

Provisional: not to be quoted without reference to the writer

R. V. ERNEST HOLT

Report for Cruise 7/67

Staff:

- D. J. Garrod
- P. G. Griffiths
- A. D. Clayden
- J. H. Nichols
- T. C. Doddington
- A. J. Jones
- B. J. Clarke (to Aberdeen)

Duration:

15 August-11 September

Aims:

1. To participate in the international survey of 0-group fish in the north-east Arctic.
2. To continue the programme of development of echo-survey techniques with special reference to:
  - (a) the integration of pelagic traces on an extended survey;
  - (b) the range and resolution of the 100 Kc echo-sounder;
  - (c) the estimation of the number, size and target strength of individual fish.
3. To continue the development of a net suitable for sampling pelagic scattering layers containing 0-group fish.

Narrative:

This cruise was a part of an international survey of the distribution of 0-group fish in the pelagic scattering layer of the north-east Arctic. The other vessels taking part were:

AKADEMIK KNIPOVITCH	} USSR	JOHANN HJORT	} Norway
FRITJHOF NANSEN		G. O. SARS	

R. V. ERNEST HOLT sailed at 15.30 GMT on 15 August. Mr. Clarke carried out initial tests on the 100 Kc echosounding equipment and after he was disembarked at Aberdeen on 16th we continued to the Norway coast, arriving off Malangen on 19th. Two days were spent on these grounds testing three nets, the Engels midwater trawl, a 'Boothbay' net, and a modified TTN, and calibrating their depth of fishing against ship's speed and warp length. We took fuel and water at Tromso on 22nd and commenced the ERNEST HOLT's section of the international Barents Sea 0-group fish survey at 1300 hrs on 23rd.

The survey entailed systematic echo survey of the pelagic scattering layer along a pre-arranged grid, with periodic sampling of the trace for identification of the 'scattering' organisms. The R. V. ERNEST HOLT grid included the Svalbard Shelf and whilst in the vicinity of Bear Island on 26 August a search was made to locate concentrations of cod on the bottom suitable for further tests of the 100 Kc echo-sounder and fish-counting equipment, and for experiments on the selection characteristics of ulstron and mufil cod-ends. Cod were very sparse in both the SE and NW Gully averaging about 5 baskets/hour, and the search was discontinued on 28th in order to obtain medical assistance at Longyearbyen for an injured crewman. R. V. ERNEST HOLT was forced to return to Longyearbyen a second time shortly after leaving following a second injury, but we were able to resume the survey at 0600 GMT on 29 August.

The diversion to Spitzbergen necessitated a slight revision of the R. V. ERNEST HOLT grid and from Longyearbyen we proceeded to the northern limit of navigation at this time, encountering pack ice at 79°39'N. The survey grid

was then worked southward with a simultaneous survey of the Spitzbergen Banks for concentrations of adult cod. Adequate quantities were found on Bellsund Bank on 1 September. We carried out the selectivity and echo-counting experiments here and the survey was then continued southward, the selection work and testing of the 100 Kc sounder being completed on the banks south of Bear Island on 4 September.

R. V. ERNEST HOLT then returned to the area of highest concentration of 0-group fish reported by all vessels in the survey in order to investigate further the haul-to-haul variation in catches of 0-group fish, and to attempt trace identification with the underwater camera. In the course of this work R. V. ERNEST HOLT sustained some damage to her propeller on 6 September and, since the programme was virtually complete, the remainder was abandoned in order to proceed to Honingsvaag for inspection. We then proceeded to Tromsø on 7th for Lloyd's clearance and to disembark the N.I.C. who remained for discussions with the Norwegian and USSR scientists. R. V. ERNEST HOLT then had a fair passage to Grimsby, docking at 2300 hrs on 11 September.

The weather was exceptionally calm throughout the cruise but the area north of 74°00' was fog-bound almost continuously.

Results:

0-group survey. Full details of the survey will be published elsewhere. The preliminary impression indicates a reduced amount of 0-group redfish compared with 1966 and increased quantities of cod and haddock. Haddock were particularly widespread. Surprisingly large quantities of 0-group coalfish were located in the West Spitzbergen Current and were identified as far north as 78°54'N.

Pelagic trace sampling. One of the main problems of this survey has been to develop a gear which will take a quantitative as well as qualitative sample of the echo trace. The performance of the Boothbay Harbour net was encouraging in this respect and may serve this purpose given some increase in size, a change of rig and general strengthening to enable it to be towed at 6<sup>1</sup>/<sub>2</sub>-7 knots.

Electronic equipment

- (1) The acoustic link worked perfectly for monitoring the performance of the Boothbay Harbour net.
- (2) The 30 Kc integrator also worked perfectly throughout the cruise and is expected now to give an adequate quantitative estimate of the scattering layer. The flexibility of this integrator also enabled us to collect data which it is hoped will provide estimates of the target strength of the particular size group of cod on the fishing grounds but it was not possible to carry out enough bottom trawling to make much progress in defining an integration/catch relationship.
- (3) The 100 Kc gear was less successful. A series of technical problems prevented a thorough test of the high power transmitter. However, the 100 Kc low power gear did work and provided very useful additional information on the structure of the pelagic scattering layers. The single fish/shoal separator-cum-integrator cycle counter functioned but it was apparent that to make the best use of the information provided by the echo-sounder a 100 Kc bottom lock device, and a different form of presentation of the 'cycle counting', will be required.

Selectivity. Concentrations of cod were located only at Sorkapp, Hornsund and Bellsund. In this last area catches ranged from 5 to 30 baskets of cod per hour, with a sprinkling of 'jumbo' haddock. The better hauls represented good commercial fishing rates and gave adequate quantities of cod within the selection range of the cod-ends being investigated. Provisional results are as follows:

<u>Twine</u>	<u>Mesh size</u> (mm)	<u>Number of fish</u>				<u>Selection factor</u>
		<u>Cod-end</u>	<u>Cover</u>	<u>50% retention</u>		
Ulstron	139.5	2 205	2 339	490	3.50	
Nufil	141.7	537	912	540	3.80	

Underwater camera. It was only possible to complete one shot of the underwater camera but some of the negatives look promising.

Although not all the objectives of the cruise worked out in the manner expected, nevertheless the scientific programme was satisfactorily and successfully completed: in addition to providing the required results for this year it has indicated the way in which the technique of echo-survey needs to be improved in the near future.

D. J. Garrod

15 September 1967

Seen in draft: M.R.S.  
G.W.A.

Initialed: H.A.C.

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