R1/12

In Confidence - Not to be quoted without reference to Laboratory

FRV 'Scotia'

Cruise 3/81 3SR81

Report

25 March - 14 April

Objectives

1. To carry out an acoustic survey to the west of Britain to establish the abundance and distribution of the blue whiting spawning stock, as part of an ICES coordinated programme.

2. To identify echotraces and collect biological samples by way of directed midwater trawling.

3. To measure single fish echoes with the purpose of assessing target strength in situ.

4. To investigate the possible application of underwater photography to blue whiting identification and density determination; to record fish orientation by underwater flash to provide evidence for non-reaction in the dark.

5. To commission the new shipboard computer.

6. To prepare a documentary film to illustrate blue whiting trawling and sampling.

Narrative

After leaving Aberdeen at 1900 hrs, 25.3.81, 'Scotia' steamed to Loch Eriboll, where an acoustic calibration was performed. The ship then continued to a position west of the Flannans (58° N, 09°30'W) in order to participate in an intercalibration exercise with the Norwegian research vessels "GO Sars" and "Michael Sars". On its completion at 2000, 27.3.81 the survey resumed, but only to be temporarily discontinued when the towed transducer was brought aboard because of bad weather (2145, 27.3.81 - 1100, 28.3.81). On 29.3.81 the trawl was shot, partly to test the winding-on gear of the starboard net winch in which a fault had been discovered on the day prior to sailing. Although the net was recovered it was found to have suffered considerable damage through contact of the sweeps with the bottom. A test session on 30.3.81 confirmed a suspicion that the gearbox for the starboard net winch had developed a fault, and the Chief Engineer recommended that trawling be abandoned. The acoustic survey was continued along the continental slope to Porcupine Bank (see cruise track) before returning northwards, and the mid-cruise break was taken between 0900, 2.4.81 and 1100, 3.4.81 at Stornoway. During the second half of the Survey 'Scotia' covered an area between 54°30' and 60°N, taking in Rosemary Bank, Rockall and the continental slope, before putting into Scapa Flow, Orkney, for a final instrument calibration (0630 - 1100, 12.4.81). The ship docked at Aberdeen at 2200, 13.4.81. The cruise track was as illustrated in Fig. 1.

On six occasions during the cruise video recordings were made and colour and monochrome still photographs were taken by underwater cameras lowered into what were considered to be dense blue whiting concentrations. On two such occasions, when the vessel was stationary, acoustic data from single fish insonified by a transducer similarly lowered into a shoal, were collected and transferred to computer store.

Results

Density distribution

Densities of up to 600t km^{-2} per half hour run were recorded. Arithmetic mean densities (averaged for each statistical rectangle) were highest on the shelf edge between latitudes 54° and 55°N (135 - 195 t km^{-2}) and between 59° 30' N and 60° 30'N (112 - 150 t km^{-2}). Contouring revealed a steep gradient in density in the area of the shelf edge just north of latitude 53°30'N.

Identification of echotraces

Repeated attempts to identify blue whiting by remote photography at depths where echo-intregated densitites were high were unsuccessful; however, small sources of reflected light (possibly planktonic in origin) were observed.

Target strength

On two occasions, transducers were lowered to the depth of the assumed blue whiting later. Single fish echoes were recorded and the data stored on computer.

Computer

Considerable progress was made towards commissioning the new ship' s computer.

Because trawling was rendered impossible, objective (?) (see above) was not achieved and objectives (4) and (6) were only partially attained.

The acoustic and photographic results of this survey are discussed more fully by Warburton and Forbes (1981) ('The density distribution and abundance of blue whiting spawning to the west of the British Isles in 1981"., ICES CM 1981/H:5).

K Warburton
3 August 1981

Seen in draft: I C McLeod

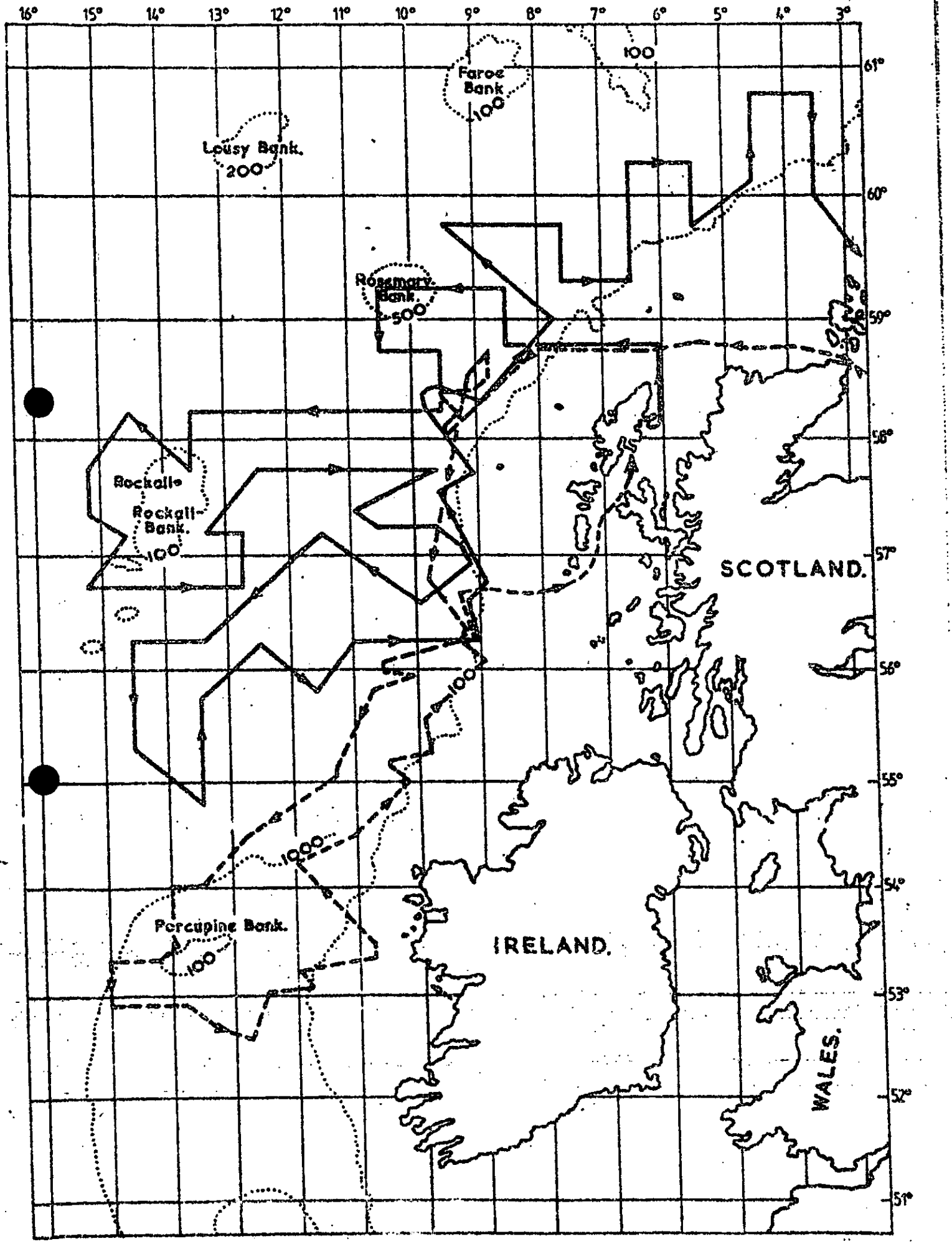

Fig. 1 Cruise track, FRV 'Scotia', 25 March - 2 April; , 3 - 12 April 1981.

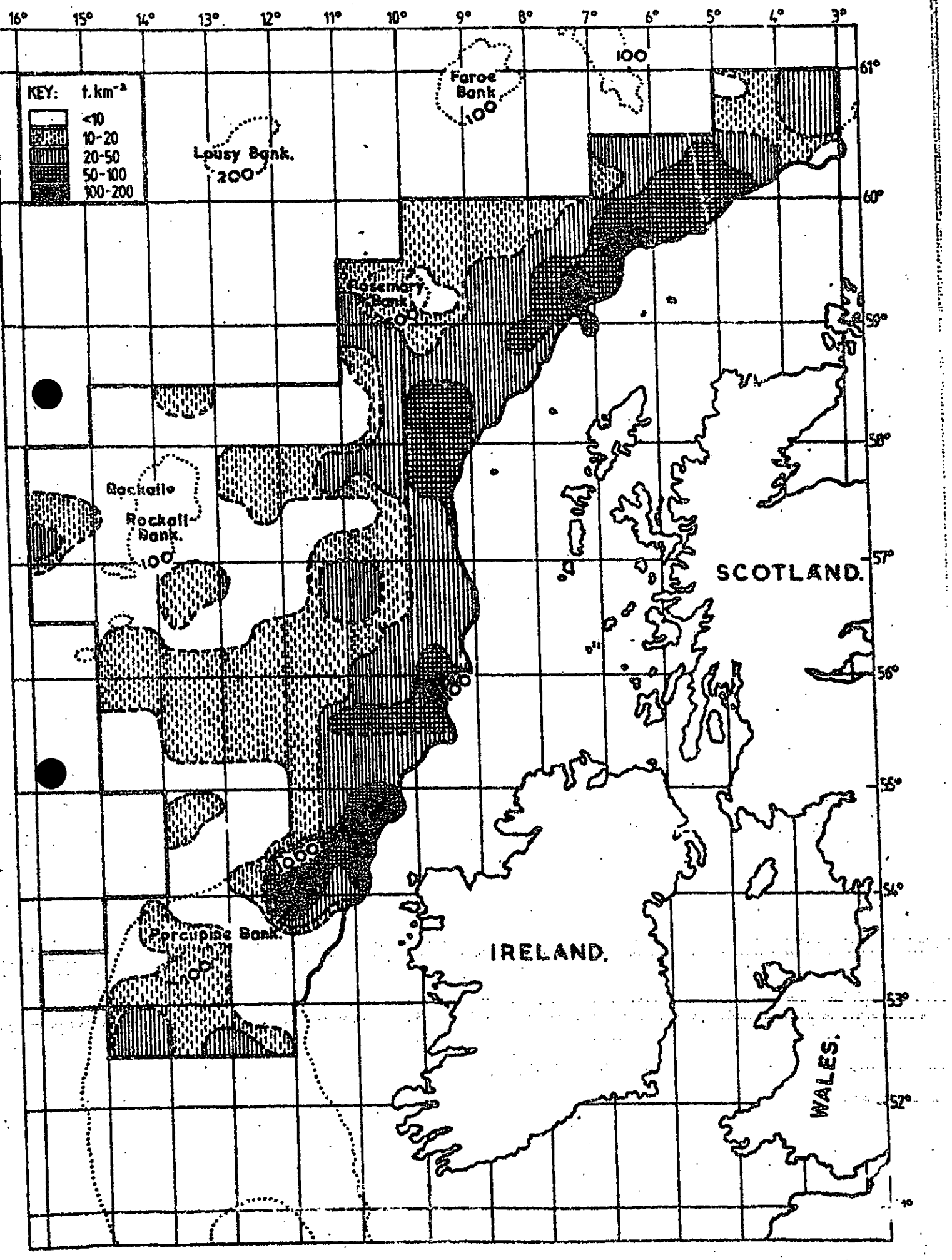

Fig. 2. Contour diagram of blue whiting density distribution.