MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

Mr. BAILE.

1972 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 1

(PROVISIONAL: NOT TO BE QUOTED WITHOUT PRIOR REFERENCE TO THE AUTHOR)

STAFF

R B Mitson	6-20 January
D H Cushing	14-17 "
M J Holden	6-20 January
N J Pearson	6-20 "
A J Burridge	6-20 "
(A Swain Freshwater Laboratory	6-8 "
(A S Champion	6-8 "
(A R Child	6-8 "
(N Henderson	6-8 "
C R Hood	8-20 "
H R Stewardson	8-14 "
D W Mummery	8-20 "
M J Holley	8-20 "
R Tuthill (S G Brown)	8-14 "
P R Hopkin (Kelvin Hughes)	8-20 "
J W Ramster	20-23 "
R R Dickson	20-23 "
G C Baxter	20-23 "
J W Read	20-23 "

DURATION

Left Grimsby 0830 h 6 January

Arrived Yarmouth 1515 h 23 January
All time Greenwich Mean Time

LOCALITY

North Sea

AIMS

1. To test all sonar systems;

2. To carry out Salmon Fishing tests;

3. To test current meter mooring arrangements.

NARRATIVE

CIROLANA proceeded to an area off Flamborough Head and shot 10 x 25 fathom gill nets. After these had been hauled the vessel moved north and nets were shot again off Whitby. On 8 January staff were exhanged in the Humber at 0930 h. After some trials of a new salinity probe a course was set for the Moray Firth which was reached at 1400 h 9 January. A position was eventually chosenn

for handling trials of a transducer towed body in the Cromarty Firth and CIROLANA anchored. These trials continued until 2030 h 10 January when bad weather prevented further work. Meanwhile measurement and adjustment of the electronic equipment continued. On 11 January the wind had dropped sufficiently to allow handling of the transducer calibration frame. After this had been satisfactorily rigged and lowered into the water measurements were taken and adjustments made to the equipment power output levels. Similar trials were carried out with a standard target fitted to the frame, continuing until the morning of 13 January when the towed transducer was lowered away. Whilst this was being towed measurements of wire angle, load and noise were made. Two trawl hauls were made on Smiths Bank and noise measurements carried out whilst they were in progress. At 2050 h course was set for Stornaway where Dr Cushing came on board at 1500 h 14 January.

CIROLANA left Stornaway at 1700 h and carried out a short survey in the Cape Wrath area. Very few fish traces were seen and it was decided to return to the Cromarty Firths. A survey line of approximately constant depth was laid out and the various calibrated echo sounding instruments were used when CIROLANA arrived back in Cromarty Firth at 1000 h 15 January. This work continued until Monday 17 January when Dr Cushing and Mr Tuthill went ashore at Nairn. Because of high winds CIROLANA entered the Invergordon Firth and anchored for trials with a narrow beam 100 kHz transducer.

The weather forecasts were SE severe gale 9 to storm force 10 so it was decided not to attempt the only remaining work which needed 200 m depth and return to Grimsby. After some hours of dodging the wind changed to SW and normal speed was resumed in the early hours of 19 January. The anchor was dropped in the Humber at 2030 h in preparation for the final changeover of staff on 20 January.

This changeover was accomplished by 1300 h and the afternoon was spent stowing the gear that had been brought out by tug and testing the crane and buoy recovery winch. At 1600 h the anchor was weighed and the ship set course for Clay Deeps. The vicinity of JONSIS station C was reached by first light but the surface buoy could not be seen. A box search began at 0830 h and it was found two hours later in good condition. The rest of the morning was spent putting all the components of a rig apart from the current meters into the water in the correct sequence so that more familiarity with the new cranes and winch was acquired. The actual station was recovered at 1300 h in ideal conditions. The bottom instrument was missing. The trial rig was then recovered and immediately re-launched this time complete with current meters. By 1630 h the station had been re-established, the ship was making for Station B and gear was being prepared for that station.

A new Station B was launched at 0830 h the following day, Saturday 22 January. The ship then moved about half-a-mile to the old station and began to recover it. The buoy-tow parted as the weight was taken. Since the pellet marking the current meters was not visible the spare anchor was rigged on the trawl warp via the "Insurance" wire. At 1330 h the ship began towing for the ground wire with the anchor and contact was made at the second attempt. All the gear was recovered up the stern ramp without loss or damage by 1510 h.

The ship then moved to Station A, a position 6 miles off Filey Bay, and arrived at 1830 h. For half an hour the vessel dodged around the position waiting for the tide to slacken and then the new station was launched. There was still some tide running and so the recovery of the old rig was delayed until 2200 h.

At the first attempt to pick up the surface buoy the hook fell away as the buoy reached deck level and the buoy fell back into the water. Very soon after the buoy had been hooked for the second time it was found that the wires leading away beneath it had become snagged on the bow-thruster pod. A complicated salvage operation then began which involved getting the surface buoy out of the system fishing for the wires with a grapnel on the port side, heaving them aft once they had been caught, and then bringing the gear up the ramp whilst paying away a loose end from the starboard side of the forward working deck. All the gear except for the buoy weight was recovered successfully by 0200 h, 23 January.

The ship then began a passage to Yarmouth. This was interrupted for two hours during the morning while a trial single-line taut mooring was attempted just off the Haisborough Lightship. The vessel then resumed its passage and docked at 1515 h.

RESULTS

Aim 1: There were a number of items under this heading:-

a System Checks

Of all electronic systems associated with the echo sounding equipments including experimental signal processing peripherals. A number of adjustments and additions to the circuitry were found to be necessary during the course of the cruise.

b Practice handling and towing the Humber gear transducer body. After some initial difficulties and delay due to high winds a satisfactory system of launching and retrieval for the towed body was evolved. The HIAB crane proved to be excellent for the purpose, but the final extension piece, still awaited, should make the operation easier. Towing was from the baggage davit, this was cumbersome and needs an extension of at least 2 m to get the body far enough off the ships side. Wire angle and towing load measurements were made.

c To take noise measurements on the echo sounder transducers against ships speed and when trawling. The measurements were carried out at 30 and 100 kHz for speeds of 2 to 11 knots on the shipboard and towed transducer in depths of 50 to 70 m. Above a critical speed the noise levels were higher than expected especially during trawling. Flow noise was exceptionally low indicating that the hull is satisfactorily smooth. A separate report will be made.

d Experiment with the use of a positioning frame for positive transducer calibration. The Humber gear towed transducer body was fitted to one end of a specially prepared frame which had standard hydrophones fixed at the other end. By ensuring that the hydrophones were held rigidly on the acoustic axis of the Humber transducer a positive and stable measurement of source level against electrical power input was possible. This was regardless of the attitude of the frame in the sea. The same transducer was then calibrated as a receiver. Once the calibration was completed, a sphere having a target strength of -26 dB relative to a 2 m radius sphere, was substituted for the hydrophones on the frame. The Humber gear was then used as an echo sounder on the sphere, the signal from which was measured. It gave a voltage 4.5% higher than the calculated value probably due to the method of support adding some signal.

e Check the performance of a Time Varied Gain control system. Under the limited range of depths at which it was possible to work on fish targets this experimental system appeared to work well for the laws of 40 log R + 2 $\propto$ R and 20 log + 2 $\propto$ R.

f Calibrate the Simrad QM integrator as part of a survey system. Having calibrated the complete echo sounding system at 30 kHz it was possible to apply the signals to the integrator and produce calibration curves for the various correction factors. After this a number of surveys were carried out on fish shoals during the day and at night in Cromarty Firth. Results from these surveys were most encouraging.

g Check the performance of a new design of single fish/shoal discriminator Although it was used on rather dense shoals of fish for most of the time when conditions were not ideal, the discriminator appeared to be giving sensible answers. In situations where fish were well spaced it was possible to observe the signals being processed correctly.

h Obtain frequency distributions of single fish echoes by the use of a pulse height analyser. By using the discriminator referred to under (g) above, signals from single fish could be applied to the pulse height analyser. This technique was used in a number of range gates to obtain a series of results for Dr Cushing.

i Observe the performance of a new Kelvin Hughes seabed locked system. This system was used a great deal during the cruise, particularly for recording individual fish and concentrations of fish close to the seabed. Clear, unambiguous records were obtained in all the depths of water where the ship worked. Deep water trials were not possible because of bad weather.

j Test a narrow beam 100 kHz transducer. Full trials were not possible because the permanent housing was not completed in time. However, preliminary trials of this transducer which has a beamwidth of 3^{o} x 5^{o} to half power points were impressive. The resolution as shown on a paper recorder, used with the standard 100 kHz equipment, was greatly enhanced.

k Carry out deep trials of the PDR and Humber gear towed transducer. All deep water trials had to be cancelled because of bad weather conditions. Mr Hopkins carried out extensive checks and measurements on the PDR and made a number of important adjustments.

AIM 2: Salmon Fishing Tests

No difficulties were experienced in shooting or hauling the nets for this work.

AIM 3: Test Current Meter Mooring Arrangements

a The three JONSIS stations were serviced. Two of these stations had been out since 21 November and the third since mid-December. All had successfully withstood the gales and storms of recent weeks.

A current meter, two weights and a buoy tow were lost . In the former case, part of the frame was still on the wire but bent. It seems likely that the rest of the frame and the current meter were torn off at some time. In the latter case the wire had obviously been wearing away gradually on an underwater obstruction.

b In calm weather and sea conditions the arrangements for mooring and recovering current meters from the vessels were fully tested for the first time. A detailed report is provided in "Moored Current Meter Programme, Progress Report Number II".

MISCELLANEOUS

1. Mr Stewardson carried out tests on the prototype of a continuous reading inductive salinometer. The instrument performance was satisfactory giving repeatable results during a total of 15 hours immersion in the sea.

2. Mr Mummery observed the operation of Length of Warp meters on the main trawl winch. As a result he has produced sketches for a new design.

3. Mr Tuthill carried out measurements on a prototype speed measuring instrument.

4. The instrument tube in the main laboratory was used satisfactorily.

R B Mitson
31 January 1972

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DISTRIBUTION

Basic list
R B Mitson
D H Cushing
M J Holden
N D Pearson
A J Burridge
A Swain)
A S Champion)Freshwater
A R Child)Laboratory
N Henderson)
C R Hood
H R Stewardson
D W Mummery
M J Holley
R Tuthill (S G Brown)
P R Hopkin (Kelvin Hughes)
J W Ramster
R R Dickson
G C Baxter
J W Read