NATURAL ENVIRONMENT RESEARCH COUNCIL
INSTITUTE FOR MARINE ENVIRONMENTAL RESEARCH

CRUISE REPORT

IMER B2/80
RVS 1/80

VESSEL RRS JOHN MURRAY

CRUISE PERIOD 13-24 March 1980

PERSONNEL

R.F.C. Mantoura	SSO	Senior Scientist
P. G. Watson	SSO	
P.H. Burkill	HSO	
N.J.P. Owens	HSO	
R.J.M. Howland	SO	
A.J. Pomroy	SO	
E.M.S.-Woodward	ASO	

ITINERARY

A sketch chart of stations occupied and the sequence of cruise tracks as well as list of stations are attached. Because of weather and logistical considerations the cruise started from Plymouth and not Barry as indicated in the Cruise Programme.

Thursday 13 March	Loaded, tested and secured equipment. Locked out of Millbay Dock, Plymouth at 1400 GMT. Proceeded west, around Land's End and then to station P22 on Monitoring track.
Friday 14 "	Started monitoring track from St.P22, 1000 GMT, then St. P23, 24, 25 etc. along the S.Wales portion of Monitoring track proceeding to Avonmouth.
Saturday 15 "	Turned at Portishead 1400 GMT, proceeded on westerly, N Devon leg.
Sunday 16 "	Finished Monitoring Survey at St. P22, 0626 GMT., and proceeded to Carmarthen Bay (C/B) MULEX grid St.1 started at 1350 GMT, then St.2,3,- 29. Completed C/B grid 2322 GMT. Nitrification and ammonification rate experiment carried out.
Monday 17 "	0828 GMT, Standard ^{14}C primary production incubation at St.1, 6 and (^{14}C-^{15}N calibration experiments. (NO_3,NH_4,NO_2, urea). DON,DOP irradiation. Preparation and calibration of excretion, ^{14}C, ^{15}N incubation systems. Preliminary coring at stations 1, 2, 11,12,13, 24, 25 and 31. Sediment pore water and respiration experiments.
Tuesday 18 "	Coring at St.31, 6,7; drift net zoo-plankton hauls abandoned. Scientific work ceased at 1415 because of worsening weather. Easterly gales force 8/9 imminent. Proceeded to Milford Haven. Docked at Pembroke Dock. ^{14}C:^{15}N calibration exp.

Wednesday 19 March		Storm bound at Pembroke Dock because of severe gales. MULEX excretion experiments carried out on organisms netted locally. Coring attempts unsuccessful.
Thursday 20	"	Storm bound in Pembroke Dock. C/B data work up.
Friday 21	"	Favourable forecast. Depart 1000 GMT Proceed to C/B. Unsheduled monitoring of turbidity patchiness S of Caldy Island. Plankton tows at St.15. Started MULEX excretion experiment at 1700. Coring at St. 31, 28. $^{15}N\text{-}NH_4 + NO_3^-$ uptake kinetics, St.15.
Saturday 22	"	Coring St.31,25 0400 GMT. Std. ^{14}C - prim.prod. St.25,29. P:B ^{14}C prim-prod. experiment. MULEX excretion experiments St.15. Macrobenthic trawling and excretion. Coring St.2.
Sunday 23	"	Coring St.31. Zooplankton hauls for MULEX excretion experiments 0540 GMT. $^{15}N\text{-}NH_4$, NO_3^- uptake experiment 1300. Coring at St.23, 1, 11,15. S.W.gales forecast, depart C/B 1300 GMT, shelter Porlock Bay. Tested submersible light meter and shipboard experiments on C/B samples completed at 1700 GMT.
Monday 24	"	Locked in Barry at 1000 GMT. Transfer equipment to vehicles. Cruise de-briefing at RVS; travel to Plymouth. Unload.

OBJECTIVES

a) To initiate the first of five 'MULEX' cruises to investigate nutrient (N,P,Si) cycling processes in Carmarthen Bay and associated with

1. Advective and diffusive transport of nutrients from local run off, Celtic Sea/Bristol Channel water and under-lying sedimentary pore waters.

2. Nutrient demand from primary producers using double isotope labelling techniques ^{15}N, ^{14}C.

3. Nutrient excretion by the total zooplankton system in terms of four size fractionated subpopulations.

4. Bacterial nitrification and denitrification processes.

b) To continue a series of monitoring surveys of the Bristol Channel and Severn Estuary Ecosystem (Chart 1).

OUTLINE OF PROCEDURES AND METHODS

a) The following suite of variables were measured along 30 Stn. grid in Carmarthen Bay (Chart 2): Temperature, salinity, turbidity fluorescence, POC, PON, Chlorophyll a, phaepigments, nitrate, nitrite, silicate, phosphate, ammonia, primary amines, DOC, DON, DOP. Oblique zooplankton tows were carried out at alternate stations and nitrifying and ammonifying bacterial counts every third station. Solar radiation monitored continuously.

b) Shipbased experimental rate measurements on various samples from C/B included:

1. Duplicate 6 hour zooplankton excretion for NH_3, DOC, PO_4, O_2 primary amines, on four size fractionated sub populations obtained from centre of grid.

2. Std ^{14}C-primary production incubation of waters from St. 1, 6, 25, 29.

3. Nitrogen uptake rates by phytoplankton and preference index using $^{15}N/^{14}C$ double isotope incubations. Bacterial nitrification & denitrification rates in St.15.

4. Pore water upflux rates and net benthic respiration rates on sediment cores obtained from several stations in C/B grid.

EQUIPMENT AND OVERALL CRUISE PERFORMANCE

The thermosalinograph fitted by RVS was not properly calibrated. Enzymatic activity of Urease coil was reduced to ~20% efficiency, making urea measurements unreliable. All other equipment; autoanalysers, Craib corer, glove box system, MULEX excretion system performed very well. Although 12 hours were gained during the early start of the Monitoring Grid, 2 days were subsequently lost due to bad weather. Nevertheless, the excellent close liaison with Master Officers & crew ensured that more than sufficient data was obtained in this cruise.

Prepared by: R F C Mantoura
Approved by: B L Bayne
Date: 26 March 1980

CARMARTHEN BAY GRID POSITIONS (MULEX)

STATION	LAT N	LONG W
1	51° 32'	04° 38'
2	51° 32'	04° 35'
3	51° 32'	04° 32'
4	51° 32'	04° 28'
5	51° 32'	04° 25'
6	51° 32'	04° 22'
7	51° 34'	04° 22'
8	51° 34'	04° 25'
9	51° 34'	04° 28'
10	51° 34'	04° 32'
11	51° 34'	04° 35'
12	51° 34'	04° 38'
13	51° 36'	04° 38'
14	51° 36'	04° 35'
15	51° 36'	04° 32'
16	51° 36'	04° 28'
17	51° 36'	04° 25'
18	51° 36'	04° 22'
19	51° 38'	04° 22'
20	51° 38'	04° 25'
21	51° 38'	04° 28'
22	51° 38'	04° 32'
23	51° 38'	04° 35'
24	51° 38'	04° 38'
25	51° 40'	04° 38'
26	51° 40'	04° 35'
27	51° 40'	04° 32'
28	51° 40'	04° 28'
29	51° 40'	04° 25'
30	51° 35'	04° 30'
31	51° 28'	04° 28'

APPROXIMATE MID-TOW POSITIONS
OF PLANKTON HAULS

(modified as of B2/80,14 March 1980)

St.No.	Lat. N.	Long.W.
P 10	51°24.0'	03°06.0'
P 11	51°30.0'	02°47.0'
P 12	51°26.7'	02°59.0'
P 13	51°20.0'	03°08.0'
P 14	51°16.0'	03°21.0'
P 16	51°16.0'	03°40.0'
P 17	51°21.0'	03°48.0'
P 18	51°16.0'	04°00'
P 19	51°01.0'	04°22.0'
P 20	51°07.0'	04°31.0'
P 21	51°14.5'	04°42.5'
P 22	51°24.0'	04°52.0'
P 23	51°34.0'	04°42.0'
P 24	51°41.0'	04°31.0'
P 25	51°31.0'	04°28.0'
P 28	51°35.0'	03°53.0'
P 29	51°28.0'	03°56.0'
P 30	51°21.0'	03°56.0'
P 31	51°16.0'	03°48.0'
P 32	51°23.0'	03°40.0'
P 33	51°16.0'	03°32.0'
P 34	51°21.0'	03°23.5'
P 35	51°20.0'	04°10.0'
P 36	51°17.0'	04°15.0'
P 37	51°27.0'	04°41.0'
P 38	51°16.0'	04°25.0'
P 39	51°28.0'	04°17.0'
P 40	51°27.0'	04°06.'

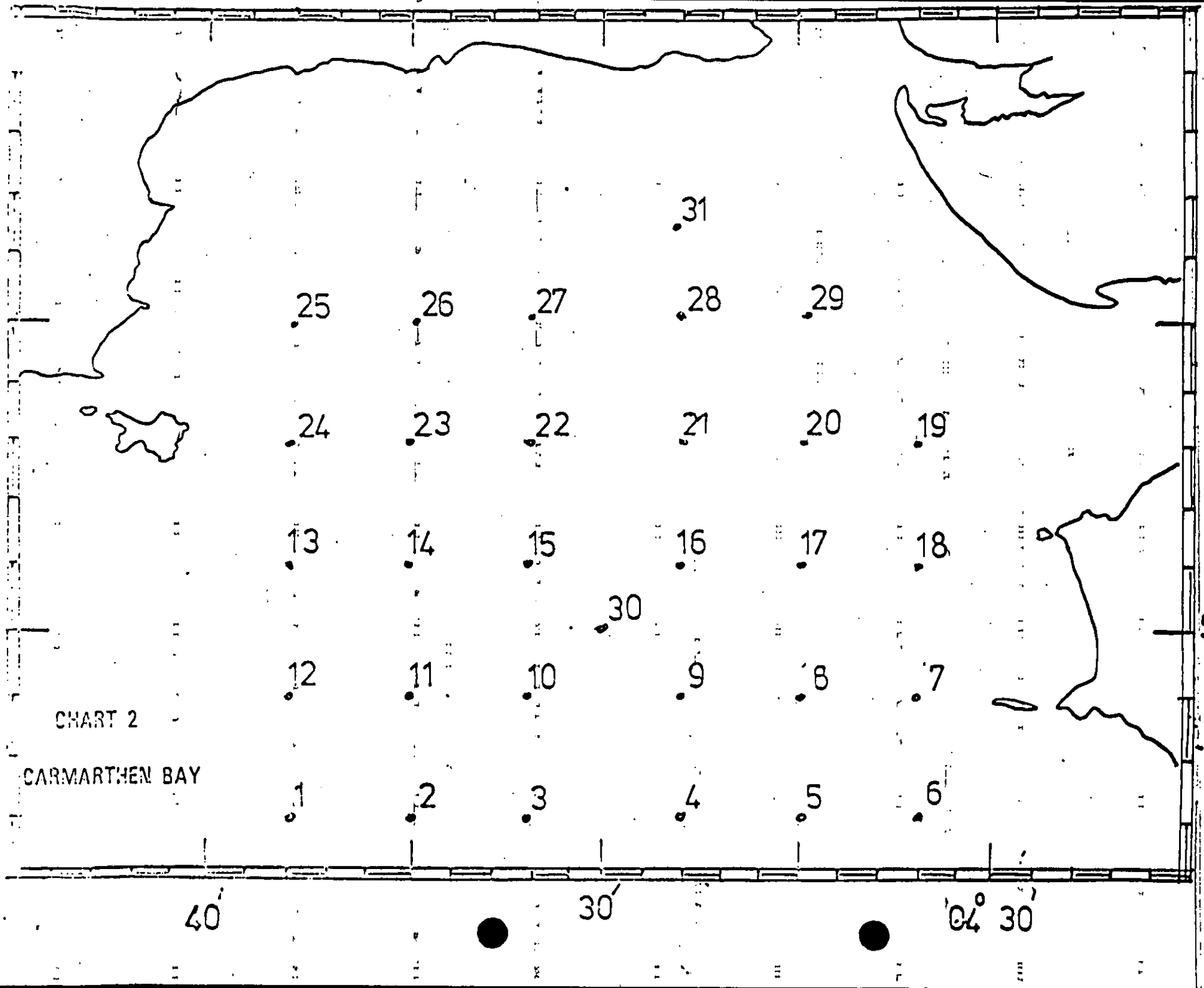
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CHART 2
CARMARTHEN BAY
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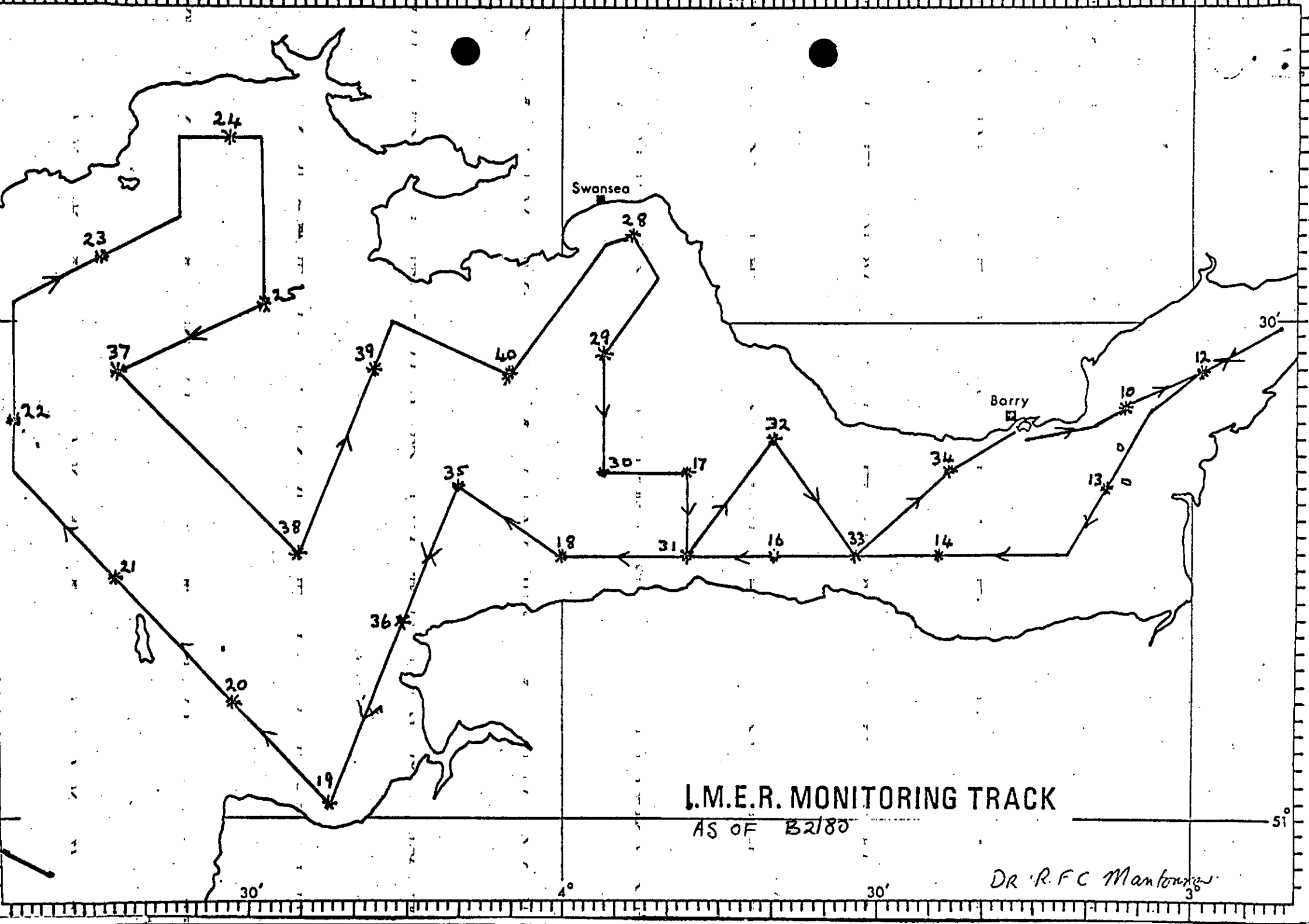
40′
30′
04° 30′



I.M.E.R. MONITORING TRACK

AS OF 82/80

DR R.F.C. Mantoura