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

1972 RESEARCH VESSEL PROGRAMME

REPORT: RV CLIONE: CRUISE 11

(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF

J W Ramster
J A Durance
T C Doddington
J Horwood
J W Read
P Taylor (Sandwich Student)
H R Stewardson
N D Pearson) afternoon of 29 August only
D W Mummery)

DURATION

Left Lowestoft 1245 h 29 August

Arrived Lowestoft 0715 h 20 September

All times are Greenwich Mean Time

LOCALITY

Northern North Sea and Orkney - Minches area

AIMS

1. To re-establish 5 of the moored current meter stations laid between Scotland and Norway by the Deutsches Hydrographisches Institute, Hamburg, in 1962;

2. To re-establish the 2 Sizewell Bank moored current meter stations previously put out in Spring 1972 in order to see if it can be demonstrated that the Suffolk coast current does change in character from season to season;

3. To service the 3 long-term JONSIS stations;

4. To take temperature and salinity samples at lines of stations stretching out from the north coast of Scotland to the 100 fathom line between the Hebrides and Shetlands as background information for the ICES 1972 Herring larval survey. Parachute drogues and DRCM measurements will also be made at various points in the region. (This work is being done in conjunction with the larval survey being made on CORELLA 12 at the same time);

5. To bring back to Lowestoft for Mr Scholes 15, 35-40 cm live plaice.

NARRATIVE

The vessel left Lowestoft at 1245h 29 August and made slow speed towards the anchorage at Corton in order to run in the engines after the annual re-fit. Preparations were made on deck and in the laboratories during this period for the launching of a current meter rig to which a MAFF acoustic release would be attached so that some final tests of the system could be made before it was used operationally for the first time. Unfortunately it was found that the shipboard transducer assembly would not pass through the lower end of the ship's well and it had to be quickly broken down into a very basic form so that the equipment could be used at all. There was no time for the tests in fact and Messrs Stewardson, Pearson and Mummery left the vessel via the Gorleston pilot boat at 1715 h.

The vessel then moved back to the Corton area, anchored and the gear was rigged for two moored stations off Sizewell which were laid at first light the next morning. (The approximate positions of these stations and of other places referred to in this text, are shown on the accompanying sketch map). A course was then set for Station B of the JONSIS line, which had been reported at 0930 h 27 August as being adrift. During the run northwards, deck and laboratory preparation of gear for the line of moored stations across the Northern North Sea began. Station B was sighted without any trouble at 2340 h, 30 August and the whole rig appeared to be in good order.

Preparation of gear continued in ideal conditions throughout 31 August, and by 1900 h the site of Station D had been reached. The actual launching operation began at 1915 h and within an hour had been completed successfully. In ideal conditions Stations E, F and G were laid by 0600, 1100 and 1900 h respectively on the following day. The only complication occurred at the last of these stations where the acoustic release fired of its own accord when the rig was half-launched severing the meter-tow completely and allowing the buoys and current meters to drift away. The second launching operation provided no problems, however.

By 0930 h, 2 September, Station H, the most easterly position on the line of moorings, had been laid, and as well as the on/off test of the acoustic release system that had been made at each of the other stations, the rest of the morning was taken up with testing the range at which the unit could be interrogated. Once this was done serial observations were made near the surface marker, and then at 30 mile intervals en route for North Ronaldsay at the northern top of the Orkney islands, which was reached at 1700 h the following day.

Serial observations at approximately ten mile intervals over a grid that covered the region between Orkney-Shetland islands and the Minch then began and continued without interruption for four days in generally good conditions. By 0700 h, 7 September, however, a south westerly gale was blowing and the vessel took temporary refuge in Sango Bay. The Kelvin Hughes Direct Reading Current meter was rigged and the ship then moved out to tidal diamond "D" (Chart L(D6)219) which lay in the lee of the coast. Twelve of the 13 required observations were made before the swell grew to such an extent that the anchor had to be brought in and shelter sought in Loch Eriboll. Fortunately, by noon the next day the wind had fallen away and, though the swell made for an uncomfortable passage during the afternoon, the grid of stations was begun again by 1800 h and finished in much improved conditions by 1100 h, 8 September. The ship tied up in Stornaway at 1430 h that afternoon and lay there for 24 h.

On leaving Stornaway, course was set for a second D R C M anchored station some fifteen miles west-north-west of the Island of Hoy in the Orkney group, and this was occupied by 2300 h, 9 September. A full set of observations were made before the vessel moved on to take up a position close to the entrance of the Pentland Firth and wait for the next flood tide. As the tide began, 150 Woodhead sea-bed drifters were released at a station at the western end of the Firth, and the vessel then swept through with the tide and on to Station D, which was found to be in good order at first light the following morning.

The acoustic release at the station was tested; found to be in good order, and so for the first time under actual field conditions a MAFF acoustic release system was fired. The sub-surface buoy appeared after a short delay, and then the meter wire, with all its components, was recovered very quickly and safely before the remainder of the rig was brought in. The rest of the day was spent in preparing three new rigs, Station D_2, D_W and D_E for launching as an equilateral triangle of stations of side 5.2 miles that was intended to test various methods of calculating the Stokes' drift. These stations were established by 1730 h and a parachute drogue was then put out in the centre of the Stokes' triangle at the end of 50 metres of wire and a surface marker. It was tracked throughout the next 25 h in ideal conditions, the wind not exceeding 12 knots throughout the period. The only complication that occurred throughout this exercise was that at daylight it was found that the recovery line had snared the surface marker. The ship's boat was launched at 0815 h 12 September and within minutes had cleared the line and returned to the vessel. Serial observations were made in the centre of the triangle and at each apex as the drogue and moored stations respectively were recovered.

By 2325 h all the equipment had been recovered and the ship was moving off north-eastwards along the line of stations. In rapid succession, and again in ideal conditions, Stations E, F and G were recovered during the next day; station F after the meter wire had been cut by the release system, the other stations by the normal method due to the failure of the respective guillotines to make any impression on the meter wires. Station H was checked at 2200 h but the ship moved further in towards the coast in order to do a water bottle station in the north-going Norwegian coast current. By 0630 h, 14 September, the vessel was alongside Station H taking the final series observations of a Scotland-Norway hydrographic section along the line of the moored stations.

Once the observations had been completed the recovery operation began. The red buffs normally found at both ends of a current meter rig were missing, but since this is quite a normal situation no great weight was given to it. The acoustic release was fired but no sub-surface floats appeared. The same situation had occurred at Stations E and G so that again this development did not seem particularly ominous. The normal recovery technique was then employed in marginal wind and sea conditions and it was found immediately that the surface buoy had been stripped of all easily movable items. The rest of the rig came in without undue complication but the sub-surface float did not appear as the meter weight was raised off the sea-bed. It was found in fact, that the meter wire had been successfully severed by the acoustic release and that the sub-surface floats had either been removed or had lost all buoyancy. The severed meter wire, presumably with all the current meters still attached, lay on the sea-bed.

A grapnel was quickly rigged and, guided by the signals from the acoustic release at the botton of the meter wire, was dragged to and fro, up and down and in and out of the region throughout the morning and afternoon without success. By 1730 h the wind and sea were making and the dragging operation had to be stopped while the decks were cleared. In fact the vessel had to dodge out a westerly gale during the hours of darkness. Dragging for the meter tow was resumed at 0530 h but again no contacts were made at any time during the morning.

The afternoon of Friday 15 September was spent in preparing the starboard side for trawling and tows through the area were made during that evening and throughout the whole of the next day. The complete fin of one of the lost current meters came up in one of the hauls, but nothing else. At 2100 h 16 September the acoustic release was turned off and the vessel headed for Station C of the JONSIS line of moorings. A more detailed account of the attempt to recover the lost equipment at Station H has been written and copies forwarded to the appropriate officers.

Station C was reached at 1700 h the next day and the surface markers quickly changed. RV CLIONE then steamed to Esbjerg and was alongside the quay there for the period 1000-1200 h 18 September. During this time a portrait of Henry Spencer Maurice was passed over to the agent for rail transportation to the Secretary General of the International Council for the Exploration of the Sea in Copenhagen, and a surface buoy that had been picked up earlier in the year by a Danish buoy-tender was taken on board. On leaving the ship moved back along the JONSIS line to Stations B and A which were serviced at 1230 and 1700 h respectively the next day. During the run between the stations an echo-sounder search for herring traces was made for Mr Wood of Pelagic Section. At the same time a combination of strong sunlight, clear off-shore water and the removal of the transducer package from the ships' well showed that the tube was absolutely clear all the way to the botton and that there was no obvious reason for the failure of the full package to pass through the well on the first day of the cruise. Consequently the complete package was re-assembled and lowered on a wire rather than the sectional piping used previously, and there was little doubt that the transducer heads cleared the ship's botton comfortably. The failure on the first day was put down to either the stiffness of the valve after being re-packed during the refit preventing its being fully withdrawn, or the sectional piping being off-centre when the package was well down the tube causing either the heads or part of the motor unit to hang-up on the sides.

At 1735 19 September the vessel set course for Lowestoft and docked at 0715 h the next day.

RESULTS

(a) Relating to the initial aims:

1. Four of the five moored current meter stations deployed between Scotland and Norway were recovered successfully, the fifth was lost (see separate report).

At Station E the current meters had pressure transducers attached and these data should provide a good indication of the efficacy of the computer programme that calculates the shape of the wire on which the meters hang under varying current speeds and payloads. The current meter data itself from this and the other stations, coupled with the data from the long-term JONSIS stations, will provide a general indication of the current field in the Northern North Sea at the beginning of the 1972-73 annual cycle of inflow from the North Atlantic.

2. The two Sizewell Bank moored stations were laid, but the recovery of them had to be left to RV CORELLA, Cruise 13.

3. The surface buoys at each of the three long-term JONSIS stations were changed so that lights with a life of 15 weeks could be brought into use.

4. The hydrographic background to the ICES 1972 Herring larval survey in the region lying between the Hebrides and the Shetlands was obtained. Initial plots of uncorrected surface and bottom temperatures are to hand, the tidal information at tidal diamond "D" on the appropriate Admiralty chart was checked and an additional set of data observed at a station 15 miles west-north-west of the island of Hoy. A 14 cm/sec south-east going tidal residual was found at 10 metres depth at this station during a period of fresh-to-strong westerly winds.

5. Unfortunately it did not prove possible to obtain any live fish for Mr Scholes.

(b) Relating to aims that developed after the cruise programme had been written:

1. Hydrographic sections across the northern North Sea were made just after the moored stations were laid and as they were being recovered. A feature of the former was the appearance on the uncorrected temperature distribution of a mass of warm water at depth close to the western edge of the Norwegian trench. Features of this kind have been found previously by Dooley and Martin of the Aberdeen Laboratory.

2. In an attempt to calculate the Stokes' velocity for a small region of the North Sea an equilateral triangle of moored stations of side 5.2 miles was established for 25 h. Pairs of current meters lay close to each other at each station so that if one should fail mechanically the record from the other would still be relevant. To avoid the possible complication of the calculations by a bottom friction effect a level area was chosen and the meters positioned at approximately the same level in the upper halves of each water column.

A parachute drogue positioned at 50 metres was tracked throughout the 25 h to provide a measure of the true Lagrangian drift. Fortunately the winds were light and the sea very calm throughout the exercise.

3. The MAFF acoustic release system had its first full field test and was found to be free of virtually all its teething troubles. In its transponding mode, for example, and even though only half the ship-board signal was available, all the releases responded perfectly to signals from the ship at ranges of 1-3 cables and all proved likely to respond at a range of seven cables.

Three of the six guillotines severed meter tows very cleanly on command, two made no real impression on their respective wires and the sixth leaked through the top of the case, shorted out and prematurely cut a meter tow.

All in all the situation is immeasurably improved from that found only six months ago and it suggests that within a year the acoustic release will be a routine feature of MAFF moored current meter stations. A separate note on various changes of the launching and recovery techniques that have to be made when the releases are used has been written and filed on FLR 24.

4. No herring traces were found during the run into the Yorkshire coast from the region of the South-West Spit of the Dogger Bank.

J W Ramster
6 October 1972

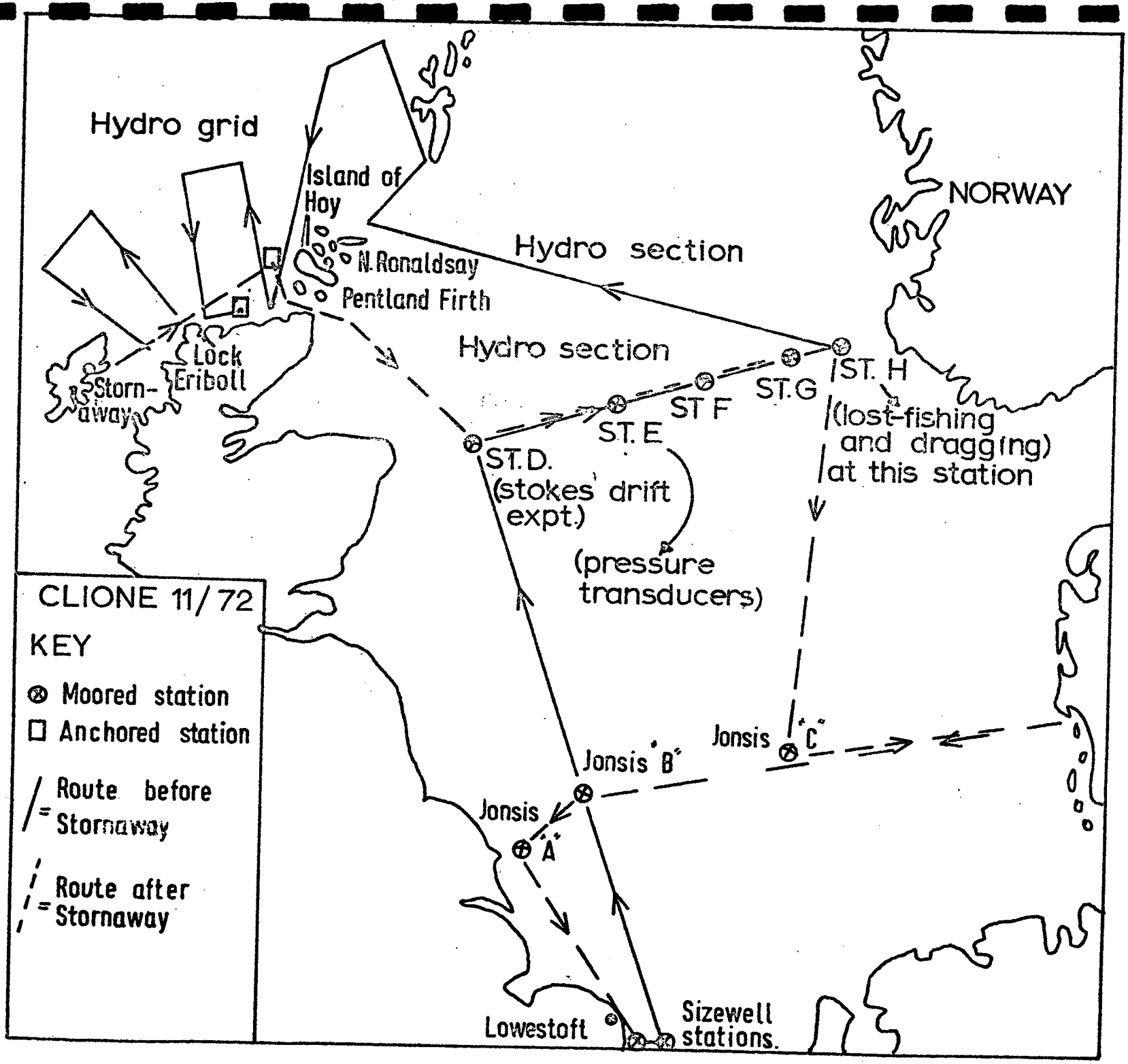
SEEN IN DRAFT JEMB
AJB

INITIALLED AJL

DISTRIBUTION

Basic List

J W Ramster
J A Durance
T C Doddington
J Horwood
J W Read
P Taylor
H R Stewardson)
M D Pearson) Afternoon of 29 August only
D W Mumnery)


Hydro grid
Island of Hoy
N. Ronaldsay
Pentland Firth
Hydro section
NORWAY
Hydro section
Lock Eriboll
Storn-away
ST. H
ST.G
ST F
ST. E
ST.D.
(stokes drift expt)
(pressure transducers)
(lost-fishing and dragging) at this station
CLIONE 11/72
KEY
Moored station
Anchored station
Route before = Stornaway
Route after = Stornaway
Jonsis "C"
Jonsis "B"
Jonsis "A"
Lowestoft
Sizewell stations.