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Observations on the Shrimp Fishery at East Greenland in 1980

by

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Introduction

The shrimp fishery off East Greenland began in 1979, but not before in 1980 the fishery grew to a significant commercial scale. Total catches at the beginning of November being about 6700 tons of shrimp.

The fishery at East Greenland by two trawlers of the Royal Greenland Trade Department and four Danish trawlers was planned in cooperation with the Greenland Fisheries Investigations, who also had observers on board three of the trawlers in shorter periods. In the present paper information based on data from observers is given, covering the geographic distribution of the fishery, catch rates, by catch and size composition of shrimp catches.

General remarks

The physical conditions for the shrimp fishery at East Greenland differ from those at West Greenland in more turbulent sea currents and a heavier sea ice. Bottom conditions are in general more rough than in the shrimp fishing grounds at West Greenland, with more clay or mud bottom often hampering fishing operations or making the catch unfitted for processing.

The trawls used at East Greenland are of the same types as those used at West Greenland ('Sputnik' and 'Galut' trawls).

Data on catch and effort

All vessels above 80 GRT participating in the fishery at Greenland are obliged to report catches to the Greenland authorities once a week. At the beginning of November 1980 a total catch of 6680 tons of shrimp had been reported from East Greenland waters. Table 1 shows the reported catches by month and nation, and also the total number of vessels of each nation participating in the fishery.

Haul by haul logbook data from three Greenlandic and three Danish trawlers fishing at East Greenland in periods of varying length from March to the end of October have been available to the Greenland Fisheries Investigations. The data base includes a total of 634 hauls. The trawlers range from about 450 to about 800 GRT, but a splitting of data based on vessel tonnage has not been attempted due to the scarcity of data.

Figure 1 shows the geographical distribution of the fishery of the six trawlers, - excluding only a few exploratory hauls outside the map with very low catch rates (the line east of the fishing area is a tentatively drawn midline between Greenland and Iceland economic zones). Table 2 shows the monthly mean catch of shrimp per hour in a south to north grid of 7 1/2 degree, and table 3 the corresponding effort in number of hours trawled per month and latitude unit. Table 3 also includes latitude areas of exploratory hauls with zero catches.

Fig 2 shows the monthly distribution of effort and CPUE in statistical units. It is seen that the fishery from May to June was concentrated in a rather limited area to the northeast of Dohrn Bank, and that the highest catch rates for the year were here in April and May. From August to October the main fishing area had moved further to the northeast, north of 66° 30'N. In general, the autumn fishery was spread over a wide area with catch rates declining. This is similar to the West Greenland situation with peak catches in minor areas in the spring and lower catches later in the year, the fishery being spread over a wider, more northerly area.

According to information from skippers the trends described here are typical for the whole shrimp fishery at East Greenland.

Diurnal variation in catches.

Table 4 shows the diurnal variation in mean catches per hour in 2-hour periods throughout the day on a monthly basis in the main fishing area. The pattern is similar to experience from West Greenland (Smidt, 1978), with highest catch rates in the middle of the day. However, the more pronounced diurnal variation in catch rates in spring and autumn compared to the summer time, which is found at West Greenland, is not significant in the present data.

Further data from the fishery is needed before a more thorough analysis of the diurnal variation in shrimp catchability at East Greenland is possible.

Bycatch.

Table 5 shows the reported bycatch in East Greenland waters from logbooks of six trawlers. According to skippers and observers onboard during the fishery the bycatch includes smaller amounts of redfish, cod, wolffishes, eel pouts, Greenland halibut and Greenland shark. In contrast to bycatches at West Greenland large amounts of capelin are often caught, and sometimes blue whiting also. The capelin bycatch may hamper the processing of shrimp as it is difficult to sort out from the catch.

Large amounts of sea sponges, named 'soap' by the fishermen, are often seen in the catches.

Biological samples.

A total of 20 shrimp samples mainly from Greenland trawlers and covering the period from April to the beginning of June have been analysed for size and developmental stage composition. A typical sample (taken in the afternoon local time to minimize the influence of vertical migration) from April is shown in table 6. The sample is from statistical unit JZ113 (see fig. 1) and thus from the main fishing area of that month. It is characterized by a high percentage of females (82.7 pct.) of which 94 pct. are berried, and by very low percentages of males and transitionals. In the present sample the number of shrimps per kg is 61, the characteristic figure being between 50 and 60 per kg.

Information from samples supports the information from skippers and observers that the fishery in April to May was based on high concentrations of berried females, while the later fishery exploited a more widely distributed stock.

All analysed samples show very low percentages of females neither having head roe at an early developmental stage nor being berried, thus indicating that almost the total population of females is spawning over several years.

Acknowledgements.

Gratitude should be expressed to my colleagues at the Greenland Fisheries Investigations for their great efforts to make data ready for analysis in spite of the short time of preparation available.

References.

Smidt, E., 1978. Diurnal variation in shrimp catches on the offshore grounds in ICNAF Divisions 1B and 1C. Sel.Pap.ICNAF, (4), 45-46.

Table 1. Reported catches (tons) at East Greenland in 1980 (Jan to Oct) by month and nation and no. of vessels fishing as reported to Greenland authorities.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Greenland	-	-	-	22	63	5	-	2	23	23	186
Denmark	-	-	-	-	294	151	70	-	68	84	667
Faroe Island	-	-	259	1187	1180	1266	-	-	-	144	4036
Norway	-	-	484	130	244	107	16	31	350	376	1738
France	-	-	-	-	-	-	-	-	9	44	53
Total	-	-	743	1339	1781	1577	86	33	450	671	6680

Table 2. Mean catch per hour (kg/hour) in the main fishing area at East Greenland as reported in logbooks of six trawlers April to October 1980 in a south to north grid (7 1/2 degree latitude scale - see fig. 1).

	Apr	May	Jun	Aug	Sep	Oct
KL	-	-	-	-	-	155
KK	-	-	-	-	-	155
KJ	-	-	-	-	-	83
KH	-	-	-	-	140	174
KG	-	-	-	80	272	115
KF	-	-	-	14	212	65
KE	-	-	-	-	199	52
KD	311	337	-	-	194	-
KB	-	424	54	13	-	-
KA	724	425	77	-	-	-
JZ	768	364	126	-	-	-
JX	-	370	155	10	-	-
JV	-	276	-	-	-	-
JS	-	-	-	-	-	-
Mean kg/hr	734	401	117	19	212	125

Table 3. No. of hours trawled at East Greenland as reported in logbooks of six trawlers April to October 1980 in a north to south grid (7 1/2 degree latitude scale - see Fig. 1).

	Apr	May	Jun	Aug	Sep	Oct
KL	-	-	-	-	-	31
KK	-	-	-	-	-	24
KJ	-	-	-	-	-	16
KH	-	-	-	1	8	36
KG	-	-	-	3	33	60
KF	-	2	-	7	114	25
KE	-	-	-	-	79	8
KD	1	44	-	-	23	-
KB	-	301	4	8	-	-
KA	14	477	19	-	-	-
JZ	17	306	36	5	-	-
JX	-	111	19	10	-	-
JV	-	2	-	-	-	-
JS	-	-	-	2	-	-
JL	-	-	-	1	-	-
JH	-	-	-	2	-	-
JF	1	-	-	-	-	-
JD	-	-	-	1	-	-
HZ	-	-	-	2	-	-
HX	-	-	-	3	-	-
HT	-	-	-	1	-	-
HK	-	-	-	2	-	-

Table 4. Diurnal variation in mean catch rate (kg/hour) per month and 2-hours period. The figures are monthly mean catch rates in the 2-hours period in percent of the highest mean catch rate of the month.

	Apr	May	Jun	Jul	Aug	Sep	Oct
Time							
period							
0	-	79.3	23.2	-	-	6.4	76.6
2	30.8	77.8	57.7	-	-	60.6	64.9
4	-	92.3	67.8	-	50.0	44.0	67.0
6	70.6	89.9	65.2	-	-	79.2	59.6
8	-	98.6	37.5	-	-	76.1	92.6
10	100.0	100.0	37.5	-	-	100.0	100.0
12	55.7	81.8	100.0	-	-	96.6	72.3
14	58.5	87.4	42.7	-	-	76.8	66.5
16	46.6	78.7	37.5	-	100.0	44.0	55.3
18	-	74.1	28.1	-	-	-	-
20	-	58.6	24.3	-	-	-	70.2
22	-	68.1	23.2	-	-	-	31.9
Max. mean catch rate (kg/hour) (= 100 percent):	1281	483	267	-	80	327	188

Table 5. Bycatch (tons) by month and species reported in logbooks of six shrimp trawlers fishing at East Greenland.

Species	Apr	May	Aug	Sep	Oct
Redfishes	0.8	3.3	1.1	0.2	0.4
Capelin	-	2.7	2.0	-	-
Mixed spec.	-	0.6	-	-	-
All species	0.8	6.6	3.1	0.2	0.4

Table 6. Shrimp sample from the Greenland trawler ELIAS KLEIST in April 1980 from statistical unit JZ113.

10 GR06-226 Elias Kleist 800416 3 800416 *
 11 Oestgroenland JZ113 305 305 1753 0322 2500 *
 13 Fjordtoft 20 987 1/ 1 0.0 3.3 sc 0.1 AGJ SF *

mm	M+JUV.	TRANS.		FEMALES (after first spawning)				LOST CARAP.		UNID. TOTAL	
		UR	HR	UR	HR	BR	HBR	UR+EH	HR+EH	UR	HR
19.5	0	0	0	0	0	1	0	0	0	0	0
20.0	1	0	0	0	0	0	0	0	0	0	0
20.5	0	0	0	0	0	0	0	0	0	0	0
21.0	0	0	0	0	0	0	0	0	0	0	0
21.5	0	1	0	0	0	0	0	0	0	0	0
22.0	0	0	0	0	0	0	0	0	0	0	0
22.5	0	0	0	0	0	0	0	0	0	0	0
23.0	2	1	0	0	0	0	0	0	0	0	0
23.5	1	0	0	0	0	0	0	0	0	0	0
24.0	1	0	0	0	0	0	0	0	0	0	0
24.5	2	1	0	0	0	0	0	0	0	0	0
25.0	2	1	0	0	0	0	0	0	0	0	0
25.5	0	2	0	0	0	0	1	0	0	0	0
26.0	0	2	0	0	0	2	0	0	0	0	0
26.5	1	1	0	0	0	2	0	0	0	0	0
27.0	0	3	1	0	0	0	2	0	0	0	0
27.5	1	1	1	0	0	5	0	0	0	0	0
28.0	0	1	0	0	0	5	0	0	0	0	0
28.5	0	1	0	0	0	8	5	0	0	0	0
29.0	0	0	3	0	0	10	9	0	0	0	0
29.5	0	0	0	0	0	10	9	0	0	0	0
30.0	0	0	1	0	0	9	11	0	0	0	0
30.5	0	0	0	0	0	13	10	0	0	0	0
31.0	0	0	0	0	0	5	4	0	0	0	0
31.5	0	0	0	0	0	10	3	0	0	0	0
32.0	0	0	0	0	0	5	0	0	0	0	0
32.5	0	0	0	0	0	8	3	0	0	0	0
33.0	0	0	0	0	0	0	1	0	0	0	0
33.5	0	0	0	0	0	4	0	0	0	0	0
34.0	0	0	0	0	0	1	0	0	0	0	0
34.5	0	0	0	0	0	1	0	0	0	0	0
>34.5	0	0	0	0	0	3	0	0	0	0	0
Unmeas	1	0	0	0	10	0	0	0	0	0	0
Total	11	14	6	0	10	97	60	0	0	0	0
Paras.	0	0	0	0	0	0	0	0	0	0	0

Males + juveniles % of total: 5.4
 Transitionals % of total: 9.9
 Females % of total: 82.7
 Unid. + lost carapaces % of total: 2.0
 Females UR % of total: 0.0
 % of females: 0.0
 Females UR + (UR+EH) % of total: 0.0
 % of females: 0.0
 Berried females % of total: 77.7
 BR + HBR % of females: 94.0
 % of fem. + trans.: 84.0
 Females, multiple spawners % of total: 29.7
 HBR + (HR+EH) % of females: 35.9

	small	medium	large
	<19.5 mm	19.5-29.0 mm	>29.0 mm
No. of shrimp measured	0	81	106
% of shrimp measured	0.0	43.3	56.7
Total no. of shrimps:	202		
No. per kg:	61		

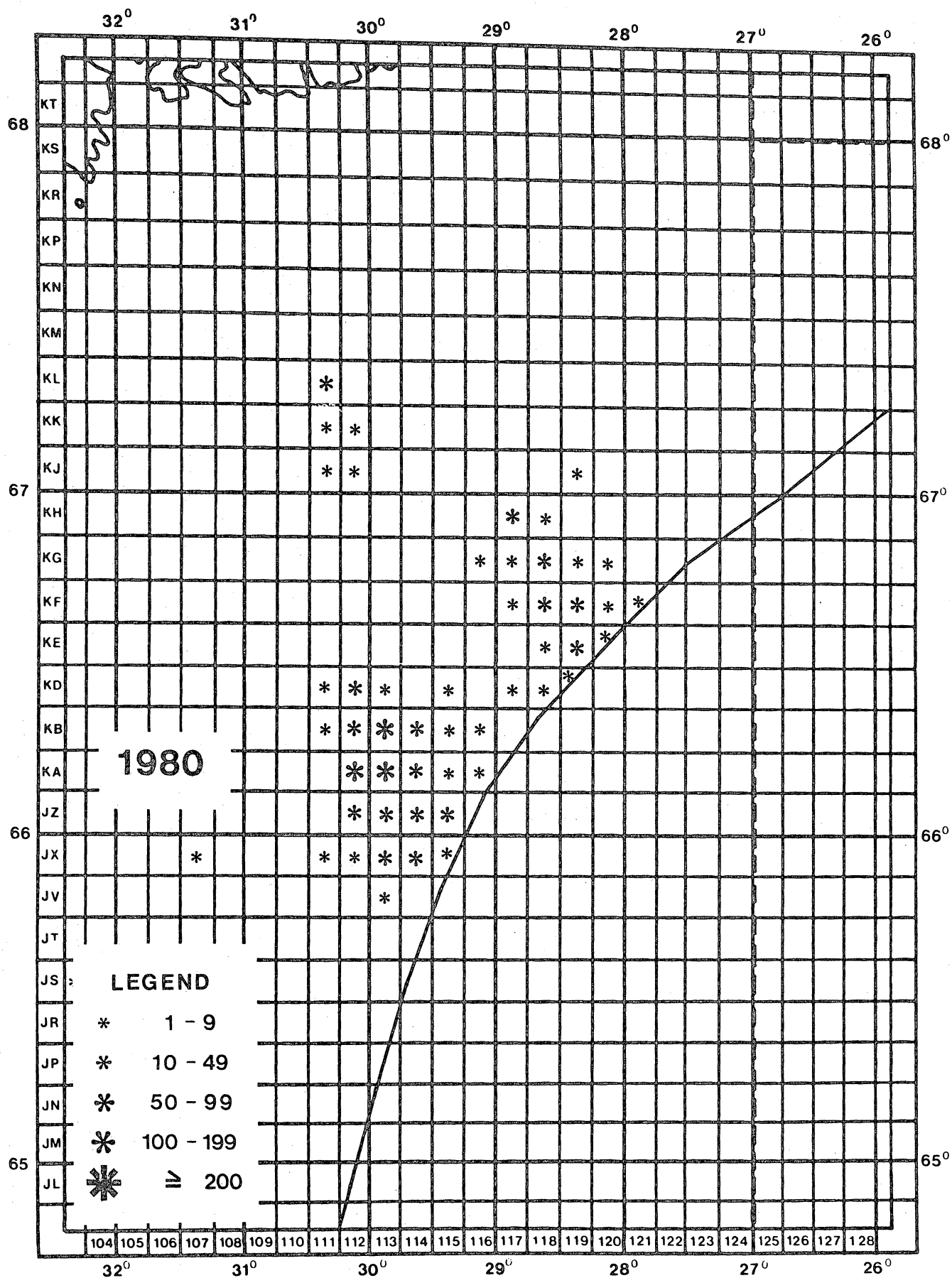


Fig. 1. Distribution of effort in the shrimp fishery at East Greenland of six trawlers from March to October 1980, excluding 13 hauls outside the map.

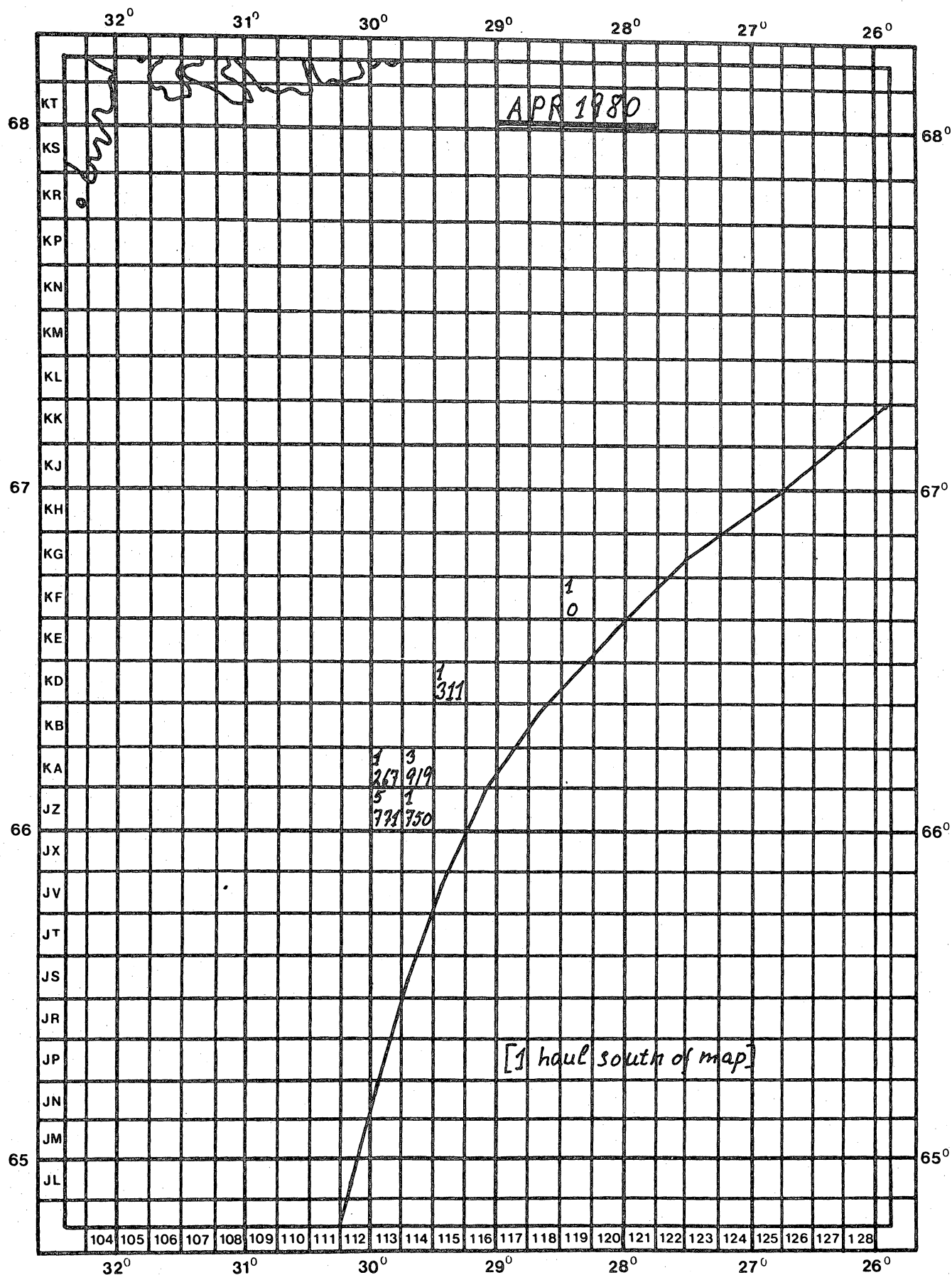


Fig. 2. No. of hauls and mean catch per hour (kg/hour) in the shrimp fishery off East Greenland in April 1980 as reported in logbooks of six Greenland shrimp trawlers. Upper figure in each statistical unit shows no. of hauls, lower figure mean catch rate (kg/hour).

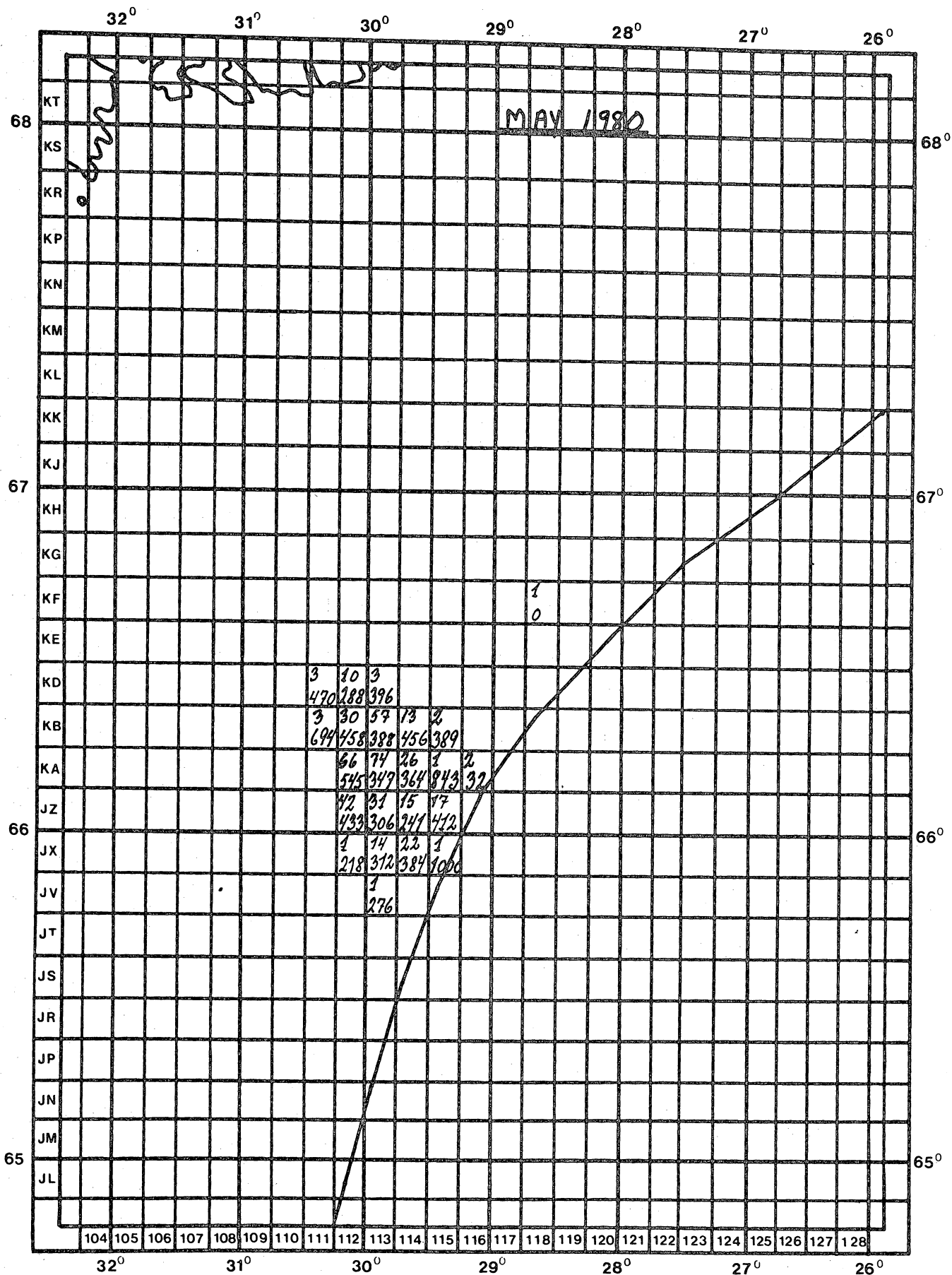


Fig. 2. Cont'd - MAY

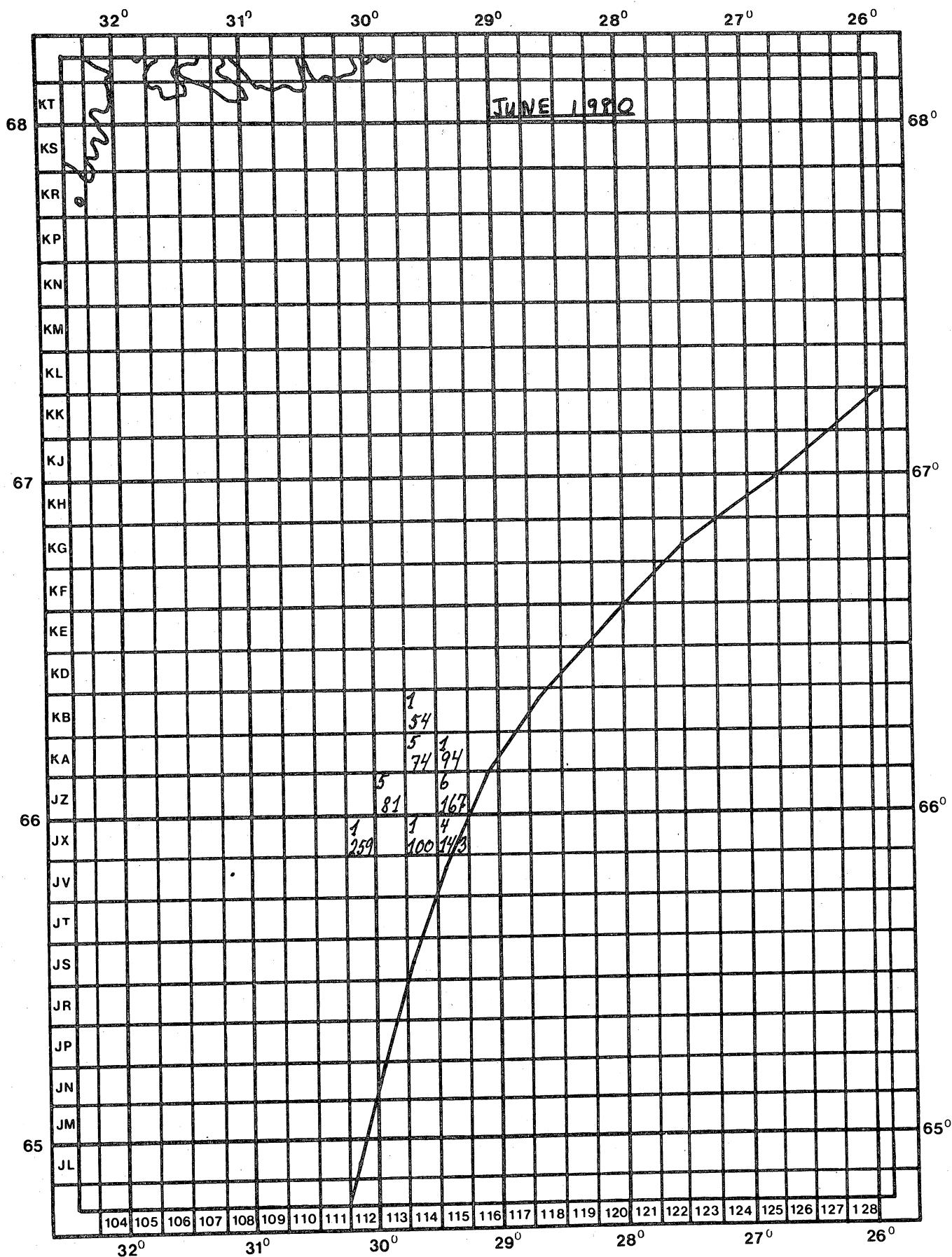


Fig. 2. Cont'd - JUNE

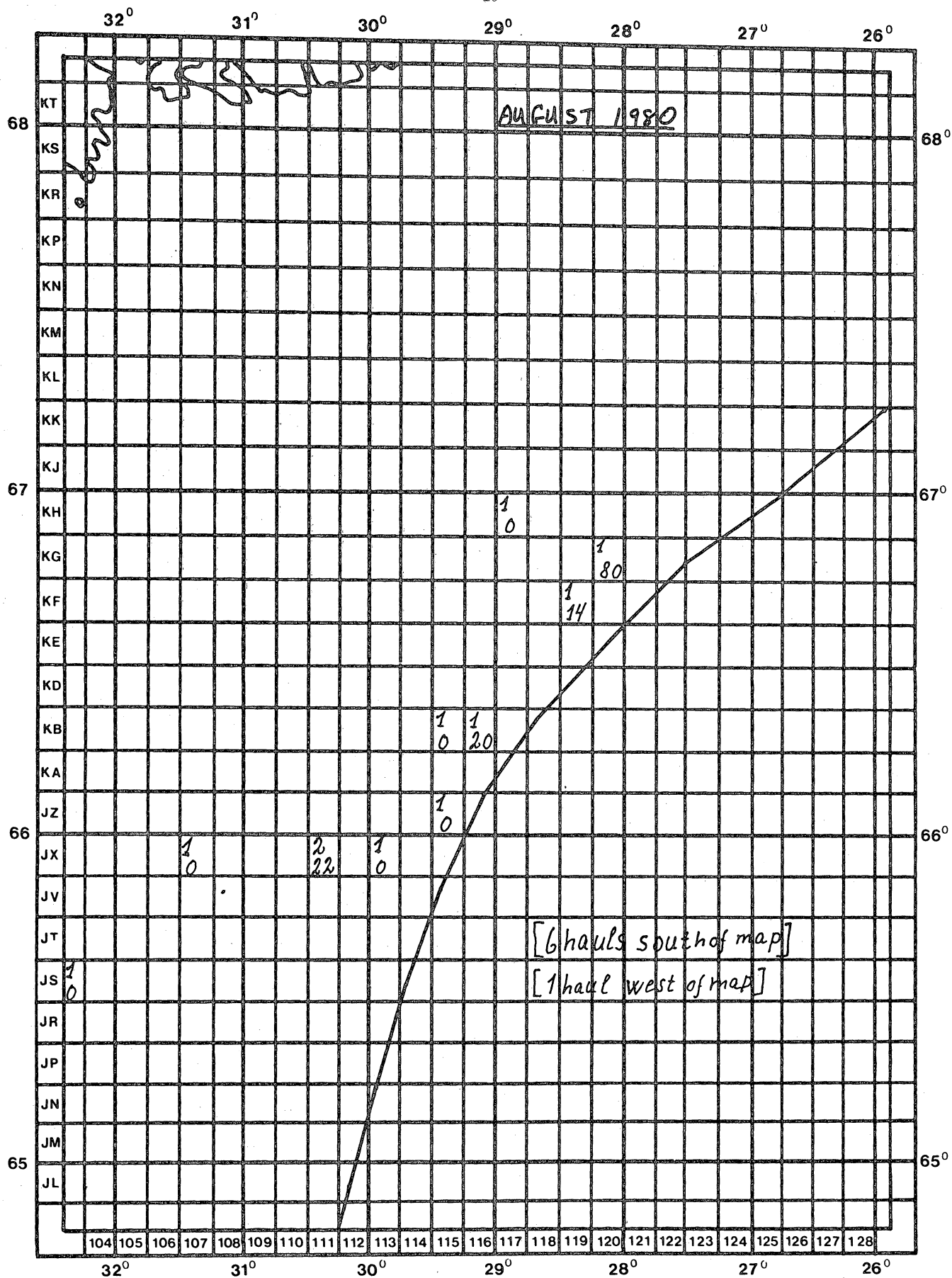


Fig. 2. Cont'd - AUGUST

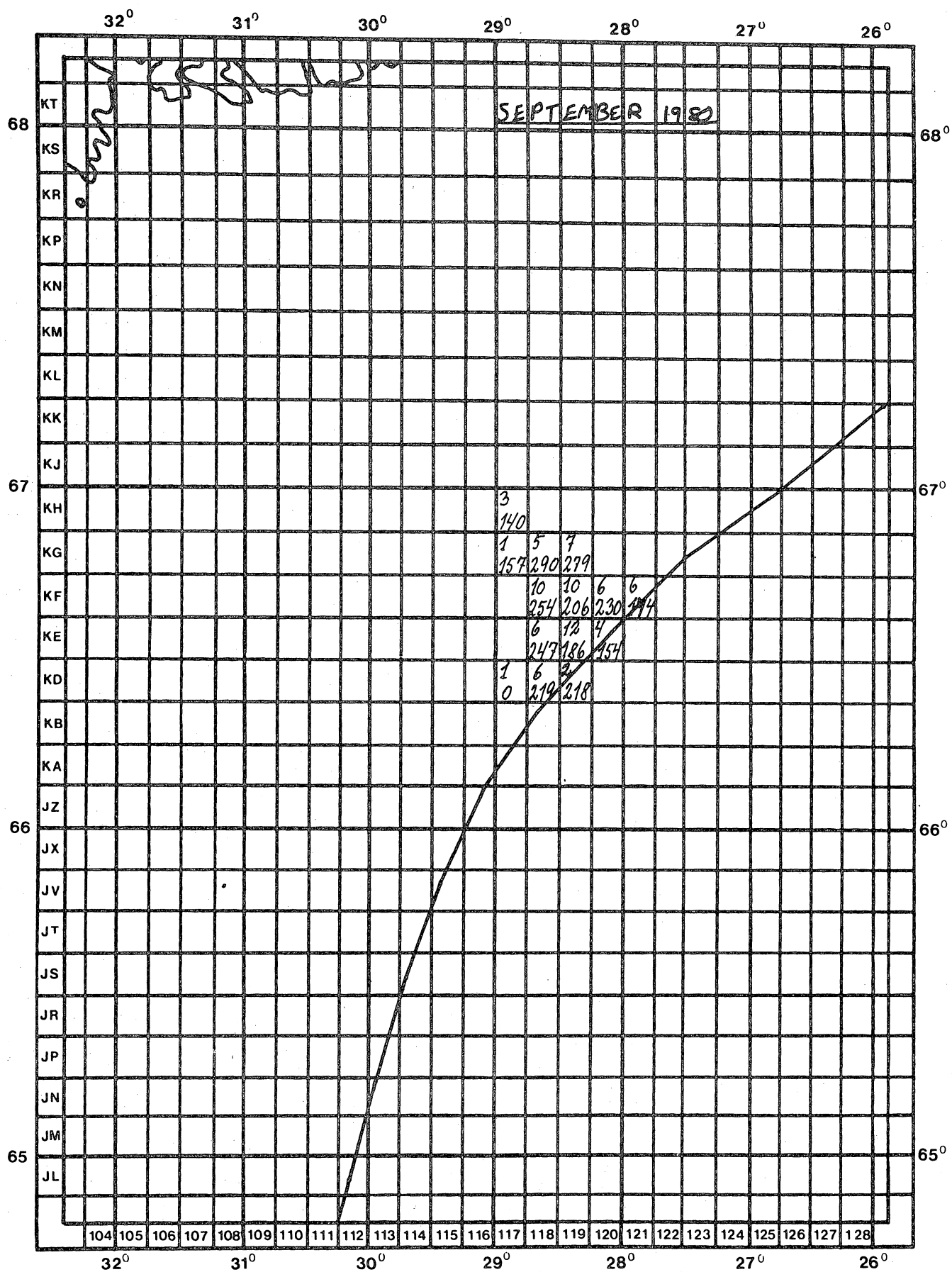


Fig. 2. Cont'd - SEPTEMBER

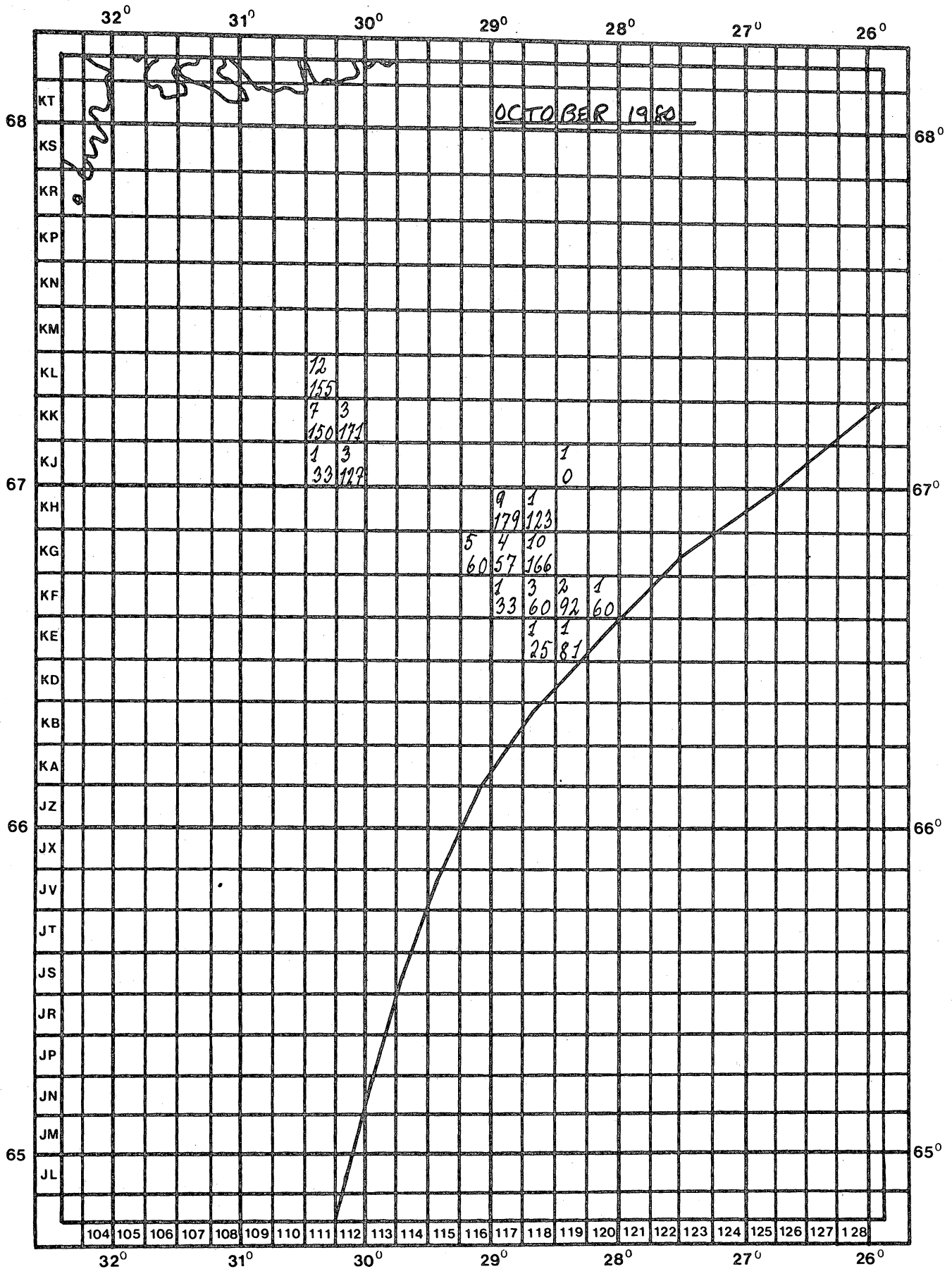


Fig. 2. Cont'd - OCTOBER