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R.V. CLIONE

Report for cruise 5/1968

STAFF

<u>Part A</u>	<u>Part B</u>	<u>Part C</u>
J. W. Ramster	E. Reynolds	J. W. Ramster
J. L. Henry	D. S. Woodhead	A. R. Folkard
E. Teare	I. A. Huggins	J. L. Henry
G. P. Willis	R. J. Read	G. P. Willis
J. W. Read	D. C. Denoon	B. F. Riches
M. El Sabh (UNESCO Fellow)	C. N. Humphreys	M. El Sabh (UNESCO Fellow)

DURATION

<u>Part A</u>	<u>Part B</u>	<u>Part C</u>
1330 hours, 4 April- 0930 hours, 9 April	0800 hours, 10 April- 1400 hours, 15 April	1830 hours, 16 April- 0800 hours, 24 April

All times are BST

AIMS

Parts A and C

1. To moor and recover six of the current meter stations of the Irish Sea network. (The Walney station will not be used.)
2. To measure currents at 4 metre intervals throughout the water column close to one or more of the moored buoy stations by means of the Direct Reading Current Meter.
3. To look for the three Plessey meters lost on CLIONE 2/1968 at the St. Bee's station with the aid of the sideways-looking sonar.
4. To investigate the nature of the 'phosphate' patch in the Solway Firth and to bring back samples from the centre of the patch for Mr. Preston.
5. To collect live rays for Mr. Holden.

Part B

- (i) To conduct an in situ gamma spectrametric survey of the sea bed at the Windscale inshore stations, up to and including the 20 mile outer stations, and to collect grab samples from each station for subsequent laboratory analysis.
- (ii) To mark and tag 1200 plaice/dabs in the vicinity of the Windscale pipeline, using lithium fluoride sachet tags.
- (iii) To conduct measurements of gamma nuclides in sea water near the Windscale pipeline, weather and time permitting.
- (iv) To collect filtered samples of sea water from surface, middle and bottom layers at each of the stations referred to in (i) above.
- (v) To collect live, mature sole for Dr. Purdom.

NARRATIVE

Part A

CLIONE left Lowestoft at 1330 hours, 4 April and by the evening of 6 April had arrived off Anglesey. Various items of equipment had been prepared during that afternoon, so that at the first daylight slack water of 7 April the launching

of a moored current meter station at $54^{\circ}25', 03^{\circ}45'W$, the St. Bee's buoy, could begin. In calm weather rigs were laid at the successive daylight slack waters of the next 48 hours at the other five stations of the network: Solway ($54^{\circ}32', 04^{\circ}20'$), Douglas ($54^{\circ}05', 04^{\circ}25'$), Holyhead ($53^{\circ}46', 04^{\circ}37'$), Midway ($54^{\circ}00', 03^{\circ}55'$) and Orme ($53^{\circ}38', 03^{\circ}45'$). Because there was a group of foreign trawlers working the area around the Orme buoy the ship moved close enough to one of them for a poster giving notice of the presence of the buoys, to be thrown on board. As an extra precaution the ship lay close to the buoy during the night of 8 April. At first light CLIONE moved off to the Bar Lightship for a pilot, and then sailed into Liverpool, landing the staff of Part A at 0930 hours, 9 April.

Part B

CLIONE left Liverpool at 0800 hours, 10 April in calm, misty conditions, arriving off the Windscale pipeline buoy at 1630 hours on the same day.

Although the weather was good throughout the cruise the ship was worked from dawn until midnight for the first three days on programmed work, especially the inshore stations, in order to allow for any deterioration of weather. Nights were spent either fishing or checking current meter stations. The southern outer probe stations, requiring more steaming time, were covered during the last two days (13/14 April).

The ship returned to Liverpool via the Orme grounds, where three tows produced the live sole (in good condition) requested by Dr. Purdom, arriving at Liverpool Bar by 0830 hours, 13 April, where the final gamma probe survey station was completed.

The Liverpool Pilot was picked up at 1100 hours and the ship docked at 1400 hours, having completed all programmed work.

Part C

The staff joined the ship at Liverpool at 1630 hours, 16 April and the ship sailed two hours later. During the night all the moored stations, apart from the Holyhead buoy, were checked both for position and the efficiency of the lights. At 0845 hours the following morning surface water sampling began along a grid of stations lying close inshore and some ten miles north and south of St. Bee's Head. By 1420 hours this work had been completed and preparations for recovering the moored stations and for measuring currents by means of the Direct Reading Current Meter were being made.

The St. Bee's station was recovered at 1500 hours and the Solway buoy on the next slack water at 2030 hours. By 0130 hours, 18 April the ship was anchored within a mile of the Midway buoy and the first readings with the DRCM were being taken. After $12\frac{1}{2}$ hours the ship weighed anchor, recovered the moored station at the next slack water and moved on in turn to the Holyhead and Orme buoys where the pattern of events outlined above was repeated. At 1130 hours, 23 April the sixth station, moored just off Douglas Bay, was recovered.

The ship then moved into Douglas Bay in order to stow the heavy chains, anchors and buoys belonging to the moored stations and make ready for trawling. At 1700 hours, course was set for the coast off Wexford and trawling for Mr. Holden's rays began at 0500 hours in the vicinity of the Arklow lightship. After seven hour-long hauls 41 live, mature fish in good condition had been caught and so the gear was stowed ready for the journey home. The ship had an uneventful passage until 2000 hours, 22 April when patches of dense fog were encountered on the approach to the Straits of Dover. These continued throughout the night and early morning so that progress was slower than anticipated, the ship docking at Lowestoft at 0800 hours, 24 April. During the homeward voyage it was found that there was an unusual amount of hull vibration when the ship steamed at full speed. It was felt that this could be the result of either wires or ropes from one of the moored stations fouling the propeller or the fact that a new propeller has been fitted recently.

RESULTS

All the aims of the cruise, apart from that of searching for the Plessey meters lost off St. Bee's during CLIONE 2/1968, were accomplished. The search for the lost meters had to be omitted because once the equipment for the main aims of the cruise was on board there simply was not room for the components of the instrument with which the search was to have been conducted. Some details of the work done are given below.

Parts A and C

(I) The six current meter stations were moored and recovered in almost ideal conditions. No meters were lost. The only indication that any of the rigs had been in any danger from other vessels was provided by the fact that the line linking the surface pellet to the sub-surface buoy at the St. Bee's station had been cut through, in all probability, by a ship's propeller.

(II) Eighteen Plessey meters were moored for periods of 9-13 days. A first examination of them suggests that there are:-

- 9 full records
- 3 records spoilt in part by transducer leaks
- 3 records spoilt in part by tape transport troubles
- 2 partial records because two clocks failed
- 1 blank tape resulting from the fact that a supply lead snapped.

(III) Half-hourly observations of current speed and direction made at 4 metre intervals over $12\frac{1}{2}$ hour periods, marked by a general absence of wind, were taken via the DRCM at the Midway, Holyhead and Orme stations. Some pronounced spirals of direction with increasing depth but steady velocity were obtained.

(IV) Recovery and launching techniques. After initial teething troubles and after the block at the mast had been lowered, the 'Pickles' Molgogge provided a "lead" off the ship's side that was a vast improvement on any other system yet tried. The initial troubles were overcome by having slight additions made to the original design by Harland and Wolff at Liverpool during Part B of the cruise.

(V) Thirty-five live rays were landed at Lowestoft for Mr. Holden.

(VI) Surface water samples from a close network of stations off Whitehaven were brought back to Lowestoft for analysis by Hydrographic Section and the Radiobiological Laboratory.

Part B (i) In situ gamma probe survey

Twenty-four stations within a 20 mile radius of the Windscale pipeline were successfully surveyed using gamma spectrometry equipment and the portable gamma monitor. Grab and water samples were taken at each station. An additional station was surveyed in Ramsey Bay to provide extra information to that obtained during CLIONE 9/1967.

During the night of 12/13 April the ship was anchored half mile north of the Windscale pipeline buoy, with the gamma probe at a depth of 20 feet. Continuous gamma spectra were recorded throughout the night, with print out and erasure of memory contents at hourly intervals.

The equipment worked well throughout the cruise, the only defect occurring in the gamma probe. This defect, which produced spurious noise pulses, was not positively identified, but dismantling and checking probe electronics apparently cured the fault, which did not return.

The seabed survey clearly showed that gamma emitting nuclides associated with the Windscale discharges and deposited on the sea bed can be easily followed with simple, but stable, total gamma monitors, or with more sophisticated gamma

spectrametry equipment. Both instruments indicated that gamma counts from nuclides associated with Windscale discharges are less than natural background counts at a distance of 20 miles from the pipeline outlet.

The cruise was particularly useful in that the good weather was accompanied by exceptional high tides. These demonstrated the need for a more flexible system of sinkers and ballast weights, which could be used - depending on tidal conditions - to stabilise probe geometry. On this cruise, Captain Sutton provided sinkers of various sizes and weights which allowed probe work to continue in all the difficult tidal conditions encountered.

Part B (ii) Plaice- and dab-tagging with combined Petersen disc-dosimeter observations.

Trawling for plaice and dabs commenced at 1640 hours, 10 April in an area two miles north of the pipeline buoy and three miles offshore. Two tows in this area produced a few dabs and several hundred plaice in good condition, but mainly too large for the present purpose (> 27 cm). A third tow fouled in the calm conditions and it was decided to finish fishing for the day.

On 11 April, in an attempt to obtain the smaller size of fish required for marking (18-25 cm), the ground to the south of the pipeline buoy was worked. A slight sea allowed the successful shooting of the trawl, and in nine tows between 0500 and 1500 hours sufficient plaice were obtained, mainly in good condition. Again there were few dabs.

A single tow with a tickler chain attached to the trawl, yielded few fish and large quantities of brittle stars. The marked fish, 1095 plaice and 50 dabs, were released $1\frac{1}{2}$ miles south of the pipeline buoy and $2\frac{1}{2}$ miles offshore at 1645 hours, 12 April.

J. W. Ramster, E. Reynolds, D. S. Woodhead

24 April 1968

Seen in draft:

T.A.S.
H.W.H.
A.J.L.

Distribution:

Basic list, plus the following:-

Scientific staff on cruise

J. W. Ramster
J. L. Henry
E. Teare
G. P. Willis
J. W. Read
M. El Sabh (UNESCO Fellow)

D. S. Woodhead
I. A. Huggins
R. J. Read
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