

M. I. A. S.

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(WORMLEY)

**DEPARTMENT OF OCEANOGRAPHY
UNIVERSITY COLLEGE SWANSEA**

AND

**SCOTTISH MARINE BIOLOGICAL
ASSOCIATION**

CRUISE REPORT

CHALLENGER 10/83

23rd JULY - 7th AUGUST

1983

DEPARTMENT OF OCEANOGRAPHY, UNIVERSITY COLLEGE OF SWANSEA

AND

SCOTTISH MARINE BIOLOGICAL ASSOCIATION

Cruise Report

R.R.S. Challenger

Cruise 10/83

23rd July to 7th August

1983

R.R.S. Challenger Cruise 10/83.

Duration: 13.00hrs 23rd July (Dunstaffnage) to 13.00hrs 7th August
(Dunstaffnage) 1983.

Locality: Hebridean Shelf and Continental Slope, Rockall Trough,
Feni Ridge, Donegal Fan.

Scientific Participants:

P.A. Tyler, University College, Swansea, Principal Scientist
S.J. Wakefield, University College, Swansea.
S.E. Shackley, University College, Swansea.
A. Muirhead, University College, Swansea.
S.L. Pain, University College, Swansea.
R. Harvey, Scottish Marine Biological Association.
G. Davies, Scottish Marine Biological Association.
A.M. Clark, British Museum (Natural History).
P. Meadows, Dept. of Zoology, University of Glasgow.
J. Tait, Dept. of Zoology, University of Glasgow.
G. Bird, Dept. of Zoology, University of Nottingham.
S. Smith, Research Vessel Services, Barry.

Ships Officers:

P. Walne, Master.
K. Avery, Chief Officer.
B. Richardson, Second Officer.
R. Chamberlain, Third Mate.
C. Harman, Chief Engineer.
D. Hornsby, Second Engineer.
J. Richards, Third Engineer.
P. March, Fourth Engineer.

AIMS

- (i) To continue the seasonal benthic sampling programmes at the S.M.B.A. Permanent Station (54°40'N, 12°10'W) and in the vicinity of Station 'M' (57°18'N, 10°23'W).
- (ii) To spade box core at a series of stations for quantitative analyses of deep sea fauna. At selected stations a subdivided box core was to be employed.
- (iii) To spade box core at selected stations. These cores were to be subcored by P. Meadows and S.J. Wakefield for geotechnical, microbiological and sediment respiration analyses (PM & JT) or for geochemical analyses (SJW). The residue of the box core was sieved for fauna.
- (iv) To use the stereocamera at several stations to obtain a photographic record of the sea bed.
- (v) To collect deep sea fish for Dr. J.M. Gordon (SMBA) and for reproductive studies by Dr. S.E. Shackley.
- (vi) To collect megabenthos with the Agassiz trawl and continue collaborative work between BM(NH), SMBA and U.C. Swansea on the zoogeography and life history biology of a variety of marine invertebrates.

CRUISE NARRATIVE (All times are GMT).

Challenger sailed from Dunstaffnage at 1200hrs on Saturday 23rd July in fine weather and proceeded to Station 1 where she arrived at 0730 on Sunday 24th July. On arrival at the 1000m station, the PES fish was launched but the connection had been damaged and it was decided to use the hull transducer until the connection was repaired. At 0811 the RVS Spade Box Corer was deployed and recovered at 0906 containing an excellent

sample which subcored by P. Meadows and S.J. Wakefield. At 1022hrs the camera was lowered and this was recovered at 1159hrs. Results were intermittent suggesting the camera was firing on the way down. At 1219 the spade box corer was redeployed and although successfully recovered, the ship had drifted off-station. The ship was repositioned at 1000m and the spade box corer deployed at 1417hrs. It was recovered at 1513hrs containing an excellent sample which was carefully sieved. At 1555hrs the Agassiz trawl was deployed and recovered at 1900hrs. A good haul was taken, but the sample contained a great deal of sediment. The sample was washed and sorted. At 2008hrs the camera was redeployed and retrieved at 2150hrs, the results being of reasonable quality.

On completion of this station Challenger steamed to Station 'M', situated in 2200m of water. During this period the entire main warp was paid out by the ship to permit tensioning of the wire. Challenger arrived at Station 'M' at 1300hrs on Monday 25th July. The spade box corer, with internal divisions was deployed at 1353hrs and successfully recovered at 1525, each division containing a 15cm deep subcore which was individually sieved. On retrieval there had been some 'kinking' of the wire and 30m were cropped. The spade box corer, without internal divisions was redeployed at 1740hrs and successfully recovered at 1912hrs with an excellent core was was subsampled by P. Meadows and S.J. Wakefield. The residue of the sample was sieved. At 1958 the camera was deployed from the main warp (on advice of S. Smith) and recovered at 2152hrs. Only twelve frames had been exposed. At 2204hrs the epibenthic sledge was deployed fitted with a timed closing mechanism. 5000m of warp were paid out and the sledge was recovered at 0315hrs containing an excellent sample which was sieved and and fixed. At 0337hrs the Agassiz trawl was deployed and recovered at 0820hrs containing a medium size collection of megafauna. At 0833 the rectangular mid-water trawl was deployed. 2000m of warp was paid out

and the net towed for 1hr. It was recovered at 1049hrs containing an excellent sample dominated by salps.

All the work at Stations 1 and 2 (Stn. 'M') was completed in good weather conditions. On completion of Station 'M' the Challenger steamed to Station 3, which was situated in 2000m+ of water to the S.W. of Rosemary Bank. On arrival at this station, the sea conditions had worsened considerably, with increased wind speed and rough seas. The Agassiz trawl was deployed at 0010hrs on Wednesday 27th July and recovered at 0421hrs. It was found to be full of stones, but also contained an excellent haul of fauna. Due to the rough sea conditions and the stoney ground, it was decided not to deploy the spade box corer.

On completion of this station, Challenger proceeded to Station 4, arriving there at 1157hrs on 27th July. Sea conditions were rough and the Agassiz trawl was deployed at 1210hrs. At 2700m of warp, the wire jumped out of the block on the boat deck and jammed. The warp was freed and paid out to 3500m. By this time, a strong swell was running. At 1430hrs hauling commenced. At 2056m of warp out, it was noticed the wire was damaged. The warp was brought fully in and found to be damaged. 1969m had to be cut off and abandoned. There was, however, a good sample in the Agassiz trawl containing the asteroid Ceramaster and Henricia and the echinoid Poriodidaris, and numerous specimens of the prosobranch gastropod Colus.

The camera was then deployed but failed to work. The power pack was checked and found to be badly corroded inside, including all the batteries. This corrosion had been taking place over a long period of time and we were surprised it worked at all at the first few stations. Stan Smith worked on the power pack and eventually got it working again. Due to heavy seas, it was decided to proceed to Station 5.

Challenger arrived at Station 5 at 0819hrs on July 28th. The Agassiz trawl was deployed at 0830hrs and recovered at 1200hrs containing a small, but diverse sample. At 1342hrs the epibenthic sledge was deployed and this was recovered at 1556hrs containing a small, well-washed, sample. By this time, the sea conditions were very rough and the wind speed was Force 7-8. Challenger steamed at 2-3knots to Station 5a, proceeding on a westward course in heavy seas. At 2000hrs Challenger turned ESE to travel to Station 6. It was decided not to sample Stations 5a and b, due to the poor conditions.

Challenger arrived at Station 6 at 0200hrs on Saturday 30th July. Sea conditions were still rough. The Agassiz trawl was deployed at 0200hrs and recovered at 0600hrs containing a small sample. The epibenthic sledge was deployed at 0722hrs and recovered at 1111hrs. This sample was huge, with ooze filling the tail bag right up to the main bag. A number of Hemiaster juveniles were found in this sample. The camera was deployed at 1242hrs, but due to sea conditions, it appeared to be triggering in the water column and no seabed photos were obtained. Conditions were still far too rough to permit the use of the spade box corer.

Challenger then steamed to Station 7, arriving there at 0019hrs on Sunday 31st July. The Agassiz trawl was deployed at 0022hrs and recovered at 0440hrs containing a small sample. The epibenthic sledge was deployed at 0518hrs and recovered at 0913hrs containing a large sample.

In poor sea conditions, Challenger steamed to Station 7a, arriving at 1415hrs 31st July. The Agassiz trawl was deployed and recovered at 1853hrs containing a good haul of echinoderms. The epibenthic sledge was lowered overboard at 2100hrs and recovered at 2357hrs containing a small sample.

At this point in the cruise, the camera was still not functioning properly, so it was decided to test it in the shallower water of the Rockall Bank. Challenger steamed towards Rockall arriving at Station 7b in 150m

of water 7½ miles from Rockall at 0500 on Monday 1st August. The stereo camera was lowered on the hydrographic winch, but one of the leads was shorting in the water and thus the flash was not in synchrony with the shutter of the camera. This fault was repaired (see report of S.E. Shackley and A. Muirhead). At this station, the rock dredge was deployed at 0658hrs. Due to highly variable tension readings during deployment, the rock dredge was recovered after 15mins, but found to contain an excellent haul of sponges, the echinoderms Henricia, Stichastrella, Astropecten and the opisthobranch Scaphander.

Challenger then steamed to Station 8a in 1000m of water, arriving at 1045hrs, 1st August. The sea conditions were rough on top of a long swell. The Agassiz trawl was deployed at 1058hrs and retrieved at 1339hrs and was found to have been bent almost double and the outer net ripped. There was, however, a good sample including the echinoderms Zoroaster, Ceramaster, the coral Lophohelia, crabs, galatheids and ? large hydroids.

Challenger steamed to Station 8 and the repaired camera was deployed at 1709, 1st August, and recovered at 1900hrs. The repairs were justified, as some excellent photographs were obtained. The epibenthic sledge was deployed at 1922hrs and recovered at 2321hrs with a very small, well-washed, sample. The sample pot had come out of the side frame of the sledge possibly during original deployment.

Challenger then proceeded to Station 9 in 2000m of water, arriving at 0915hrs on Tuesday 2nd August. The camera was deployed but a reed switch was faulty and no photographs were obtained. The pinger trace during the camera drop was also weak so the pinger on the camera frame was replaced. The sea conditions had moderated and so the spade box corer was deployed at 1117hrs and recovered at 1347hrs. During this lowering, the bow thruster stopped working, so operations were stopped. The core retrieved was only 6cm deep and partly washed, but consisted of very compact sediment which

prevented deep penetration of the box core. The spade box corer was deployed again, but failed to trigger as the grommet on the release wire had jammed in the tension spring. The spade box corer was lowered again at 1626hrs and recovered at 1814 containing a similar sample of compact, calcareous, sediment (6cm thick) to the previous core. It appeared to contain a lot of ? fossil burrows. Samples were frozen for geochemical analysis. The epibenthic sledge was deployed at 1904hrs and recovered at 2345hrs containing an excellent sample, including the asteroids Pteraster and Pectinaster. The Agassiz trawl was deployed at 0001hrs 3rd August, with a following sea. 5000m of warp were paid out and at 0230hrs, the Agassiz trawl became fast. Master was called and the ship manoeuvred to try to retrieve the Agassiz. Wire parted at 600m.

Challenger then steamed to station 9a, arriving there at 1215hrs on 3rd August. This station was selected as permission had not been granted by the Irish Government to work the S.M.B.A. Permanent Station in 2900m of water at 54°40'N, 12°10'W. This was despite early notification and repeated requests from the ship for clearance. Station 9a was in 2600m of water and it is hoped that the fauna collected will be similar to that from the Permanent Station. The epibenthic sledge was deployed at 1230hrs and recovered at 1827hrs with a small, well washed, sample. The repaired Agassiz trawl was deployed at 1956hrs. During deployment, the tension steadily increased and then dropped back to 'normal'. The Agassiz trawl was recovered at 0210hrs, 4th August, and found to contain bits of wooden decking, some corroded iron and the tail fin of a German 250kg bomb (identified by G. Bird). The Agassiz also contained a good faunal sample, including a number of Paragonaster and galatheids.

The rectangular mid-water trawl was deployed at 0340hrs and recovered at 0617hrs containing an excellent sample. The camera was then deployed at

0709hrs and recovered at 0901hrs. One film worked well, but the other failed. During dismantling on retrieval, the power pack was dropped and it rolled into the scuppers and over the side!

The spade box corer was deployed, but during this drop, the winch kept stopping of its own accord. On recovery, it was believed the pinger snagged the spade box and fell off the wire. To remedy this problem, the pinger was placed at 20m. The station was completed at 1232hrs, 4th August, and Challenger proceeded to Station 10a, as it was now too late to steam to the Permanent Station, even if permission was granted.

Station 10a was in 2200m of water to the north of the Hebrides Terrace Seamount. Challenger hove to on this station at 1934hrs, 4th August. Due to improved weather conditions, the box corer was deployed and an excellent box core recovered. This core was subcored by P. Meadows and S. Wakefield. The Agassiz trawl was deployed at 2225hrs and recovered at 0401hrs containing a good, rich haul of echinoderms, including Benthogone and Palaeopatides. The spade box corer was then redeployed after one failure, a successful core was retrieved and sieved. The failure of the box corer was due to the wire wrapping itself around a protruding bolt.

Challenger then steamed to Station 10b, south of the Hebrides Terrace Seamount and hove to at 1245hrs on 5th August. The Agassiz trawl was deployed at 1300hrs and recovered at 1909hrs containing a very rich haul.

The spade box corer was then deployed using the subdivider and a successful haul was retrieved. The individual sections were sieved separately.

Challenger then proceeded to Station 11 and the spade box corer was deployed in 2000m of water at 0018hrs on Saturday 6th August. This was recovered intact at 0146hrs.

Challenger then proceeded up the slope and took successful box cores

at 2000m, 1800m, 1600m (2), 1400m, 1200m and 1000m. The first box core at 1600m was subcored by P. Meadows and S.J. Wakefield and SJW took small subcores out of each of the remaining box cores.

The 1000m station was completed successfully at 1601hrs 6th August, and Challenger proceeded to Dunstaffnage, docking at 1300hrs, Sunday, 7th August.

RESULTS

Aim 1: It was not possible to sample the Permanent Station as we did not get permission from the Irish Authorities. This station has been sampled by us on a regular basis since 1973 without problem, often with an Irish Observer present. Sufficient notice was given to the relevant authorities and we are rather upset that permission was not granted.

At Station 'M' however, good hauls were obtained with both the epibenthic sledge and the Agassiz trawl. Gonads from echinoderms species were dissected out and frozen for calorific and biochemical studies whilst some whole echinoderm specimens were frozen for energetics studies. The remaining material was fixed in 5% buffered seawater formalin, except the large prosobranch gastropods. In these specimens, the apices of shells were broken and the tissue fixed in Bouins solution.

PAT.

Aim 2: The box corer was successfully employed at a number of stations (see Appendix I). The technical problems concerning the operation of the box corer have now been totally overcome with the assistance of Mr. S. Smith (R.V.S.). However, sea conditions are still the dominant factor in the successful deployment of this apparatus. As the height of the swell increases, the chances of a successful box core decrease. The use of the subdivided corer was very successful, but as expected, penetration into the seabed was not as good as with the undivided corer. In most cases,

penetration was a maximum of 30cm except on the South Feni Ridge, where the hardness of the sediment permitted penetration of only a few cm.

PAT.

Aim 3: Microbiology, Geotechnology and Bioturbation.

Measurements were taken of shear strength and Eh profiles at 4 stations in subcores taken from the spade box core. Shear strength rapidly increased with depth in the sediment. At shallower stations Eh fell with depth, but this was not so at the deeper stations. Spread plate counts were taken to estimate numbers of viable heterotrophic bacteria, and these were found to be most abundant at the sediment/water interface. There proved to be very few viable bacteria below about 10cm depth in the sediment. A new enzymic based method was tested for characterising bacteria in situ, and initial results show that the method may have general applicability. Sediment respiration was also investigated by measuring the rate of degradation of labelled glucose. However, this technique proved difficult to operate at sea and needs some refinement. A careful study was made of the microbiological activity of faecal pellets found in invertebrate burrow systems, and these pellets were found to contain very high numbers of heterotrophic bacteria although the sediment nearby was almost sterile.

PM/JT.

Benthic Flux Studies in the N.E. Atlantic.

A total of 6.81 metres of sediment was sampled from ten separate sampling sites. 31 subcores of the spade box cores were taken and these ranged from 10cm - 36cm in length. Of these 31 cores, 7 were used in benthic flux experiments carried out on board, 6 were capped and kept cool at 4°C and 18 were frozen immediately on board.

The flux experiments that were carried out on board consisted of setting

up the cores in the C-T room on board Challenger (at approx. 5°C) and putting a known volume of clear seawater above the sediment-water interface. This water was then sampled at set time intervals, filtered through glass fibre filters and either frozen for later analysis at Swansea or analysed on board for phosphate. The experiments ranged in duration from 3-60hrs and the initial on board results did indicate some release of nutrients to the overlying water.

Additionally surface sediment samples were centrifuged to extract their pore waters which will also be analysed upon return to Swansea.

As a pilot study, the geochemical part of the cruise was a success and should serve to establish a base from which more "on board" and "process-oriented" studies can take place concerning benthic regeneration in the deep sea.

SJW.

Aim 4: UMEL Stereo Camera Log.

Date: 24/7/83. CAM236: Stn. 1 57°06.7 Lat. 09°22.0 Long.

Ident. Nos. 101 (Master), 201 (Slave). FP4 F8 1.5m - 42 shots.

Comments: Rig lowered at 60m/min. Hydrographic winch. Depth 1000m. After bottom contact rewind 20m, then lowered after 25 seconds, 20 times. 1109z on bottom, 1144z hauling. Total time of deployment 1022-

Results: Master fired continuously during descent. (recycle time 10-13 secs). Slave and master fired on contact with seabed, and both when raised to 20m above bed. Master ran out of film, slave continued firing at bottom and at 20m off bottom. Master still recording frame numbers. Focus and exposure otherwise exact. Technique to be amended accordingly.

Date: 24/7/83. CAM240: Stn. 1 57°06.9 Lat. 09°22.3 Long.

Ident. Nos. 102 (Master), 202 (Slave). FP4 F8 1.5m - 42 shots.

Comments: Rig lowered at 30m/min. Hydrographic winch. Depth 1010m.

After bottom contact, rewound slowly, stopped and lowered after 10 secs.
20 times. 2054z on bottom. 2128z hauling. Deployment 2008-2150z.

Results: When fitting cameras and plugging in flash fired NB only switch
on power pack when cameras rigged. Problems encountered with knowing
exactly when camera first made contact with seabed. Pinger sounds difficult
to identify. Stopped 50m off bottom, when Master fired. First three frames
from slave underexposed. Timers out of synchronisation! Early shots to
be compared on content alone. Last 15 frames on each film in focus and
synchronised. Negatives scratched changing to plastic spools.

Date: 25/7/83. CAM243: Stn. 2 57° 22.0 Lat. 10° 19.5 Long.

Ident. Nos. 103 (Master), 203 (Slave). FP4 F8 1.6m - 42 shots.

Comments: Main winch. Heavy swell. Had to "stream" camera and use bow
thrusters during deployment. Depth 2200m. 2058z camera on bottom, 2119z
camera off bottom. Deployment time 1958-2152z. Used timing intervals
as per CAM240.

Results: Master fired at 2005z in water column, and every 10-15 secs until
2009-30z, when film ran out. Slave fired at 2035-48z in water column
(2 frames) until first seabed exposure at 2057z. 5 consecutive exposures
correct then alternate exposures of seabed and water column commencing 2100z.
Continued firing until film ran out at 2212z, our 13th attempt at firing
on seabed. Extra weight to be added to trigger in an attempt to
desensitise.

Date: 27/7/83. CAM -: Stn 4. 50° 00.0 Lat. 10° 29.4 Long.

Ident. Nos. 104 (Master), 204 (Slave). FP4 F8 1.5m - 42 shots.

Comments: Hydrographic winch. Flash not triggering on deck. Camera
brought back inboard. Power pack defunct. Repairs to be carried out.
Station abandoned.

Date: 30/7/83. CAM253: Stn. 6. 58° 54.9 Lat. 13° 00.1 Long.

Ident. Nos. 105 (Master), 205 (Slave). FP4 F8 1.5m Large spool. Loading in dark.

Comments: Hydrographic winch. Lowering at 30m/min. Depth 3000m.

Heavy swell. 1350z camera on bottom, 1417z hauling. Deployment time 1242-1447z.

Results: All apparently went well. No photographs obtained. Firing in water column?

Date: 30/7/83. CAM253 (repeat). Stn. 6. 59°52.3 Lat. 13° 09.2 Long.

Ident. Nos. 106 (Master), 206 (Slave). FP4 F8 1.5m Large spool. Loading in dark.

Comments: Hydrographic winch. Lowering at 30m/min. Depth 3000m. Heavy swell. 1854z camera on bottom, 1934z hauling. Deployment time 1811-1951z.

Results: All apparently functioning well. Cameras both fired on deck x 3. No trigger until on bottom. Slave fired 12 times in all - all of water column? i.e., no seabed photos. Nothing further until camera on board when Master and Slave both fired. No photographs obtained, film winching on O.K?

Date: 1/8/83. CAM258. Stn 7b "Rockall". 57° 37.5 Lat. 13° 27.6 Long.

Ident. Nos. 107 (Master), 207 (Slave), FP4 F8 1.5m Large spool. Loading in dark.

Comments: Hydrographic winch. Lowering at 30m/min. Depth 1877m. 0532z camera on bottom. Deployment time 0528-0555z. Short run to test equipment. 10 shots taken.

Results: Camera flash unit appeared to be flashing continuously, returned onboard. Two pin plug/socket on flash unit power pack touch sensitive and firing constantly in water column. Aborted work. Lead repaired by cutting off broken wires and soldering direct onto pins on power pack and taping up.

Date: 1/8/83. CAM260. Stn. 8. 57° 21.1 Lat. 12° 02.1 Long.

Ident. Nos. 108 (Master), 208 (Slave). FP4 F8 1.5m Large spool. Loading in dark.

Comments: Hydrographic winch. Lowering at 30m/min. Heavy swell. Camera on bottom 1801z, hauling 1834z. 30 shots taken. Deployment time 1709-1900z. Depth 2000m.

Results: Pinger stopped functioning at 300m, still not functioning at 1000m, hauled in, pinger reactivated at 500m, so continued deployment. Pinger heard weak but readable. Both cameras fired on deck. No triggering until on seabed. Photos obtained, but not synchronous.

Date: 2/8/83. CAM -. Stn. 9. 56° 30.0 Lat. 13° 30.0 Long.

Ident. Nos. 109 (Master), 209 (Slave). FP4 F8 1.5m. Large spool. Loading in dark.

Comments: Hydrographic winch. Lowering at 30m/min. Camera on bottom 1012z, hauling 1040z. Deployment time 0928-1058z. Depth 2000m.

Results: Reed switch for flash unit faulty, not operating flash correctly. No photos obtained. Camera adjusted so that the only operable reed switch now controls the flash unit. Camera to be triggered on visual PES trace only, no audio now available. New pinger also fitted.

Date: 4/8/83. CAM269: Stn. 9a. 56° 23.6 Lat. 11° 59.7 Long.

Ident. Nos. 110 (Master), 210 (Slave). FP4 F8 1.5m. Large spool. Loading in dark.

Comments: Hydrographic winch. Lowering at 30m/min. Camera on bottom 0745z, hauling 0839z. Deployment time 0709-0901z. Depth 2,600m.

Results: Full results from slave unit. Nothing from Master - film not wound on although frame numbers registering. Spools snagging? Camera wind on jamming? First four frames of test run on deck O.K. Power unit lost overboard. No further camera work.

SES/AM.

Aim 5: Fish Ovary Samples.

Samples removed from one species of macrurid (rat tail) -

Coryphenoides guentheri?

Each bilobed ovary was divided into two lobes - one fixed in formalin for light microscopy, the other subdivided and fixed in glutaraldehyde for electron microscopy.

Station 'M', No. 2. 57° 20.9', 10° 20.8'.

Agassiz trawl. 3 samples (1, 2 and 3).

Station 7a "Rockall". 57° 56.0', 12° 12.3'.

Agassiz trawl. 2 samples (4 and 5).

Station 9a Rockall Trough. 56° 24.4', 11° 57.1'.

Agassiz trawl. 2 samples (6 and 7).

Station 10a. N. Hebrides Terrace Seamount. 56° 39.8', 10° 34.9'.

Agassiz trawl. 2 samples (8 and 9).

Station 10b. S. Hebrides Terrace Seamount. 56° 09.0', 10° 29.0'.

Agassiz trawl. 6 samples (10 to 15).

SES.

Aim 6: A wide variety of fauna was collected with the Agassiz Trawl at a number of stations. The stations are listed in Appendix I and the fauna in Appendix II.

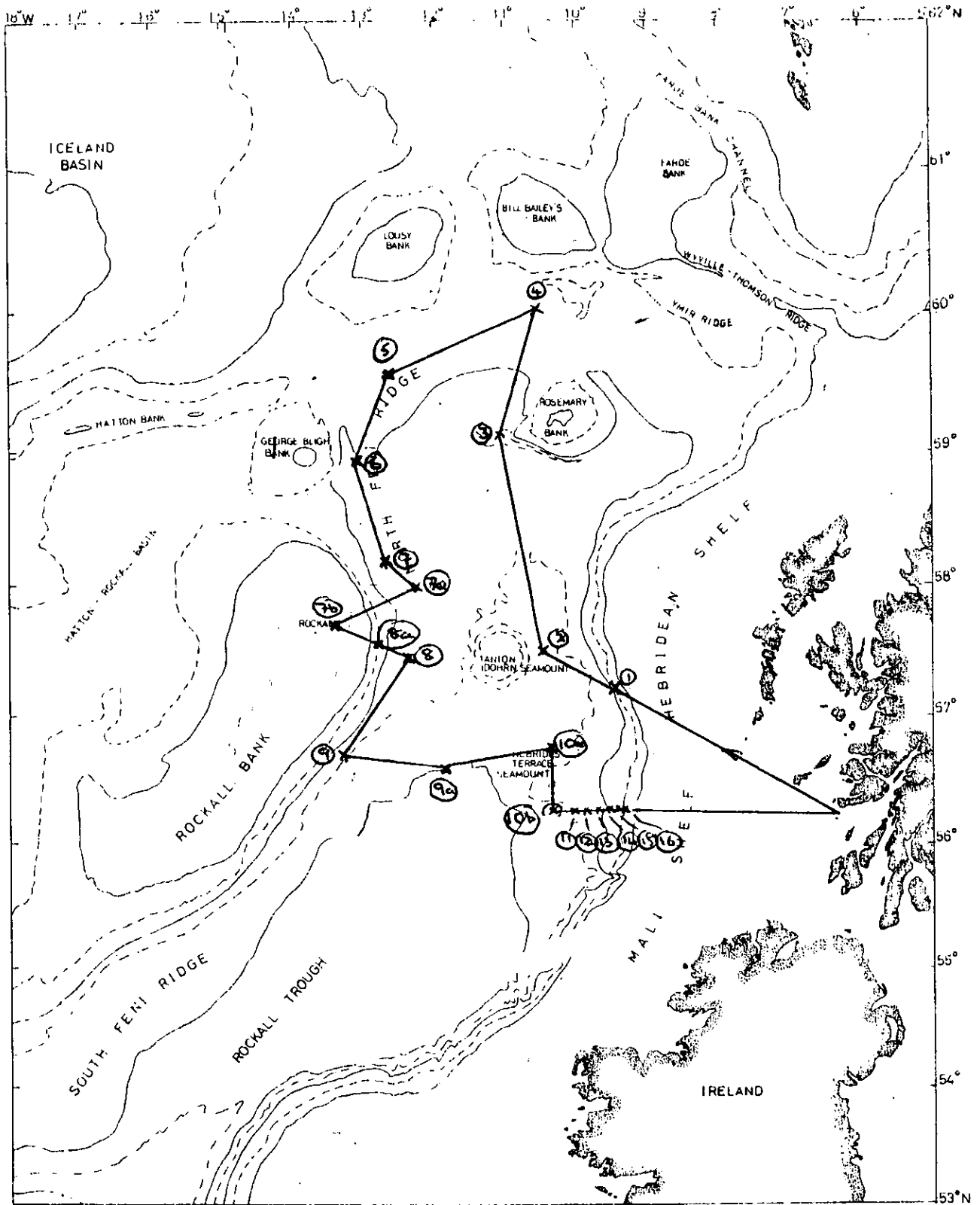
PAT.

ACKNOWLEDGEMENTS

I wish to thank all those who assisted in making this cruise a great success. Especial thanks are due to Captain P. Walne, the officers and crew of R.R.S. Challenger for their considerable help and patience throughout the cruise. Stan Smith (R.V.S.) is also sincerely thanked for all his efforts in keeping the equipment working, whilst Mr. C. Adams and Mr. I. Innes are thanked for logistic support before and after the cruise.

CHALLENGER 10/53

CRUISE TRACK
& STATIONS



APPENDIX 1.
SAMPLE STATION DATA

Number	Date	Position	Uncorrected Depth (m)
SBC235	24/07/83	57°05'N 09°22'W	995
CAM236	24/07/83	57°06'N 09°22'N	1010
SBC237	24/07/83	57°06'N 09°23'W	1150
SBC238	24/07/83	57°05'N 09°21'W	1020
AT 239	24/07/83	57°05'N 09°21'W	990-1145
CAM240	24/07/83	57°06'N 09°21'W	990
SBC241	25/07/83	57°22'N 10°19'W	2175
SBC242	25/07/83	57°21'N 10°19'W	2170
CAM243	25/07/83	57°21'N 10°18'W	2165
ES 244	25/07/83	57°21'N 10°18'W	2180
AT 245	25/07/83	57°25'N 10°21'W	2175
RMT246	26/07/83	57°17'N 10°19'W	2200
AT 247	27/07/83	59°03'N 10°59'W	2080
AT 248	27/07/83	59°59'N 10°31'W	1160
AT 249	28/07/83	59°46'N 12°22'W	1275
ES 250	28/07/83	59°44'N 12°31'W	1280
AT 251	30/07/83	58°55'N 13°00'W	1525
ES 252	30/07/83	58°55'N 12°59'W	1520
CAM253	30/07/83	58°54'N 13°00'W	1500
AT 254	31/07/83	58°27'N 12°34'W	1610
ES 255	31/07/83	58°27'N 12°35'W	1610
AT 256	31/07/83	57°56'N 12°12'W	1710
ES 257	31/07/83	57°55'N 12°12'W	1715
RD 258	01/08/83	57°37'N 13°24'W	135
AT 259	01/08/83	57°29'N 12°52'W	1000
CAM260	01/08/83	57°21'N 11°59'W	1860
ES 261	01/08/83	57°23'N 12°01'W	1860
SBC262	02/08/83	56°30'N 13°30'W	2085
SBC263	02/08/83	56°30'N 13°30'W	2065
ES 264	02/08/83	56°24'N 13°32'W	2150
AT 265	03/08/83	LOST	
ES 266	03/08/83	56°24'N 11°44'W	2600

/Continued

SAMPLE STATION DATA (Continued).

Number	Date	Position	Uncorrected Depth (m)
AT 267	03/08/83	56°25'N 11°49'W	2615
RMT268	04/08/83	56°22'N 11°56'W	2620
CAM269	04/08/83	56°22'N 11°56'W	2600
SBC270	04/08/83	56°42'N 10°29'W	2220
AT 271	04/08/83	56°42'N 10°25'W	2220
SBC272	05/08/83	56°42'N 10°29'W	2200
AT 273	05/08/83	56°10'N 10°29'W	2200
SBC274	05/08/83	56°10'N 10°29'W	2170
SBC275	05/08/83	56°13'N 10°05'W	1970
SBC276	06/08/83	56°14'N 9°51'W	1800
SBC277	06/08/83	56°14'N 9°44'W	1600
SBC278	06/08/83	56°14'N 9°45'W	1635
SBC279	06/08/83	56°16'N 9°35'W	1390
SBC280	06/08/83	56°16'W 9°29'W	1192
SBC281	06/08/83	56°20'N 9°17'W	1005

APPENDIX II Preliminary identifications of fauna in hauls (Agassiz and
Rock Dredge samples only).

AT 239 Large sample with much mud. Wide variety of fauna.

Asteroidea

<u>Pontaster tenuispinus</u>	2
<u>Psilaster andromeda</u>	8
<u>Plutonaster bifrons</u>	?
<u>Zoroaster fulgens</u>	6
? <u>Zoroaster fulgens</u> juvenile in vial	1

Ophiuroidea

<u>Ophiomusium lymani</u>	3
<u>Amphilepis ingolfiana</u>	1
<u>Ophiacantha abyssicola</u>	1
<u>Ophiacantha crassidens</u>	4
<u>Ophiactis abyssicola</u>	3
<u>Ophiochiton tenuispinus</u> juvenile	1
<u>Ophiocten gracilis</u>	139
<u>Ophiopleura inermis</u>	3
<u>Gorgonocephalus caputmedusae</u>	1

Echinoidea

<u>Poriodidaris purpurata</u>	1
<u>Echinus acutus</u> var. <u>norvegicus</u> (incl. 41 juveniles)	47
Juvenile 16mm diam.	1
<u>Spatangus raschi</u> (juv.)	3
<u>Brissopsis</u> sp.	122
? <u>Brissopsis</u> sp. juvenile	1
<u>Calveriosoma</u> sp. 170mm	1
<u>Sperosoma grimaldi</u>	9

<u>Hydrosoma petersi</u>	2
<u>Phormosoma placenta</u>	27
<u>AT 245 (Stn. M) 26/7/83</u>	
Asteroidea	
<u>Brisinga endecacnemos</u>	1
<u>Benthopecten simplex</u>	70
<u>Plutonaster bifrons</u>	4
<u>Zoroaster fulgens</u>	1
<u>Bathybiaster vexillifer</u>	8
<u>Hymenaster membranaceus</u>	421
Ophiuroidea	
<u>Ophiomusium lymani</u>	396
<u>Ophiura irrorata</u>	1
<u>Ophiocantha bidentata</u>	110
<u>Ophiura ljunmani</u>	16
Holothuroidea	
<u>Ypsilothuria talismani</u>	268
Echinoidea	
<u>Hemiaster expergitus</u>	9
<u>Echinosigra phiale</u>	2
<u>AT 247 27/7/83</u>	
Asteroidea	
<u>Chondraster grandis</u>	2
<u>Plutonaster bifrons</u>	5
<u>Pteraster sp.</u>	2
<u>Bathybiaster vexillifer</u>	2
<u>Benthopecten simplex</u>	4

Ophiuroidea

<u>Ophiactis abyssicola</u>	19
<u>Ophiacantha bidentata</u>	32
<u>Ophiura irrorata</u>	28
<u>Ophiura ljungmani</u>	3
<u>Ophiomusium lymani</u>	291

Echinoidea

<u>Echinus affinis</u>	290
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Holothuroidea

<u>Psolus pourtalesii</u>	104
<u>Kolga ?hyalina</u>	18

AT 248 27/7/83

Crinoidea

<u>Atelecrinus balanoides</u>	3
<u>Trichometra cubensis</u>	41

Asteroidea

<u>Pseudarchaster parelii</u>	3
<u>Bathybiaster vexillifer</u>	1
<u>Henricia ?abyssicola</u>	7
<u>Ceremaster granularis</u>	1

Ophiuroidea

<u>Ophiomusium lymani</u>	1
<u>Ophioscolex ?purpureus</u>	1
<u>Ophiacantha ?simulans</u>	1
<u>Ophiactis abyssicola</u>	47
<u>Ophiopleura inermis</u>	4

Echinoidea

<u>Araeosoma hystix</u>	2
<u>Sperosoma grimaldii</u>	2
<u>Phormosoma placenta</u>	47
<u>Poriocidaris purpurata</u>	3
<u>Echinus ?acutus</u> juv.	1
<u>Echinus ?acutus norvegicus</u> juv.	1
<u>Echinus alexandri</u>	7

Holothuriodea

<u>Ypsilothuria talismani</u>	8
<u>Echinocucumis hispida</u>	15
<u>Laetmogone violacea</u>	9
<u>Benthogone rosea</u>	3

AT 249 28/7/83

Crinoidea

<u>Atelecrinus balanoides</u>	1
<u>Trichometra cubensis</u>	1

Asteroidea

<u>Plutonaster bifrons</u>	4
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Ophiuroidea

<u>Ophiactis abyssicola</u>	1
<u>Ophiopleura inermis</u>	1
<u>Ophioscolex ?purpureus</u>	1

Echinoidea

<u>Phormosoma placenta</u>	8
<u>Sperosoma grimaldii</u>	2

Holothuroidea

<u>Laetmogone violacea</u>	5
<u>Benthogone rosea</u>	1

AT 251 30/7/83

Asteroidea

<u>Pseudarchaster parelii</u>	3 - 1 juv.
<u>Plutonaster bifrons</u>	7
<u>Pteraster reductus</u>	1
Asteroidea sp.	1

Ophiuroidea

<u>Ophiomusium lymani</u>	17
<u>Ophiochiton ternispinus</u>	1
<u>Ophiacantha bidentata</u>	4
<u>Ophioscolex ?purpureus</u>	1
<u>Ophioactis abyssicola</u>	6

Echinoidea

<u>Brissopsis ?lyrifera</u>	fragments	1
? <u>Phormosoma (placenta)</u>		2
<u>Hemiaster expergitus</u>		2
<u>Echinus alexandri</u>		2

AT 254 31/7/83

Asteroidea

<u>Pseudarchaster gracilis</u>	1
<u>Plutonaster bifrons</u>	2
<u>Brisinga endecacnemos</u>	1

Ophiuroidea

<u>Ophiomusium lymani</u>	12
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<u>Ophiura ?irrorata</u>	3
Echinoidea	
<u>Phormosoma placenta</u>	40
Holothuroidea	
<u>Mesothuria (Zygathuria) lactea</u>	2
<u>AT 256 31/7/83</u>	
Asteroidea	
<u>Benthopecten simplex</u>	41
<u>Plutonaster bifrons</u>	23
<u>Zoroaster fulgens</u>	13
<u>Psilaster andromeda</u>	4
Ophiuroidea	
<u>Ophiomusium lymani</u>	juv. 27 64
<u>Ophiochiton ternispinus</u>	2
<u>Ophiactis abyssicola</u>	2
<u>Ophiacantha bidentata</u>	8
<u>Ophiura irrorata</u>	19
<u>Ophioscolex ?glacialis</u>	1
Echinoidea	
<u>Echinus alexandri</u>	3
<u>Phormosoma placenta</u>	7
Holothuroidea	
<u>Hedingia albicans</u>	1
<u>RD 258 1/8/83</u>	
Asteroidea	
<u>Astropecten ?irregularis</u>	1

<u>Henricia ?sanguinolenta</u>	2
<u>Stichastrella rosea</u>	1
Ophiuroidea	
<u>Ophiothrix ?fragilis</u>	1
<u>Ophiopholis aculeata</u>	1
AT 259 1/8/83	
Asteroidea	
<u>Zoroaster fulgens</u>	9
<u>Henricia sanguinolenta</u>	2
<u>Neomorphaster talismani</u>	1
<u>Brisinga endecacnemos</u>	
<u>Pseudarchaster parelii</u>	1
<u>Ceramaster granularis</u>	1
<u>Stichastrella rosea var. <u>ambigua</u></u>	2
Ophiuroidea	
<u>Ophioscolex ?glacialis</u>	2
<u>Ophiactis abyssicola</u>	62
<u>Ophiomya serpentaria</u>	15
<u>Ophiura irrorata</u>	6
<u>Ophiacantha sp.</u>	1
<u>Ophiacantha abyssicola</u>	2
<u>Ophiacantha ?cuspidata</u>	4
Echinoidea	
<u>Echinus alexandri</u>	4
<u>?Poriocidaris (purpurata)</u>	1
<u>Phormosoma placenta</u>	1
<u>Araeosoma hystix</u>	2

<u>?Stereocidaris ingolfiana</u>	5
Holothuroidea	
<u>Benthogone rosea</u>	1
<u>Laetmogone violacea</u>	37
<u>AT 267 3/8/83</u>	
Asteroidea	
<u>Bathybiaster vexillifer</u>	2
<u>Pectinaster filholi</u>	2
<u>Paragonaster subtilis</u>	17
<u>Plutonaster bifrons</u>	7
<u>Porcellenaster ceruleus</u>	37
<u>Asteroidea species unidentified</u>	4
<u>?Pseudarchaster</u>	4
<u>Hoplaster spinosus</u>	1
<u>Zoroaster fulgens</u>	3 juv.
Ophiuroidea	
<u>Ophiura ljunmani</u>	22
<u>Ophiacantha bidentata</u>	6
<u>Ophiocten hastatum</u>	1
<u>Amphilepis ingolfiana</u>	7
Echinoidea	
<u>Echinus affinis</u>	7
<u>Echinosigra phiale</u>	4 anteriors 1
Holothuroidea	
<u>Ypsilothuria talismani</u>	80
<u>?Benthogone rosea</u>	7

<u>Molpadia ?musculus</u>	1
<u>Myriotrochus bathybius</u>	1
<u>AT 271 4/8/83</u>	
Ophiuroidea	
<u>Ophiacantha bidentata</u>	93
<u>Ophiactis abyssicola</u>	32
<u>Ophiura ljunmani</u>	6
<u>Ophiomusium lymani</u>	876
Asteroidea	
<u>Hymenaster membranaceus</u>	124
<u>Brisingella coronata</u>	1
<u>Plutonaster bifrons</u>	3
<u>Bathybiaster vexillifer</u>	10
<u>Benthopecten simplex</u>	82
<u>Hymenaster sp.</u>	1
<u>Pontaster tenuispinus</u>	2
Echinoidea	
<u>Echinus affinis</u>	154
<u>Hemiaster expergitus</u>	1
Holothuroidea	
<u>Ypsilothuria talismani</u>	4
<u>Peniagone azorica</u>	23
<u>Benthogone rosea ?</u>	10
<u>AT 273 5/8/83</u>	
Asteroidea	
<u>Zoroaster fulgens ?</u>	3

<u>Ceramaster granularis</u>	1
<u>Hymenaster</u> sp.	7
<u>Pontaster tenuispinus</u>	2
<u>Benthopecten simplex</u>	60
<u>Hymenaster</u> sp. ?	1
<u>Bathybiaster vexillifer</u>	2
<u>Plutonaster bifrons</u>	1
Ophiuroidea	
<u>Ophiacantha bidentata</u>	144
<u>Ophiomusium lymani</u>	571
<u>Ophiura ljungmani</u>	11
<u>Amphilepis ingolfiana</u>	1
<u>Ophiactis abyssicola</u>	10
Echinoidea	
<u>Echinus affinis</u>	692
Holothuroidea	
<u>Protankyra abyssicola</u>	2
<u>Ypsilothuria talismani</u>	10
<u>Paelopatides grisea</u>	3

APPENDIX III

TIME DATA

Challenger Cruise 10/83.

Total Voyage Time	14 days 23.6 hours
Total Steaming Time	7 days 13.0 hours
Total Scientific Time	6 days 22.7 hours
Total Lost Time	15.4 hours
Total Harbour S.T.	3.5 hours
Total Steaming Distance	1323.2 m/s.

APPENDIX IV

EQUIPMENT FUNCTION

Spade Box Corer - excellent results in suitable sea conditions.

Epibenthic Sledge - excellent results.

Rectangular Mid-Water Trawl - excellent results.

Agassiz Trawl - Excellent results. One Agassiz was damaged and repaired. One was lost (see attached form).

Stereo Camera - This presented a series of problems, especially the power pack, which was found to be very corroded. On-board repairs remedied this until the power back was lost (see attached form). The power leads also shorted during deployment.

Ships Main Warp - This presented the occasional problem during the cruise. The main warp was installed in early 1983 but was not tensioned until July 1983 (see main report). A number of problems then occurred including 'cats paws' and 'birds nest' which resulted in the loss of wire. Care was taken with every deployment and we very much regret the loss.

To : Finance Division
NERC HQ

From: Natural Environment Research Council
Research Vessel Services
No 1 Dock, BARRY, S Glam
CF6 6UZ

Ref : F3/1/17/3

Losses of Stores and Equipment
above local write-off powers

I have to report the following loss. Formal write-off authority is requested.

1. a) Item:- *PINGER*
b) Inventory No:- *1631*
2. a) Date of purchase :-
b) Cost :-
3. a) Condition at time of loss :- *WORKING*
b) Estimated/actual replacement cost at time of loss:-

4. Date of loss:- *4/8/83*

5. Circumstances of loss:-
(attach copies of relevant reports)

The Spade Box Com was deployed as usual and the pinger placed as the wire at 10m. This was lowered to the seabed (see attached PDR record). The tension meter indicated the SBC was on the bottom and 5m more were paid out. On recovery the pinger can be seen coming up but it is suggested it snagged the SBC & fell off back to the seabed. Possibly the clamps gave when the wire was under tension during the pull-out.

To : Finance Division

N E R C H Q

From: Natural Environment Research Council

Research Vessel Services

No 1 Dock, BARRY, S Glam

CF6 6UZ

Ref : F3/1/17/3

Losses of Stores and Equipment

above local write-off powers

I have to report the following loss. Formal write-off authority is requested.

1. a) Item:- STURCO CAMERA POWER PACK

b) Inventory No:-

2. a) Date of purchase :-

b) Cost :-

3. a) Condition at time of loss :- The Power Pack had been rebuilt twice due to heavy corrosion and drying of batteries.

b) Estimated/actual replacement cost at time of loss:-

4. Date of loss:- 4 AUG 1983

5. Circumstances of loss:-
(attach copies of relevant reports)

The power pack had presented considerable problems throughout the cruise and was rebuilt by Stan Smith. On returning to shore the battery pack was being removed. Sea conditions were fairly rough and silicon grease had covered the side of the power pack. As a result it was dropped, rolled into the scuppers and overboard.

To : Finance Division

N E R C H Q

From: Natural Environment Research Council

Research Vessel Services

No 1 Dock, BARRY, S Glam

CF6 6UZ

Ref : F3/1/17/3

Losses of Stores and Equipment

above local write-off powers

I have to report the following loss. Formal write-off authority is requested.

1. a) Item:- Agassiz Trawl

b) Inventory No:- 2341

2. a) Date of purchase :-

b) Cost :-

3. a) Condition at time of loss :-

b) Estimated/actual replacement cost at time of loss:-

4. Date of loss:- 3 AUG 1983

5. Circumstances of loss:-
(attach copies of relevant reports)

The Agassiz Trawl was being towed in 2100m of water with 5000m of warp out when it became fast at 02.30 hrs. The Master was called and the ship went steadily astern taking in water. However due to rough seas over the stern the warp parted at 600m.