

## CRUISE REPORT

R.V. Frederick Russell

Cruise 10

17 August 1981 - 4 September 1981

### Participants

R.D. Pingree	IOS/MBA Principal Scientist
N. Griffin	IOS
C. Griffiths	Southampton University
R. Harris	MBA (Second Leg)
R. Head	MBA (First Leg)
P. Holligan	MBA (Second Leg)
G. Mardell	IOS/MBA
J. Smithers	IOS
T. Weekley	MBA

### Objectives

To study the relationships between physical and biological parameters in the southern North Sea, Lyme Bay and Skagerrak. The sea surface temperature, salinity, chlorophyll 'a', suspended solids and nutrients are planned to be monitored continuously. Vertical profiling to be done on station with the STD + hose and whilst underway with XBT's and the undulating CTD (batfish) + oxygen sensor + in situ fluorometer. Current measurements will be carried out at the southern end of the Dogger Bank using moorings O59 and O60.

### Procedure (1st Leg)

The Frederick Russell steamed from Millbay Docks, Plymouth on the evening of 17 August 1981. Three STD dips were carried out between the Eddystone Lighthouse and El to complement work done in the previous week in relation to the phytoplankton blooms (red tides) in the western English Channel.

The STD was then fitted with 100 metres of 2" hosing so that phytoplankton, zooplankton and nutrients could be sampled vertically on each station for the rest of the cruise. The first STD station was station F where biological work had been carried out on the previous cruise. The dense blooms of the dinoflagellates, Gyrodinium aureolum and Noctiluca that were observed on this previous cruise had largely disappeared.

The ship then steamed into Lyme Bay where a number of zig-zag legs were completed in order to examine surface features highlighted by the coastal zone colour scanner aboard the orbiting satellite NIMBUS-7. Expendable bathythermographs (XBT's) were dropped at regular intervals along these legs. On completion of this survey the ship steamed towards the North Sea, being delayed approximately 12 hours off the Dorset coast due to clutch failure.

The ship then steamed north to the South Winterton ridge off the Norfolk coast and then north-east across the Norfolk Banks to examine suspended sediments and chlorophyll 'a' near the tops of the banks.

The ship arrived at mooring position O59 at 0900 on 21 August. The mooring was deployed and an STD station carried out. We then steamed to position O60 on the south-western edge of the Dogger Bank where the second mooring was laid and again an STD station was completed. Two more STD stations were then done, on the Dogger Bank and the other 30 miles to the west to examine the extent of stratification in the area. At this point

the batfish was deployed for the first time at the start of leg 20 and towed to the end of the leg. It was then recovered and redeployed at the start of leg 24 and towed at 9 knots to a point 5 miles south of Kristiansand. The wire out on the batfish was adjusted several times along leg 24 so that there was never more wire out than the minimum depth of water in any particular section. Due to the shallow nature of the Dogger Bank the batfish was put into a level tow at 5 metres along this portion. When the batfish was recovered at the end of leg 25 an STD station was done and the ship steamed into Kristiansand harbour on the evening of 24 August.

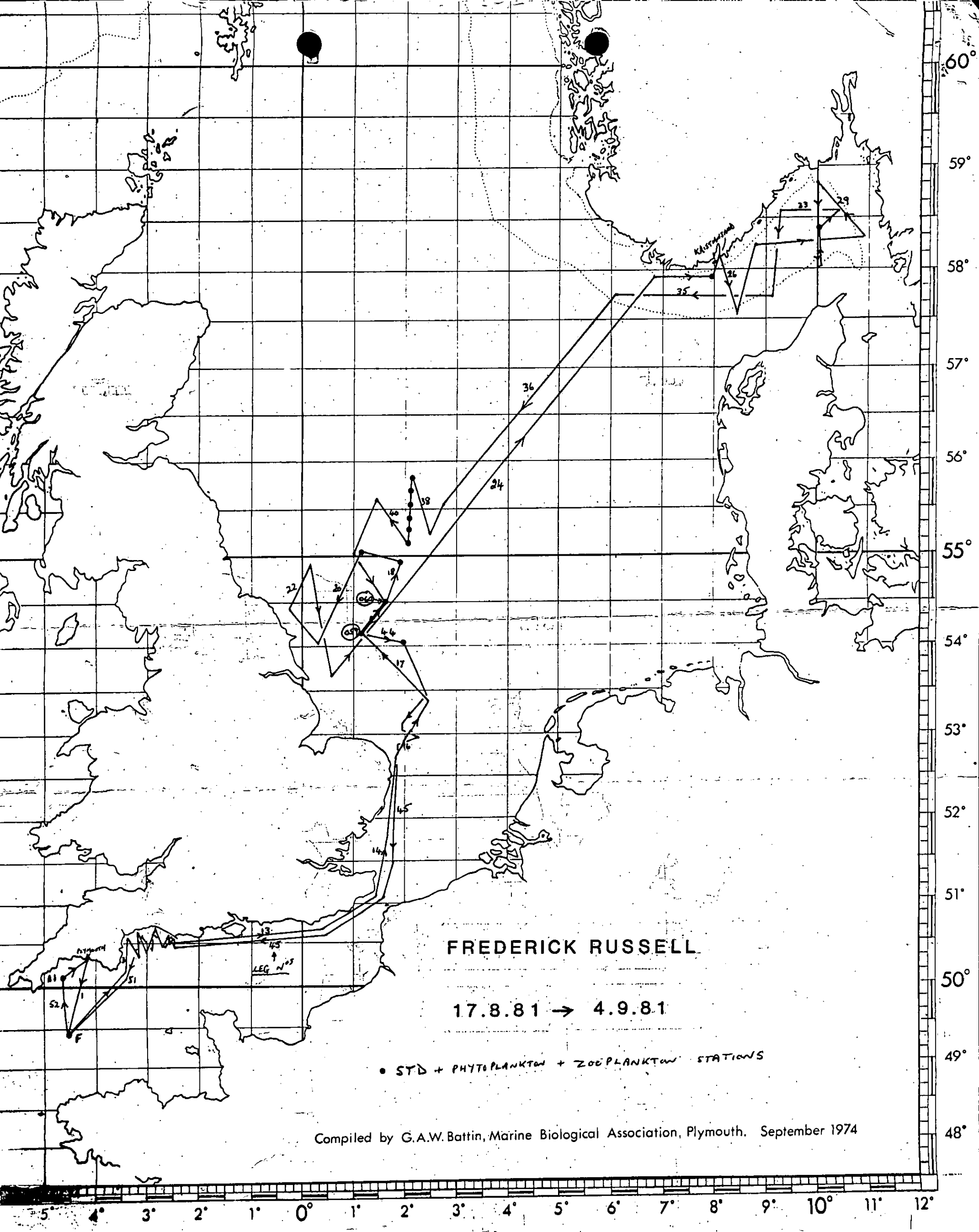
### 2nd Leg

The ship was bunkered in the morning of 26 August and sailed at 1030. The batfish was deployed 5 miles offshore in 500m of water. A series of transects of the Skagerrak were then done to examine the doming of the thermocline in the central region under strong wind conditions. Winds during this initial period were force 5 - 8 mainly north-westerly. A 24 hour pump station was then carried out at the end of leg 31 on 28 August. The pump station showed that the chlorophyll 'a' maximum in the shallow thermocline that had been identified by the batfish fluorometer survey had a value of about 25 mg m<sup>-3</sup>. Vertical net hauls and STD dips were done every 3 hours with the batfish left hanging vertically at 15 metres depth, for cross-calibration purposes. The dense chlorophyll 'a' peaks at the base of the thermocline were in contrast to the generally low levels of chlorophyll 'a' that had been observed in the eastern English Channel and southern North Sea. The plankton were dominated by Coccolithophores and small dinoflagellates.

On completion of the 24 hours pump station the ship steamed around the legs shown, still towing the batfish, until it was recovered at the end of leg 36 on the northern edge of the Dogger Bank. A 12 hour station was then carried out at the end of leg 38 on 30 August and a series of six stations were performed along leg 39. These stations showed relatively high sub-surface levels of ammonium and nitrite associated with the thermocline and bottom water on the bank.

The ship steamed next to mooring position O60 (20 metres) via legs 40, 41 and 42. The mooring was completely intact although had to be picked up the spar buoy end due to the ships crew cutting off the current meter marker buoy. The mooring was eventually recovered after 1½ hours. The ship then steamed to position O59 (50 metres) the mooring was again lifted the spar buoy end. The ship failed to keep the sub-surface buoy astern once the current meter weight was lifted off the bottom, resulting in the wire becoming wound around the ship's propellor. The current meters were brought inboard and the mooring wire broke under load, the other end being cut near the propellor leaving 15 metres of wire unaccounted for.

The ship steamed back over the extremities of the Norfolk Banks and eventually arrived off Portland Bill at 0400 on 3 September. Several zig-zag courses (legs 46 - 50) were completed in Lyme Bay where conditions were now vertically mixed due to weather conditions and spring tides. The batfish was deployed off Start Point and towed to station F at the end of leg 51, where a vertical profile and net haul was completed. The batfish was again deployed for the steam to A1. This station was finished at 0500 and the ship arrived in Millbay Docks at 0730 on 4 September.



FREDERICK RUSSELL

17.8.81 → 4.9.81

• STD + PHYTOPLANKTON + ZOOPLANKTON STATIONS

Compiled by G.A.W. Battin, Marine Biological Association, Plymouth. September 1974

