

R.R.S. DISCOVERY CRUISE **S** REPORT



N.I.O. CRUISE REPORT SERIES : CR 5

N/99/D/5

Mr Tyrke.

National Institute of Occanography R.R.S. "Discovery"

Report on Cruise 5 : 28th April to 23rd May 1965

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	Α.	Winters	A.R.L.
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	R.H.	Belderson	N.I.O.
	N.D.	Smith	N.I.O.
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	Mrs.	P. Edwards	N.I.O.
	B.J.	Barrow	N.I.O.
	K.R.	Evans	N.I.O.
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23rd May	G.	Andison	Hydro. Dept. Data Co
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	J.E.	Hudson	Birmingham Universi
	G.	Hodges	Plessey (U.K.) Ltd.
		Swallow	N.I.O.
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Most of the projects required handling of gear over the side of the ship and were therefore best done during daylight, so that the usual routine was to stop the ship by day and survey by night. The only snag of this proceedure was that the Decca Navigator fixes were often unreliable at night, since the ship was working near the limit of range and sky-wave propagation becomes important in this region.

Some work required deep water and some shallow, so the ship spent most of her time near the edge of the Continental Shelf. She returned to Falmouth on 11th May to interchange personnel.

During the first part of the trip the weather was rougher than could have been wished for, but on only one day was it impossible to work at all, due to a Force 10/11 gale.

All staff assisted in the routine surveying work.

A brief account of the various projects will be given. In many cases, of course, the results have not yet been analysed. (The order of presentation has no significance).



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(2) Bottom pressure measurement below waves.

An f.m. wave recorder was laid in 165 metres of water and an hour's record obtained. The output of the S.B.W.R. was recorded simultaneously and a Clover-leaf buoy record obtained shortly afterwards. It is thought that there was probably not enough standing-wave component to give appreciable second order effects, but the first order attenuation is also of considerable interest because previous measurements have departed significantly from theoretical predictions.

(3) Non-linear effects in ship motion.

Some records were taken for an exploratory study to test whether bispectral analysis is a useful tool for studying non-linear effects in ship motion.

(4) Off-shore telemetering tide gauge.

This device, which measures the bottom pressure in depths of up to about 200 m and transmits it back to the ship by radio, was laid successfully, but with great difficulty, in a depth of 165 m at a position of approximately 46°21'N 4°23'W. The radio range proved to be about 10 miles and a 24 hour tide-record was obtained, after which a valve in the transmitter failed. The recovery of the equipment also proved to be difficult, and it was decided not to use the equipment again.

(5) N.I.O. expendable velocity-of-sound meter.

This device was still in a "lash-up" state and experienced a series of accidents (including a winch failure), so that it was not possible to test it properly. It is obvious that the practical difficulties are greater than anticipated, but the tests that were made indicate that the principle is sound and that several tenths of an acoustic watt were being radiated.

(6) Two coring lines were carried out across the Cockburn Bank in the Celtic Sea, but owing to the unsatisfactory control system on the coring winch, only very short cores were obtained. Where satisfactory cores were not obtained, grab samples were taken.

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This was tried on a vertical wire and gave reasonable signal strongths up to full depth.

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These operate on a folded Kelvin-tube principle, but did not work owing to the water thread fragmenting under the vibration experienced in use at sea.

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The party from Birmingham University investigated acoustic propagation . in connection with the formation of narrow beams, a wide-band acoustic transducer and an experimental low-frequency sound source.

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Two instruments were taken, one reading in ft/sec and the other in m/sec. These were thoroughly tested to depths of up to approx. 1500 m and compared with measured temperatures and salinities. One failed, but the readings of the other agreed well with velocities calculated from Wilson's tables, giving a largest error of 1.7 ft/sec and an r.m.s. error of 0.7 ft/sec (the uncortainty in the calculated velocities was estimated at approx. \pm 1ft/sec).

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On passage and during survey, surface temperatures were measured every $\frac{1}{4}$ hour and bathythermograph dips were made every $\frac{1}{2}$ hour. Several rapid bathythermograph sequences were taken with the ship stationary, and a total of over 1000 bathythermograph slides were obtained. Considerable difficulty was experienced with the bathythermograph winches.

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The narrow beam 37 kc/s sonar was being checked and tested in preparation for cruise 7, but the opportunity was taken to take some bottom pictures and several records of scattering layers near the shelf edge. These latter showed extremely interesting features which also showed on the 10 kc/s P.E.S. In nearly every case, concentrations of scatterers in mid-water were observed just off the shelf edge, though it was not possible to sample them. This phenomenon deserves further investigation.

(14) Development of Swallow Float tracking system.

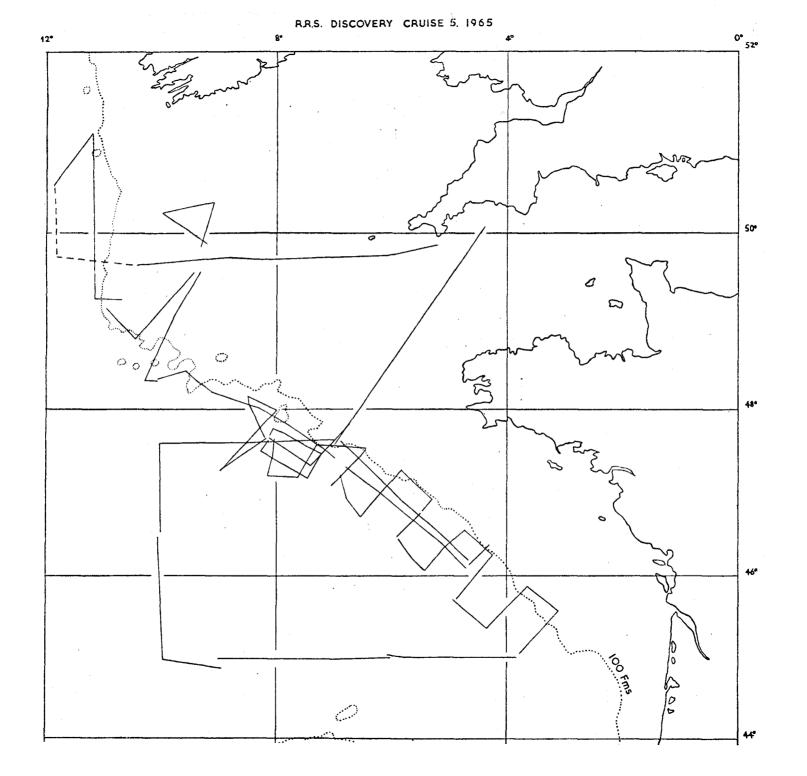
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