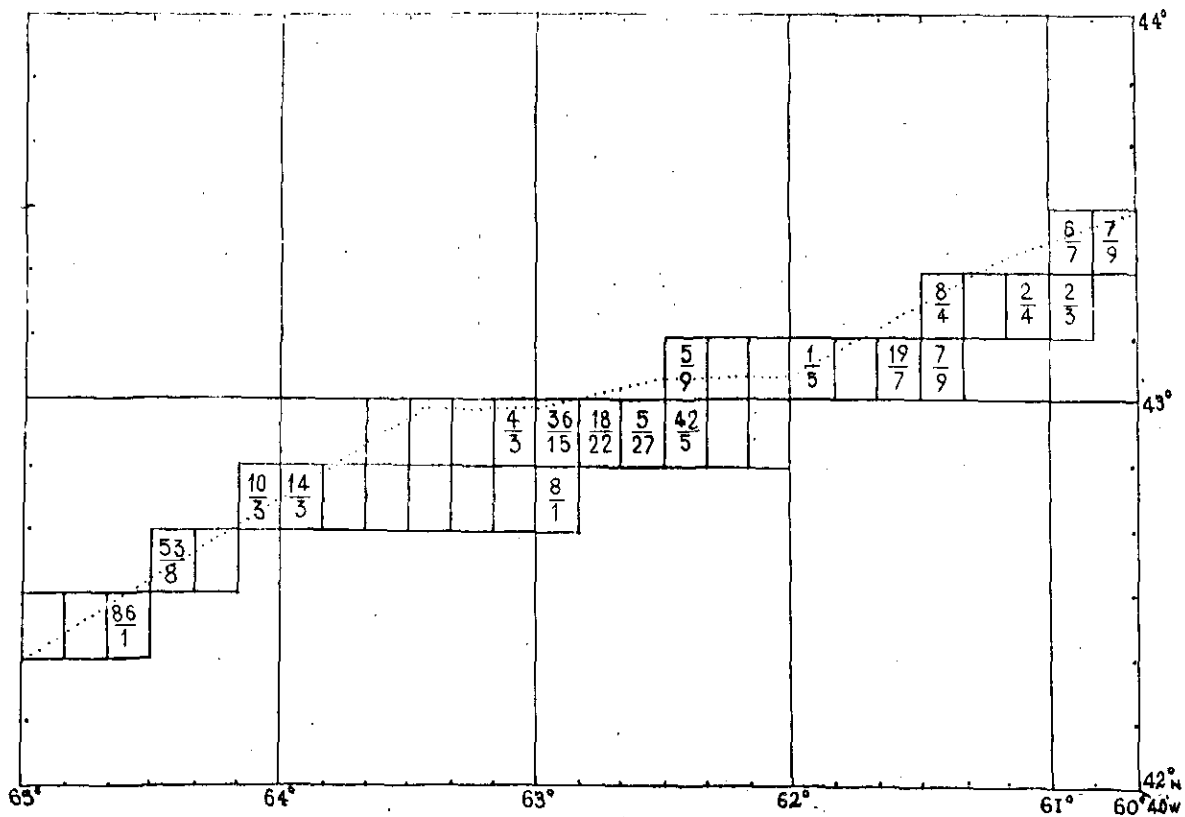


Fig.18. Cod catches per trawling hour (kg) in June 1989.

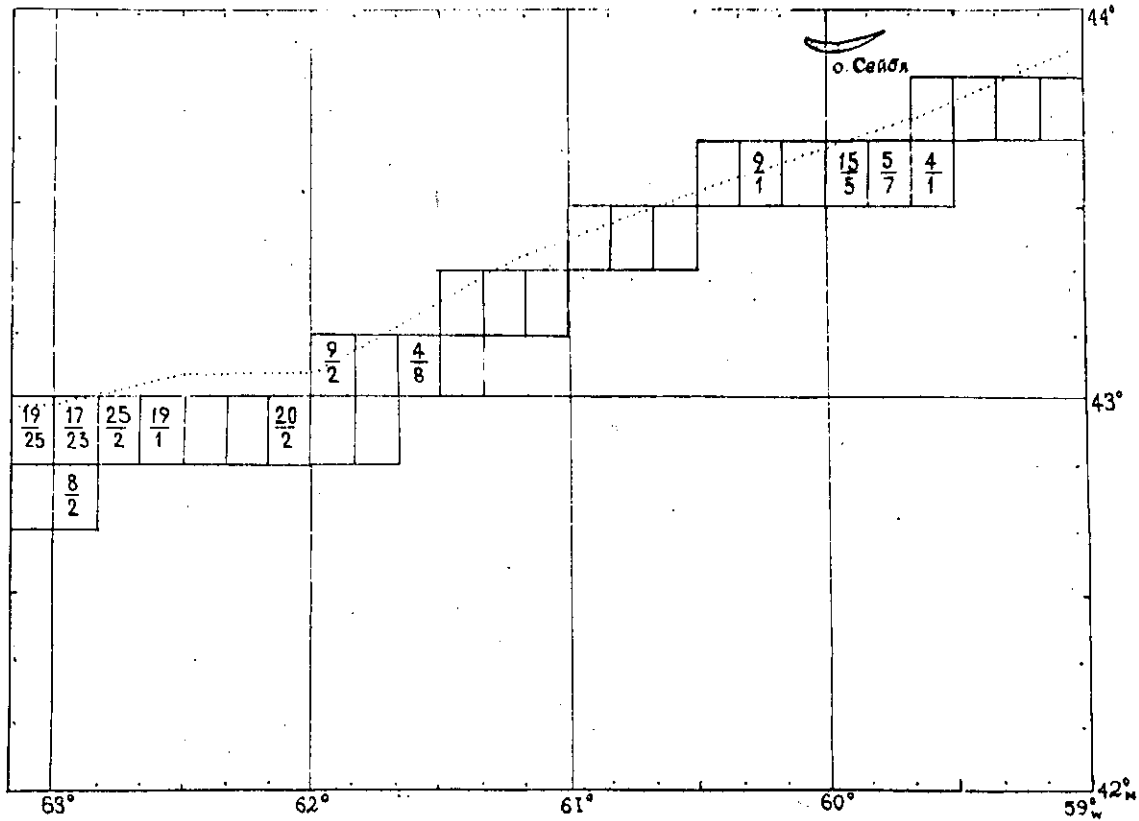


Fig.19. Cod catches per trawling hour (kg) in July 1989.

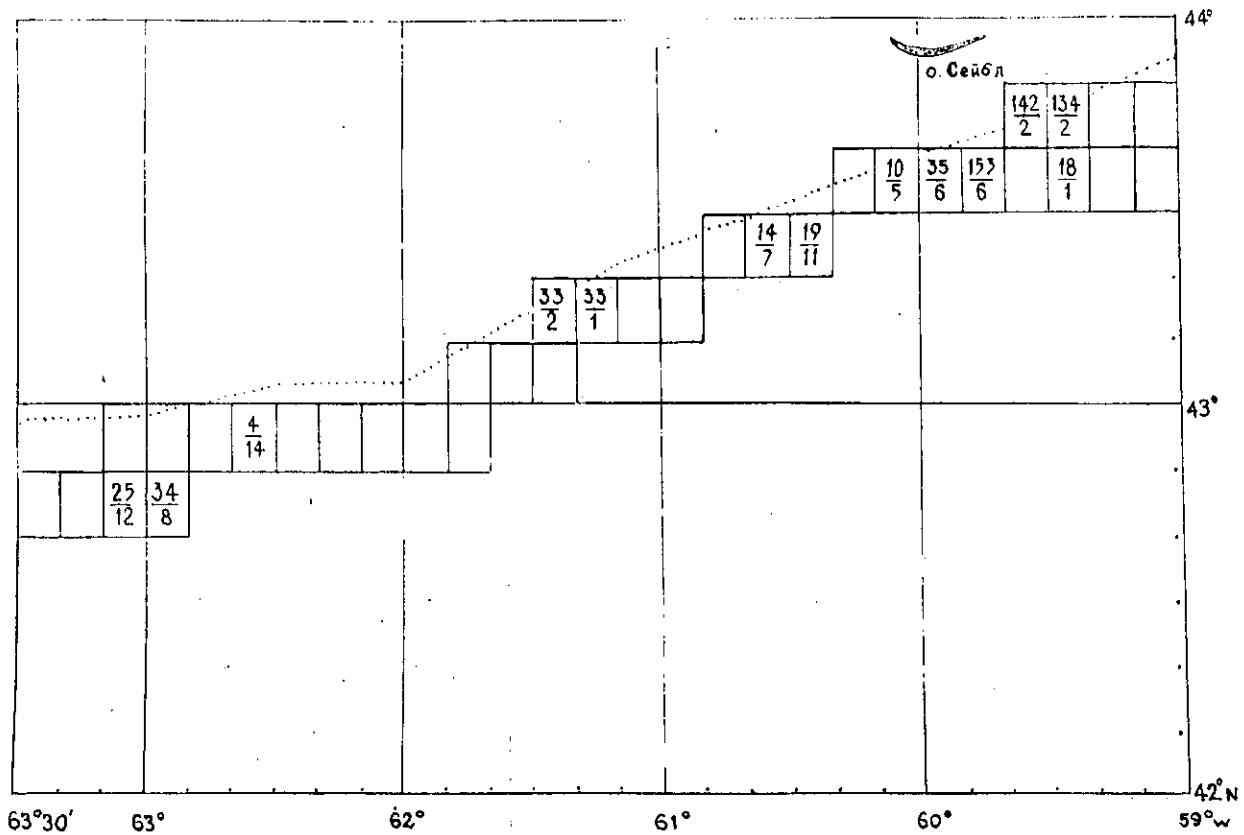


Fig.20. Flatfish catches per trawling hour (kg) in May 1989.

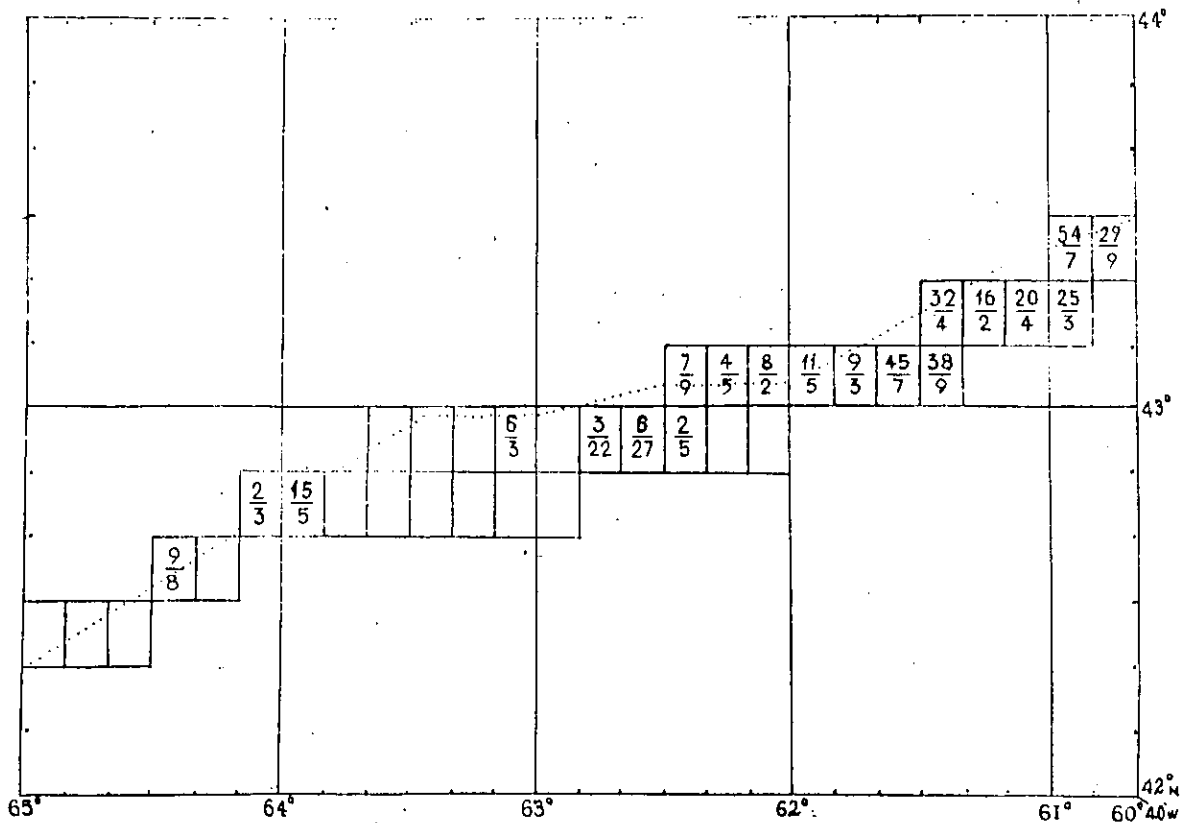


Fig.21. Flatfish catches per trawling hour (kg) in June 1989.

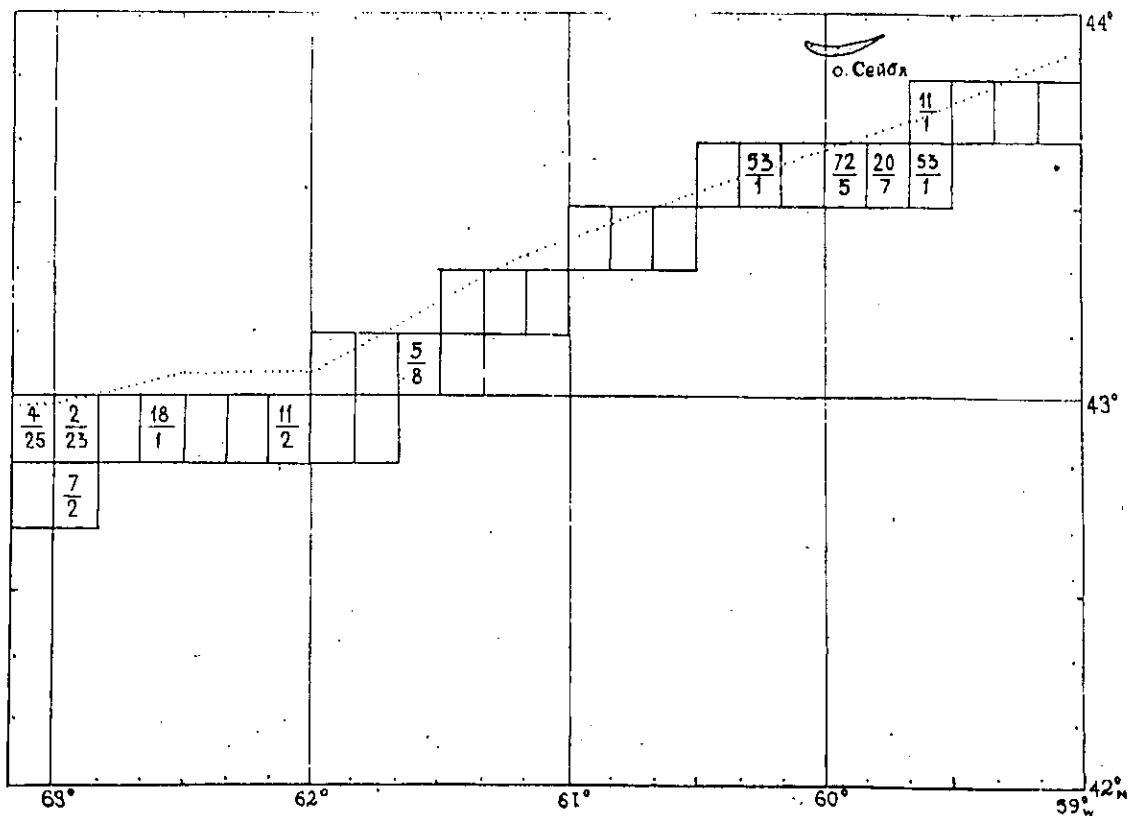


Fig.22. Flatfish catches per trawling hour (kg) in July 1989.

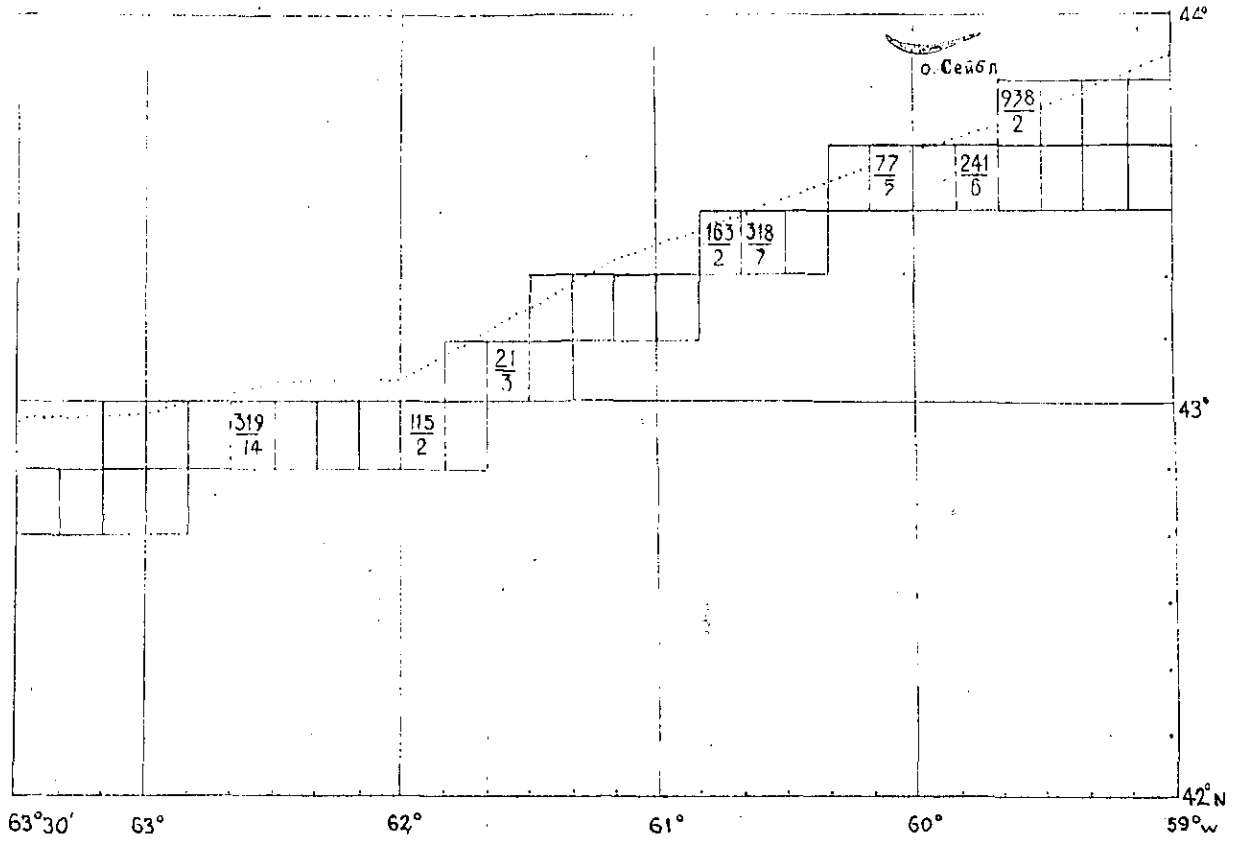


Fig.23. Atlantic herring catches per trawling hour (kg) in May 1989.

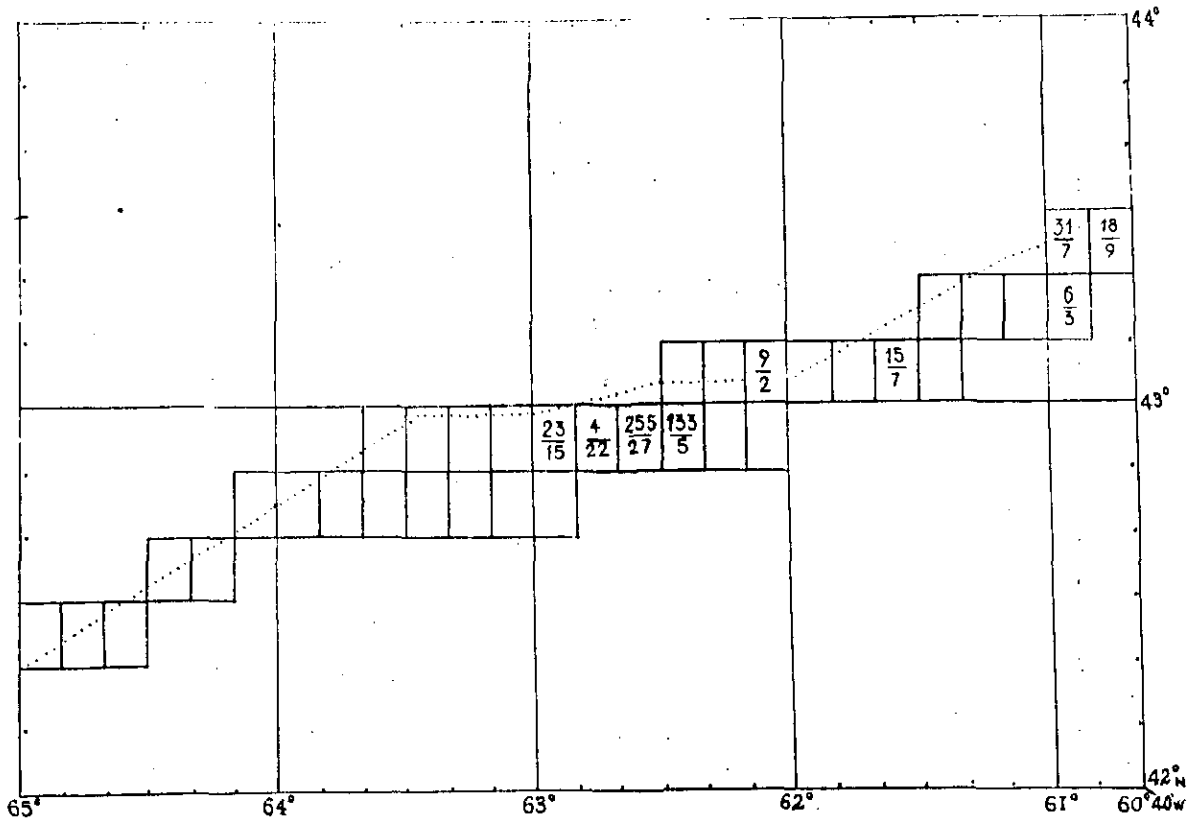


Fig.24. Atlantic herring catches per trawling hour (kg) in June 1989.

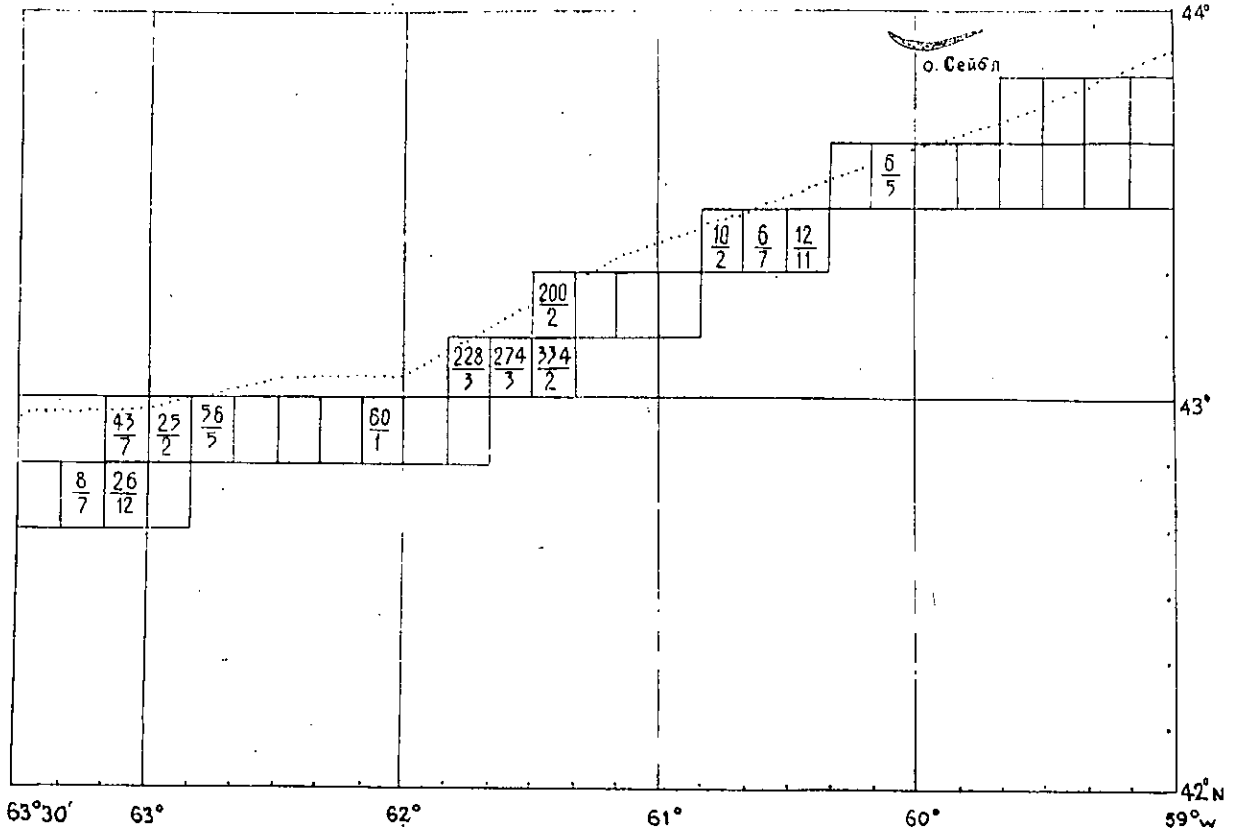


Fig.25. Squid catches per trawling hour (kg) in May 1989.

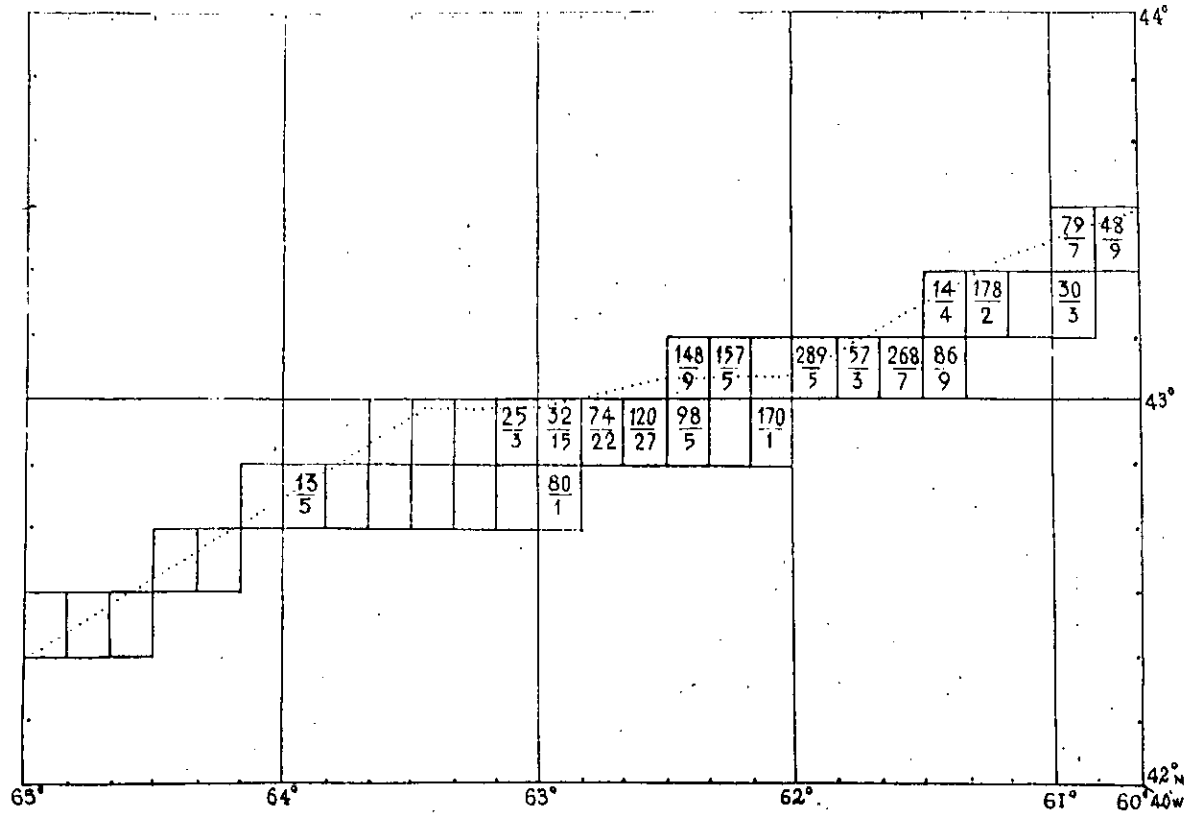


Fig.26. Squid catches per trawling hour (kg) in June 1989.

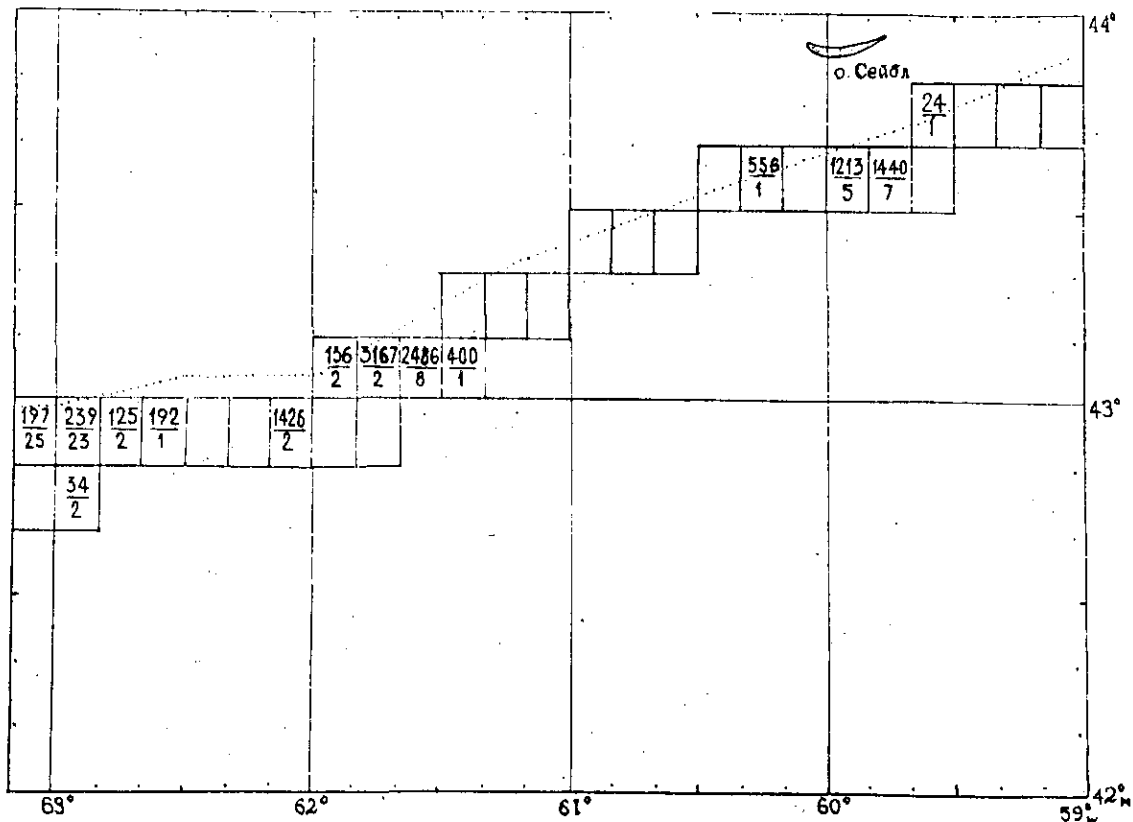


Fig.27. Squid catches per trawling hour (kg) in July 1989.

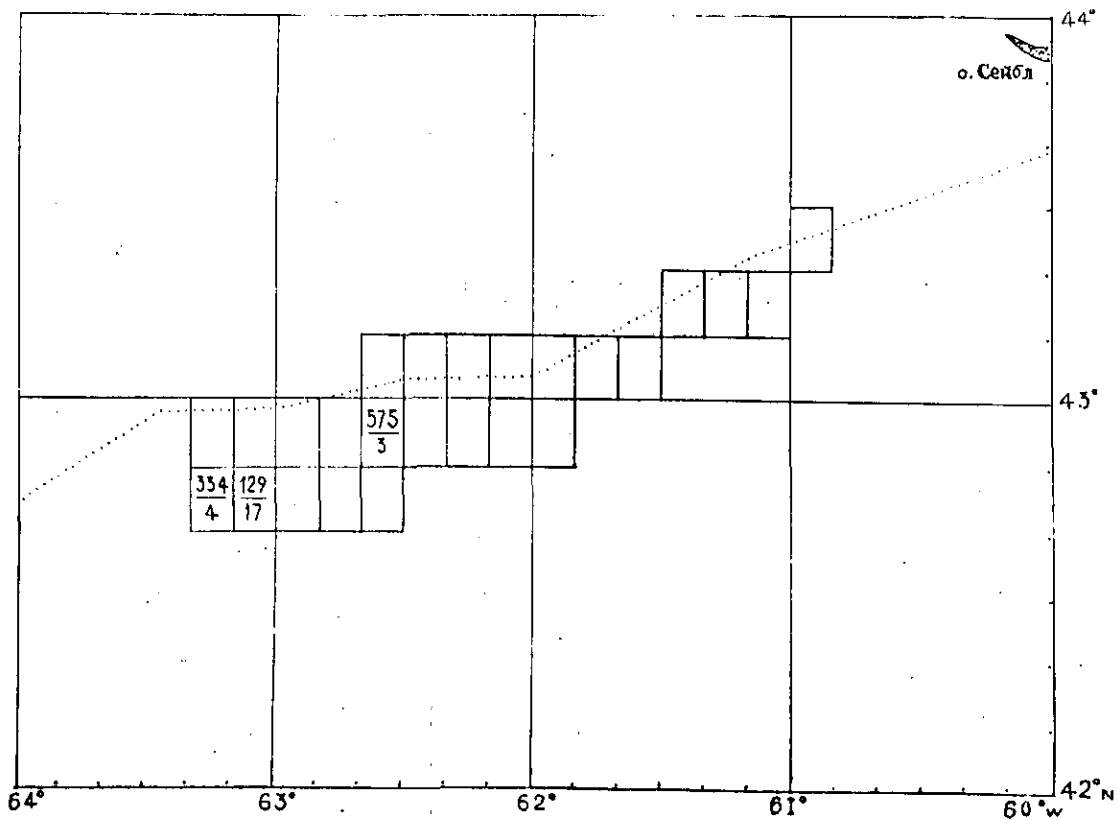


Fig.28. Redfish catches per trawling hour (kg) in April 1989.

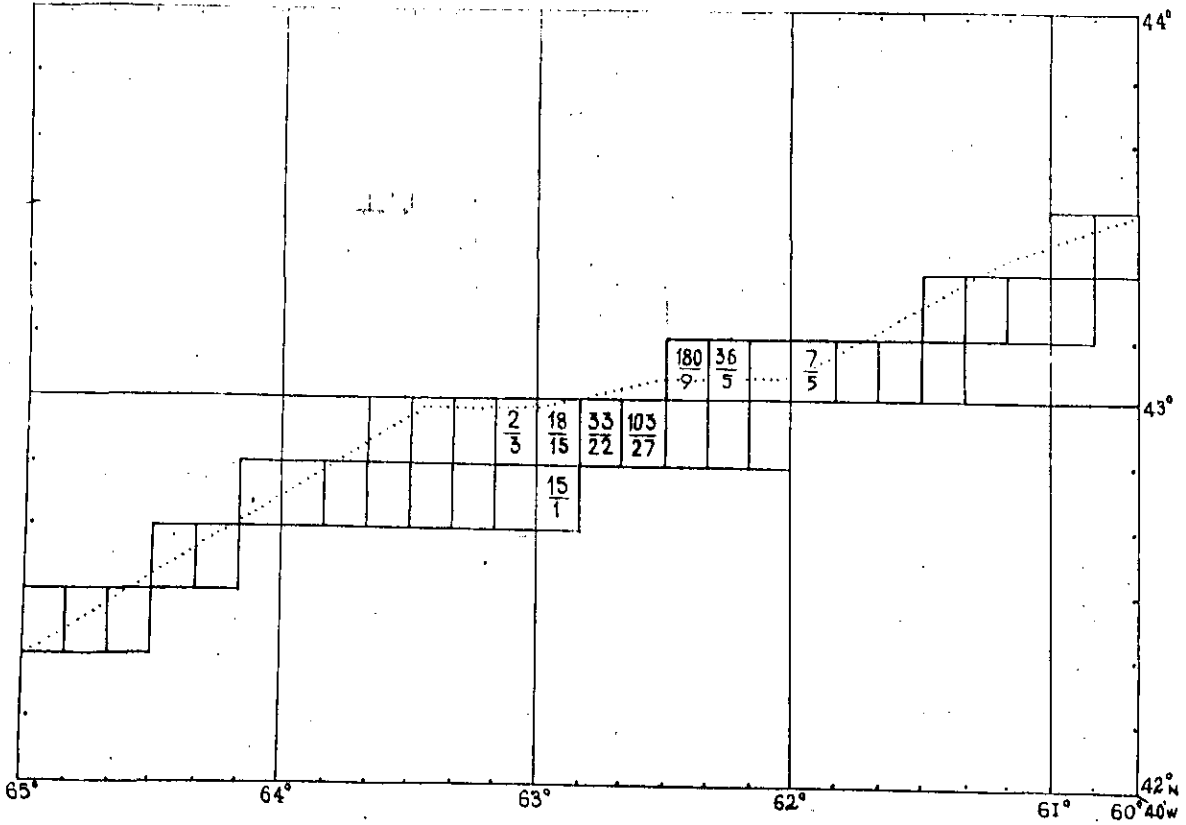


Fig.29. Mackerel catches per trawling hour (kg) in July 1989.

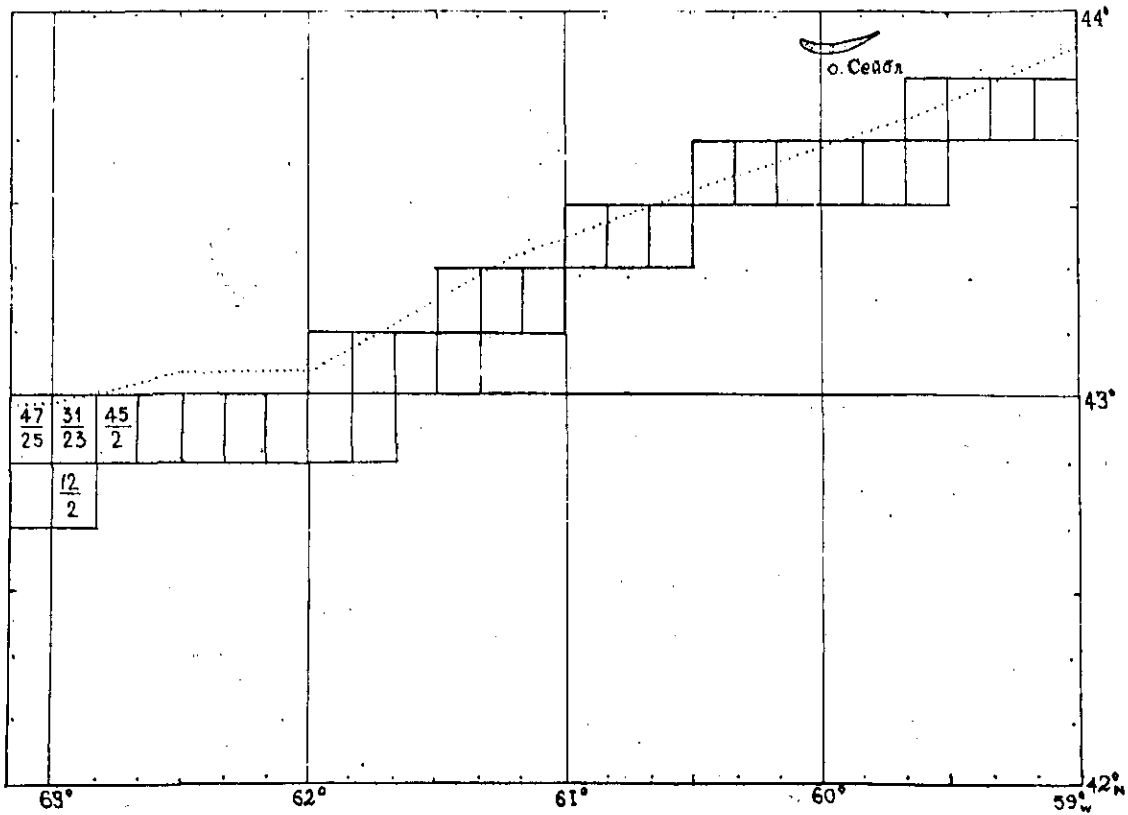


Fig.30. Cusk catches per trawling hour (kg) in July 1989.