IMER C/2/78
R.V.B. Charter

VESSEL M.V. RESEARCHER

CRUISE PERIOD 17 March - 29 March 1978

PERSONNEL

R Williams	PSO	(Senior Scientist)
H H Bottrell	SSO	
P H Burkill	HSO	
T F Kendall	SO	
A J Bale	SO	
R J M Howland	SO	
Ms. S Gent	SO	
A J Pomeroy	ASO	
D Robins	ASO	
Ms. M. Brinsley	ASO	
C. Anderson	ASO	

ITINERARY

Wednesday 15 - Thursday 16 March		Equipment and personnel to Barry.
Friday 17	10.20	Departed Barry.
	10.50	Flygt pumps fitted and secured off the Breaksea lightship.
	11.00	Set course for Carmarthen Bay.
	17.32	Arrived Carmarthen Bay, Live plankton collections.
	19.00	Lowestoft-LHPR deployed - depth calibration of MUFAX.
	21.00	Link call to RVB.
	23.00	Live plankton collections.
Saturday 18	10.10	Commenced Carmarthen Bay grid at Station 1.
	13.00	Lowestoft 20" deployed.
	14.56	Lowestoft 20" deployed.
	20.21	Completion of Carmarthen Bay grid at Station 28.
Sunday 19	08.30	Live plankton collections,
	10.30	Lowestoft 20" deployed,
	13.00	Discontinued scientific work due to adverse weather conditions (Gale Force 8-SW).
Monday 20	08.00	Steamed back from 'Blue Anchor Roads', Minehead to Carmarthen Bay.
	10.30	Arrived at Carmarthen Bay grid
	10.40	Live plankton collections,
	11.00	Commenced feeding experiments with Calanus,
	12.00	Lowestoft-LHPR deployed,
	15.20	Recovered Lowestoft-LHPR,
	16.00	Lift Flygt pumps,
	16.30	Set course for Pembroke,
	21.30	Dock Pembroke.

Tuesday 21	09.00	Replacement power unit for winch arrived.
Wednesday 22 -	Friday 24	Stormbound in Pembroke.
Saturday 25	07.30	Sailed Pembroke,
	13.30	Edge of Celtic Sea grid Force 8,
	14.48	Started Celtic Sea grid, Station 13,
	18.29	Stopped grid sampling at Station 7a due to bad weather,
	18.29	Steamed for Milford; transect sampling Stations 33-44.
	21.30	Stopped sampling at Station 44,
	22.30	Anchored Dale Roads.
Sunday 26		Anchored Dale Roads.
Monday 27	18.30	Sailed from anchorage for Celtic Sea
	23.30	LHPR 1.
Tuesday 28	01.00	Live plankton collections,
	01.10	Started Celtic Sea grid Station 27,
	02.00	Feeding experiments started,
	09.23	Stopped grid sampling at Station 13 due to bad weather,
	09.38	Ceased profiling. Weather 8/9,
	20.20	Anchored Dale Roads.
Wednesday 29	02.00	Celtic Sea Site feeding experiment completed,
	09.00	Sailed from Dale Roads for Carmarthen Bay,
	10.00	Profiling from Station 200-216,
	14.00	Station 216 near Carmarthen Bay site,
	14.15	Deployed Lowestoft-LHPR system Gear lost overboard at launching through 8mm wire parting at block,
	15.18	Transect of Stations 1-4 on Carmarthen Bay site,
	16.08	Completion of sampling,
	21.00	Dock Barry.
Thursday 30		Personnel and gear to Plymouth

OBJECTIVES

Programme Objectives

1. To compare the rates and processes which control the seasonal development of two species of copepod at two contrasting sites; one a near-shore embayment (Carmarthen Bay), the other, offshore with a seasonally stratified water column (Celtic Sea site).

2. To compare seasonal differences in the rates of nutrient turnover at the two sites with emphasis on sediment-water column interactions at the Carmarthen Bay site.

Cruise Objectives

1. To measure levels of nutrients, chlorophyll, total suspended matter, organic matter and the zooplankton and phytoplankton populations.

2. To characterise the hydrographic conditions at the two sites.

3. To measure the feeding rates and development times of two species of copepods at the two sites.

4. To measure uptake and release of nutrients by micro-organisms.

5. To measure the release of nutrients by zooplankton.

PROCEDURE AND METHODS

As outlined in the Cruise Programme. The grids and Station positions were amended to suit the prevailing conditions (Appendix 1).

EQUIPMENT AND OTHER FAILURES

1. Adverse weather conditions from Sunday 19 - Tuesday 28, gale force 6-8 increasing 9, severely hampered the scientific programme.

2. The wrong MUFAX system was fitted by RVB. The system was an uncalibrated unit and did not have the inbuilt sensitivity of the 'IMER' designated unit.

3. The MUFAX broke down; the fault was found on the helixdrive board, which was replaced. The faults with this system were responsible for a considerable loss of biological sampling at the Carmarthen Bay site.

4. The Lowestoft-LHPR control unit developed a series of faults which were rectified aboard although the system failed to function on the manual operation mode.

5. The fine mesh transport in the cod-end of the Lowestoft-LHPR was faulty and will require redesigning with a more positive 'drive and take-up' action.

6. The power unit of the LEBUS hydrographic winch broke a shaft bearing after its first hour of use. The replacement unit supplied by RVB at Pembroke dock turned out to be incompatible with the winch system when the system was used at the Celtic Sea site. The loss of this unit curtailed the vertical biological and hydrographical sampling programmes.

7. The Stuart-Turner pump supplied by RVB to evacuate the waste water from the laboratory burnt out.

8. The Lowestoft-LHPR sampler was lost overboard during launching when the 8 mm warp parted at the heel block. The loss of this sampler is the subject of a separate report. (Loss Report and attempted recovery operations of IMER prototype sampler lost from MV Researcher, 27 April 1978).

9. With the failure of the circulation motor the ship was without heating and hot water for the period 25-30 March.

RESULTS

The weather conditions restricted the survey work to approximately one grid per sampling site; 25 stations in the Celtic Sea and 32 stations in Carmarthen Bay (Appendix I and II). The DESO 10 precision depth recorder was run continually during these surveys. Horizontal profiles were also obtained from the Celtic Sea site to Milford and from Milford to the Carmarthen Bay site. With the failure of the hydrographic winch no vertical profiles were taken during the cruise.

Quantitative serial plankton samples were obtained with one oblique LHPR haul at the Celtic Sea site and one horizontal haul at the Carmarthen Bay site (Station 4 to Station 1) with the Lowestoft-LHPR system.

The 20" Lowestoft sampler was deployed along two legs of the Carmarthen Bay grid. The small catches consisted of Mysids, decapods, fish larvae and Calanus helgolandicus.

In the Celtic Sea live plankton was obtained in sufficient quantity to set up 15 feeding bottles (15 x 250 ml), 9 containing 5-10 stage V copepodites or adult Calanus helgolandicus, 3 containing a variable number of smaller copepods and 3 controls. In Carmarthen Bay 10 feeding bottles were set up with stage V or adult C. helgolandicus. The number of experiments and the range of sizes of the experimental animals were restricted by the difficulties of sorting copepods under bad weather conditions. At both sites the unused portions of the live plankton collections were frozen soon after collection for laboratory determinations of dry weight, ash weight, CHN, calorific value, lipid content and gut analysis.

One 'development time experiment' was completed in Carmarthen Bay (17-24 March). 51 containers were set up each containing one copepod (Calanus helgolandicus 1 stage V, 15 adult ♀♀, Acartia clausi 7 stage IV, 13 stage V, 15 adult ♀♀). No postembryonic development times were obtained although 10 copepods (7 Calanus and 3 Acartia) produced eggs and egg development times were obtained. No development time measurements were obtained in the Celtic Sea due to bad weather.

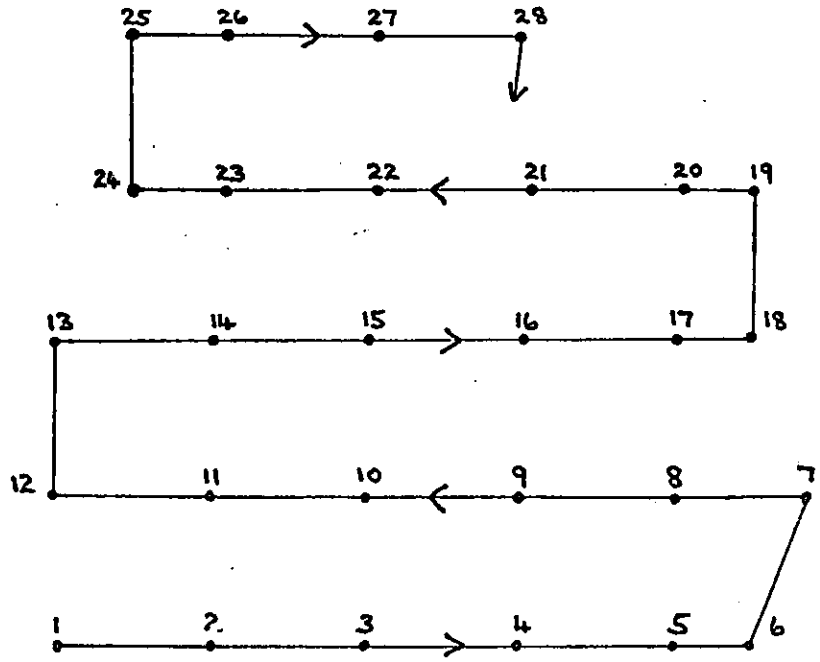
One excretion experiment was set up with Pleurobrachia from the Carmarthen Bay site. The rate of NH_4^+ excretion was 1.44 µg at.N/l after 6¾ hrs or 0.21 µg at.N/l hourly with 5 animals. No ^{14}C work was carried out because of the weather conditions and the breakdown of the hydrographic winch.

Prepared by: R Williams
Approved by:
Date : 6 April 1978

Appendix 1

Carmarthen Bay Site - Cruise track and station positions

18 March



29 March

Station Positions

	Station	Time (GMT)	Decca Positions			Time (GMT)	Decca Positions	
18.3.78	1	10.10	F 41.30	J 68.40	29.3.78	14.18	F 42.39	J 67.19
	2	10.20	F 39.50	J 70.30		14.28	F 39.60	J 70.00
	3	10.36	F 36.80	J 73.70		14.49	F 36.80	J 73.70
	4	10.58	F 33.30	J 77.80		15.08	F 33.38	J 78.00
	5	11.15	F 31.40	A 51.00				
	6	11.30	F 46.50	A 55.40				
	7	11.48	F 46.65	A 59.40				
	8	12.23	F 31.31	A 55.60				
	9	13.05	F 33.95	A 52.18				
	10	13.37	F 37.21	J 77.97				
	11	14.03	F 39.90	J 74.52				
	12	14.28	F 42.61	J 71.33				
	13	14.52	F 43.00	J 75.10				
	14	15.15	F 40.30	J 78.10				
	15	15.40	F 37.61	A 51.60				
	16	16.08	F 34.37	A 56.00				
	17	16.32	F 31.70	A 59.40				
	18	16.43	F 30.60	A 61.12				

Appendix I

Station Positions

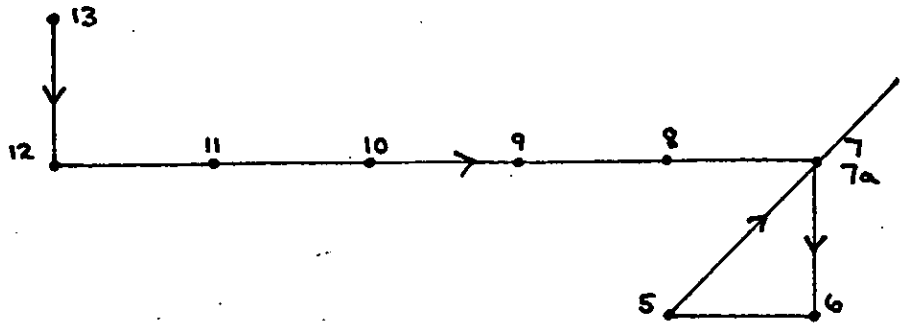
	Station	Time (GMT)	Decca Positions	
18.3.78	19	17.04	F 30.90	A 64.70
	20	17.15	F 32.26	A 63.20
	21	17.38	F 34.80	A 60.20
	22	18.12	F 38.00	A 55.20
	23	18.35	F 40.72	A 52.20
	24	18.54	F 42.50	A 79.60
	25	19.15	F 42.80	A 53.30
	26	19.32	F 40.90	A 55.60
	27	19.54	F 38.50	A 58.80
	28	20.21	F 35.20	A 62.75

Nutrients, temperature, salinity, ammonia, Chl*a*, fluorescence, POC, microseston and particle size distribution were measured at all stations and selected samples were taken for salinity checks and phytoplankton species counts.

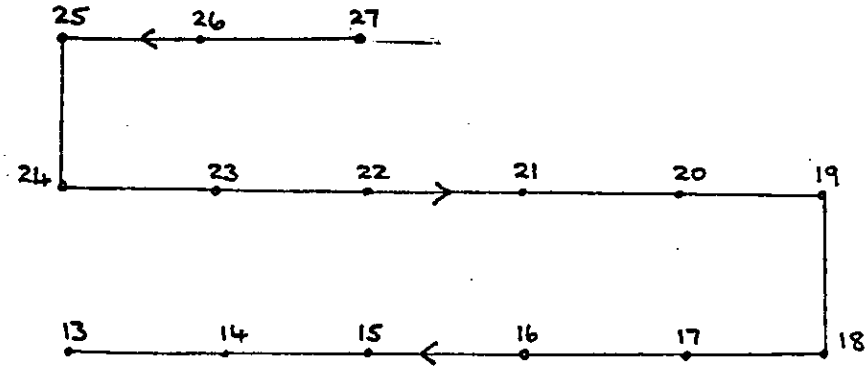
Appendix II

Celtic Sea Site - Cruise track and station positions.

25 March



28 March



Station Positions

	Station	Time (GMT)	Decca Positions J	H		Station	Time (GMT)	Decca Positions J	H
25.3.78	13	13.38	J 46.60	H 68.71	28.3.78	27	00.10	J 39.30	H 77.46
	12	14.02	J 47.80	H 66.21		26	00.48	J 42.00	H 76.10
	11	14.20	J 45.00	H 66.70		25	01.22	J 44.60	H 74.50
	10	14.35	J 42.20	H 67.62		24	01.56	J 45.61	H 71.70
	9	14.55	J 38.60	H 68.76		23	02.23	J 43.00	H 72.60
	8	15.08	J 35.90	H 69.09		22	02.51	J 40.30	H 73.85
	7	15.20	J 33.15	H 71.40		21	03.15	J 36.80	H 76.60
	6	16.10	J 34.10	H 67.49		20	03.35	J 34.30	H 77.24
	5	16.56	J 36.85	H 66.42		19	03.58	J 31.50	H 78.90
	7a	17.29	J 33.50	H 69.80		18	04.35	J 32.30	H 75.50
						17	05.16	J 35.10	H 74.00
						16	05.57	J 37.70	H 72.60
						15	06.46	J 41.20	H 71.06
						14	07.25	J 43.95	H 70.18
						13	08.23	J 46.50	H 69.20

Nutrients, temperature, salinity, ammonia, Chl a, fluorescence, POC, microsestor and particle size distribution were measured at all stations and selected samples were taken for salinity checks and phytoplankton species counts.

Appendix III

MV RESEARCHER — IMER Cruise C/2/78

LHPR

Tow	Date	Type	Deployed Time GMT	Deployed Position	Recovered Time GMT	Recovered Position
1	27 March	oblique	22.30	J 32.55 I 50.72	23.00	J 34.56 I 50.88

Lowestoft 20" sampler

Tow	Date	Type	Deployed Time GMT	Deployed Position	Recovered Time GMT	Recovered Position
1	18 March	Stepped horizontal	13.08	F 34.9 A 51.2	14.28	F 42.61 J 77.33
2	18 March	"	14.56	F 43.00 J 75.10	16.31	F 31.70 J 59.40
3	19 March	"	10.30	F 39.70 J 77.56	11.45	F 38.80 J 74.86

Lowestoft LHPR combination net

17 and 18 March preliminary towing trials and acoustic monitoring

Tow	Date	Type	Deployed Time GMT	Deployed Position	Recovered Time GMT	Recovered Position
1	20 March	Stepped horizontal	14.20	F 32.91 J 78.70	15.20	F 39.96 J 69.44
2	29 March	Sampler lost overboard at launching 13.15 GMT Position F 41.50 J 68.33 (Chain SW. 1B)				

CIRCULATION LIST - BRISTOL CHANNEL

Internal

Glover

Hamilton
Robinson
Fay

File
Notice Board - (Brown)

External

NERC

Foxton
Director STS - NERC - London

IOS

Mrs Edwards (BODS)
Cartwright (Bidston)
Charnock (Wormley)
Tucker (Taunton)

IGS

Moore

MBA

Denton

SMBA

Currie

MAFF

Lee
Cushing
Wood

DAFS

Parrish

RVB

Stobie - (2)

DOE

Graham, London

WRC

Eden, Stevenage

Welsh Office

Naylor Firth - (4)

ICI

Pearson

BRISTOL UNIVERSITY

Dineley
Eglinton

UNIVERSITY COLLEGE CARDIFF

Bellamy
Hammond

UWIST CARDIFF

Davies

UNIVERSITY COLLEGE SWANSEA

Knight-Jones (3)

IMPERIAL COLLEGE OF SCIENCE & TECHNOLOGY

Webb

UNIVERSITY OF LIVERPOOL

Abdullah

WATER AUTHORITY

Welsh National
Severn-Trent
Wessex
South West