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Distribution of Silver Hake, Other Abundant Fish Species and Short-finned Squid on the Scotian Shelf Slope in 1990 From Data Obtained by USSR Observers

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INTRODUCTION

This paper provides a brief summary of 1990 distributional patterns for the most abundant fish species to the south of SMGL (Small Mesh Gear Line). It should be regarded as continuation of similar works which were begun in 1980.

MATERIALS AND METHODS

Samples were collected by two fishing boats during April-July, 1990 inclusive. Number of samples and their distribution by square and period are given in Table 1. Data presented show the intensity of sample collection to be high enough. Methods of material processing and data analysis underwent no changes. Numbers on figures (denominators) and in tables (in brackets) mean number of tows with catches of the species under investigation. As in previous years distributional patttern for gender Urophycis is given without breakdown by species. Data in Tables 2 and 3 are based on the information presented by USSR observers.

RESULTS AND DISCUSSION

Silver hake (Merluccius bilinearis)

As in 1989 silver hake dense concentrations were found during the second half of March (experimental fishery) between 250 and 480 m. During April 1-20 situation was similar to that observed in 1989. Dense concentrations occurred between 59°30'W and 63°00'W (Fig. 1) at depths of 150-350 m. Portion of squares with catches of 3000 kg per hour fished and more accounted for more than 30% of the total. According to previous surveys (Rikhter, 1990) this value should

be considered as a positive indication for the stock status. But already during 20-30 April catch rate per hour fished decreased sharply. So did the mean length of hake in the catches (Rikhter, 1991; Report for the present Scientific Council meeting). No stable hake aggregations were detected in May-June .In this respect situation was similar to that observed in 1981 (Rikhter, Turok, Grinkov, 1982). Small specimens predominated in the catches. They occurred between 50°00'W and 63°00'W (Fig. 2,3) at depths of 100-300 m. But in July to the south of SMGL rather dense concentrations appeared between 61°30'W-63°00'W (Fig. 4). They were found there up the the middle of July. The catches increased greatly in that period. Silver hake mean catches by year and month are shown in Table 2. On the whole distributional and behaviour patterns differed greatly from those observed in 1989 (Rikhter, Turok, 1990). Evidently, this fact can be explained by peculiarities of 1990 oceanographic conditions.

Haddock (Melanogrammus aeglefinus)

Distributional patterns of the species for the April-June period are presented on Fig. 5-7. As in previous years haddock occurred more frequently in May and June between 59°00'W and 63°00'W. But total by-catch during the season accounted for less than 1% (Table 3).

Pollock (Pollachius virens)

In April pollock were encountered in substantial area (Fig. 8), but the most dense concentrations were found in May (Fig. 9). Pollock abundance in the fishery area decreased sharply in June (Fig. 10). On the whole total by-catch during the season accounted for 1% (Table 3; data obtained by observers).

Cod (Gadus morhua)

Data obtained by USSR observers prove cod abundance to the south of SMGL to be very low (Fig. 11, 12, 13).

Urophycis sp.

In 1990 catch rates declined as compared to the values reported in 1989 (Fig. 14, 15). In June Urophycis sp. were very seldom in the catches.

Atlantic herring (Clupea harengus)

Herring were predominantly found in the eastern part of the area and formed randomly dense concetrations, which didn't occur earlier (Fig. 16, 17, 18). In April-June herring abundance to the south of SMGL was, apparently, rather high. Accordingly, herring by-catch reached a record figure and accounted for about 5% of the total catches. But in July practically no herring occurred in the catches. It can be suggested that abnomal environment influenced the distributional pattern of the species in 1990.

Mackerel (Scomber scomber)

In April mackerel were predominantly taken in the eastern part of the ground (Fig. 19), where extremely dense aggregation was detected on a rather small area. During the next two months herring aggregations dispersed and by-catch estimate was low. On the whole mackerel by-catch increased as compared to the estimate reported for 1989, but didn't reach its 5% level.

Squid (Illex illecebrosus)

Squid began to occur in the catches in May (Fig. 22). During June-July its abundance increased rapidly to the south of SMGL and peaked in July (Fig. 23, 24). But data obtained by observers showed the catch of somewhat lower as compared to that reported for 1989. However this information seems to be unreliable as far as observers collected samples on board the ship engaged in directed hake fishery. Thus, the areas with high squid abundance were not fished.

CONCLUSIONS

During the 1990 fishery season silver hake distribution and behaviour patterns to the south of SMGL were extremely unstable as compared to those observed in 1989. This resulted in great decrease of catch-per-unit-effort estimates. At the same time dense concentrations occurred in some periods comparable to those observed in 1989. Diffeerences can be mentioned concerning some other species (herring, mackerel) distribution and abundance as compared to those observed in previous year. Practically no plaice and redfish were available in the catches. It can be suggested that all peculiarities mentioned resulted from abnomal oceanographic conditions.

ACKNOWLEDGMENTS

The authors express sincere thanks to scientists of Fishing scouting service collected valuable silver hake samples from commercial catches in 1990.

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4. Rikhter V.A., V.F.Turok and Yu.S.Grinkov. 1982. Distribution of some groundfish species and short-finned squid on the Scotian Shelf during the 1981 fishing season based on data from USSR observers. NAFO Scr. 82/01, 12 p.

Table 1

Distribution of Silver Hake samples (by square and period)

collected by USSR observers in 1990

Fishery square	April			May			June			July			Total
	I	II	III	I	II	III	I	II	III	I	II	III	
59°10							1						1
20							1						1
30													-
40	1	-	-		1				2				4
50	1	7	2		3	2			1				16
60°00	5	15	1	8	5	1			4				39
10	-	12	4	8	4		2						30
20	1	1	1		1								4
30	5	-	1				1			1			9
40	1	-	-	1			4	3	1		2		12
50	5	-	1	4			2	2	2	1			17
61°00	2	-	-	2	3		3	4	5	1			20
10	2	-	3	10	10	8	5	6	9	1	1		55
20	-	-	1	5	10	5	18	8	1	1			49
30	1	-	-		2	3	7	6	1	1	2		23
40	-	-	-		1	1	6	4			1	1	14
50	1	-	1			5	3	1		4	6	1	22
62°00	-	-	2			4	1	2		7	10	1	27
10	-	-	2			3	1			5	2		13
20			3			1	2			1	1	4	12
30			5				4	1				3	13
40			1							2	1	1	5
50			4							3	1	2	10
63°00										1			1
10	-	-	-	-	-	-	-	-	-	-	1	-	1
Total	25	35	32	38	41	33	61	37	86	29	28	13	398

Table 2

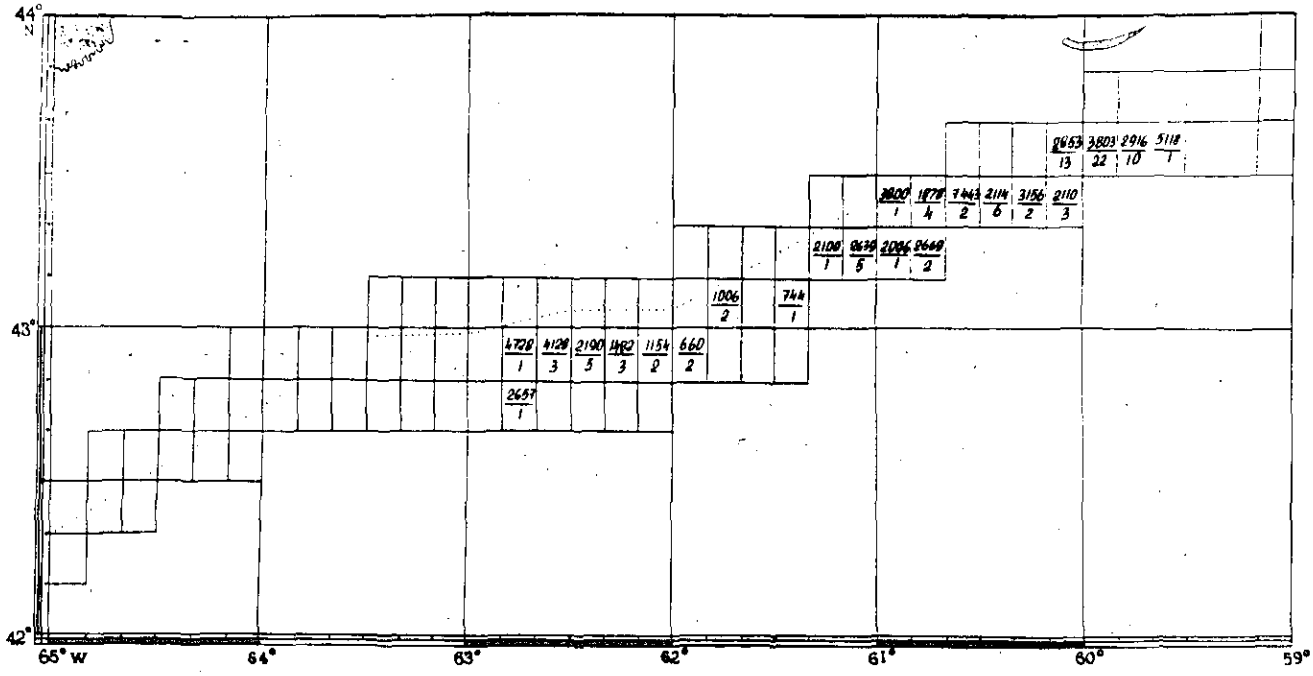
Silver hake catches per hour fished (kg), broken down by year and month

Year	Month			
	April	May	June	July
1981	-	2368 (33)	1121 (69)	1909 (68)
1982	-	8654 (34)	5471 (103)	1724 (99)
1983	-	2771 (160)	2778 (105)	-
1984	-	5738 (90)	2783 (57)	3298 (125)
1985	-	3094 (131)	3635 (195)	3994 (208)
1986	-	-	4469 (174)	4372 (170)
1987	-	5988 (47)	2957 (74)	3610 (77)
1988	4260 (61)	3671 (103)	2085 (114)	-
1989	6426 (84)	3324 (115)	2173 (161)	3901 (83)
1990	2796 (93)	1918 (110)	817 (122)	2587 (70)

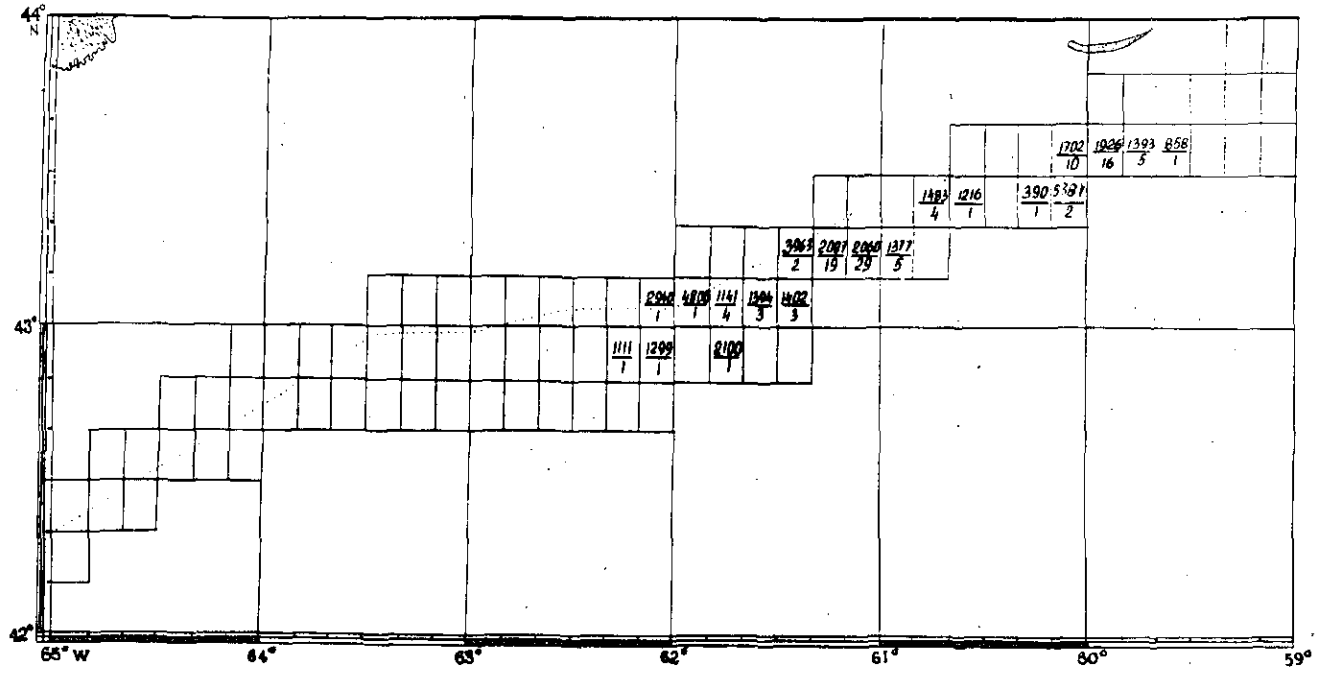
Table 3

Species composition (%) for catches analysed by USSR observers in 1990

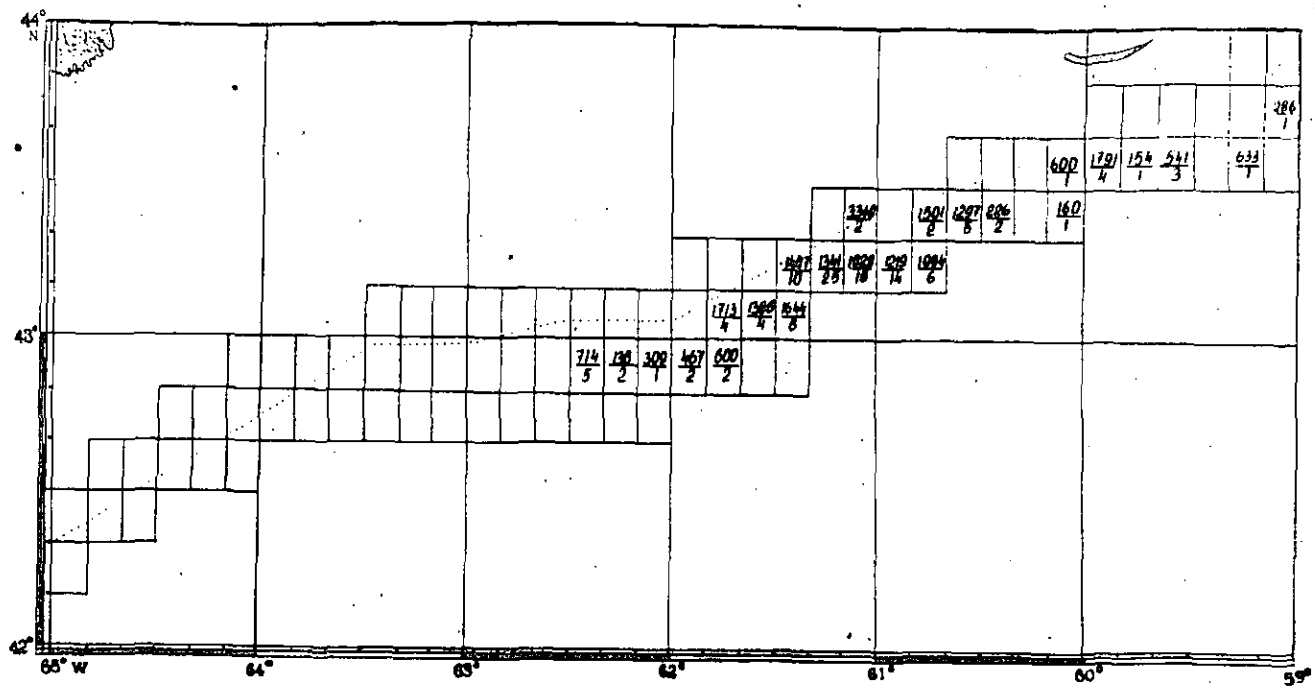
Species	Month				
	April	May	June	July	April-July
Silver hake	93.2	88.6	77.4	91.5	88.8
Haddock	0.1	0.7	0.7	-	0.4
Pollock	0.8	2.1	0.8	-	1.0
Cod	0.2	+	+	-	0.1
Atlantic herring	2.9	6.6	15.9	-	5.3
Mackerel	2.7	1.8	0.8	-	1.8
Urophycis sp.	0.1	0.1	+	-	+
Squid	-	0.1	4.4	8.5	2.6



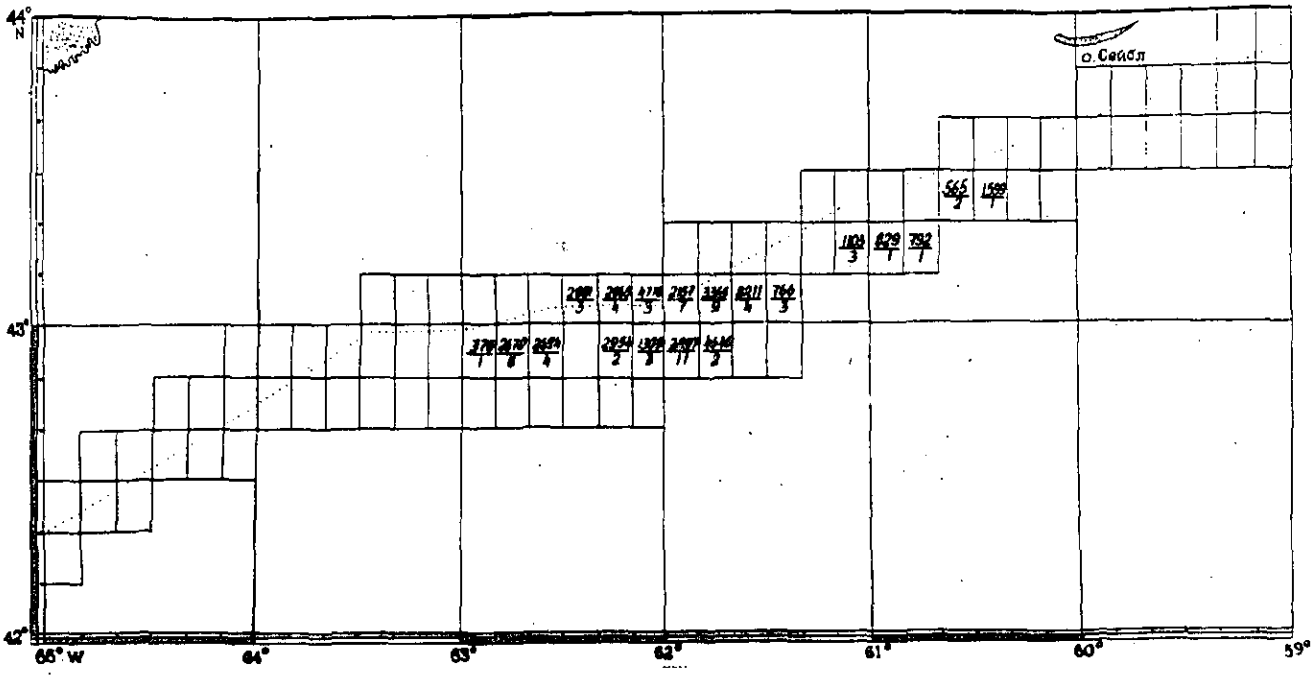
1. Silver hake catch per hour (kg) in April 1990.



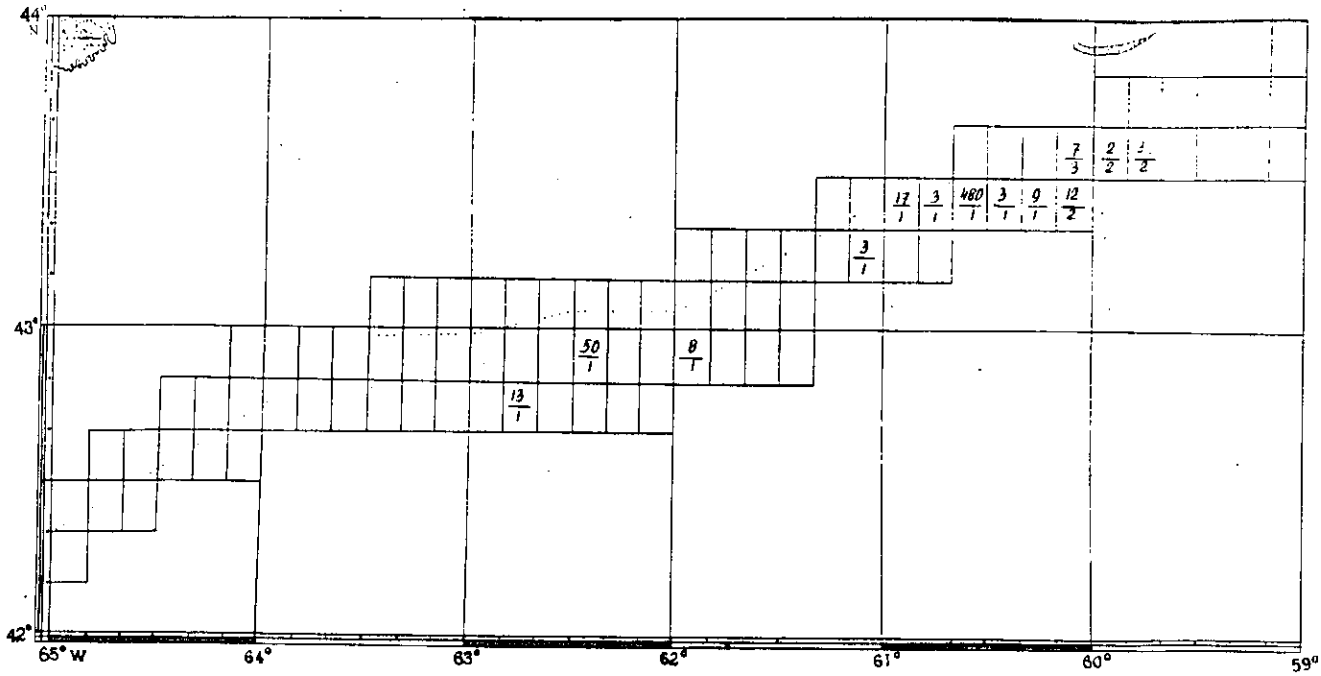
2. Silver hake catch per hour (kg) in May 1990.



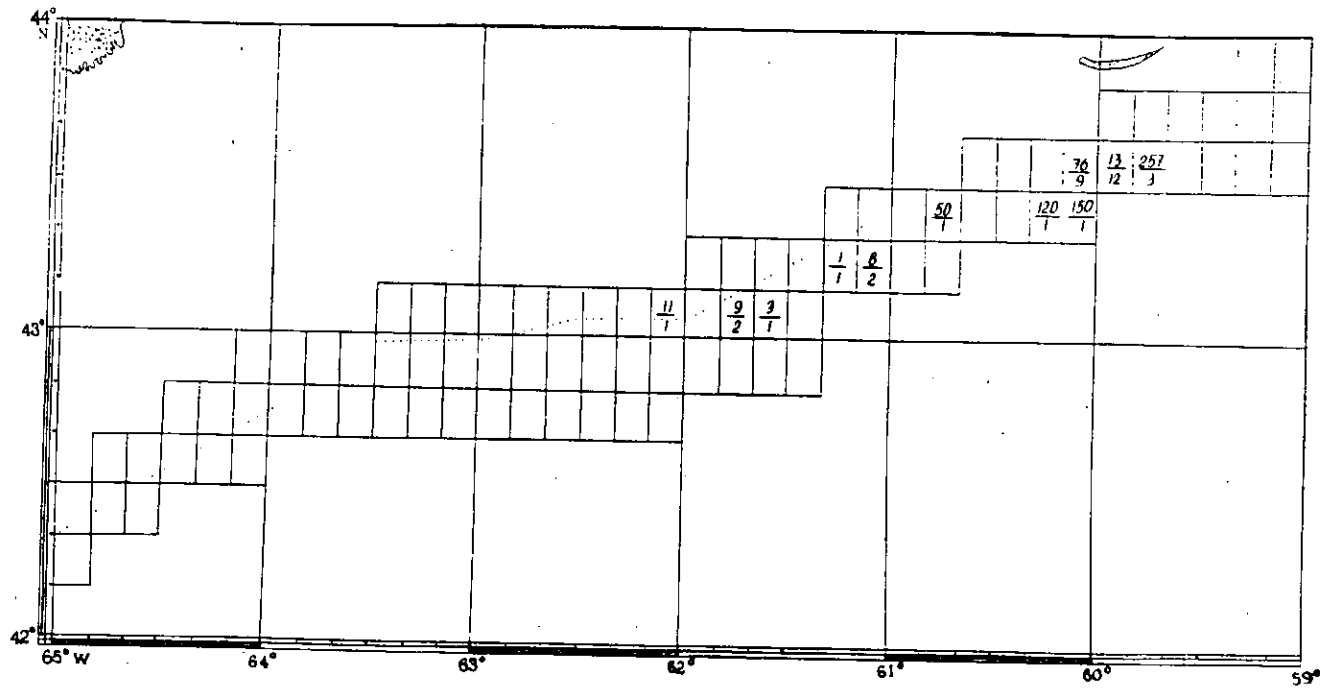
3. Silver hake catch per hour (kg) in June 1990.



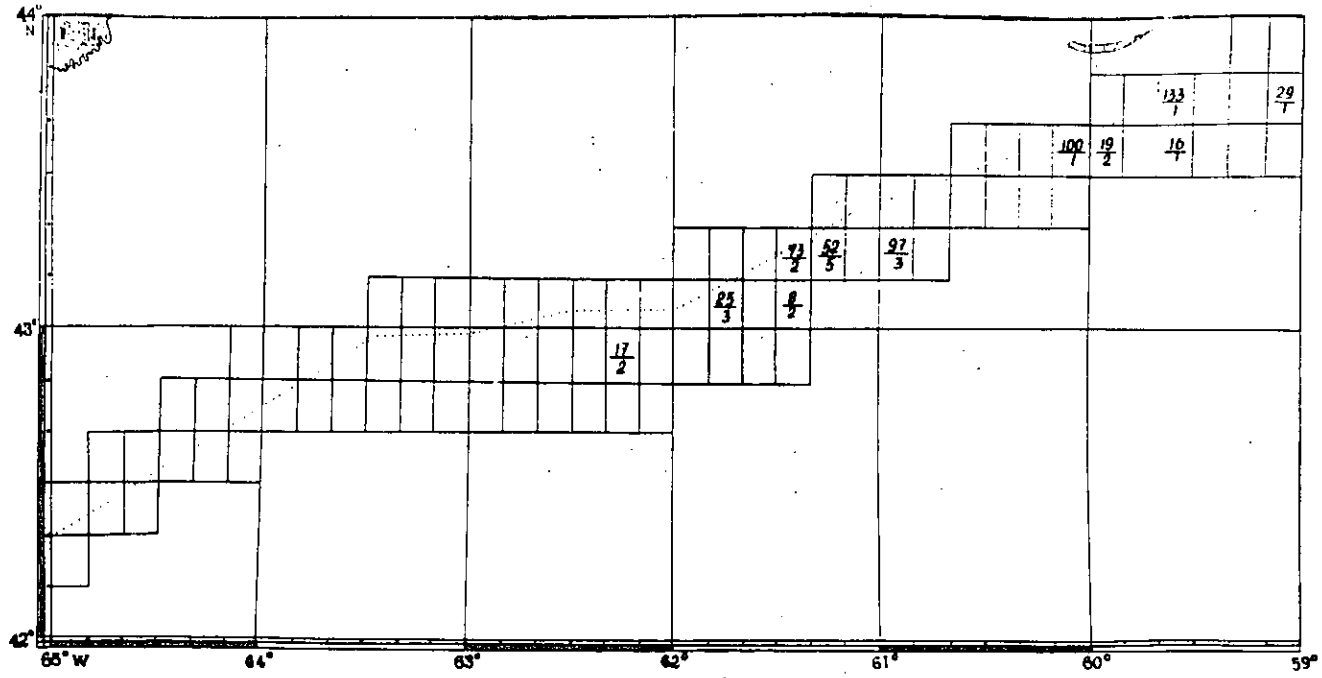
4. Silver hake catch per hour (kg) in July 1990.



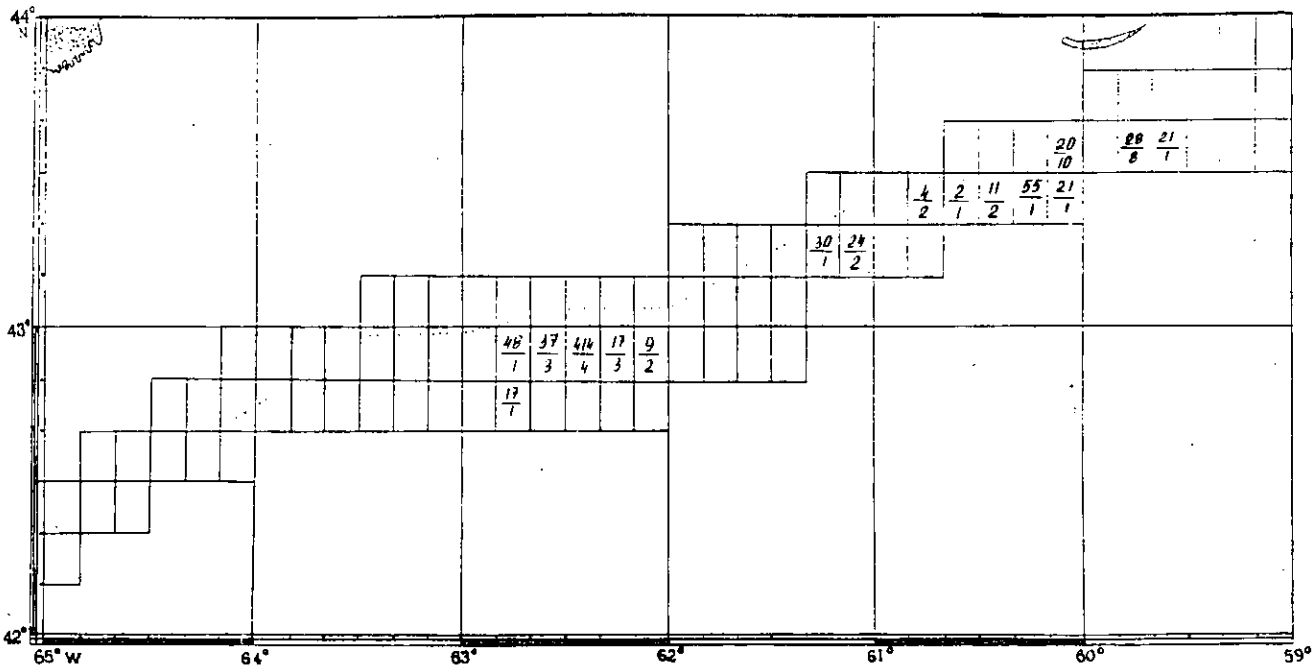
5. Haddock catch per hour (kg) in April 1990.



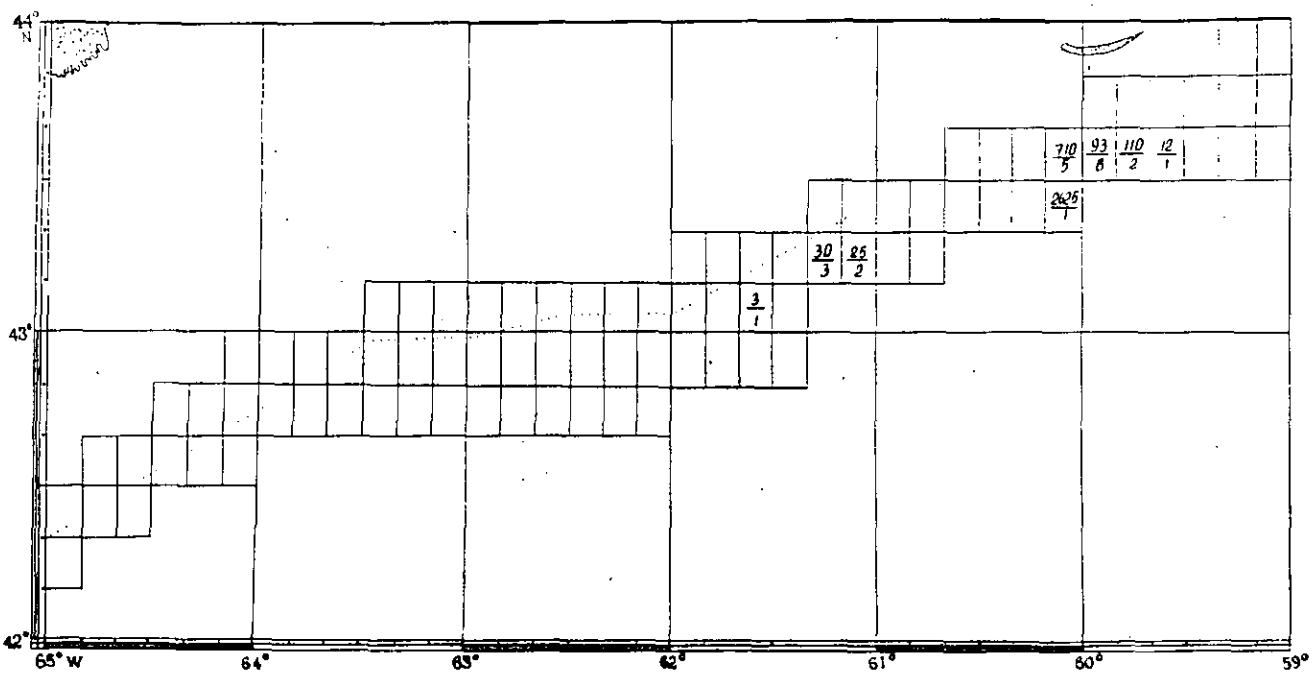
6. Haddock catch per hour (kg) in May 1990.



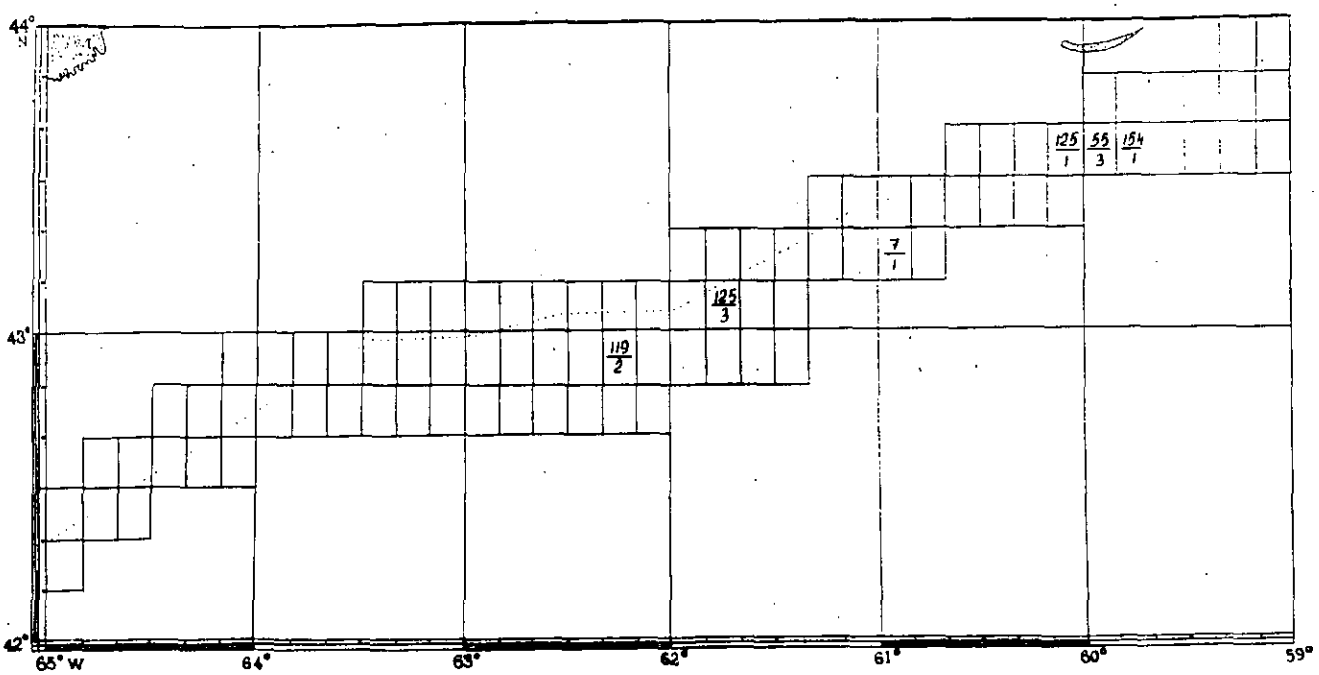
7. Haddock catch per hour (kg) in June 1990.



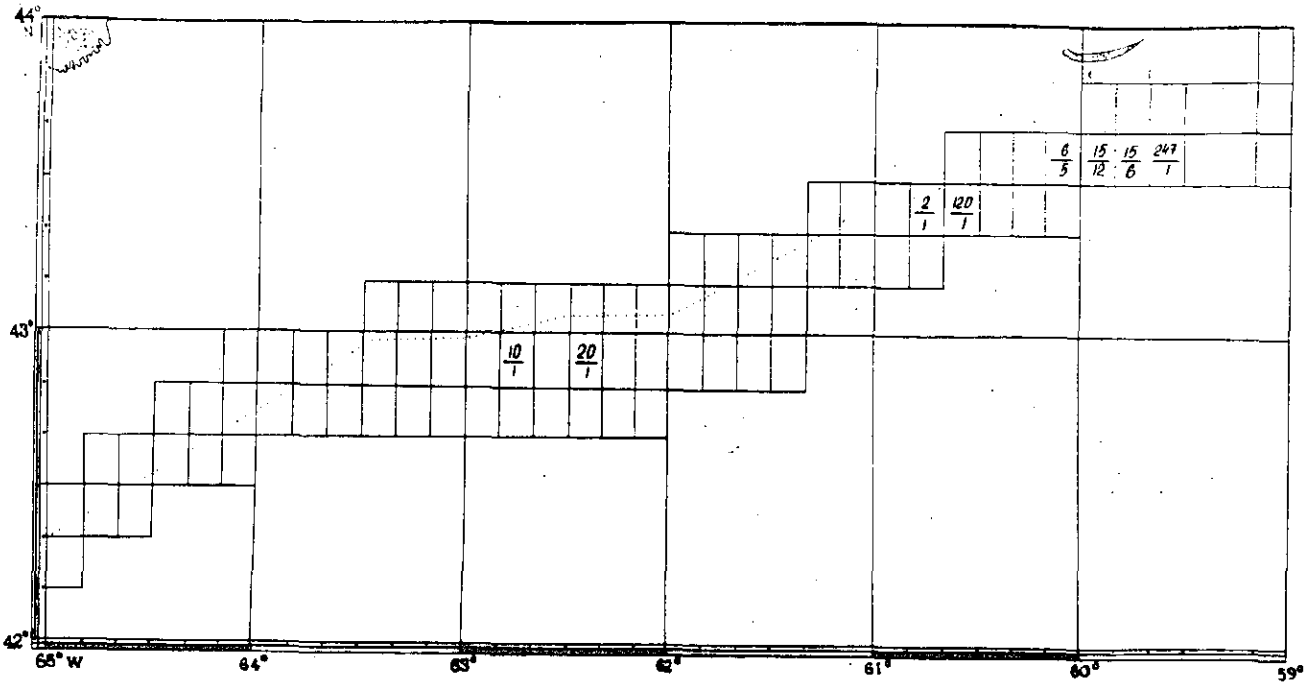
8. Pollock catch per hour (kg) in April 1990.



9. Pollock catch per hour (kg) in May 1990.



10. Pollock catch per hour (kg) in June 1990.



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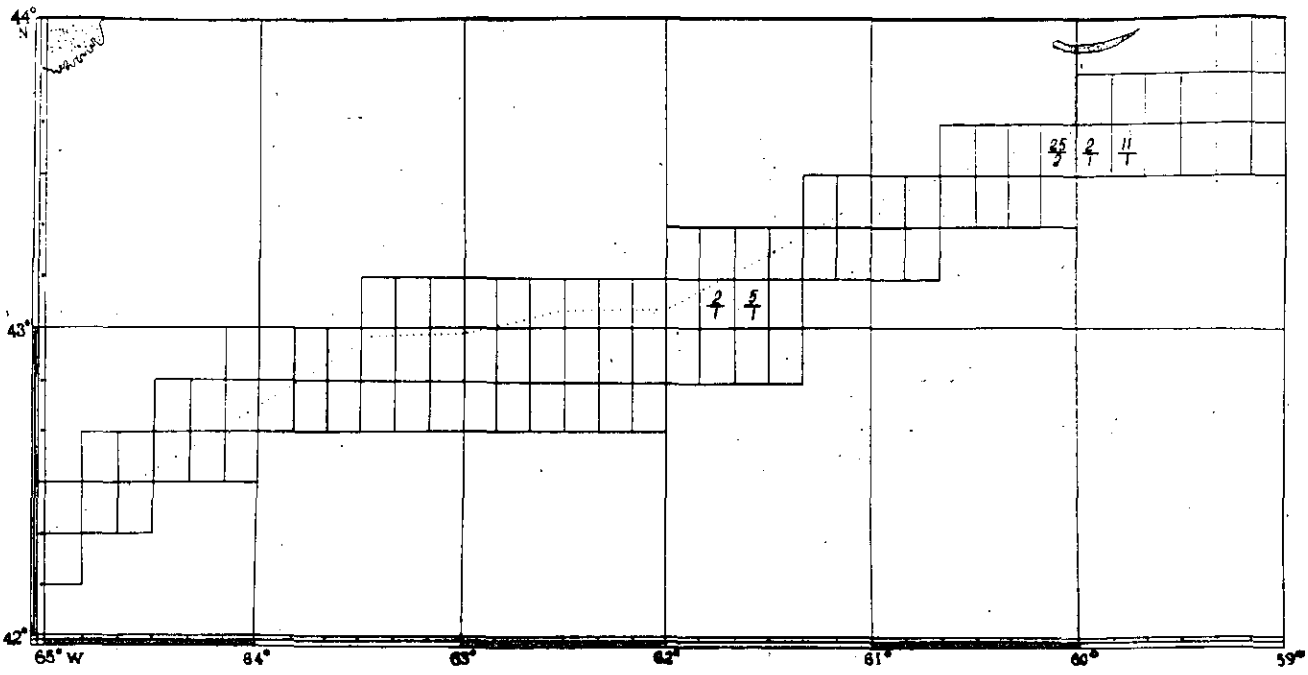
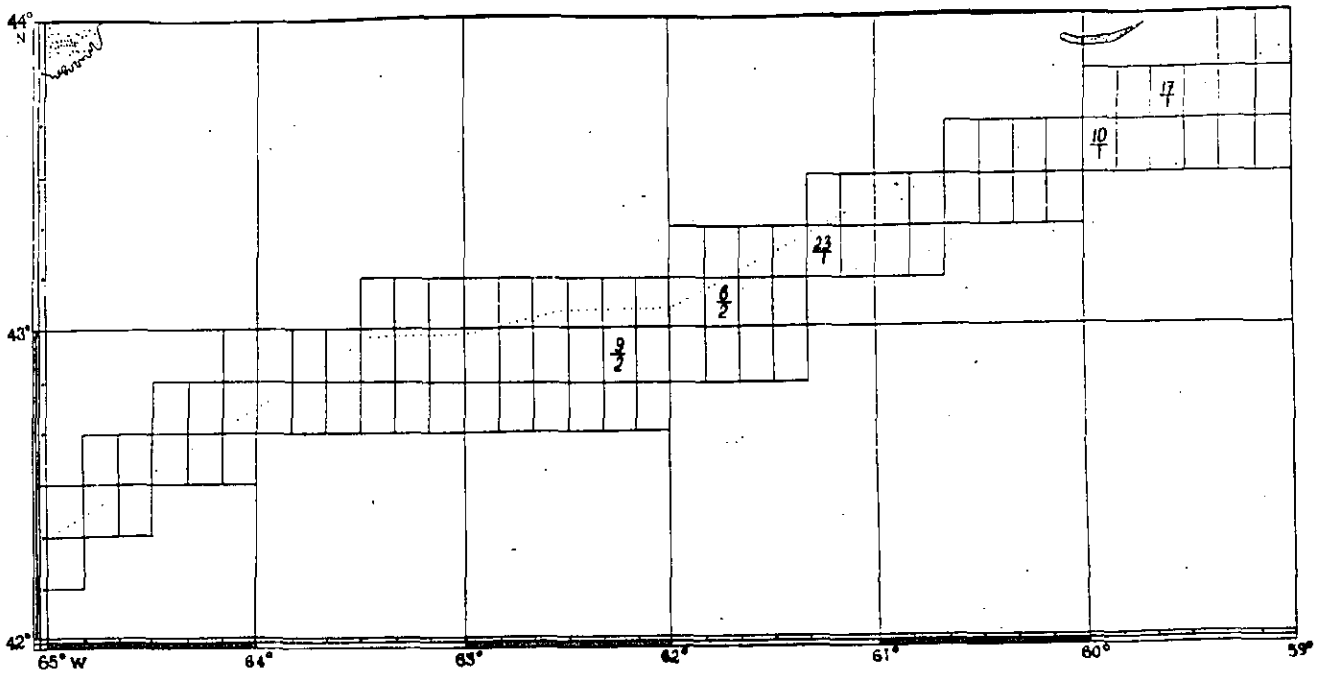
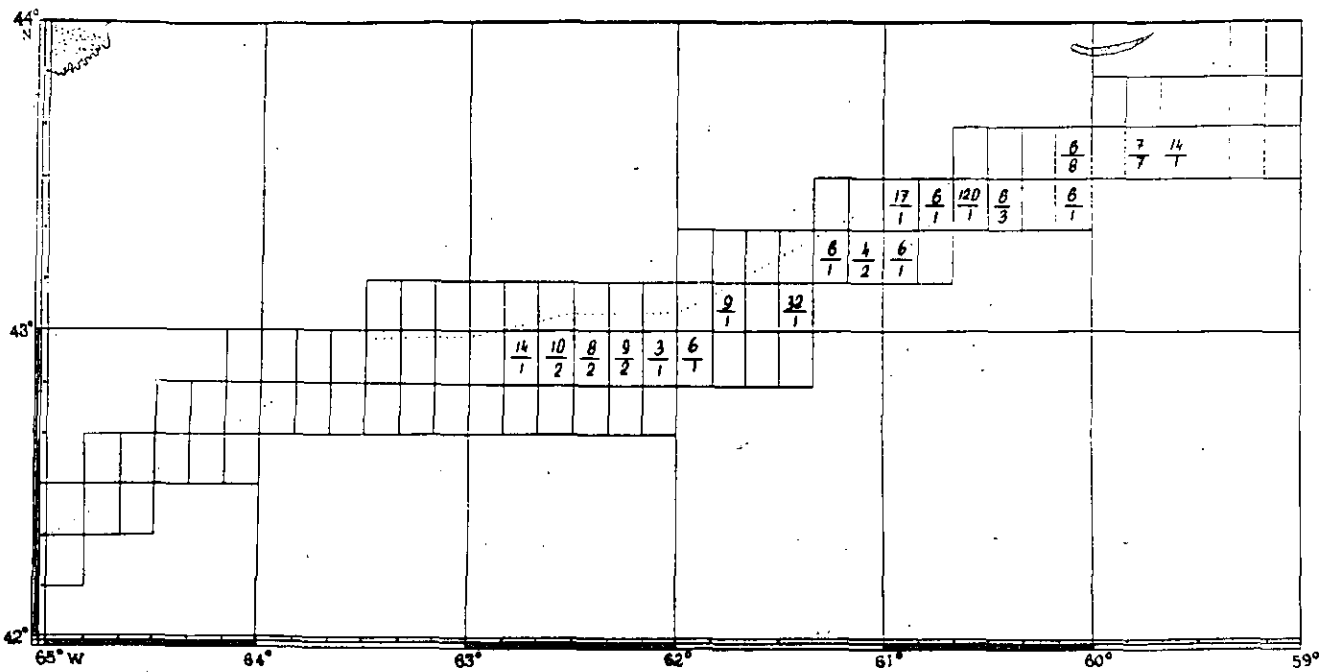


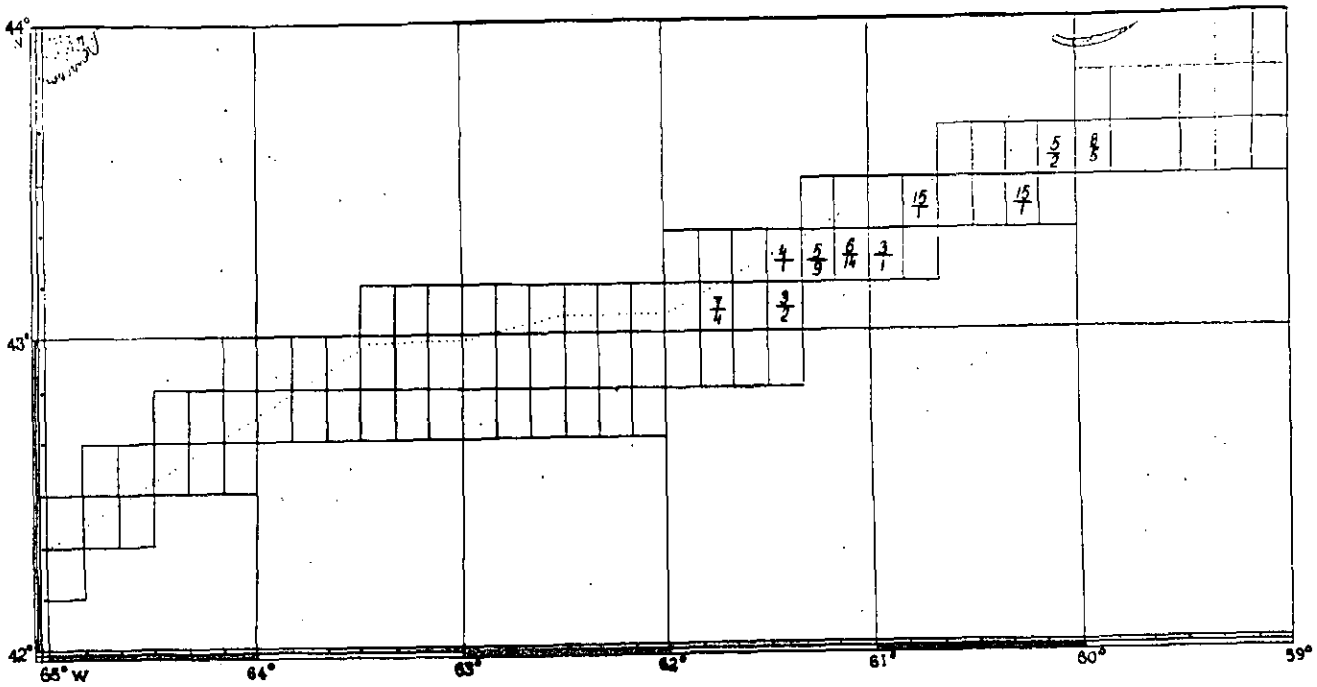
12. Cod catch per hour (kg) in May 1990.



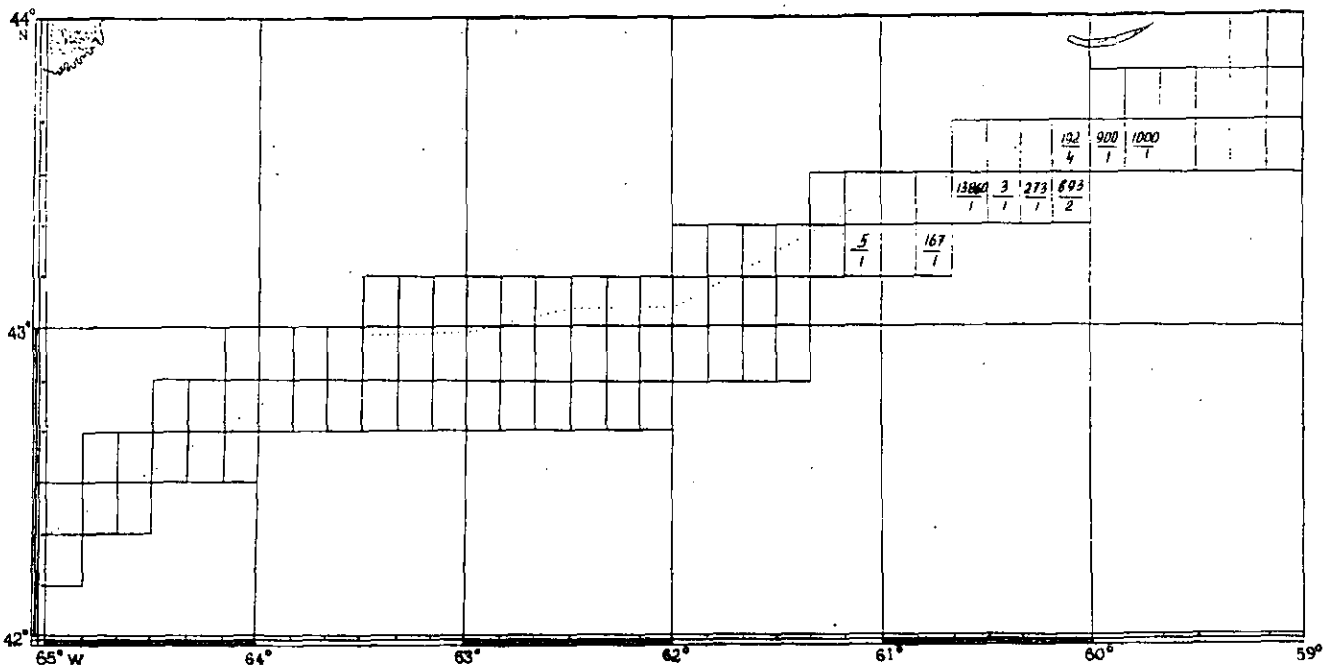
13. Cod catch per hour (kg) in June 1990.



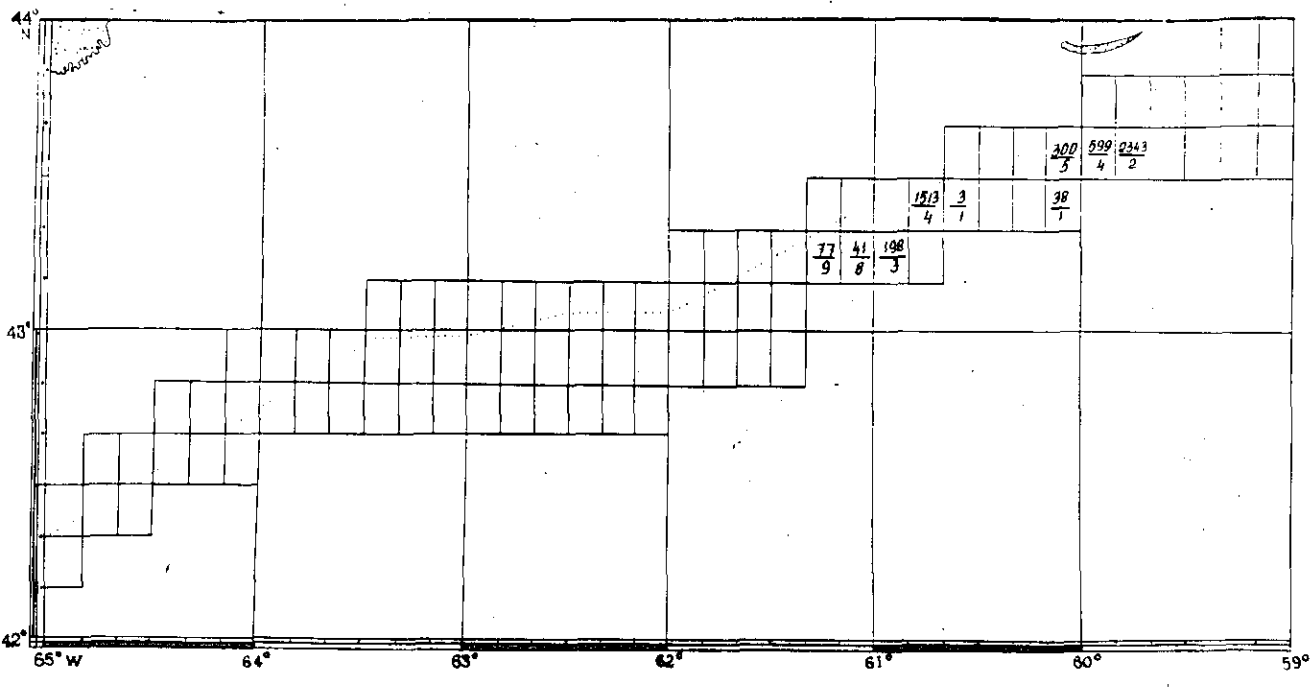
14. Urophycis sp. catch per hour (kg) in April 1990.



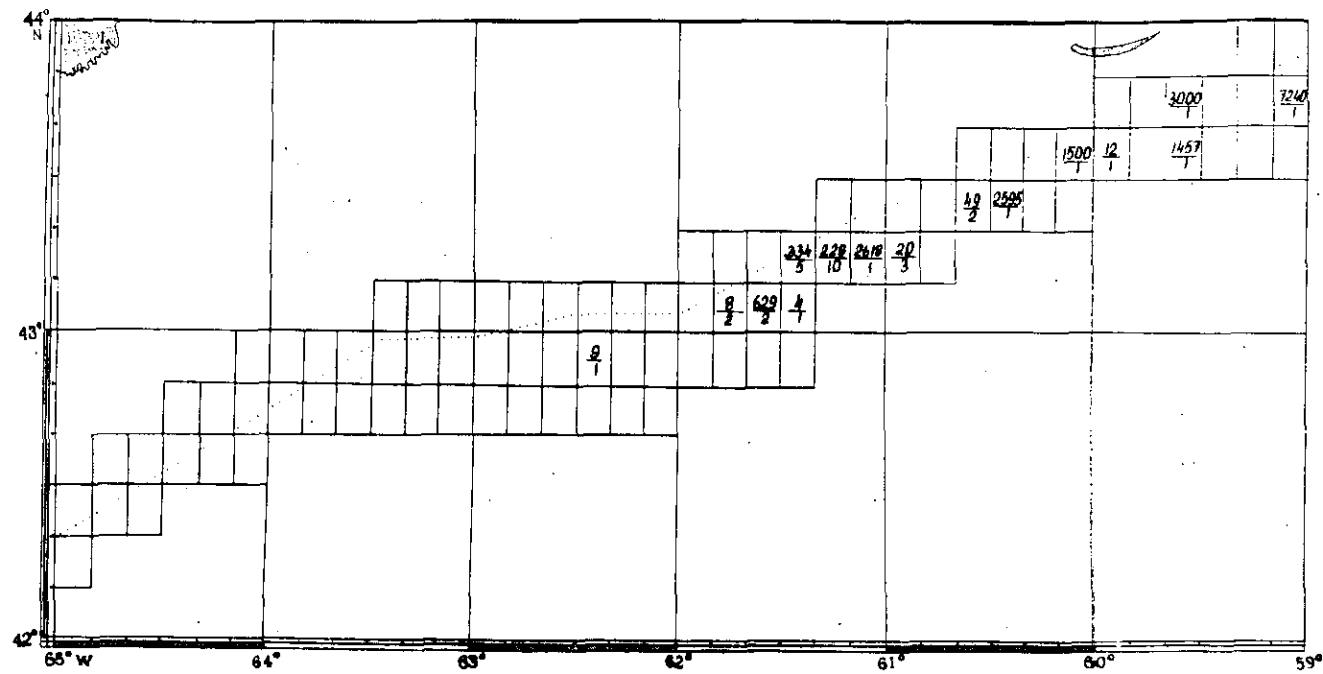
15. Urophycis sp. catch per hour (kg) in May 1990.



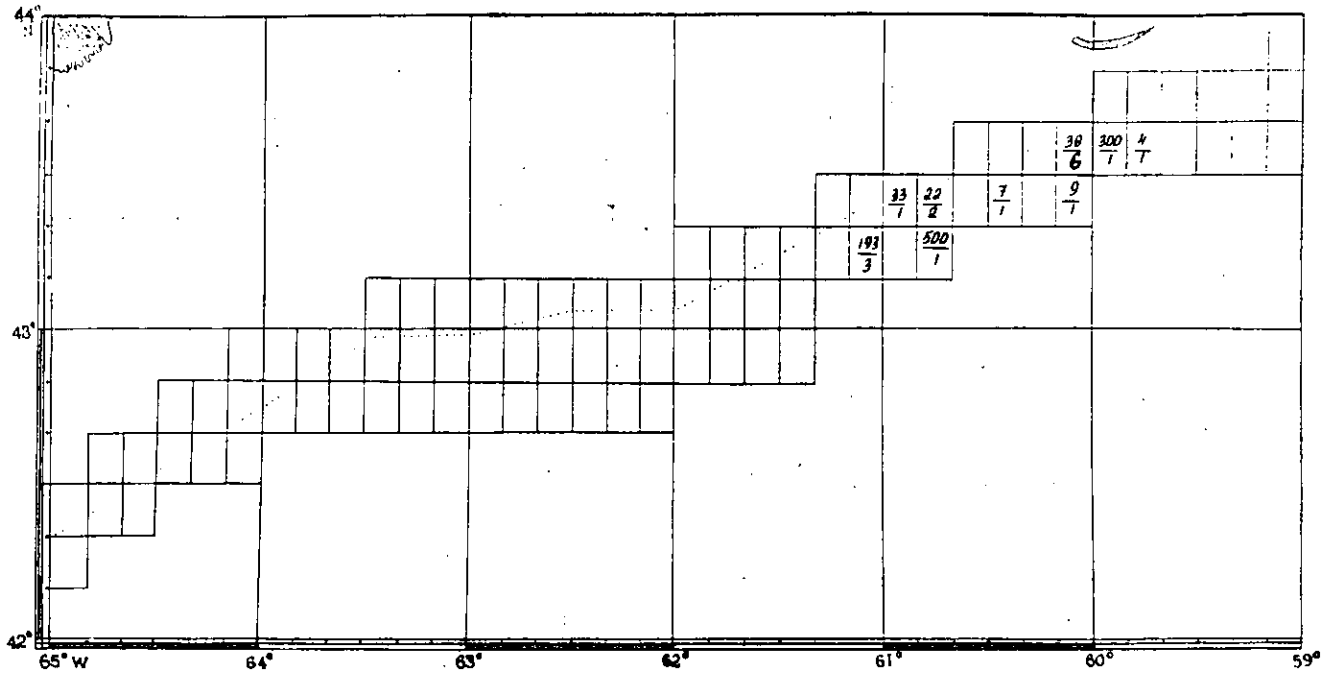
16. Atlantic herring catch per hour (kg) in April 1990.



17. Atlantic herring catch per hour (kg) in May 1990.



18. Atlantic herring catch per hour (kg) in June 1990.



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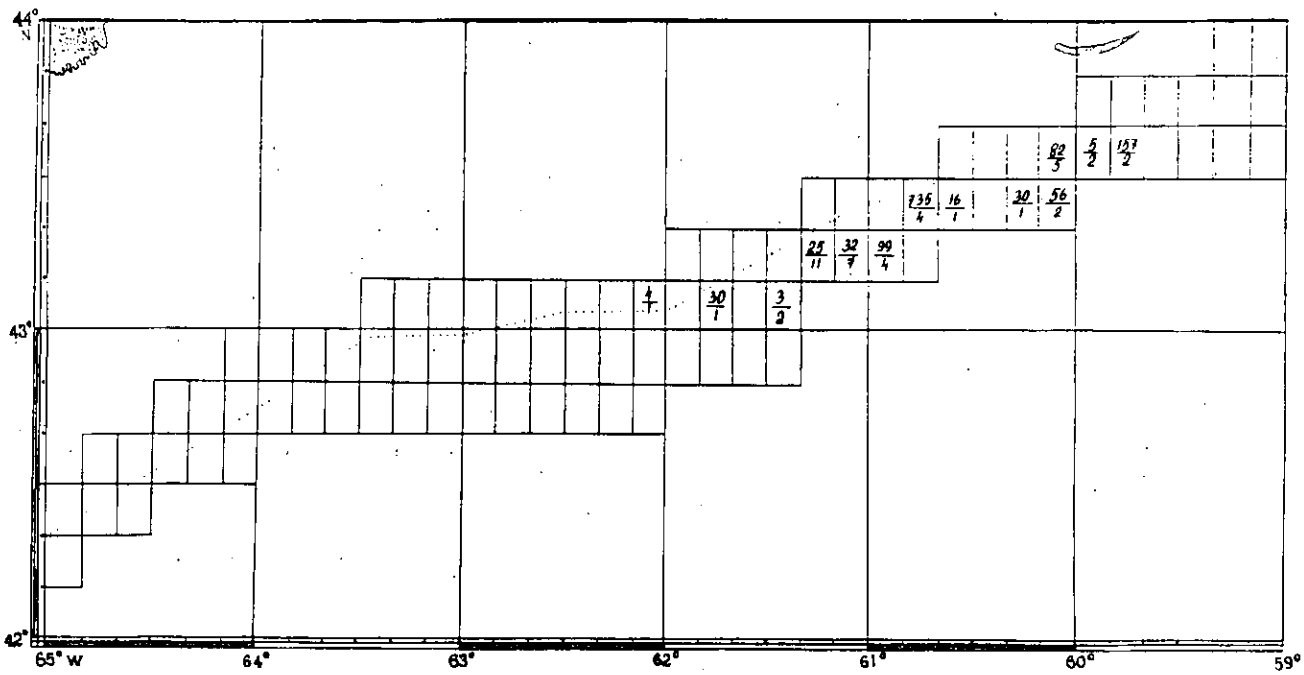
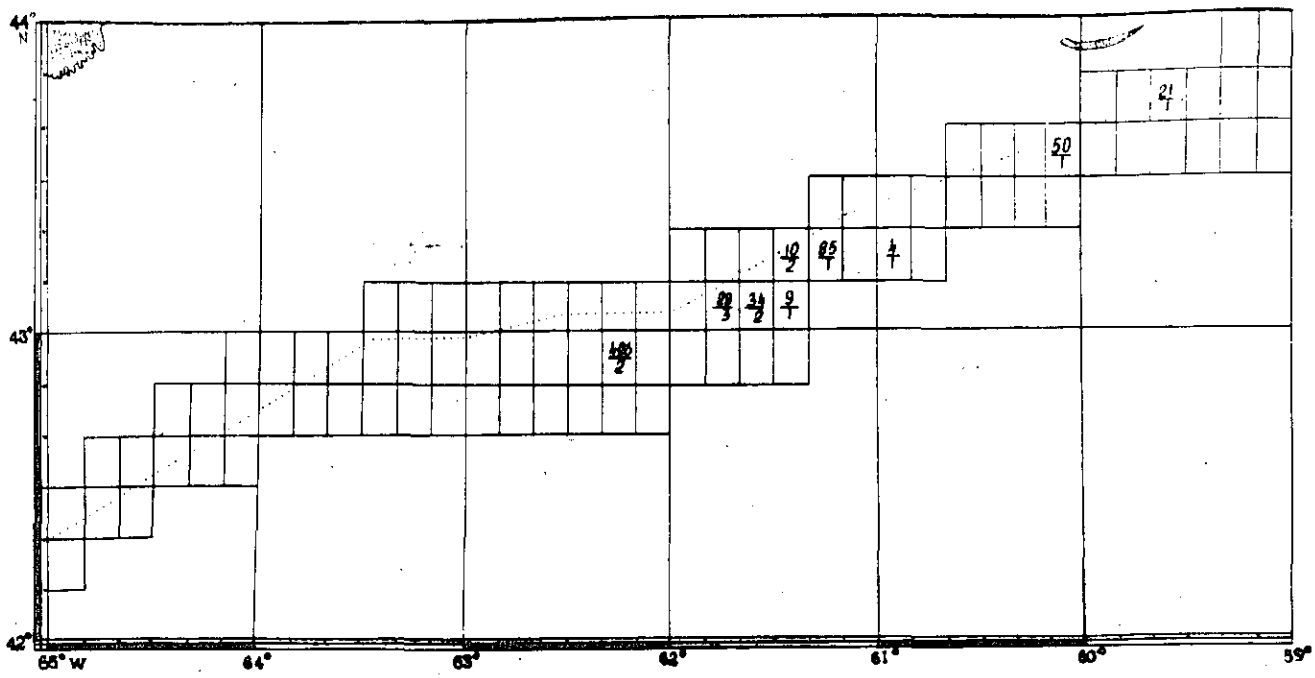


20. Mackerel catch per hour (kg) in May 1990.



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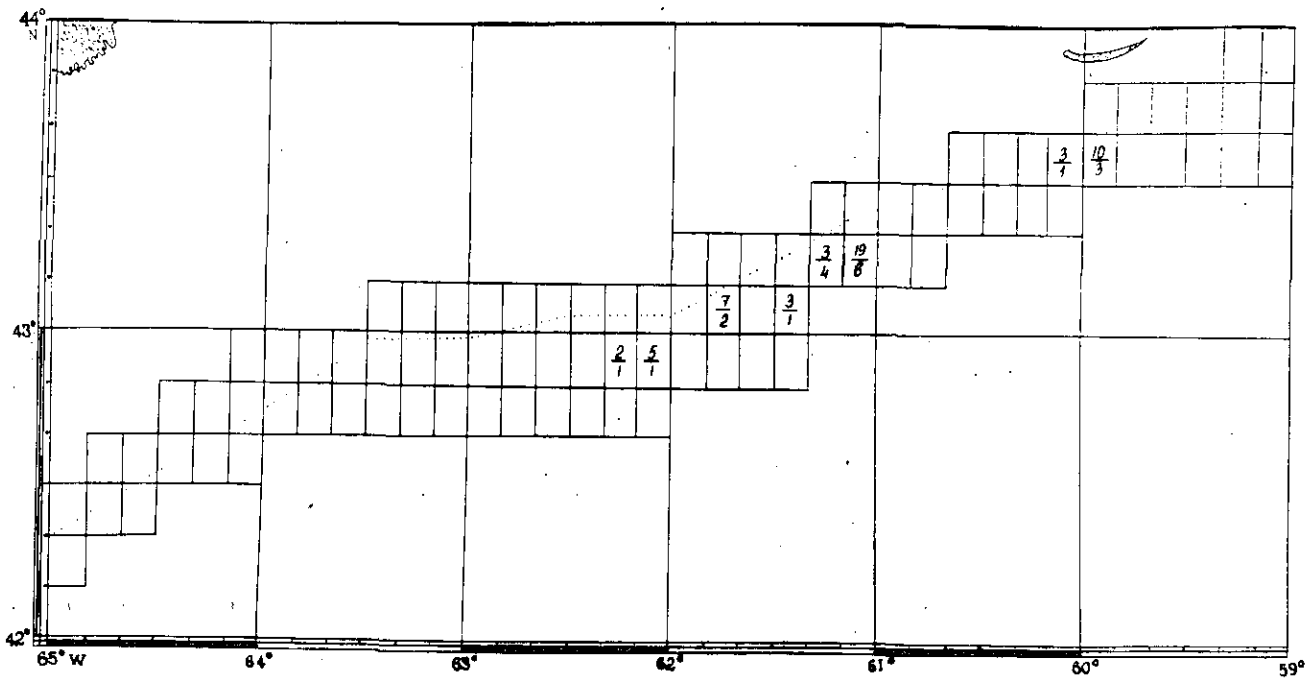
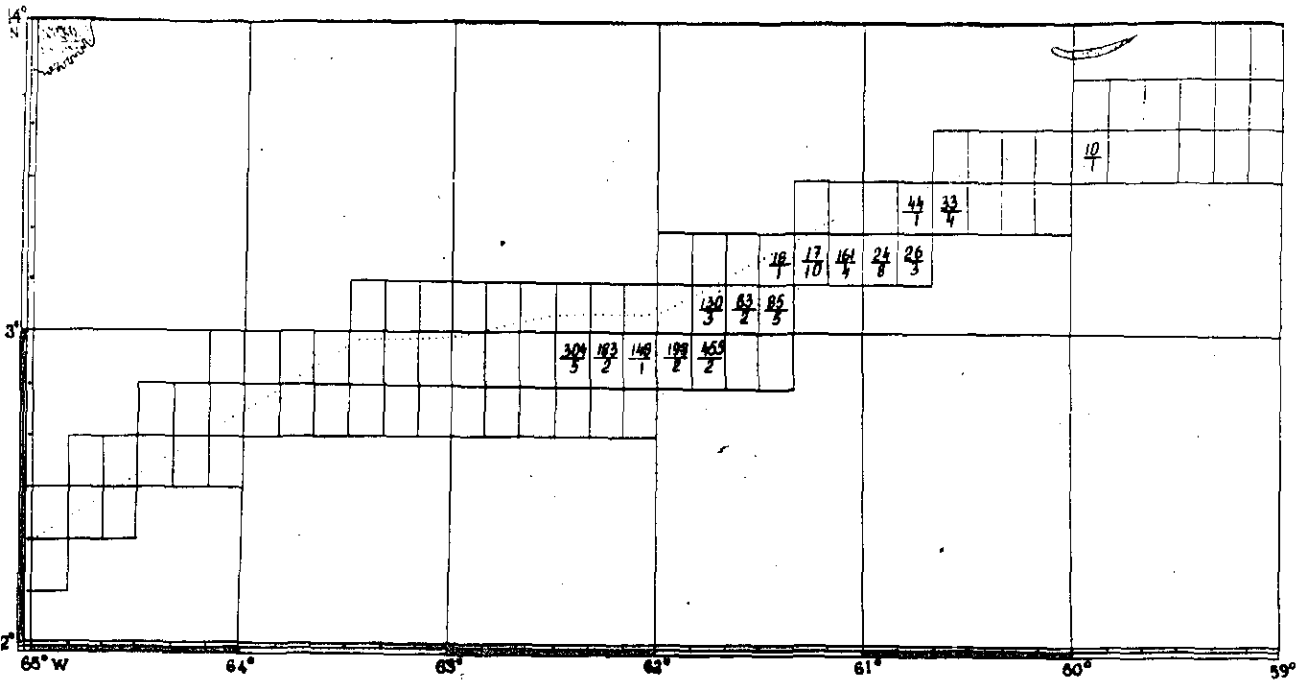
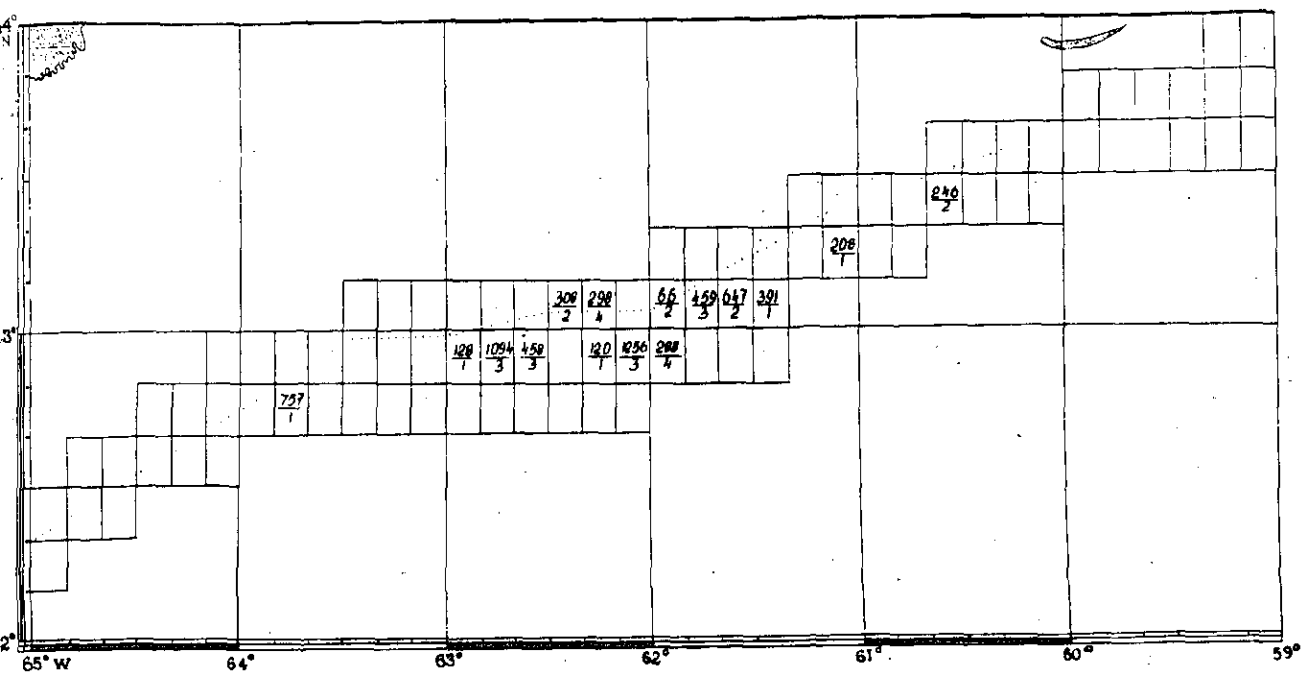


22. Squid catch per hour (kg) in May 1990.



23. Squid catch per hour (kg) in June 1990.



24. Squid catch per hour (kg) in July 1990.