

Scottish Marine Biological Association
Dunstaffnage Marine Research Laboratory

CRUISE REPORT

RRS Challenger Cruise No. 3/76

by

J.D. Gage

1) Main objectives

Continuation of seasonal sampling studies on the deep-sea benthos and midwater populations in the Rockall Trough, and laying a waverider buoy off S. Uist for I.O.S. Taunton.

2) Locality and cruise track (see Fig. 1)

- a) Shelf station: $56^{\circ} 01.5'N$ $07^{\circ} 39.2'W$, 148 m depth.
- b) I.O.S. " : $57^{\circ} 17.96'N$ $07^{\circ} 38.30'W$, 42 m "
- c) Deep " 2: $54^{\circ} 40'N$ $12^{\circ} 16'W$, 2886 m "
- d) " " 1: $55^{\circ} 03.5'N$ $12^{\circ} 03.5'W$, 2880m "

3) Sampling gear used

Craib corer and multiple corer for meiofauna sampling; IOS pattern rectangular midwater trawl (RMT 7 + 1) for midwater plankton, and epibenthic sledge for deep-sea macrobenthos sampling.

4) Scientific participation

- | | |
|--------------------|----------------------------------|
| 1. A.G.H. Connelly | S.M.B.A. |
| 2. J.D. Gage | " Chief Scientist |
| 3. Miss H. Grigg | " |
| 4. J. Humphrey | I.O.S. Taunton |
| 5. R.H. Lightfoot | University of Newcastle/S.M.B.A. |
| 6. J. Watson | S.M.B.A. |

5) Sea and weather conditions

Generally good, with light generally southerly winds which increased to force 7 during 28-29th February and prevented work for a few hours,

and left a heavy swell. The wind and swell increased again on the evening of 1st March but work continued up to the deadline set for Challenger's steam back to Greenock.

6) Conduct of cruise; scientific equipment, operation and handling

The cruise was, overall, quite successful in view of the risk of bad weather at this time of year and the very short period of time left after crew illness had delayed Challenger's sailing for one week. We are grateful to RVB Barry for rescheduling the ship's programme to allow her return to Greenock, thus saving us an extra 12 hours at sea. However, because of the drastically shortened period of time remaining for this cruise, its content had to be pruned of all but the most essential elements. This meant that plans for a sampling survey on the Porcupine Seabight and for additional sampling and seabed camera work on the deep stations in the Rockall Trough had to be abandoned before sailing. However, because of its importance and because it had been so badly delayed up to now, the laying of the waverider buoy for I.O.S. Taunton was left in the programme. This had originally been included in the programme for the preceding Cruise 2/76 which had been cancelled.

The start of the present cruise was therefore rescheduled for 27 February and Challenger sailed on schedule from Greenock at 0900. The shelf meiofauna station was visited first arriving at 0024 on 28 February. A series of 6 satisfactory core samples (with 3 blank drops) were obtained using the Craib corer on the hydrographic wire. This work was completed, with a bottom-water bottle sample, by 0229 hrs and the ship then steamed north for the waverider buoy position off S. Uist.

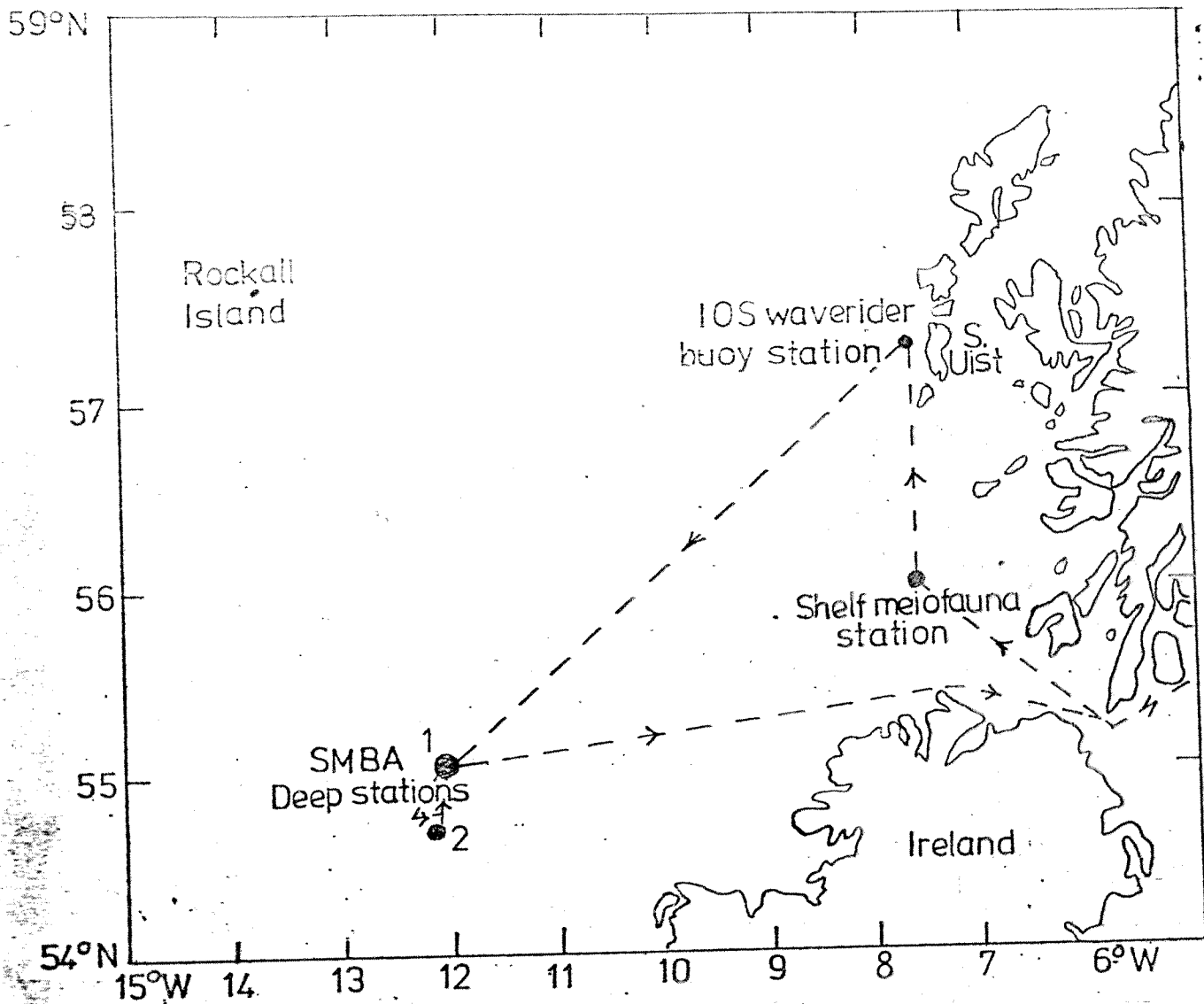


Fig.1 RRS Challenger Cruise 3/76

A depth of 42 m at a position ($57^{\circ}17.96'N$ $07^{\circ}38.30'W$) a little to the southeast of the original target area was eventually selected because it was found to be slightly too deep there. The buoy was then laid and at 1026 hrs Challenger steamed for the S.M.B.A. deep station slightly ahead of schedule. However, because of a steadily freshening wind up to Force 7 and a southerly swell, Challenger made little more than 5 knots for most of the way, arriving behind schedule at 1430 hrs 29 February. It was judged by then to be too rough to attempt any sampling and Challenger hove to until conditions had improved sufficiently to allow an RMT 7+ 1 haul on the main wire at 1906 hrs. The nets were retrieved successfully with good hauls at 2125 hrs and immediately shot again for the longer, deep haul required. The latter haul was retrieved, with an excellent sample at 0530 hrs the following day. By this time sea conditions had improved somewhat, and it was decided to attempt an epibenthic sledge haul. In order to complete a bottom tow of the sledge intersecting $54^{\circ}40'N$ $12^{\circ}16'W$ as close as possible, 4 hours steaming were necessary. The P.D.R. fish was then launched in the hope of improving the quality of the signal from the pinger used on the wire near the gear. The sledge was finally put over the side at 0945 hrs at $54^{\circ}46'N$ $12^{\circ}10'W$ with the ship steaming at about 1 knot maintaining a heading into the southerly swell. The gear bottomed at 1054 hrs with 3126 m of wire out. A good pinger signal was received by the PDR using the ship's hull transducer; that using the PDR fish being found to be markedly inferior. Since our last Challenger cruise (14B/75) we can only conclude that the fish was at fault. It was probably fortunate that the ship's motion was not too severe during

this sledge haul or else the pinger signal undoubtedly would have been degraded by noise associated with hull turbulence when the ship's transducer was used - as we have experienced before during rough conditions.

A very good haul was obtained when the gear was finally retrieved at 1400 hrs and after hauling in the PDR fish the ship steamed north for the station 1 position on $55^{\circ}03.5'N$ $12^{\circ}03.5'W$ arriving at 1615 hrs. Meiofauna sampling using the multiple corer started immediately the first drop being started at 1635 hrs. This work continued until 0209 hrs 2 March, the deadline given for Challenger's steam back to Greenock. Seven multicorer drops were made during steadily worsening sea conditions during this time, but these yielded only 8 cores in all out of a possible 28. Some of the earlier blanks may have been caused by the corer frame being pulled over from the vertical by the wire during the dashpot-damped fall of the core tubes into the sediment, because the sediment surfaces within the successful cores was clearly tilted. Other empty core tubes resulted from failure of the lower tube closure, the sediment then slipping out of the core tube when the frame collided with the stern of the ship on being winched out of the water. The last three drops yielded no cores at all, and these possibly resulted from slight damage to the corer dashpot on an earlier accidental bump with ship's stern.

Challenger arrived in the Clyde earlier than expected, and speed trials over the measured mile (that were necessary after repairs to the ship's gear box), and which originally had been planned for the start of this cruise before its later sailing date,

could then be undertaken. These were completed by 1200 hrs and Challenger then entered James Watt dock at Greenock.

Table 1 gives a breakdown of the distribution of ship time during this cruise.

Table 1

Distribution of ship time

	<u>hrs.</u>
Craib corer	2
I.O.S. buoy	1
Rectangular midwater trawl	10.5
PDR fish	2
Epibenthic sledge	4.5
Multiple corer	9.5
Box corer	nil
Shipek camera	nil
<hr/>	
Total scientific working time	29.5
Ship hove-to	4.5
Total steaming time	83
<hr/>	
Total	117

7) Equipment performance

a) As noted in previous reports of S.M.B.A. biological cruises, the wire metering equipment remains unreliable. It failed completely for the last three drops of the multiple corer. Fortunately, the wire tension meter was working and a strong pinger signal was obtained so that it was known when the gear bottomed. Although I am aware that the present metering equipment has absorbed considerable time and effort in order to improve its efficiency, surely the time has come for installing a, preferably simpler, backup meter as well as for putting, in hand arrangements for permanently marking the wires. If such improvements were put in hand it would also seem well worthwhile taking up Barnett's recommendations (3 - 5) on p. 9 of his report on Challenger cruise No. 14B/75 (12 - 20 November).

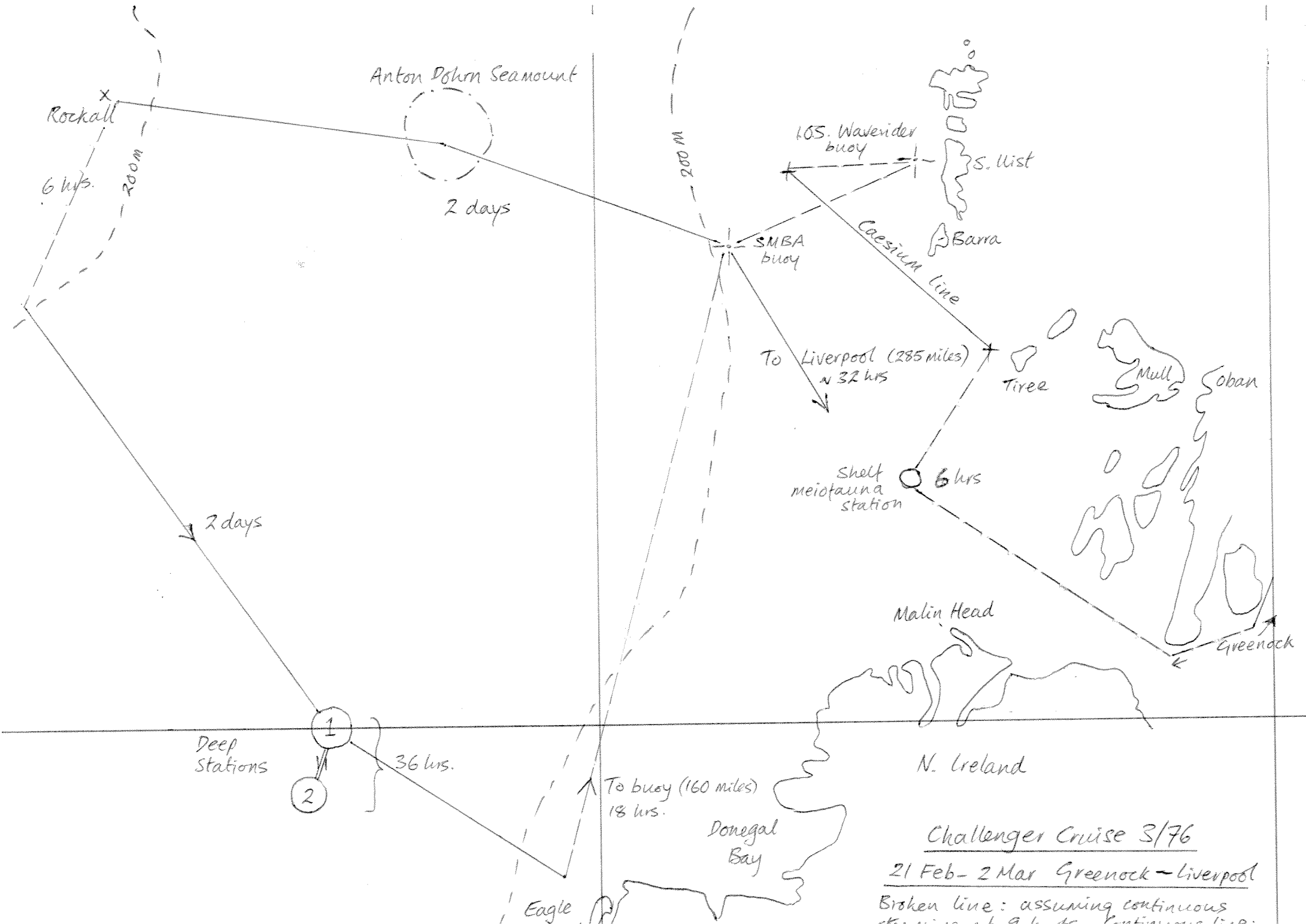
b) Despite the fitting of a new faired cable to the PDR fish supplied, it was nevertheless found, as previously, that the signal received by it was inferior to that from the ships hull transducer. I was also surprised to learn from Captain Maw that the fish could still not be towed at full speed. Since the maximum towing speed (7 knots) would have seriously delayed our already severely shortened but still crowded programme, this necessitated our launching and recovering the fish only while on station. Because this cannot be done in bad weather this resulted, as on previous cruises, valuable good weather time being spent while on station in launching a piece of gear that turned out to be of no help anyway.

c) The state of the scientific workshop needs no further comment to that made in previous cruise reports of S.M.B.A. biological cruises (e.g., 10B/75, 12B/75 and 14B/75). I may add, however, that the hand tools, now long gone, were originally supplied and installed by S.M.B.A.

8) Ships performance

It is a pleasure to report that the scientific programme was unaffected by any fault in the ship during the cruise. The delayed start to the cruise and consequent rescheduling of the scientific programme was entirely the consequence of an outbreak of influenza on board the ship while tied up at Greenock.

We are grateful for the improved handling of gear over the stern made possible by the now lowered stern rail. Once again we are grateful for help received from the ships officers and crew, and especially the friendly co-operation of the bosun and the deck crew. It is also my pleasure to acknowledge the advice and co-operation received from Captain Maw. On cruises such as ours where so much needs to be done in so little available time, and where the weather is so important in determining what can be done, his advice based on long experience can really determine the successful outcome of the work.



Anton Dohrn Seamount

Rockall

6 hrs.

200 M

2 days

200 M

SMBA buoy

105. Waverider buoy

S. Wist

Barra

Caesium line

To Liverpool (285 miles)

~ 32 hrs

Tiree

Mull

Oban

Shelt meiotaua station

6 hrs

Malin Head

Greenock

2 days

1

Deep Stations

2

36 hrs.

To buoy (160 miles)

18 hrs.

Donegal Bay

N. Ireland

Eagle

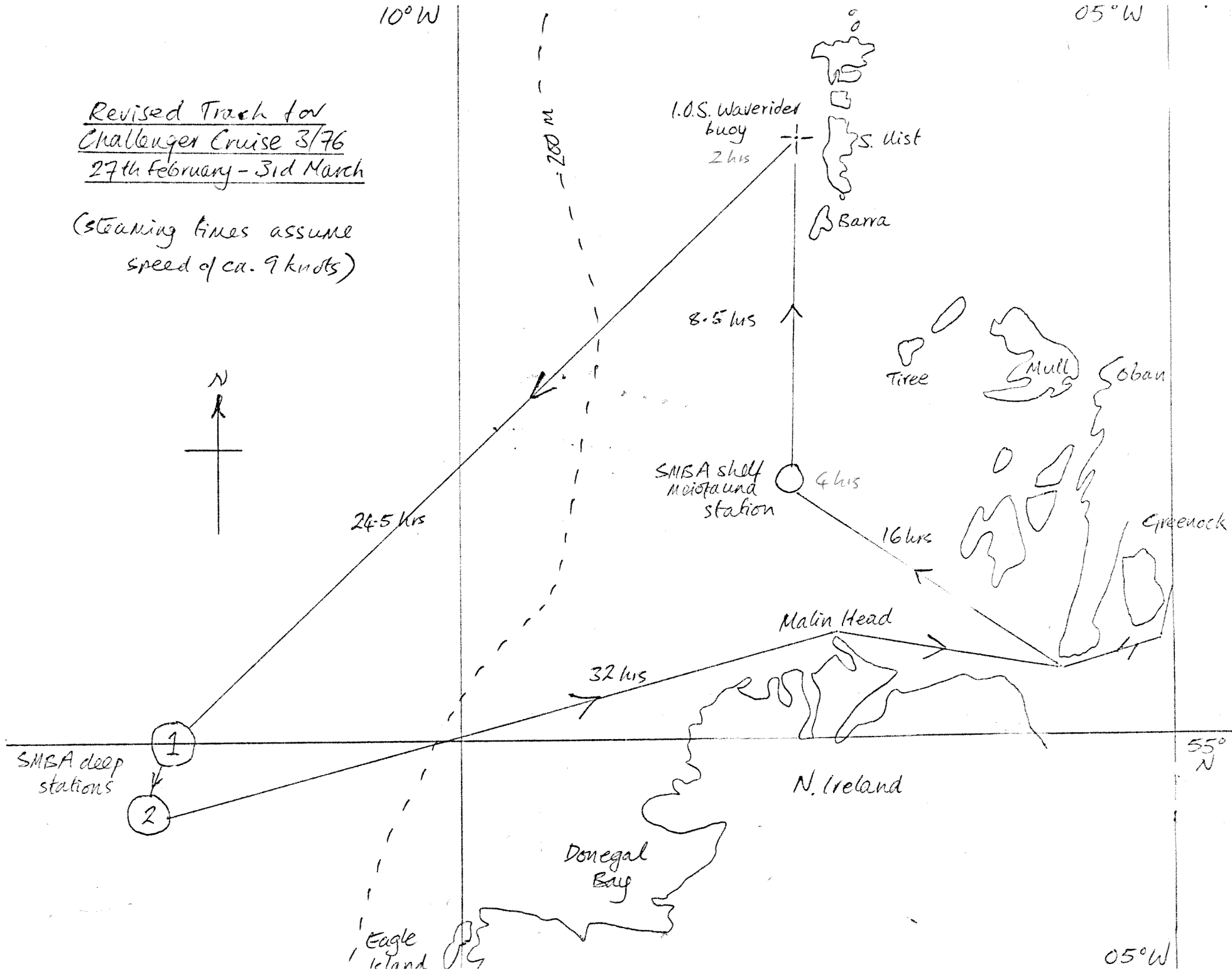
Challenger Cruise 3/76

21 Feb - 2 Mar Greenock - Liverpool

Broken line: assuming continuous

Revised Track for
Challenger Cruise 3/76
27th February - 3rd March

(steaming times assume
speed of ca. 9 knots)



Distances (approx)

and steaming times (hrs)
assuming speed of 9 knots.

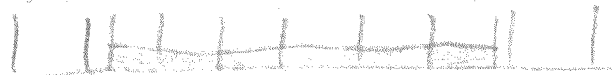
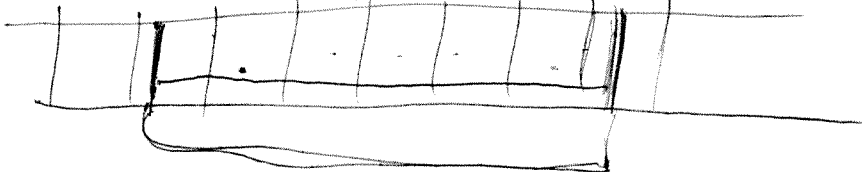
13

	Greenock	Deep Stu	105 Stu	Liverp
Greenock		275 (30.5)	210 210 (23.3)	
Deep Stu			220 (24.4)	385 (42.7)
105 Stu				320 (35.5)
Liverp		385 (42.7)		
Shell Stu				

105 + SMB-A 0.5 Stu. time reqd. = 5.3 hrs.

$\frac{17116R}{5R}$ | Greenock \rightarrow 105 \rightarrow DS \rightarrow Liverp. |
 " \rightarrow DS \rightarrow 105 \rightarrow " = 5.55 days.
 " \rightarrow DS \rightarrow 105 \rightarrow Greenock. 4

Wed Thu Fri Sat Sun Mon Tues Wed.



Thu Fri Sat Sun Mon Tues Wed

GEOPHYSICAL LOG SHEET

No.

No.

Date 28-2-76

LOG	LAT N SAT	LONG W NAV	R	DECCA G	P			
	56°02.57	07°39.78	20.5 ^I		70.70 ^I			1/2 hove to
	56 02.57	07°39.78	20.52		70.68			CORER ON BOTTOM N°1
	56 02.57	07°39.78	20.22		70.58		— —	N°2 (GOOD)
	56 02.67	07°39.76	20.26		70.08		— —	N°3 (GOOD)
	56 02.67	07°39.76	20.24		70.36		— —	N°4
	56 02.67	07°39.78	20.36		70.44		— —	N°5
	56 02.67	07°39.78	20.34		70.30		— —	N°6 (GOOD)
	56 02.67	07°39.78	20.40		70.52		— —	N°7
	56 02.67	07°39.78	20.40		70.64		— —	N°8 (GOOD)
	56 02.67	07°39.76	20.52		70.86		— —	N°9 (GOOD)
	56°02.67	07°39.76	20.42		71.10		— —	N°10 (GOOD)
								W/BOTT SAMPLE
								1/2 underway.

28-2-76. WAVERIDER BUOY STATION.

57°18.1	07°40.7	<u>G.</u>		<u>H.</u>				1/2 on station. Steaming inwards to obtain correct depth
57°17.96	07°38.30	17.2		76.2				Buoy streamed (Subsurface)
57°18.00	07°38.30	17.2		76.25				Buoys launched. Rubha Ardwick 122" x 7.20 (RA)
57°18.60	07°38.48	17.25		76.10				Check posn. on buoy. 1/2 underway.

GEOPHYSICAL LOG SHEET

No.

n No. R-MT 7+1 Date 29-2-76

LAT	LONG	METHOD	R	DECCA G	P	DEPTH	REMARKS
5° 02' 6.12	12° 12' 8.8	⊖				2,900m	Cod end 0/13. RMT 0/13 paying out
5° 03' 46	12° 14' 64	⊖					2000m Stop paying out.
— " —	— " —	— " —					Comm. hauling
5° 03' 03	12° 16' 29	— " —					Net on surface
5° 03' 90	12° 22' 70	FIX ⊖					Net inboard. — good
5° 03' 89	12° 22' 69	⊖					Cod end 0/13.
— " —	— " —	— " —					RMT 0/13 paying out.
5° 04' 90	12° 30' 06	⊖					4000m. Stop paying out.
5° 05' 27	12° 38' 57	DR.					Commenced hauling
5° 08' 9	12° 55' 2	⊖					On surface
✓	—	—					Net 1/13 — Comp. station — good.

Deep Station ②

GEOPHYSICAL LOG SHEET

No.

n No. Epibenthic - Sledge Date 1-3-76

LAT	LONG	METHOD	DECCA		P			
			R	B				
44° 45.3212°	11° 51'	SAT NAV.						✓ 1/2 on station P.D.R. Fish launched @ 0923.
44° 45.94	12° 10.03	FIX						✓ 1/2 steaming 197° 7' oct. kt. Sledge launched.
"	"	⊖						Stop @ 75 m., attach pinger balls.
"	"	⊖					20.	Stop @ 150 m. - " - pinger.
44° 44.0812	09.30	FIX						Sledge on bottom.
54° 43.8	12 10.78	DR FIX						Commenced heaving
54° 42.4	12 10.37	⊖						P.D.R. fish on Deck.
44° 41.96	12 09.22	⊖						
44° 41.96	12 10.12	⊖						
44° 41.45	12 10.11	DR						✓ 1/2 proceeding to Deep Sta 1, Dredge inboard.
44° 57.2	12° 06.8	⊖					21	

Deep Station ①

GEOPHYSICAL LOG SHEET

No.

1 No. MULTI-CORER. Date 1-3-76

S M B A ³ 7/76

LAT N	LONG W	METHOD	R	DEPTH	Ø			
55 03.0	12 03.8	⊕						Multi-Corer 0/B. (1)
03-1	03.8	⊕						on bottom
3-1	3.8	✓						1/B
15 5.6	12 0.0	✓ FIX						0/B. (2)
✓	✓	✓						On bottom
✓	✓	✓						1/B
5 6.0	11 59.19	✓ FIX						0/B. (3)
5.92	59.27	✓ FIX						on bottom
5.8	59.28	✓ FIX						1/B
5.84	59.28	✓						0/B. (4)
5 5.39	12 00.12	✓ FIX						On bottom
✓	✓	⊕						1/B
✓	✓	✓						0/B.
5 5.03	12 00.52	✓ FIX						On Bottom
5 04.78	12 00.77	✓ FIX						
✓	✓	⊕						1/B
✓	✓	✓						0/B.
✓	✓	✓						On Bottom

DEEP STATION ①

GEOPHYSICAL LOG SHEET

No.

No. MULTI-CORE Date 2.3.76

SMB A 3/76

ATN	LONGW	METHOD	R.	G.	P.			
55 04.18	12° 00.78	DR SATNAV						Core on board
55° 04.04	12° 01.21	φ						
5° 04.04	12° 01.20	DR						Core lowering.
5° 03.86	12° 01.19	φ						
5° 03.98	12° 01.16	φ						Core on bottom
								Commenced heaving Core
5° 04.00	12° 01.00	DR						Core on board.
								1/2 08.0 126. Completed Scientific Programme.
55° 04.6	11° 51.00							

BARNETT & WATSON

Challenger Sept. '75

Shelf Station 148 metres. 56° 1.5' N
07° 39.2' W

10 hauls with Craib Cover
about 3 hours

Deep Station 2,900 metres 55° 03.5' N
12° 03.5' W

Minimum 7 hauls with multiple cores
(which will have camera mounted on it)
12 hours

plus any available extra time
for photography on bottom "boom"
camera on its framework

240.

PLANKTON SAMPLES

DEPTH OF WATER REQUIRED FOR ~~DATA~~ ALL

HAULS : > 2500m.

SAMPLER: RMT 7+1.

BASIC HAULS

(1) OBLIQUE 0-1000 m (2000m WIRE) 2½ hours
Preferably at night.

(2) DEEP HAUL (4000m WIRE) 8 hours

TOTAL TIME: 10½ hours.

V. Sage

Reference P12/3/76

R.V.B. SAILING INSTRUCTIONS

R.R.S. "CHALLENGER" - CRUISE 3/76 - 18 FEBRUARY - 2 MARCH 1976

To the Master

1. Ship's Programme

(a) RRS "CHALLENGER" is to sail from Dunst affnage on Wednesday 18 February with members of the Scottish Marine Biological Association (SMBA) for a benthic cruise in the North-east Atlantic (Rockall Trough and Porcupine Bank area) as required by the Senior Scientist (See attached plan).

(b) The outline programme is given below:-

Wednesday	18 February	- Sail Dunstaffnage
Tuesday	2 March	- Arrive Liverpool

2. Scientific Programme

(a) The requirement is to continue the SMBA study of seasonality in shelf and abyssal benthos and midwater plankton populations. If time permits and as a bad weather contingency, sampling is planned elsewhere in the Porcupine Bank/Rockall area, including inshore stations in the Hebrides, for the purpose of comparison with the seasonal stations.

(b) Equipment to be used will include a bottom dredge, a Craib corer, a mid-water trawl, and an epibenthic sledge. SMBA equipment will be loaded in Dunstaffnage on Tuesday 17 February and unloaded in Liverpool.

3. Scientific Party

(a) From the Scottish Marine Biological Association, Dunstaffnage:

Dr. J. D. GAGE	- Senior Scientist
Dr. P. BARNETT	
Miss. H. GRIGG	
Mrs. M. PEARSON	
R. LIGHTFOOT	
J. WATSON	
D. CONNELLY	

(b) SMBA personnel will embark in Dunstaffnage on Tuesday 17 February, and disembark in Liverpool on Wednesday 3 March.

4. Agent

LIVERPOOL - Hogg Robinson (GFA) Ltd.,
641, Royal Liver Buildings,
Water Street,
Liverpool.
L3 1 HH (Mr. Cameron)

Telephone 051-236-3552
T elex 62175 HOGGROB
Telegrams HORCAP LIVERPOOL

D.M.H. Stobie
(Director)

26th January, 1976

PTO

Distribution

- Ship: - Master, R.R.S. "CHALLENGER" (6)
Senior Scientist - Dr. J. D. Gage, Dunstaffnage Marine Research Laboratory, (8)

External

- NERC Headquarters, London - Director, Scientific & Technical Services
- J. Cleverly, Esq.,

- Scottish Marine Biological Association - Director
- Administration Officer, Dunstaffnage
- Head of Technical Services, Dunstaffnage.

- Ministry of Defence - Hydrographer of the Navy, London.

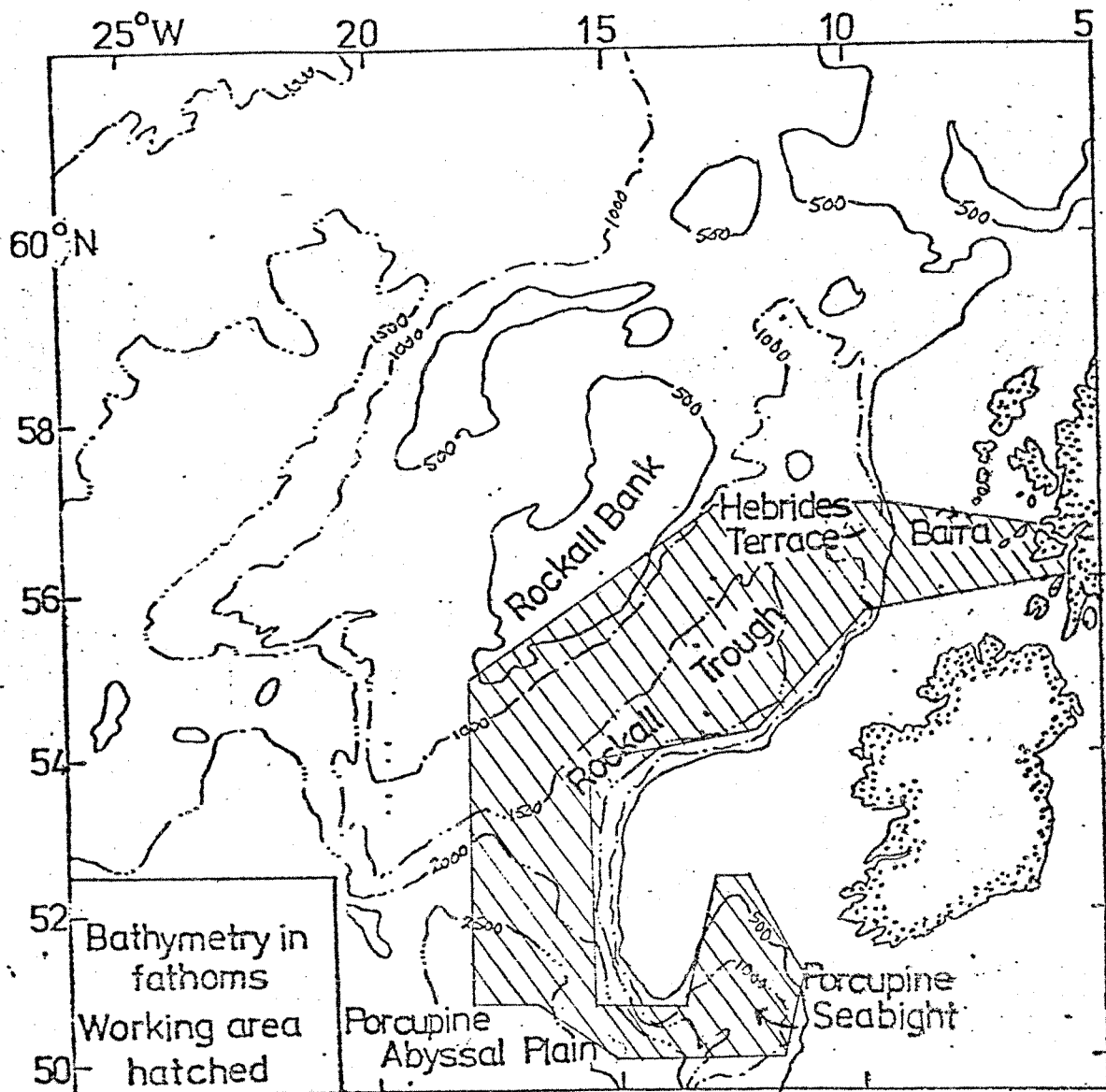
- Foreign & Commonwealth Office - Marine & Transport Department.

- Ministry of Agriculture, Fisheries & Food, London - Chief Inspector of Fisheries.

- Institute of Oceanographic Sciences, Wormley - Director
- Head of British Oceanographic Data Services.

Internal

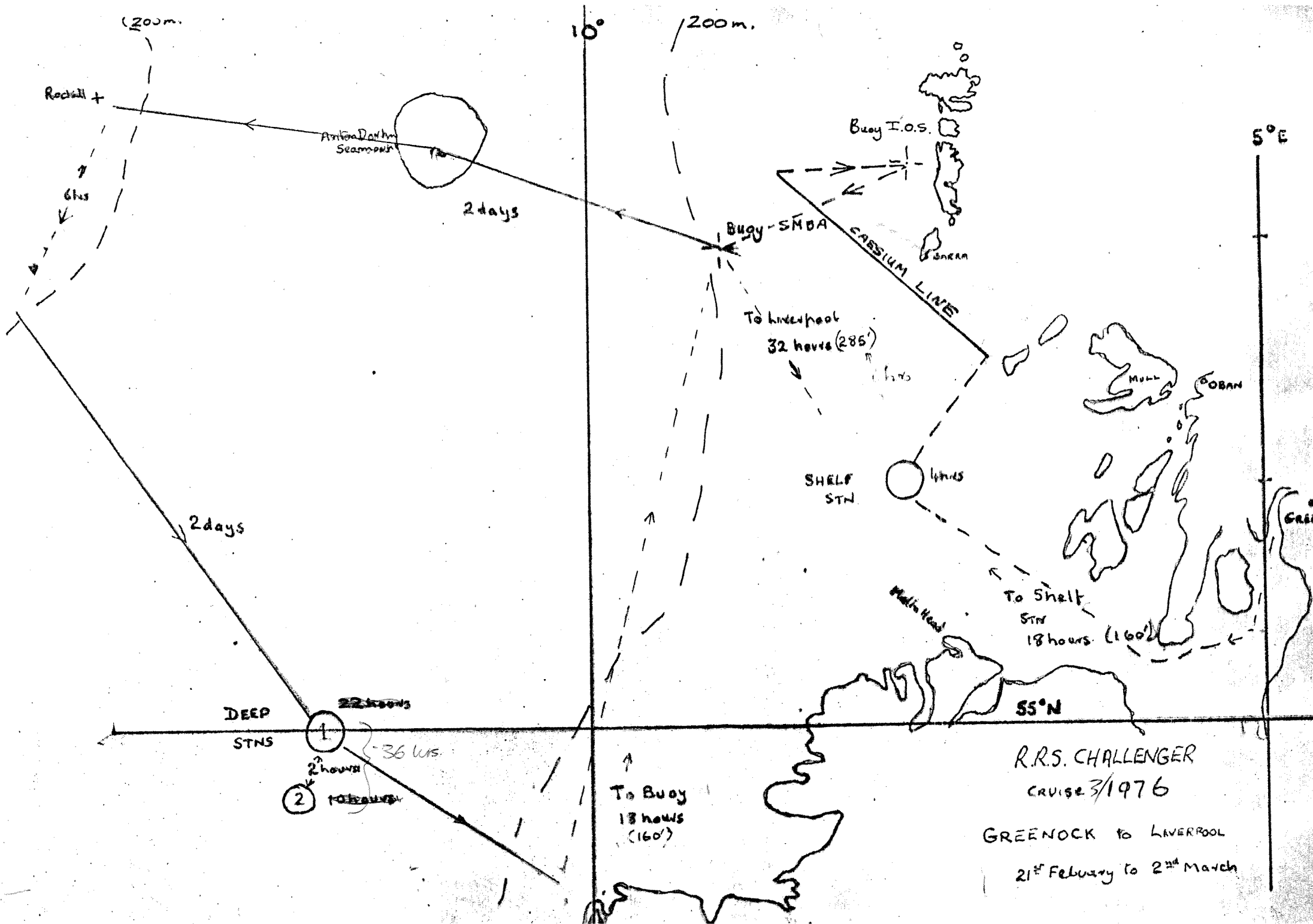
Normal RVB and IOS



Proposed working area Challenger
cruise 3/76

18 February - 2 March 1976

Dr. J. D. Gage, Scottish Marine Biological Association.



RRS CHALLENGER CRUISE 3/76

21 February - 2 March

1. Outline Programme

Saturday 21st February: Sail Greenock a.m. after trials over measured mile and disembarkation of gearbox installation team by small boat.

Tuesday 2 March: Arrive Liverpool p.m.

2. Scientific Requirements

This is a combined Hydrographic/Biological cruise with the following aims:

Hydrographic: a) to lay current meter mooring at $57^{\circ}\text{N } 9^{\circ}\text{W}$, left for as long as possible before recovery at end of cruise. b) to work hydrographic stations (STD) to Rockall and back. c) to collect 50 litre seawater samples on shelf for caesium-137 analysis. d) to lay waverider buoy west of S. Uist for I.O.S. Taunton.

Biological: a) to continue a seasonal sampling programme on the benthic meiofauna at a fixed station on the Hebridean shelf using the Craib corer. b) to conclude a 12-month run of seasonal samples of the abyssal meiofauna at the fixed deep station ($55^{\circ}\text{N } 12^{\circ}\text{W}$) using the multiple corer. c) to continue a seasonal programme of sampling the bathypelagic populations using the rectangular midwater trawl. d) to continue a seasonal programme of sampling the macrobenthos using an epibenthic sledge.

3. Scientific participation

1.	G.G. Coghill	SMBA	British
2.	A.G.H. Connelly	"	"
3.	D. Edelsten	"	"
4.	A. Edwards	"	"
5.	J.D. Gage	"	" Senior Scientist
6.	Helen Grigg	"	Australian
7.	J. Humphreys	IOS Taunton	British
8.	R. Lightfoot	SMBA	"
9.	A.M. Souter, Jr.	"	"
10.	J. Watson	"	"
11.	+ Fishing skipper		

4. Detailed Scientific Programme

The following programme is proposed:

21st	1200	Leave Greenock
22nd	0600	Arrive shelf meiofauna station
	1200	Leave " " "
	1600	Arrive caesium station. Start working caesium line.
	2400	Leave caesium line to arrive at I.O.S. station at daybreak.
23rd	0600	Arrive I.O.S. station to lay waverider buoy on $57^{\circ}18.1'N$ $7^{\circ}40.7'W$.
	0900	Leave waverider station.
	1500	Arrive SMBA current-meter buoy station.
	1800	Leave. Commence working hydrographic (TSD) stations on track to Rockall.
25th	1200	Finish line.
	1800	Arrive southern line of hydrographic stations; commence TSD work.
27th	0600	Arrive deep biological station 1 ($55^{\circ}03.5'N$ $12^{\circ}03.5'W$). Start meiofauna coring using multiple corer on main wire.
	1800	Finish coring. Start RMT haul 1 (deep haul) on main wire.
28th	0200	Finish deep RMT haul. Start oblique RMT haul.
	0430	Finish oblique RMT haul near Deep biological station 2 ($54^{\circ}40'N$ $12^{\circ}16'W$).
	0530	Start epibenthic sledge hauls on main wire.
	1800	Finish sledge hauls; restart hydrographic work.

29th	0900	Finish hydrographic stations.
1st	0300	Arrive SMBA buoy; commence pick-up.
	0800	Leave buoy station.
2nd	1600	Arrive Liverpool.

John D. Gage

18th February 1976.