

24th July - 23rd August, 1967

Birmingham University

Geophysical survey in the area of Nympe Bank and St. George's Channel

A variety of geophysical methods were employed during a four week cruise. The attached map indicates the extent of the traverses that were achieved using a gravimeter and an airgun seismic profiler. Of the total of thirty days available for the cruise, twenty were spent in survey work. Six days were spent in port for bunkering, loading and off-loading scientific equipment and replacing personnel. Only four days were lost through bad weather. Even though the weather conditions were not particularly good (only four days with wind less than force four) it was found that the survey could continue in higher seas than had been anticipated.

In 1965 and 1966 a spark source seismic reflection profiler was used to survey across Cardigan Bay and much of St. George's Channel. This survey was continued during the cruise using an airgun profiler, with the result that the area has been extended in some detail west nearly as far as Cork. In addition, a traverse was made from Pembrokeshire across the shelf to beyond the continental margin south-west of Ireland. The airgun operated reliably throughout but its repetition rate of about 12 sec seemed to make it less well suited for work in shallow seas than the sparker, despite its extra power. However, a number of useful records were obtained which show structures within the top thousand feet below the sea bed.

Seismic refraction lines were fired using sonobuoys to radio back to a recorder on board ship the signals picked up by hydrophones suspended 60 ft beneath them. Reversed lines about four miles long were fired, principally to obtain velocity control for the reflection survey, south of Waterford and between Carnsore Point and St. David's Head. Rough weather during the last week of the survey prevented the programme of refraction work from being completed but sufficient results were obtained to make a worthwhile contribution.

Of major importance in this survey was the opportunity to operate the Askania ship-borne gravimeter kindly lent by the University of Cambridge. The map indicates the extent of the survey made with this instrument. Some of the traverses were made with the ship travelling at ten knots but the majority were

Cross-coupling equipment was also operated during part of the survey.

Attempts to operate a proton magnetometer were thwarted by the high level of electrical noise existing in the general laboratory which interfered with the signal returning from the magnetometer fish and produced inconsistent readings.

A brief inspection of the results has suggested that the sedimentary basin in Cardigan Bay, discovered in 1965, produces a gravity 'low' of about 60 mgal. The basin appears to continue round the south coast of Ireland to just west of Cork. However, gravity anomalies there are about -20 mgal so it seems that the basin is not as deep as in Cardigan Bay. There has been no time yet to map the structures recorded by the airgun profiler.

During the second half of the cruise the Birmingham group were joined by Mr. Sunderland and Dr. McKeown of the University of Cambridge who successfully completed trials of a newly developed sea-bed proton magnetometer. They put the instrument on the sea bed under 30 fathoms of water for 24 hours before commanding it to return to the surface by firing two 10 lb charges of geophex exploded two minutes apart at a range of ten miles from the magnetometer. On reaching the surface the magnetometer gave out a radio signal to enable the ship to locate it by radio D.F. The magnetometer successfully recorded for at least six hours on the sea bed.

I should like to pay tribute, and express my sincere thanks, to the Ship's Company whose efficiency, enthusiasm and good humour made the greatest contribution to the scientific achievement of the cruise. I must also compliment those responsible for the design and construction of the scientific amenities on board, in particular in the general laboratory. This made all the difference to the quality of the scientific results and to the efficiency of the survey, allowing maximum use to be made of the time available for survey.

D. J. Blundell,
Geology Department,
Birmingham University.