

R1/12

3SR84

IN CONFIDENCE: Not to be quoted without prior reference to the Laboratory

FRV 'Scotia'

Cruise 3/84

LD

REPORT

15 March to 4 April

OBJECTIVES

- 1) To conduct 'in-situ' target strength experiments on blue whiting and herring.
- 2) To test a dual frequency towed body (38 and 120kHz).
- 3) To investigate long term performance of the transducer calibration rig.

PART 2

- 4) To test and deploy a free fall drop camera.
- 5) To evaluate a new scanning sonar system.
- 6) To observe the behaviour of shoaling fish especially their reaction to disturbance by research vessels.
- 7) To test shooting and hauling procedures of the IKMT.

GENERAL

Part 1 25 March to 30 March

After several unavoidable delays, Scotia sailed from Aberdeen on the morning of the 25 March and proceeded directly to anchor in Loch Eriboll for calibration experiments. The standard 38kHz calibration system was set up on arrival late in the evening and was operated continuously until the following afternoon to check on long term stability, which proved excellent. At the same time the dual beam target strength equipment was checked and calibration measurements were made.

Scotia then proceeded to the area west of St. Kilda to search for blue whiting concentrations for 'in-situ' target strength measurements; a suitable mark was found at around 57 30 N and 9 30 W. Dual beam data were acquired during the afternoon of 27 March, and a trawl sample was taken for length and weight measurements. The same procedure was followed on the following day at a position 30 miles further south. The fish length distribution found was appreciably different, and a further trawl haul was made in the first location to confirm that the difference was real.

In both locations, the fish caught were all spent, and Scotia moved north in the hope of finding some pre-spawning fish for comparison. On passage the dual frequency towed body was deployed and appeared to behave satisfactorily. Fish traces were found at about 58 45 N and 8 30 W, but unfortunately, before any work could be done, news of a bereavement was received and Scotia proceeded directly to Stornoway to land the officer concerned, arriving late on the evening of the 29 March. Despite the short time available, all the objectives of this part of the cruise were satisfactorily attained, although more data from different parts of the area would have been useful.

Part 2 30 March to 5 April

Scotia sailed from Stornoway at 1700 on the 30 March to Little Loch Broom, anchoring at approximately 2100 hours. The scanning sonar developed by Sonar Research and Development (SRD) was deployed on Scotia's port crane for initial evaluation. The trials of the sonar continued on the 31 March and included (i) range and bearing tests with 300kHz transponders deployed from Scotia's rubber boat (ii) tracking tests using transponders and trawl floats which were allowed to drift free with the wind and tide. At approximately 2000 Scotia left Little Loch Broom to test the IKMT in deep water south of Priest Island.

Scotia anchored in Loch Ewe at 0800 on the 1 April in close proximity to Aultbea. The scanning sonar was tested on large static objects which included Aultbea pier and the "dolphins" associated with the fueling berth in Loch Ewe. The free fall camera system was simultaneously tested for buoyancy and a recovery method was developed. The camera frame also formed a target for the scanning sonar. Scotia sailed from Aultbea at approximately 1600 and anchored in deep water in Loch Ewe where the pressure and time release mechanisms on the drop camera system were tested on several tethered drops. Scotia's new Simrad SX200 sonar was used to track the drop camera on each occasion. Further trials of the IKMT were made on the night of the 1 April as Scotia crossed the Minch, docking in Stornoway at 1000 on the 2 April to disembark personnel from the SRD and Mr Urquhart. Scotia sailed at 1100 to continue testing the Simrad SX200 sonar, which was used to track small shoals of fish south of Stornoway. A grid pattern was then set working south from Stornoway to the Shiant Islands searching for suitable sonar targets on which the drop camera system could be tested. Two free fall camera tests were made on scattering layers north of the Shiant Island, both were successful in that the system functioned correctly, however no photographs of fish were taken. The search grid was abandoned at 2200 and further test on the IKMT took place over night.

Most of the 3 April was spent in an unsuccessful attempt to locate suitable fish shoals on the north east side of the Minch. The grid was expanded to include the north coast and a small shoal of fish was located in Loch Eriboll at approximately 2100. However worsening weather conditions combined with difficulties in manoeuvring Scotia over a small shoal prevented the drop camera from being deployed. Scotia sailed for the Moray Firth at 2300 where a final test of the IKMT was made.

The drop camera system was deployed on a scattering layer of fish near the sea bed off Nairn, once again the system worked correctly but no photographs of fish were obtained. Scotia sailed from Nairn to Aberdeen at 2000 docking at 0230 on the 5 April.

RESULTS

- 1) The SRD scanning sonar system was tested on several different types of target and in general worked well. It was possible to obtain clear images of stationary objects such as the ships anchor chain, piers, the drop camera etc. However it was often difficult to interpret the results of transponder tests, the 300kHz transponder giving better results than the 75kHz system. It was not possible to find a 6inch aluminium trawl float at a range of approximately 100m, although larger targets could be found with relative ease.
- 2) The Simrad SX200 sonar was tested and appears to work well. Only one fish shoal was located and tracked, but this was mainly due to a lack of suitable targets. Several pinnacles on the sea bed were detected at ranges greater than 1000m and the ship successfully steered to pass directly over them.

- 3) The stereodrop camera system was tested and 3 successful free fall drops were made. Although no fish were photographed, this was probably due to a lack of suitable targets.
- 4) The IKMT was successfully tested and 12 instrumented hauls were made.

S T Forbes and J I Edwards

22 October 1984.