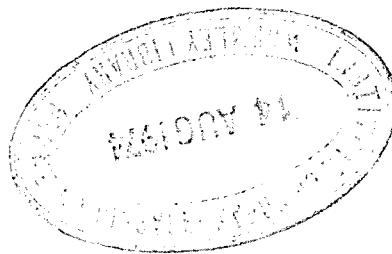


N4941/D/43

NATIONAL INSTITUTE OF OCEANOGRAPHY
Wormley, Godalming, Surrey.

"Surveyor" Cruise Sept. - Oct. 1971



INDEXED

N.I.O. CRUISE REPORT No. 43
(Issued October 1971)

Summary of Work Done:

1. The two moorings laid in early August, Nos. 91 and 92, were recovered.
2. Two new moorings were laid, Nos. 104 and 106. A wire broke during laying No. 105 and one current meter, an acoustic release and approx. 500m of wire were lost.
3. One set of photographs of the sinking of a dummy radioactive waste container was obtained, using a buoyant camera and soluble release. The camera was lost on the second attempt, when the release did not work, and the third dummy waste container was lost in transferring it from the well deck to the A frame.
4. Eight water sampling stations were occupied, arranged in two 10-mile squares centred on the positions of moorings 104 and 106.
5. Two unsuccessful attempts were made at dragging for the remains of mooring 75.
6. Some gaps in the bathymetric survey of the mooring area were filled in by echo sounding, particularly in the northern part near mooring 106.

Scientific participants:

J.W. Cherriman	N.I.O.
A.J. Chitty	"
E.P. Collins	"
W.H. King	A.E.R.E. Harwell
J.R.G. Phillips	N.I.O.
P. Stamp	"
J.C. Swallow	"

Narrative of cruise:

"Surveyor" sailed from Barry 1045A/23rd Sept. E/S watch was started at 2000/24th on crossing the 100fm line and the nearest mooring position (92) was reached at 2305. That mooring was interrogated successfully, but the second one (91) did not respond when called at 0130/25th. Passage was resumed into deeper water and acoustic units were tested for use in new moorings. By 1110/25th, one release and two command pingers were available. Returning to mooring 91's position, the mooring was located and released at 1422, and all recovered by 1619. The same wire and subsurface sphere, with new acoustic units and current meters, were then laid (mooring 104) in nearly the same position that evening. Returning to deeper water, further acoustic tests were made overnight 25th - 26th. A dummy waste container with buoyant camera and pinger attached was dropped at 0528/26th. It took $29\frac{1}{2}$ mins. to reach the bottom in 3877m depth. The soluble release let go at 0937 $\frac{1}{2}$, (about an hour overdue), the instrument package took nearly $1\frac{1}{2}$ hours to reach the surface and was recovered at 1123. Mooring 92 was then released and all recovered by 1717. The wind which had been force 2-3 during most of the day had by then increased to force 5, and instead of re-laying the mooring in the dark an echo-sounding survey to the northwest of mooring 92 position was started.

Next morning, 27th Sept., there was a heavy swell, and, instead of laying the second mooring immediately, some time was spent in getting an accurate fix on mooring 104 since the Decca had been poor when it was laid. With the swell decreasing, a start was then made at laying the second new mooring, No. 105. The sinker, release and one current meter were being paid out when the wire coming off the storage reel caught on a shackle and broke. Enough short lengths of wire were

available to make up a somewhat shallower mooring, with a single current meter, and it was set (mooring No. 106) at 1912/27th.

Another camera drop was then made in 4467m depth, near 47° 20'N, 9°10'W. The waste container slipped out of its sling and caught up on a steady line when being lowered into the water, but was cut away without any lines being left attached that could foul the release. It sank to the bottom in 26 mins., and had not released by 1255. By then the pinger was becoming weak and the buoyant camera was abandoned. Returning to the mooring area, four water sampling stations were occupied in a 10 mile square centred on mooring 104. Mooring 106 was then interrogated and its position fixed accurately, and four more water sampling stations were worked in a 10 mile square around that position. There was one dummy waste container remaining, and a spare camera but no deep buoyancy material. With the idea of lowering them on 4mm wire with a soluble link above the waste container, an attempt was made to transfer the container from the forward well deck to the after A-frame, from which it could be lowered, but in doing so the wire bridle on the container got caught on a protruding bolt and broke, and the container was lost. The water sampling was completed by 2330/29th, and was followed by a sounding survey to the NW of mooring 106, ending next morning near the position of mooring 75, part of which was known to be on the bottom but with its release pinger still working. Four attempts were made to drift through its position with a drag on the bottom consisting of a hookfish, a set of Gifford grapnels and a transponder, without catching anything. Another echo-sounding survey was started at 1800, and continued overnight whilst the Decca was less accurate and unsuitable for dragging. Returning to mooring 75's position, dragging was resumed a.m. 1st Oct. and continued during daylight, again without success. On one occasion the transponder passed within 130m of mooring 75's pinger. The drag was recovered at 1800, moorings 104 and 106 were interrogated successfully and course was set for Southampton at 2120/1st. With much better weather than was forecast, "Surveyor" arrived at Southampton 1100/3rd.

Notes on equipment and observations:

1. Moorings: The wire recovered from mooring 91 and relaid as 104 had been in use since June (mooring 90) and was almost completely covered with rust which appeared to be only superficial. The galvanizing had gone, and very slight scraping revealed clean metal. The wire from mooring 92, (new in August) still looked almost new, though slightly blackened, after 6 weeks exposure. It was one of these lengths that broke in attempting to lay mooring 105, and it seemed surprising that a wire of 4 tons breaking strength could have failed in such circumstances. The end remaining on the storage reel was pulled out without difficulty, and the tension on the storage drum was normally quite small. It is important to have more tension on the storage drum when winding in than when paying out, but it is difficult to maintain that situation with the present arrangement for driving the storage drum, and that may have been partly the cause of the break.

The subsurface floats showed no trace of leakage and although some patches of their orange paint had worn off, the black paint underneath appeared intact. The same floats were used again on the new moorings.

The bottom 100m of wire and the lowest current meter and release of mooring 92 (979m depth) were found to be coated with a brownish slime on recovery, but showed no signs of corrosion.

Four of the five current meters recovered appear to have produced full records. The clock had stopped in the remaining one, but it appears to have done so during recovery.

2. Buoyant Camera: When recovered after its first drop, the 4mm wire strap to which the camera and pinger were attached was found to be badly kinked and unlaid, and it was replaced by a heavier wire (8mm).

A swivel was added, just above the release. These changes may possibly have caused the release to foul on the second drop, if the 8mm wire stored up torsional energy during the descent (due to differential rotation of the buoyancy unit, pinger and camera) which was released during the overshoot on striking the bottom, when the bridles attached to the container would slacken and might get twisted up around the release gear. Another possibility is that the release might have been strained when the container got caught up whilst being launched. In a future experiment of this kind, it might be advisable to risk premature release of the camera by using a simpler corrosive link, or several links in series in case one got fouled.

The one successful drop appears to have produced a full set of pictures of good quality, one picture every 15 sec. during the whole cycle. The horizontal distance moved by the instrument package in rising to the surface was less than the uncertainty of fixing positions ($\pm 0.3\text{ml}$).

Station List:

Moorings:

- 91 Recovered 25.9.71 (49 days duration)
- 92 Recovered 26.9.71 (44 days duration)
- 104 Laid 25.9.71. Lat. $47^{\circ}32' \cdot 6\text{N}$, $8^{\circ}21' \cdot 6\text{W}$
in 2003m depth. Current meters at 311m and 1981m.
- 105 Part lost whilst laying 27.9.71.
- 106 Laid 27.9.71. Lat. $47^{\circ}45' \cdot 6\text{N}$, $7^{\circ}58' \cdot 4\text{W}$
in 742m depth. Current meter at 344m.

Buoyant camera and container:

Launched 0528/26.9.71. Depth 3877m.,
 $0557\frac{1}{2}$ on bottom. $47^{\circ}16' \cdot 3\text{N}$, $8^{\circ}25' \cdot 8\text{W}$
 $0937\frac{1}{2}$ released
1054 at surface
1123 recovered $47^{\circ}16' \cdot 5\text{N}$, $8^{\circ}25' \cdot 9\text{W}$.

Water Sampling stations:

- 1. 1627-2001/28. $47^{\circ}31' \cdot 4\text{N}$ $8^{\circ}31' \cdot 6\text{W}$
- 2. 2115/28-0125/29 $47^{\circ}26' \cdot 8$ $8^{\circ}18' \cdot 2$
- 3. 0235-0556/29 $47^{\circ}33' \cdot 2$ $8^{\circ}11' \cdot 6$
- 4. 0721-1000/29 $47^{\circ}39' \cdot 4$ $8^{\circ}21' \cdot 9$
- 5. 1428-1524/29 $47^{\circ}46' \cdot 0$ $8^{\circ}07' \cdot 6$
- 6. 1653-1748/29 $47^{\circ}52' \cdot 8$ $7^{\circ}57' \cdot 6$
- 7. 1913-2005/29 $47^{\circ}45' \cdot 8$ $7^{\circ}47' \cdot 8$
- 8. 2108-2322/29 $47^{\circ}39' \cdot 2$ $7^{\circ}58' \cdot 3$

Acknowledgements:

Once again, the willing help of all on board the "Surveyor" in the scientific work is gratefully acknowledged. The help of Mr. C.Himsworth and Mr. A.E.Fisher in installing and removing the heavy equipment is also much appreciated.

Distribution:

Prof. H. Charnock	Mr. Cherriman
Sir George Deacon	Mr. Cleverly
Mr. Crease	Mr. Fisher
Mr. Tucker	Mr. Chitty
Mr. McCartney	Mr. Collins
Mr. Gould	Mr. King
Mr. Harris	Mr. Phillips
	Mr. Stamp