International Council for the
Exploration of the Sea.

Demersal Fish (Northern) Committee
Ref: Pelagic Fish (Northern) Committee
ICES C.M. 1977/F: 44

PRELIMINARY REPORT OF THE INTERNATIONAL 0-GROUP SURVEY IN THE FAROE WATERS 1977

x) General Secretary
ICES
Charlottenlund Slot
DK 2920 CHARLOTTENLUND

Summary.

Two countries participated in the international 0-group surveys at the Faroes in 1977.

France with R/V Chryos in May, and Faroe Islands with R/V Jens Chr. Svabo in June/July.

This report summarizes the results of the cruises of the two vessels.

Appended to this report is a summary of the 0-group surveys of Jens Chr. Svabo for the years 1974 to 1977, prepared by Kjartan Hoydal.

This summary includes the abundance indices of the four most common species. Cod, Haddock, Norway Pout and Sandeel together with the calculated precision of these indices.

Introduction.

For the first time since 1972 UK did notparticipate in the 0-group surveys at Faroes, leaving the task to France and Faroe Islands. R/V Chryos worked in the area from 15. to 21. May. The cruise was mainly intended to cover 0-group saithe.

Chryos covered in a fixed grid design 20 stations in stratum 1, which is mainly the area inside the 100 m depth contour line and 8 stations in stratum 2 which is the area between the 100 and 200 m depth line (se former reports).

Jens Chr. Svabo worked fram 23. June to 11. July covering 109 stations choosen randomly inside 3 strata, with 54 in stratum 1, 39 in stratum 2 and 16 in stratum 4 (Faroe Bank).

Methods and results.

The methods are described in former reports (Anon 1974, 1975 and 1976). The lack of knowledge about the distribution of 0-group saithe in May, and the limited number of stations to be worked by R/V Chryos was the reason for not choosing a random design to fix the stations.

The stations of Jens Chr. Svabo were choosen in the same way as last year.

Hydrography. Temperatures measured by R/V Chryos are given in fig. 1. They are not comparable to the fig. 5 given in former reports due to the early time of the cruise.

Hydrography is not performed by the Faroese vessel.

However mr. Bogi Hansen, Stöðisútbúgvingin, Tórshavn, has kindly placed some continous measurement on the Faroese Plateau at disposal. These measurements will soon be published elsewhere.

The curve at Munkagrunn (south of Suðuroy) is shown in fig. 2.

The figure offers very interesting information although it is not comparable to the measurements made in June-July by e.g. UK research vessels in former years. Usually the watermasses in the Faroe area are described as very uniform vertically, as it clearly is shown by the stations worked by research vessels.

No thermocline appears in the summer on the plateau.
However the continuous measurements of mr. Hansen shows variations of up to 1,5 degrees during one day and night. According to mr. Hansen (personal communication) this has to be interpreted as horizontal heterogenity, the current letting watermasses of different temperature pass the moored buoy.
Jugdedby eye figure 2 shows a general heating of the watermasses on this location from about 6.7°C to about 8°C from early May to July.

0-group abundance.

The average numbers of the major species in the cruise of Chryos and Jens Chr. Svabo per stratum are shown in tables 1 and 2 together with the calculated precision of the estimates.
The problem with this type of survey for saithe, is that they have to be placed very early to catch 0-group saithe before they leave the pelagic phase on the banks and go into the littoral zone. However the cruise shows that it is possible to catch the 0-group saithe, and the precision of the estimates seems reasonable,with the limited number of stations in mind. (Table 2). Tabel 6 shows how a larger number of stations would have increased the precision.
The figure can not be compared to indices of abundance for former years, as 1977 is the first year with a real cruise for 0-group saithe.

For cod, haddock and Norway Pout
the figures are lower for 1977 than for 1976 on the Plateau. It is further to be seen from the tables (in the appendix) that the precision of the survey has increased compared to former years. The comparison with former years will be discussed in the appendix.
The numbers of other species are given in table 3-5. The mean lengths of the major species are given in table 5.

TABLE 1

O-GROUP SURVEY FAROES 1977. JENS CHR. SVABO

Species	Stratum	Total catch	Stations	Negative Stations	Mean number	Precision %
Cod	str. 1	169976	54	1	3148	40.6
	- 2	5592	39	6	143	58.8
	- 4	244	16	6	15	110.8
Haddock	str. 1	1397	54	10	26	24.4
	- 2	1019	39	1	26	30.7
	- 4	232	16	0	15	25.8
Norway Pout	str. 1	5997	54	7	111	4[illegible]8
	- 2	157	39	23	4	82.0
	- 4	2	16	14	0.1	-
Sandeel	str. 1	49819	54	2	923	41.6
	- 2	9486	39	16	243	94.9
	- 4	4862	16	6	304	150.0

TABLE 2

O-GROUP SURVEYS FAROES 1977.
R/S CHRYOS

SPECIES	STRATUM	TOTAL CATCH	STATIONS	NEGATIVE STATIONS	MEAN NO.	PRECISION %
Cod	1	3208	20	2	160	75.8
	2	1237	8	3	155	222.8
Saithe	1	1686	20	2	84	70.9
	2	852	8	1	107	75.8

TABLE 3

0-GROUP SURVEY FAROES 1977. JENS CHR. SVA[illegible]

STRATUM 1. Numbers of "other" species per 30 min.

54 stations at random.

	Herring	Capelin	Whiting	Blue Whiting	Saithe	Sebastes sp.	Cottides	Lump-sucker	Sea-snail	Monk	Long Rough Dab	Dab	Witch	Lemon Sole
Total Catch in str. 1	7	6	13	0	630	581	166	1	49	0	606	506	2	6
Negative Stations str. 1	51	53	52	54	24	28	34	53	48	54	22	28	53	52

TABLE 4

STRATUM 2. Numbers of each species per 30 min.

39 stations at random.

	Herring	Capelin	Whiting	Blue Whiting	Saithe	Sebastes sp.	Cottides	Lump-sucker	Sea-snail	Monk	Long Rough Dab	Dab	Witch	Lemon Sole
Total Catch in str. 2	0	0	7	18	10	1531	6	0	0	0	67	60	1	5
Negative Stations str. 2	39	39	34	32	36	18	37	39	39	39	21	27	38	38

TABLE 5

STRATUM 4. Numbers of "other" species per 30 min.

16 stations at random.

	Herring	Capelin	Whiting	Blue Whiting	Saithe	Sebastes sp.	Cottides	Lump-sucker	Sea-snail	Monk	Long Rough Dab	Dab	Witch	Lemon Sole
Total Catch in str. 4	0	0	0	46	0	2	0	0	0	4	1	5	0	1
Negative Stationsstr. 4	16	16	16	7	16	15	16	16	16	12	15	11	0	15

TABLE 6

0-GROUP SURVEYS FAROES 1977

R/S CHRYOS

PRECISION AS A FUNCTION OF THE NUMBER OF STATIONS TAKEN

NUMBER OF STATIONS	PRECISION % SAITHE	
	STRATUM 1	STRATUM 2
25	62.5	68.2
50	43.1	47.0
75	34.9	38.1
100	30.1	32.8

TABLE 7

O-GROUP SURVEY FAROES 1977. JENS CHR. SVABO

Meanlengths of major species in all strata, mm

Species	Stratum	$\bar{x}$	S^2	Stand. Dev.	Rel. std.	Range
Cod	str. 1	23.5	14.566	3.817	0.002	12-40
	- 2	25.9	18.397	4.289	0.014	9-39
	- 4	29.3	21.458	4.632	0.079	14-41
Haddock	str. 1	17.3	19,761	4.445	0.057	8-48
	- 2	19.5	35.711	5.976	0.054	9-59
	- 4	31.5	89.315	9.451	9.451	14-59
Norway Pout	str. 1	21.2	21.428	4.629	0.037	10-36
	- 2	23.8	17.841	4.224	0.154	14-46
	- 4	20.5	16.667	4.082	4.167	16-24
Sandeel	str. 1	42.9	48.455	6.961	0.014	20-67
	- 2	45.0	48.788	6.985	0.054	20-71
	-	46.8	217.566	14.750	0.415	20-73

HITI, Temperature measurements by a moored buoy
Depth on average 39-40 m.
Courtesy of Mr. Bogi Hansen, Stöðisútbúgvingin, Tórshavn

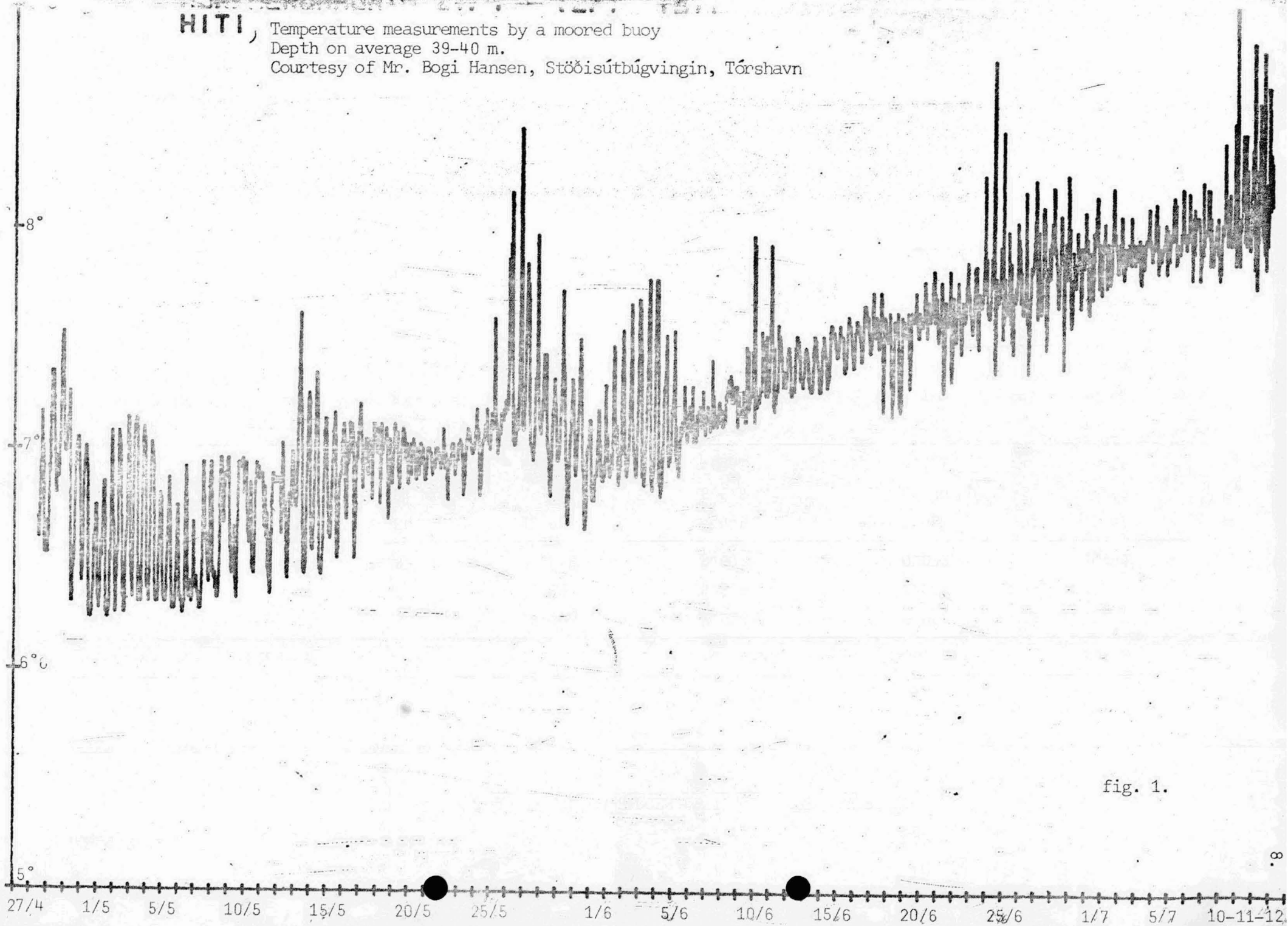

fig. 1.

ANALYSING THE 4 YEARS SERIES OF 0-GROUP SURVEYS OF THE FAROESE RESEARCH VESSEL JENS CHR. SVABO IN FAROE WATERS.

by
Kjartan Hoydal
Fiskirannsóknarstovan, Tórshavn.

The Faroese 0-group surveys as a part of the international 0-group surveys in Faroe Waters have taken place now for 4 years. This is a too short time span to make it possible to get estimates of yearclass strength from other sources e.g. VPA. At present there is no mean by which to convert the indices to actual numbers, so the results of the 0-group surveys can by used directly as input to predictions on future catch.

Results:

Tables A 1-4 summarize the results of the 0-group survey for four major species on the Faroe Plateau (stratum 1 and 2). The table A 1 and A 2 give dates, total catch, number of stations mean number per station (half hour haul) and the precision calculated in the same way as described in the report from 1975 (Anon. 1975) Tables A 3 and A 4 give the meanlengths corresponding to tables A 1 and 2.

Discussion:

The statistical precision has increased since the surveys started as it is seen from tables A 1 and A 2.

Two indices are given. The abundande in stratum 1 and in stratum 2. The strata are not of equal size. Stratum 1 comprises 49 rectangles size 5 minutes latitude x 10 minutes longitude. Stratum 2 comprises 100. Combining stratum 1 and 2 by adding the mean value for stratum 1 to the mean value in stratum 2 x 2.04 gives the estimates in table A 5.

Using 1974 as an index we get the following.

Index	Cod	Haddock	Norway Pout	Sandeel
1974	100	100	100	100
1975	148	176	7	35
1976	302	371	61	17
1977	65	56	1	14

The indices of cod and haddock are remarkably alike with tops in 1975 and 1976. There is however a factor with relevance to these abundance estimates that must be kept in mind. It is the correct timing of the survey.

If the survey starts too early a larger fraction of the 0-group will not be caught by the gear, if to late a fraction has left the pelagic phase and will

not be caught.
This is clearly demonstrated by comparing the results of the late and the early cruises in 1974 (Hoydal 1974) and f.ex. the cruise of Chryos and Jens Chr. Svabo 1977. Chryos did not catch haddock but a few single specimens, and the number of cod are much lower than later on.
The timing can however not be given in absolute time of the year. The timing should really be directed by the growth of the larvae. The bulk of larvae should have reached some size where they are well caught by the gear.
On the other hand they should not have left the pelagic phase.
Now looking at the tables 3 and 4, it is seen that the mean length varies to a considerable extent. Comparing results from cruises taking place at the same dates shows great difference too. As an example in stratum 1 cod can be taken.

Year	Week no.	Cod, mean length	Range
1974	26	36.0	21-72
1975	23-25	26.1	8-44
1976	25-27	29.8	11-50
1977	25-27	23.5	12-40

It is seen that a rather variable picture arises. Especially it is interesting to see the low mean size in 1977 where the cruise was at the same time as in 1976. This low mean length is seen in all the 4 species.
This is of course what would be expected, as growth is a function of time and temperature, which not are the same in different years. Continous temperature measurements as the ones given by mr. Hansen mentioned on page would make it possible to estimate day-degrees form the spawning time, and thus make a correction possible when the spawning time is known.
The crucial point seems to be not to start the survey to early, so the gear will not catch 0-group below a given size efficiently.
This might offer an explanation why the figures are so much lower in 1977 compared to former years in all 4 major species.
In the report from the Working Group of the Fish stocks at Faroes (Anon. 1977). Year class strength for a number of years are given for cod and haddock as two years old, estimated by VPA.
Taking the largest and the smallest year class in the period 1957-1967 for cod and haddock we get

	Mill. as two years old	
	Cod	Haddock
Largest	22.8	50.5
Smallest	8.0	19.4
Largest / Smallest	2.85	2.60

This can be compared to the factor arriving from dividing the 1976 0-group index with the 1977 one giving for cod 4.65 and haddock 5.62, thus the about double of the factor from the VPA.

REFERENCES:

Hoydal, Kjartan, 1974: Preliminary Report on the 0-group Survey in the Waters around the Faroes
Annales Bilogiques 1974, 31 p. 210-217.

Anon 1975: Preliminary Report of the International 0-group Fish Survey in Faroese Waters
ICES CM 1975 /H:51

Fig. 1 A. Temperature 0° at 0 m. CHRYOS 10.-16. May

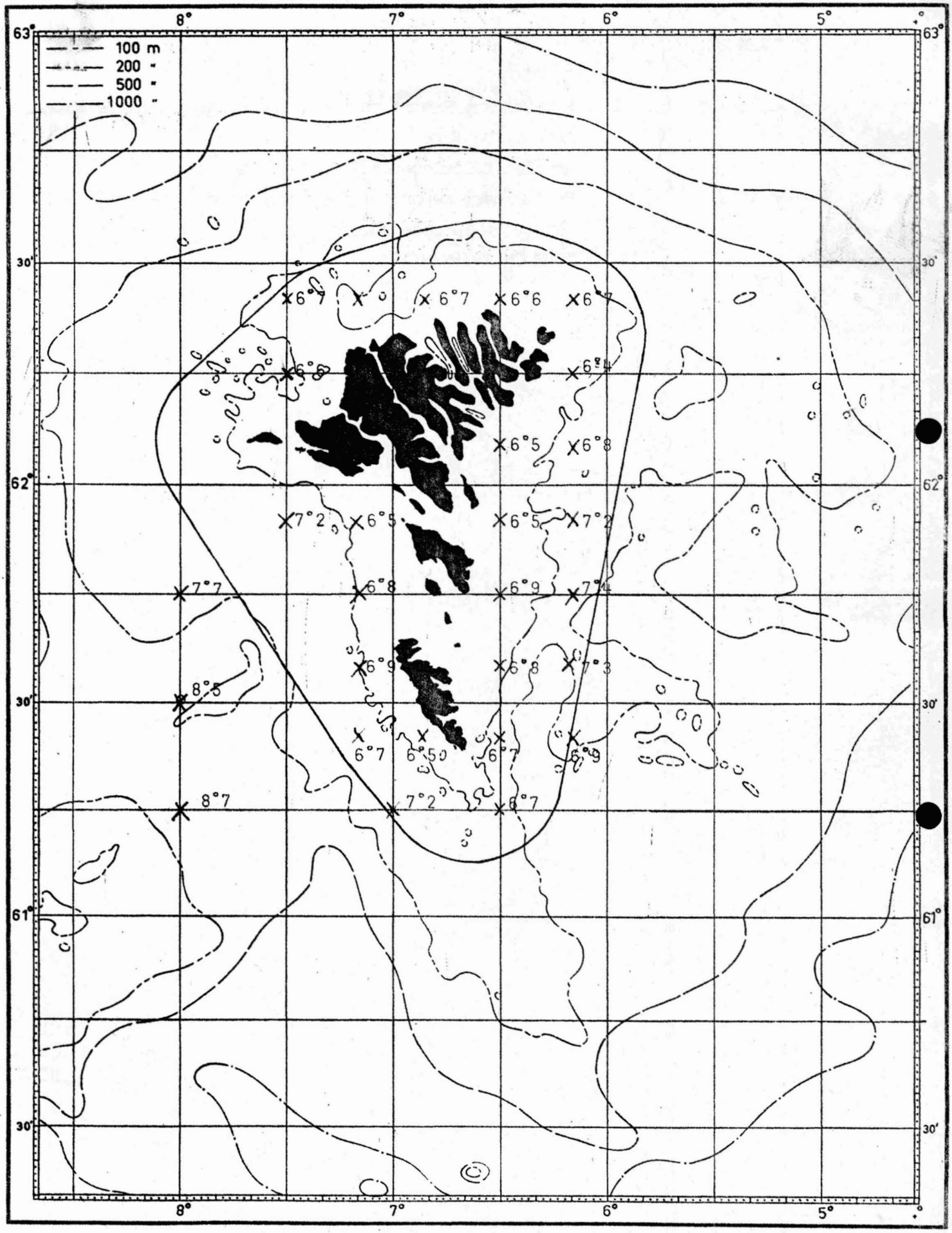

Fig. 2 A. Temperature 0° at trewling depth. CHRYOS 10.-26. May

TABLE A 1 O-GROUP SURVEY FAROE JENS CHR. SVABO

STRATUM 1

Species/year		Total number of Specimen	Stations	Negative Stations	Meannumber $\bar{x}$	K	Precision d
Cod							
1/7-5/7	1974	78482	17	1	4617	0.2931	95
11/6-26/6	1975	74032	24	0 (1+)	3085	0.3498	71
22/6-9/7	1976	591745	52	0	11165	0.3844	44.9
23/6-11/7	1977	169976	54	1	3148	0.4506	40.6
Haddock							
1/7-5/7	1974	1009	17	3	59	0.3346	89
11/6-26/6	1975	243	24	10	10	0.2299	89
22/6-9/7	1976	7206	52	2	139	0.5977	36.1
23/6-11/7	1977	1397	54	10	26	1.3179	24.4
Norway Pout							
1/7-5/7	1974	172574	17	3	10151	0.1565	130
11/6-16/6	1975	26224	24	3	1093	0.2477	85
22/6-9/7	1976	318124	52	4	6118	0.2542	55.2
23/6-11/7	1977	5997	54	7	111	0.3554	45.8
Sandeel							
1/7-5/7	1974	69345	17	0 (1+)	4079	0.2974	9[illegible]
11/6-26/6	1975	33359	24	1	1390	0.3883	68
22/6-9/7	1976	49236	52	2	947	0.4222	42.8
23/6-11/7	1977	49819	54	2	923	0.4295	41.6

TABLE A 2 O-GROUP SURVEY FAROES . JENS CHR. SVABO

STRATUM 2

Species/year		Total number of Specimen	Stations	Negative Stations	Meannumber $\bar{x}$	K	Precision d
Cod							
5/7-25/7	1974	10370	32	12	324	0,1247	1 102
26/6-4/7	1975	60531	26	5	2328	0,1734	96
7/7-16/7	1976	102395	44	10	2327	0,1539	77,5
4/7-11/7	1977	5592	39	6	143	0,3039	58,8
Haddock							
5/7-25/7	1974	932	32	8	29	0,3029	66
26/6-4/7	1975	2529	26	3	97	0,3912	65
7/7-16/7	1976	6510	44	4	147	0,3614	50,6
4/7-11/7	1977	1019	39	1	26	1,1600	30,7
Norway Pout							
5/7-25/7	1974	116072	32	20	3627	0,0412	178
26/6-4/7	1975	2422	26	9	93	0,1678	98
7/7-16/7	1976	97121	44	26	2207	0,0491	125,6
4/7-11/7	1977	157	39	23	4	0,1624	82,0
Sandeel							
5/7-25/7	1974	90825	32	22	2838	0,0329	199
26/6-4/7	1975	26397	26	7	1015	0,1486	105
7/7-16/7	1976	16466	44	23	374	0,0763	110,0
4/7-11/7	1977	9486	39	16	243	0,1165	94,9

TABLE A 3 O-GROUP SURVEYS FAROES JENS CHR. SVABO

STRATUM 1

Menalengths etc. of major species.

Species/year		Numbers Measured	Mean length	Variance	Range	Date
Cod	1974	1730	38.8	36.0	21-72	1-5/7
	1975	2504	26.0	28.5	8-44	11-26/6
	1976	9844	29.8	31.3	11-50	22/6-9/7
	1977	6858	23.5	14.6	12-40	23/6-11/7
Haddock	1974	179	52.6	148.1	28-105	1-5-/7
	1975	133	17.8	37.9	10-46	11-26/6
	1976	1286	26.4	45.8	10-41	22/6-9/7
	1977	345	17.3	19.8	8-48	23/6-11/7
Norway Pout	1974	1822	37.7	29.4	19-54	1-5/7
	1975	641	23.5	21.2	7-34	11-26/6
	1976	4525	30.4	32.0	12-51	22/6-9/7
	1977	578	21.2	21.4	10-36	23/6-11/7
Sandeel	1974	1200	62.6	65.6	35-101	1-5/7
	1975	1729	43.7	70.9	18-68	11-26/6
	1976	2544	51.8	23.7	20-73	22/6-9/7
	1977	3527	42.9	48.5	20-67	23/6-11/7

TABLE A 4 O-GROUP SURVEY FAROES JENS CHR. SVABO

STRATUM 2

Meanlengths etc. of major species.

Species/year		Numbers Measured	Mean length	Variance	Range	Date
Cod	1974	15	36.9	21.6	30-50	5/7-25/7
	1975	1293	28.0	26.8	13-47	16/6-4/7
	1976	800	35.7	25.7	15-52	7/7-16/7
	1977	1362	25.9	18.4	14-41	4/7-13/7
Haddock	1974	42	56.1	224.2	37-97	5/7-25/7
	1975	884	21.2	33.2	9-45	16/6-4/7
	1976	1485	29.7	60.0	11-79	7/7-16/7
	1977	667	19.5	35.7	9-59	4/7-13/7
Norway Pout	1974	49	49.0	38.3	27-58	5/7-25/7
	1975	270	20.0	34.8	8-39	16/6-4/7
	1976	798	36.9	18.8	18-52	7/7-16/7
	1977	116	23.8	17.8	14-46	4/7-13/7
Sandeel	1974	243	65.1	78.1	42-93	5/7-25/7
	1975	617	42.6	66.4	17-70	16/6-4/7
	1976	798	59.6	51.7	22-77	7/7-16/7
	1977	905	45.0	48.8	20-73	4/7-13/7

TABLE A 5

O-GROUP SURVEY FAROE, JENS CHR. SVABO

Abundance estimate of 4 major species. O-group surveys at Faroe 1974-1977 by R/V Jens Chr. Svabo.
Combined estimate str. 1 and 2 (see text) numbers per 1/2 hour haul.

	Cod	Haddock	Norway Pout	Sandeel
1974	5278	119	17554	9872
1975	7836	209	1283	3462
1976	15914	441	10622	1711
1977	3440	79	119	1419