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R. V. ERNEST HOLT

Report for Cruise 111/1963

by J. Corlett

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Duration: 1235 hrs 3 April to
1520 hrs 6 May.

(all times G.M.T.)

Aims

To take part in the first survey of the ICNAF study of the environment and the planktonic stages of cod and redfish in Greenland waters, (NORWESTLANT 1).

Narrative

Sailing was delayed until the mid-day tide on the 3rd because the ship's refit had been held up by bad weather. After a moderate passage in the North Sea the ship reached Stornoway at 1245 on the 5th to top up with fuel and fresh water. We sailed at 1805 and had a good passage to the southern end of the Hydrographic Section VI in $56^{\circ}32'N$ $38^{\circ}40'W$. Work on the section was started at 1610 on the 9th, and continued in good weather until 1535 on the 11th, with a diversion to work Reference Station A in $58^{\circ}30'N$ $43^{\circ}W$ on the evening of the 10th. The last station on the section was near the ice edge about 10 miles from Cape Farewell.

The next part of the programme was a grid of 60 plankton stations about 240 miles long and 60 miles wide covering the coastal banks of south-east Greenland between Cape Farewell and Cape Mosting. This was about one quarter of the full grid between Iceland and the Davis Straits to be worked by ships of four countries between 10 and 20 April to study the distribution of cod eggs and larvae. Before we were able to start on the grid the wind increased to gale force from the north-east and we had to heave to for 24 hours. Between 1600 on the 12th and 1400 on the 20th, we managed to complete thirty-nine stations with vertical hauls of the Hensen net or the 1 metre silk net. The wind was between north and east all the time and was never less than 20 knots: for most of the time it was over 25 knots and we had three interruptions for gales, the largest being for three and a half days between the 16th and 19th when the winds reached storm force. The thirty-nine stations, with five on the hydrographic section, made a grid of forty-four stations which covered the whole area except for the strip between 10 and 20 miles off the coast, which was covered by pack ice. Cod eggs were found at all stations on the banks, and the numbers in the vertical nets were so large and the weather so poor that neither the 2 metre stramin net nor the Icelandic High Speed Sampler was used. The largest catch was over 900 eggs at one station on the Fylkir Bank.

On completion of the plankton grid we sailed for Reykjavik for fuel and water, arriving at 1800 on the 22nd. The French Research Vessel THALASSA, which had been working in the section to the north and east of us, also arrived in Reykjavik that day. We were able to exchange results and have useful discussions with the French scientists and with the staff of the Icelandic fisheries laboratory.

We sailed from Reykjavik at 1015 on the 24th in company with THALASSA and made a rendezvous with the Russian Research Vessel ACADEMICIAN KNIPOVICH at 2230 in $63^{\circ}24'N$ $26^{\circ}43'W$. In that position the three ships worked a full hydrographic station so that a comparison could be made of the different methods of analysis.

We then sailed for Reference Station B in $61^{\circ}N$ $34^{\circ}W$ at the southern end of Hydrographic Section IV. The section was started at 2335 on the 25th and completed near Cape Mosting at 1425 on the 28th, after a break of thirty-two hours in a northerly gale between the evening of the 26th and the morning of the 28th.

On the evening of the 28th we fished on Fylkir Bank but came fast and damaged the net in the first haul and only caught six baskets of cod, haddock, redfish and halibut.

We spent the 29th making a direct measurement of the current over the Fylkir Bank by tracking two parachute drogues for thirteen and a half hours.

Work on the third Hydrographic Section (No.V) was started off Cape Discord at 0925 on the 30th. The wind increased steadily as we continued south eastwards along the section and by the afternoon of May 1st a south westerly gale and heavy swell forced us to stop work. At 1710 it was decided to abandon the section, and course was set for the Pentland Firth. Strong to gale force winds between south-west and north-west helped us make a fast passage, and we reached Aberdeen at 1635 on the 5th. After landing samples for the Marine Laboratory we sailed at 1645, and docked in Grimsby at 1520 on the following afternoon.

Results

1. Cod Egg Survey

Cod eggs were found at the stations on the banks on all the lines between Cape Farewell and Cape Mosting. The largest numbers were over the Fylkir and Cape Bille banks in the north, and between Cape Discord and Cape Farewell in the south. Most of the eggs were in the early stages I and II or stage III, but a few later stages, IV and V were found: one cod larva was caught off Cape Farewell and three on Fylkir Bank. (See Figure and Table).

Near the ice field, 10 to 20 miles from the coast, the surface temperature was below $0^{\circ}C$ and over the deep water, about 40 miles from land, it was above $5^{\circ}C$. In some places there were sharp gradients. Most of the eggs were in water with surface temperature between 1° and $5^{\circ}C$.

2. Hydrography

(a) The three hydrographic sections were about 120 miles apart and ran south-eastwards from the coast for about 240 miles. On the two northern sections we were unable to work the innermost stations because of ice. The temperature pattern on all three sections was similar. Over the shelf there was a layer of cold surface water of less than $2^{\circ}C$ while the temperature near the bottom between 200 and 400 metres was between 3.5° and $4^{\circ}C$. Of the edge of the shelf the Irmiger Current water was distinguished by temperatures above $5^{\circ}C$ down to 300 or 400 metres. East of this the temperatures were below $5^{\circ}C$ from the surface downwards until about 200 miles from the coast when there was again water above $5^{\circ}C$ from the surface down to about 300 metres. Sampling was restricted to the top 1,500 metres: below 1,000 metres the temperature was between 3.5° and $3.7^{\circ}C$, except for the station on each section nearest the shelf, where it was warmer. The pattern on each

section was similar to that found by the Germans in March-April, 1958.

(b) Phosphate and silicate analyses were carried out on board. Observations were made in the top 100 metres on all hydrographic stations, and to the deepest sampling depth on the reference stations.

The phosphate results show the same pattern in each section with the highest values in the cooler water in the central part of the sections. The lowest values were in the cold water over the banks, and they were low again in the warmer water on the outer ends of the sections. The three sections show decreasing values from north to south.

The silicate values show a similar pattern to the phosphates on the northern and southern sections, but on section V the highest values occur in the warmer water close to the shelf.

(c) Reference Station A in $58^{\circ}30'N$ $43^{\circ}W$ was worked to the bottom in 2,600 metres on 10th April. The temperature at 1,800 metres was $3^{\circ}C$ and at the bottom $1.9^{\circ}C$.

Reference Station B in $61^{\circ}N$ $34^{\circ}W$ was worked as part of Section IV, but because of poor weather, no observations were made below 1,500 metres.

A third reference station (named "C") was worked in $63^{\circ}24'N$ $26^{\circ}43'W$ in 1,250 metres in company with THALASSA and ACADEMICIAN KNIPOVICH. We were able to exchange temperature, salinity, phosphate and silicate data with THALASSA during the next two days but were unable to make radio contact with ACADEMICIAN KNIPOVICH. THALASSA's temperatures were about $0.1^{\circ}C$ higher than ours above 450 metres and about $0.1^{\circ}C$ lower below 450 metres. At all depths THALASSA's salinity observations were about 0.04‰ lower than ours. The phosphate and silicate values were generally similar for both ships.

(d) The tracking of two parachute drogues on Fylkir Bank on the 29th was very successful. The drogues were at 29 metres and were attached to light dahn buoys. Over thirteen hours the average drift was 1 knot in the direction 215° . The wind was between 10 and 20 knots from between 020° and 040° .

Several other measurements of current speeds were made from the drift of the ship on stations.

(e) 480 surface drift bottles were released in batches of 40 at the ends and middle of each section, on the Fylkir Bank, and at other places on or near the shelf.

(f) The towed electrodes were used between stations on all three sections.

3. Fishing

Only one haul was made on the Fylkir Bank in 115 to 135 fms, and the trawl came fast after thirty minutes. The catch included four baskets of cod, many of which were mature or spent, and half a basket of haddock, which included a few ripe fish.

Lining for redfish was tried at about half the stations on the hydrographic sections, but without success.

4. Plankton

- (a) At each station on the sections a Nansen bottle full of water from 20 metres was filtered for chlorophyll estimations by J. Steele of Aberdeen
- (b) 125 cc samples of water were preserved from 10 metres at each hydrographic station for phytoplankton analysis of sedimentation by Dr. M. Gillbricht. At each end of the sections extra samples were taken at standard depths to 500 metres.
- (c) A Fine Net haul from 50 metres was made at most of the hydrographic stations. Very little phytoplankton was present.
- (d) At the deeper stations on sections IV and V comparative hauls were made with the "Weather Ship" net and the Nansen net, which is used on the Norwegian weather ships.

5. Miscellaneous

- (a) Regular daily R/T contact was made with THALASSA, and information about the progress of the work was exchanged. We maintained daily contact with G. O. SARS in the early part of the cruise until we were separated by the Greenland land mass. We were unable to make contact with ACADEMICIAN KNIPOVICH until after an exchange of cables while we were in Reykjavik.
- (b) Ice reports were sent regularly with the weather observations to Prince Christiansund on Angmagssalik radio stations. During the first part of the cruise the pack ice was generally between 10 and 20 miles from the coast, but during the second part of the cruise it was seen in several places 30 miles offshore.

J. Corlett
7.5.1963

R.V. ERNEST HOLT. CRUISE 3/1963
NORWESTLANT I

COD EGGS AND LARVAE

PROVISIONAL COUNTS (Not corrected for flowmeter readings)

A. HENSEN NET 100 - 0 M

1	2	3	4	5	6	7	8	9	10	11	12	
DATE APRIL	STA	GRID No.	POSITION		HAUL	EGGS					LARVAE	SURFACE TEMP. °C
			N. o'	W. o'		STAGES						
						I + II	III	IV	V	TOTAL		
11	6	133	5845	4214	I					0		4.5
					II					0		
	7	134	5900	4238	I					0		5.2
					II					0		
	8	135	5915	4302	I			4	2	6		5.4
					II		2	2	2	6		
	9	136	5930	4327	I	80	73	4		157	1	1.1
					II	84	77	3	1	165		
	10	(137)	5937	4341	I	27	14			41		-0.1
					II	30	17	1		48		
12	11	130	5938	4240	I	27	8	1		36		2.6
					II	26	7	1		34		
	12		5938	4221	I					0		5.4
					II					0		
	13		5948	4240	I					0		0.6
					II	3	8	2		13		
	14	129	6000	4240	I	20	11	2		33		2.2
					II	19	10	1		30		
	15	128	6000	4220	I	129	44	2		175		3.4
					II	125	52	6		183		
13	16	127	6000	4200	I	26	30	7	2	65		4.3
					II	36	34	5	2	77		
	17	126	6000	4140	I	2			1	3		5.3
					II					0		
	18	124	6020	4120	I					0		5.4
					II					0		
	19	(123)	6024	4158	I	10	2			12		2.0
					II	6	3			9		
	20		6020	4220	I	72	6	6	1	85		2.3
					II	83	5	2		90		
	21	(122)	6020	4233	I	38	8	2		48		1.4
					II	52	7	1		60		
	22	121	6040	4220	I	13	2			15		0.9
					II	5	5			10		
14	23	120	6040	4200	I	50	29	1		80		0.9
					II	44	31	2		77		
	24	119	6040	4140	I	49	23	4		76		0.4
					II	28	13	3		(44)		
15	26	117	6100	4058	I					0		5.5
					II					0		
	27	116	6100	4140	I	11	9	1		21		-0.5
					II	8	12	1		21		
	28		6100	4155	I		8			8		-1.2
	29	(113)	6120	4144	I	5	3			8		-1.1
					II	3	5			8		
	30	112	6120	4120	I	37	16	4	1	58		3.3
					II	22	10	2	1	35		
	31	111	6120	4058	I					0		5.5
					II					0		
	32	107	6140	4135	I	4	1		1	(6)		-1.0
					II	13	4			17		
16	33	108	6140	4053	I					0		5.6

B. I.M. SILK NET 100 - 0 M

1	2	3	4	5	6	7	8	9	10	11	12		
19	34	(86)	6238	3955					0		6.0		
	35	93	6230	4018					0		5.8		
	36	96	6220	4040		166	126	36	4	332	5.2		
	37		6210	4019		10	4	1		15	5.8		
	38	103	6200	4042		1	6	5		12	5.6		
	39	104	6200	4104		35	45	12		92	1.5		
	40	105	6200	4124		41	38	6		85	- 1.1		
	41		6210	4102		25	36	6	2	71		2.0	
	20	42		6220	4102		127	164	25	3	319		2.4
		43	91	6230	4102		37	7	3	1	48		1.5
44		92	6230	4040		109	28	6	2	145		4.9	
45		87	6240	4040		846	69	30	15	960	3	2.0	
46			6250	4019		14	1			15		5.9	
47		(85)	6256	4039		31	13	7	1	52		2.5	
48			6304	4023		9	1	1		11		2.0	
49		82	6312	4010			1			1		- 0.4	
50		(81)	6306	3950						0		6.0	

- N.B. (a) () in column 3 indicates haul within 5 miles of station or grid
- (b) () in column 10 indicates some damage to the net: where the net was badly damaged the haul is omitted.
- (c) Area of mouth of 1 M silk net is 2 x that of Hensen Net.

R.V. ERNEST HOLT Cruise 3/1963

(From German Chart No 256)

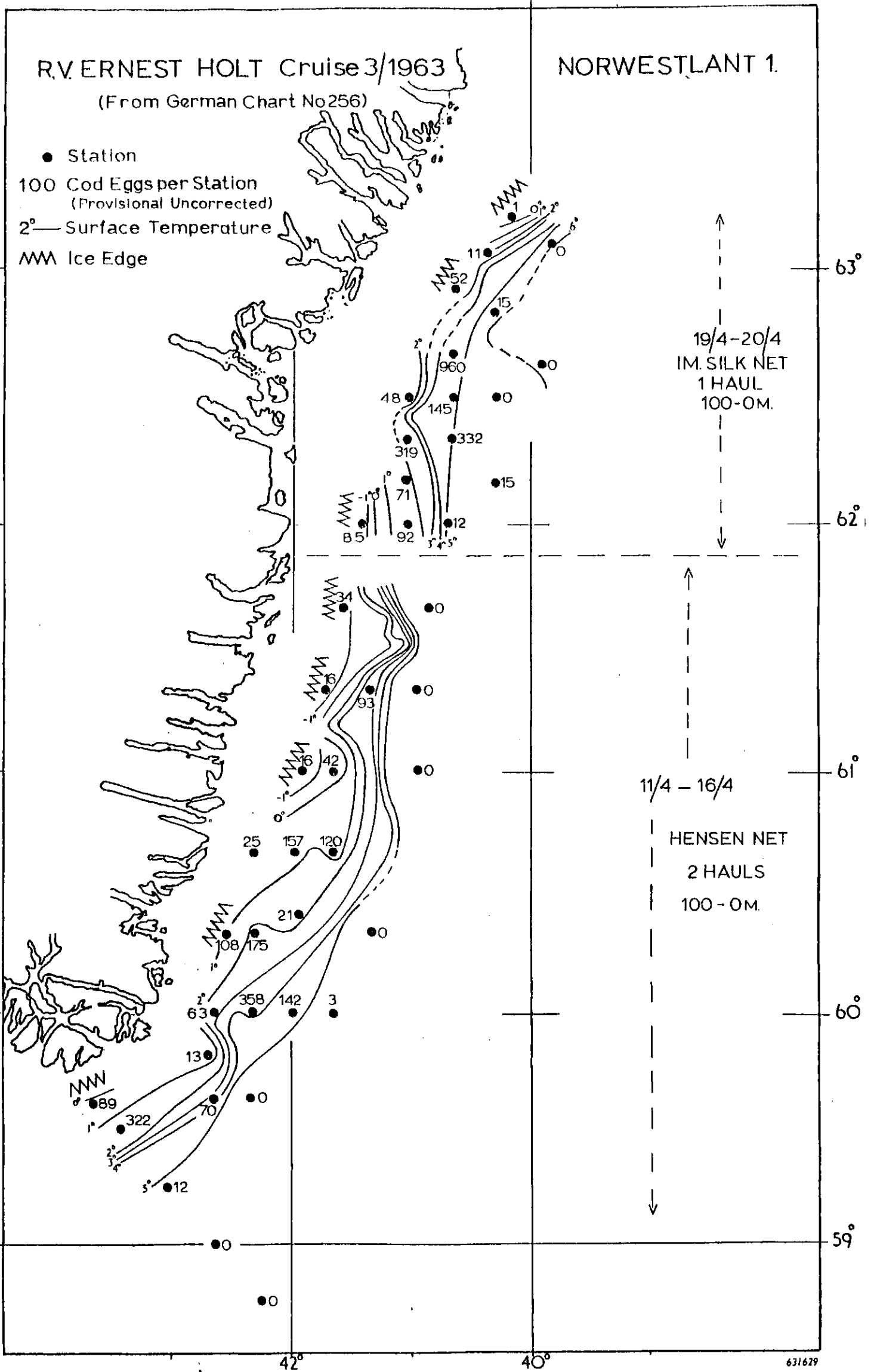
NORWESTLANT 1.

● Station

100 Cod Eggs per Station
(Provisional Uncorrected)

2°— Surface Temperature

MM Ice Edge



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