CRUISE REPORT

FRS "Clupea"

18 November-19 December 1970

STAFF:	Part 1 (18 Nov.-3 Dec.)	J J Foster	PSO	(23-26 Nov.)
		D N MacLennan	SSO	(to 20 Nov.)
		P A M Stewart	SSO	(23-26 Nov.)
		A Corrigall	EO	(from 28 Nov.)
		E S Strange	EO	
		S T R De Silva	AEO	
		A Ranachan	SA	
	Part 2 (8-19 Dec.)	D N MacLennan	SSO	(from 14 Dec.)
		A D Hawkins	SSO	(to 11 Dec.)
		D Cattanach	EO	(from 14 Dec.)
		G Cameron	AEO	
		P Anthony	AEO	(to 11 Dec.)
		A Ranachan	SA	

OBJECTIVES

PART 1

To investigate the performance of a pelagic gear using alternative rigging arrangements, with particular reference to its operation close to the sea bed.

PART 2

To lay a sea bed hydrophone array, and to operate it together with newly developed recording equipment for the evaluation of system design.

NARRATIVE

PART 1

"Clupea" sailed from Greenock at 1500 hours on 18 November and made passage for Loch Linnhe. After trawling there on the 19th she berthed at Oban that evening to collect gear. The next day, having worked her way across the Minch, "Clupea" berthed at Stornoway. The ship worked in the Minch area using Stornoway as base until 3 December.

PART 2

Following a long weekend break, "Clupea" left Stornoway on 8 December to collect scientific staff in Ullapool at 2100 hours. Having been delayed briefly by bad weather, she sailed to Loch Torridon the next day. Work with the hydrophone arrays was continued there until 11 December, before returning to Stornoway for change of scientific staff. Work was resumed at Torridon on 15 December and continued there until 19 December.

RESULTS

(a) Pelagic trawling

Several hauls were made with a small gadoid pelagic net, using a herring extension piece and cod-end. Portable tension meters (3-wheeled type) were used to monitor warp tension and a divergence/declination meter used to measure warp angles at the block. Other instruments available included a Basdic netsonde.

One of the features of the conventional method of rigging this gear is to tie back the sinkers at the wing ends on to the short wing bridle, in order to minimise the possibility of fouling. During part of these tests, however, the sinkers were suspended on 10 ft strops to provide control when fishing close to the bottom. Although this arrangement did not foul the gear itself, a lot of trouble was experienced with the netsonde cable in this context.

Catching rates were variable, the highest catch being 20 baskets per hour (mainly whiting) on one occasion. In addition to herring and dogfish, a number of horse mackerel were caught in several hauls. Catches generally correlated well with the echo-traces observed on the ship's sonar and echosounding equipment.

(b) Acoustic noise investigation

The primary objective of part of this cruise was to evaluate recently developed equipment for recording underwater noise and to further develop these techniques.

A number of hydrophones were laid on the sea-bed, up to three hydrophones at a time, connected individually by cable to the ship. The maximum cable length used was 1,000 metres. The new recording system, based on a 14-track magnetic tape deck, worked very satisfactorily. Interference and instability effects from the amplifying equipment, even at high gain settings, were not significant. Recordings were made of ship noise, sonar pulses, pinger pulses and sea state noise. For the latter, a silent ship regime was adopted for short periods with all power plant aboard shut down and the recording equipment operating off batteries.

Battery-operated acoustic pingers were used to locate the hydrophones in the sea-bed array, relative to the ship. The pinger signal received at a hydrophone, range 1,000 m, was well above the background noise level. At close range to a pinger the hydrophones were, as expected, heavily overloaded. However, overload recovery was complete within 0.5 sec after a pinger pulse, so by keeping the pulse repetition rate low a substantial proportion of the recorded data was not affected by overloading.

It was found that a 500 metre length of cable laid on a mud bottom, with a hydrophone at the end but no anchor, did not move its position over a period of 2 hours by more than $\pm$ 3 ft (the limits of measurement accuracy); indicating that specially designed anchors for the hydrophone array should not be necessary. The estimated tidal flow during this experiment was 2 knots, at right angles to the line of the cable.

The 1,000 metre connecting cable between a sea-bed hydrophone and the ship was laid using the boss boat without undue difficulty. However, it is clear as a result of this experience that some thought will have to be given to the practical problems of laying longer cables (up to 2,000 metres may eventually be required), and appropriate engineering support equipment will have to be developed.

J J FOSTER
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9 February 1971