Scottish Marine Biological Association

Dunstaffnage Marine Research Laboratory

Cruise Report

R.R.S. CHALLENGER

Cruise 6B/1977

14 - 19 April 1977

Duration of cruise: 0900h 14 April to 0915h 19 April 1977.

All times BST.

Locality: Rockall Channel, 57° to 58°N.

Staff: D.J. Ellett

D.J. Edelsten

A.M. Souter

D.I. Williamson (Univ. of Liverpool, Port Erin)

J.H.A. Martin (DAFS, Aberdeen)

J. Humphrey (IOS, Taunton)

L.G. Duff (U.C. of Swansea)

Aims:

1) To re-establish the shelf current meter mooring in 57°N, 9°W.

2) To work the Anton Dohrn Seamount STD section.

3) To work the Rosemary Bank STD section and sections on shelf to the west of the Hebrides as time permits.

4) To collect 50 litre surface samples at standard positions on the shelf for radiocaesium analysis.

5) To moor an IOS Taunton Waverider buoy off the west coast of South Uist.

6) To dredge on the continental slope for live specimens of the small crab Doryneus for Dr Williamson.

Narrative Gales gusting to 50 kt on 13 April caused the postponement of sailing from Dunstaffnage to 0900h 14 April. The westerly wind had moderated to force 5 by the time CHALLENGER reached the first radiocaesium sampling station off Tobermory at 1212h, and the heavy swell decreased during the passage to the shelf-edge. STD loweringswere made from station C2 onwards and three stations of the Anton Dohrn Seamount section were worked during the night. After daylight the ship returned to the current-meter mooring position and the rig was successfully laid between 0815 and 0902h 15 April in northerly force 3 winds and a low swell. Subsequently a rock dredge haul was made along the slope in depths of 800m from which a single adult crab was obtained for Dr Williamson. The section was resumed at 1423h at station P and continued in fine weather to the slope of Rockall Bank, where a second dredge haul was made between 1510 and 1707h 16 April, in depths of 800 to 600m. Seventeen specimens of the crab were obtained. The section was completed at 2118h 16 April in north-east winds which freshened to force 7. As there was insufficient time to work the Rosemary Bank section an eastward course was set in increasing swell.

The continental shelf was reached towards noon 17 April, and STD stations were begun 20ml to the westward of St. Kilda. Winds had decreased to force 5 and fell to force 3 during the evening. The STD survey continued overnight and the ship reached the site of the IOS, Taunton mooring off N. Uist at 0815h 18 April. The Waverider buoy from this mooring was recovered from the ship's workboat after a complete new rig had been laid, the exchange of

instruments being completed by 1010h. Following this, the shelf STD survey vas resumed and ten further stations were worked between 1021 and 2203h 18 April. The ship then steamed for Dunstaffnage via the Sound of Pabbay and the Sound of Mull, berthing at 0915h 19 April.

Results: Aim 1) The shelf current meter mooring was re-laid by 0902h 15 April. The usual rig was used except that 100m of $\frac{3}{8}$ in. chain was substituted for the lower half of the normal 12 mm diameter wire buoy tow as a safeguard in the event of the tow snagging sea-bed obstructions. Two Plessey current meters were positioned at nominal depths of 36m and 106m.

Aim 2) The 20 stations of the Anton Dohrn Seamount STD section were worked between 2330h 14 April and 2118h 16 April. Surface salinity values over the deep water were between 35.31 and 35.36‰, comparing closely with those found during the previous transit of the section in early March 1977. Off the shelf and Rockall Bank conditions were mostly homogeneous to 300-500m, but at stations F and G, to the west of Anton Dohrn Seamount, temperatures declined steadily below 100m.

Aim 3) The delayed sailing because of weather left insufficient time for the working of the Rosemary Bank section, but 23 stations were worked on 17 and 18 April on the shelf between St. Kilda and South Uist, and are complemented by those worked on 14 and 15 April on the outward passage between Barra Head and the shelf edge. Although a fault developed in the salinity circuits of the STD late on 14 April, temperature profiles were obtained at all stations, and surface and bottom water-bottle observations were taken at most stations.

Except for six stations with homogeneous conditions, situated in depths of less than 70m, an inverse thermocline was observed, with water of salinity less than 35.0‰ and temperature below 8°C spreading westward at the surface to approximately 8° 30'W. Bottom observations showed the same isotherm and isohaline

at about 8°W to the west of Barra and at 8° 20'W in the neighbourhood of St. Kilda.

There was no indication of the formation of 'winter-water' at this time by the complete overturn of the water-column on the outer shelf, although the bottom waters west of longitude 8°W had characteristics similar to the dense water found in this vicinity in May 1976.

Aim 4) 50 litre surface water samples were collected at ten standard positions between the Sound of Mull and the shelf-edge on 14 and 15 April for radiocaesium analysis by the Fisheries Radiobiological Laboratory, Lowestoft. STD lowerings were made at all except station C1, off Tobermory.

Aim 5) An IOS Taunton Waverider buoy was moored at 0909h 18 April at a position about 8n.ml. to the west of South Uist, to provide continuity of observations for the wave energy programme. The calm weather made possible the subsequent recovery by ship's boat of the Waverider previously occupying the position.

Aim 6) Many specimens of a unique type of larval crab, with 16 carapace spines in place of the usual 4, were taken over the Rockall Channel and Rockall Bank in 1968. The larva provides important evidence on the evolutionary relationships of the Brachyura (true crabs). It has not been linked with an adult crab. Participation in this and earlier 'Challenger' cruises has been to try to find out the parentage of the larva.

The only genus of crabs recorded from the Rockall area for which no larva have been described is Doryneus. Its accepted classification (in the Inachinae) suggests that it is unlikely to be the parent of the spiny larva, but one adult specimen obtained on RRS CHALLENGER Cruise 6A/77 shows features not evident from the published descriptions and figures. It now seems very probable that the spiny larva belongs to Doryneus and that the genus has been wrongly classified. This can only be confirmed by obtaining larvae from an ovigerous female in captivity or by rearing larvae to a juvenile or adult crab.

On Cruise 6B/77 attempts were made to obtain adult specimens of Doryneus using a rock dredge on continental slopes. A sample on the Hebridean slope yielded one specimen any another on the eastern slope of Rockall yielded 17 (12 living). It is possible that 2 of the living specimens have eggs. All are being kept alive in the hope that more will lay eggs and larvae will be obtained.

The Rockall dredging also yielded one live ovigerous female of the hermit crab Pagurus carneus, whose larva is also unknown. This also is being kept alive in the hope of obtaining larvae. (Contributed by D.I. Williamson.)

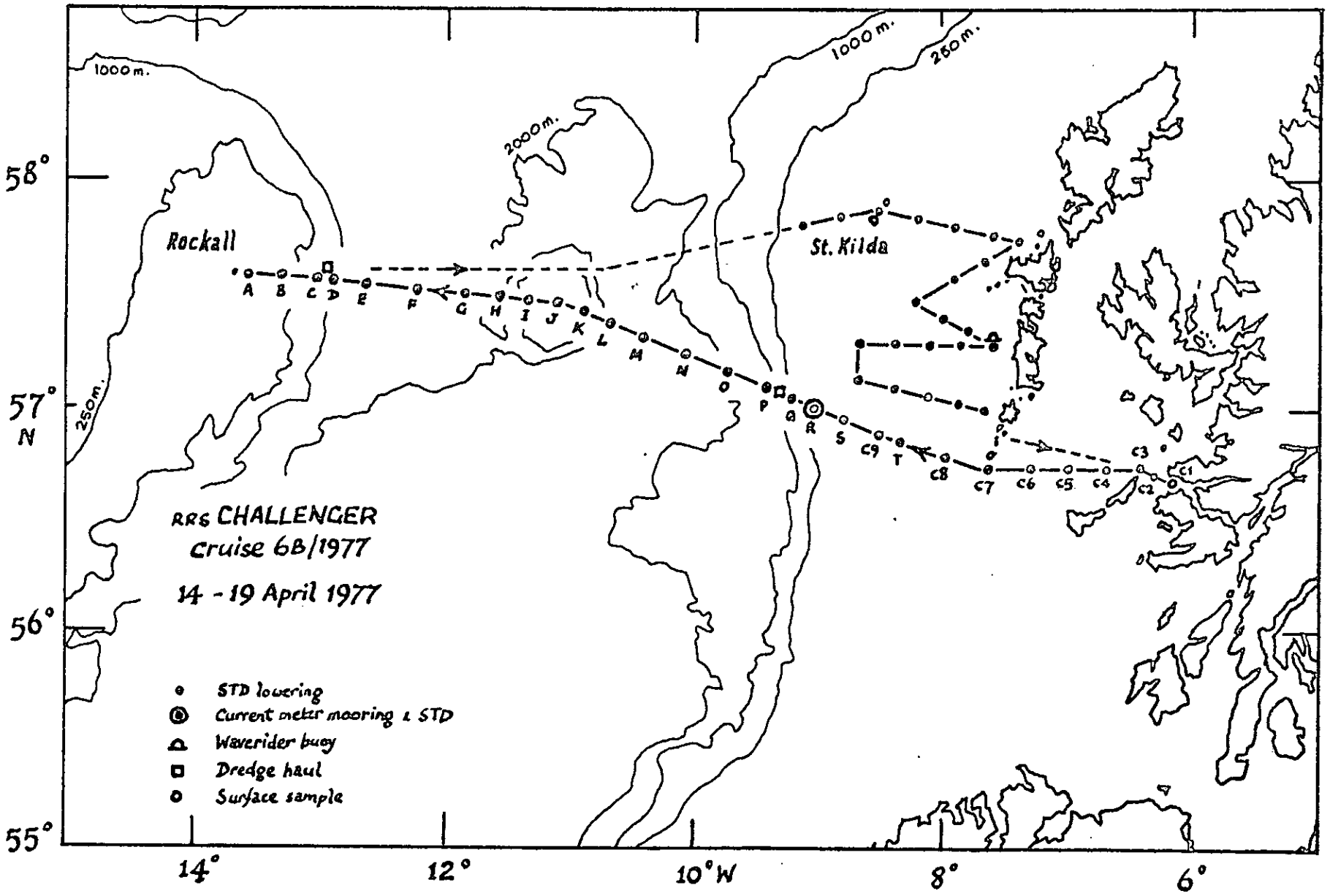
Miscellaneous) Watch was kept for mid-water traces on the echo-sounders in connection with the blue whiting surveys by DAFS and MAFF. Two bands of traces were observed at roughly 220 and 440m depth along the ships' track westwards from the shelf-edge on 15 April. These were patchy, and thinned out during the day. Between stations N and M traces were absent, but they re-appeared above the eastern flank of Anton Dohrn

Seamount. No further traces were observed during the westward run to Rockall.

Returning eastwards on 17 April, traces began to be observed on passage between the north-east quadrant of Anton Dohrn Seamount and the shelf-edge to the west of St. Kilda. These commenced above the foot of the continental slope, with a dense trace in a band of 15m thickness describing waves of about 40m amplitude and approximately 1.5n.ml. wavelength centered at 450m depth. Subsequently the trace broadened and rose, reaching to about 300m depth at the shelf-edge. 20 vessels, mostly of medium-sized modern Scandinavian purse-seiner type, were fishing within an 8n.ml. radius when CHALLENGER was about 10n.ml. west of the shelf-edge.

D.J. Ellett

6 May 1977


1000 m.
2000 m.
1000 m.
250 m.
250 m.
58°
57°
N
56°
55°
14°
12°
10°W
8°
6°
Rockall
St. Kilda
A B C D E F G H I J K L M N O P Q R S C9 T C8 C7 C6 C5 C4 C3 C2 C1
RRS CHALLENGER
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STD lowering
Current meter mooring & STD
Waverider buoy
Dredge haul
Surface sample