I.O.S.

RRS CHALLENGER
CRUISE 10/82

15 - 26 JULY 1982

BENTHIC BIOLOGY OF THE PORCUPINE SEABIGHT

CRUISE REPORT NO. 146
1983

NATURAL ENVIRONMENT RESEARCH COUNCIL
INSTITUTE OF OCEANOGRAPHIC SCIENCES

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INSTITUTE OF OCEANOGRAPHIC SCIENCES

WORMLEY

RRS CHALLENGER

Cruise 10/82

(IOS Cruise 516)

15 - 26 July 1982

Benthic biology of the Porcupine Seabight

Principal Scientist

M.H. Thurston

CRUISE REPORT NO. 146

1983

C O N T E N T S

ITINERARY

Depart Barry 1330 GMT 15 July 1982
Arrive Falmouth 0930 GMT 26 July 1982

SCIENTIFIC PERSONNEL

R.G. Aldred	IOS Wormley
E.P. Collins	" "
D. Edge	" "
A.J. Gooday	" "
R.S. Lampitt	" "
O. Pfannkuche	" "
M.H. Thurston	" " (Principal Scientist)
N.T. Timmins	" "
J. Watson	SMBA Dunstaffnage
A. Muirhead	University College, Swansea

SHIPS OFFICERS

P. MacDermott	Master
K. Avery	Chief Officer
J. Price	Second Mate
R. Chamberlain	Third Mate
F. Hammond	Chief Engineer
C. Harman	Second Engineer
H. Peck	Third Engineer
A. Greenhorn	Fourth Engineer
F. Dunning	Fishing Skipper

OBJECTIVES

1. To obtain a series of samples for investigations of bathymetric and in-sediment distribution and abundances of meiofauna, Foraminifera and chloroplastic pigments, using the SMBA multiple corer.

2. To obtain from the same multiple corer series, sets of samples for clarification of the nature and distribution of flocculent material at the water/sediment interface.

3. To test the component systems of a free vehicle grab respirometer and to obtain data sets and samples from deployments of the complete unit.

4. To recover the Bathysnap put down on Challenger Cruise 8/82, and make further deployments to monitor the presence or absence, quantities and distributions of flocculent material, and to continue the photographic survey of mobile megafauna.

5. To obtain samples of the holothurian Kolga for continuing life history studies, and of the foraminiferan Bathysipon for taxonomic purposes.

6. To obtain replicate hauls with the BN1.5 at 2000m for further biomass determinations.

7. To resample an outer shelf station to study changes in the near bottom fauna.

8. To conduct a photographic survey around the shallow transponder site (see report of Cruise 512 (Challenger 14/81)) using long tows of the BN1.5 in the photographic mode.

9. To obtain OTSB 14 samples from depths greater than 2000m as part of the long-term study of fish populations at these depths.

10. To obtain soundings for eventual incorporation into an improved bathymetric chart of the Seabight and to define suitable areas for future sampling with towed biological gears.

NARRATIVE

Departure was delayed 24 hours, due to a National Union of Seamen strike, so Challenger did not clear Barry Dock until 1340GMT/15 July. Good progress was made to the westward in fine weather with light to moderate westerly winds. The PDR fish was deployed at 1210/16; and echo-sounder watches were instituted at 2300/16 in 11°W, close to the shelf edge. The Bathysnap deployed on Challenger Cruise 8/82 was relocated and recovered without problems by 0900/17. Wire tests of command release systems were carried out during the morning. Attempts to launch the epibenthic sledge were frustrated by the gear turning over close to the surface. Various permutations of swivels, bridles, buoyancy, paying out speeds and ship speeds were tried to no avail. Although minor problems with stability have been encountered in the past, nothing like this has been experienced. At least we are now very proficient at launching and recovering the sledge! These attempts were abandoned in late afternoon, and a multiple corer deployed at 1650/17. When the corer was almost on the bottom damaged sections of the main warp were noted. The corer was recovered successfully with cores intact. An examination of the warp showed three birdcages and four sections in which the hemp core had been extruded or severed within the range 2000-2100m from the towing eye. Nearly three hours were required to pay out this amount of wire, remove the damaged section, splice together the cut ends and wind back the streamed warp. Loss of data from both camera and current meter on the Bathysnap recovered from 2000m militated against redeployment at this depth. This together with the unresolved problems with the sledge resulted in the abandonment of the 2000m station. The ship therefore proceeded at 2130/17 to the 2700m station where we hoped for better luck.

Further tests indicated that the sledge stability problem was due to the newly fitted metal frames with Netlon inserts used to occlude the sides of the lower part of the main frame. With these removed the net did not turn over. Bathysnap was deployed at 0544/18 (Sta. 51602) but not followed to the bottom as no suitable satellites were predicted. A multicore followed at 0655/18. This was recovered successfully although two of the tubes had failed to take adequate samples. At 0845/18, the BN1.5/3M was launched in 2750m in an attempt to repeat Sta. 10112#3 which had provided considerable numbers of the foraminiferan Bathysiphon. The sledge was recovered at 1315, the catch containing appreciable quantities of Bathysiphon among a rather sparse catch. During the afternoon, the wind, which had been southwesterly, veered round to the east but remained light.

Some time was spent in trying to locate previously sampled grounds close to the 3000m contour. The first attempt to fish a likely locality ended in failure when the net turned over with 3200 metres of wire out. This was particularly galling in view of the apparent stability and lack of tendency to turn over experienced at the launch of both this and the previous haul. A second attempt was launched at 2220/18 and recovered at 0250/19. This attempt went without a hitch, although the catch was very small and contained no obvious signs of Kolga.

Successful multiple corer hauls were made at 3500m, 4075m and 4500m, the latter (Sta. 51607) coming inboard at 1817/19. With the wind still light, it was feasible to fish the OTSB 14 upwind on the most direct course back to the deep transponder station. The net was shot at 1900/19. Problems were encountered due to weak signal/high noise levels, and the time and depth of last contact were not certain. On hauling, the winch appeared to be giving trouble, being unable to maintain neither constant hauling rates nor adequate speed. The problem was resolved when it was found that the tensioning gear had been set for 13mm wire rather than the 19mm wire currently being hauled. Due to this, the net was not recovered until 0552/20.

On returning to the deep transponder station Bathysnap was deployed and the reeler for the respirometer was wire-tested. The rope in the latter was obviously disturbed during deployment and did not clear the drum correctly. This failure confirmed doubts as to the desirability of using this recovery system on an expensive and complex instrument. Further reeler tests were abandoned, and thoughts turned to the possibility of laying the respirometer to a normal surface buoyancy system. Bathysnap was found to be descending at an unacceptably slow rate. Due to delays caused by outside contractors, some parts of the main assembly became available only on the day before the lorry was loaded at IOS, and the apparatus was not tank-tested. Bathysnap was recalled to the surface, recovered, and put out again with more ballast (Sta. 51609). The ship was headed north in to shoaler soundings and the OTSB 14 launched at 1444/20. Despite problems during the haul, a good catch resulted. A further OTSB 14 was fished at about 2700m (Sta. 51611), a large catch being brought inboard at 0708/21. At this same locality, a repeat multiple corer drop was made, and Bathysnap recovered. The time taken to locate the latter once it had surfaced despite near perfect conditions, was a salutory lesson. A fourth OTSB

haul was made at 2200m (Sta. 51613). This completed the deep half of the sampling programme, and a course for points north was set at 0130/22.

A 500m station involving a single multiple corer drop was made on the tail of the Porcupine Bank before Challenger proceeded to the shallow transponder station. On arrival the respirometer was put outboard on the main wire, but had to be brought inboard soon afterwards, due to a faulty sheave on top of the A-frame. The subsequent deployment was partially successful, but no grab samples were obtained. A series of multiple corer drops (Sta. 51615) commenced at 1949/22 and finished at 0056/23. A further respirometer test on the main warp was carried out, but again no grab samples were obtained. Challenger then steamed off and the bottom net was deployed. The haul was intended primarily as a prolonged photographic survey about the 1300m contour. In addition a current meter acting as a flow-meter was mounted on the front of the sledge in order to provide an independent check of the odometer readings. Although planned for 10 hours, the haul was terminated after 3, following anomalous behaviour of the gear.

The splice at 2000m in the main warp was beginning to show signs of wear, and approval had been obtained to dispose of the wire beyond this point. Accordingly, the wire was dumped in a canyon some miles west of the transponder station at a cost of 4½ hours. Challenger returned to the transponder station and a second photosledge (BN1.5/P) haul was made (Sta. 51617), this time across rather than along the contours. This haul was completed at 2153/23. Another wire test of the respirometer was carried out, and this time three of the four grabs took samples. Bathysnap was deployed at the transponder station for recovery later in the year. The time for departure toward Falmouth was rapidly approaching but it was possible to fit in another short photosledge haul (Sta. 51619) before leaving at 0901/24. A multiple corer drop was made at 400m on the east side of the Seabight (Sta. 51620) followed by two more at 220m (Sta. 51621). The last of these was completed at 1648/24. The final haul of the cruise using the BN1.5/3M, ended at 2318/24, after which the vessel proceeded toward Falmouth. Challenger anchored in Falmouth Roads soon after 0000/26 and finally came alongside at 0930/26.

The objectives of the cruise set out on p.6 were successfully attained with the following exceptions. Objective 3: the respirometer tests were less comprehensive than had been planned due to a poorly advanced state of readiness of the apparatus, and to previously unrecognized design problems. Objective 5:

no Kolga were found in a preliminary onboard examination of the catch from the haul made to obtain this organism. Objective 6. The three biomass hauls were abandoned because of time lost investigating stability problems of the BN1.5. Objective 9: although three BN1.5/P hauls were made, they were of much shorter duration than planned.

The weather throughout the cruise was excellent, warm though often overcast, with virtually no rain, and winds rarely exceeding 20 knots. The good weather together with the unstinting help and cooperation which we received from the officers and crew alike resulted in a most productive cruise. Our thanks are due to all members of this ships company, and in particular to Mr. Frank Dunning, the fishing skipper.

Michael H. Thurston
26 July 1982

SHIPS INSTRUMENTS

The Mufax recorder performed well but still has a problem with its 'new' digital clock. Synchronization of time marks is lost when either the machine or the helix is turned off, even momentarily.

The servoscribe recorder and winch load cells were satisfactory, a calibration of the load cells having been made prior to the cruise departure.

The digital winch monitors worked well, the external hydrographic winch monitor having its obvious advantages at night.

D. Edge

IOS INSTRUMENTS

Epibenthic Sledge Monitor

The monitor, J18 and its peripherals, odometer, anglemeter and gate switch were used on all sledge hauls without problems. The indicators were very useful when initial towing problems of the sledge occurred. The odometer however tended

to 'stick' when the sledge was used for a photographic survey. There was no visible explanation but clogging of the wheel may have occurred.

OTSB monitor

The right angle, tilt switch monitor was used successfully for all trawls but for stations between three and four thousand metres depth there was difficulty in obtaining a strong signal to fish the net with. The problem was a combination of a wire out to depth ratio of 3:1 ie 12,000 metres wire out, ships 'noise' and the angle of transducer on the trawl with respect to the towed receiving transducer.

Corer monitor

A standard 10kHz acoustic beacon was clamped to the wire 50m above the corer. This together with a servoscribe pen recorder giving a read-out of the cable tension, was sufficient to control bottom approach and touch-down of the gear.

Bathysnap

Ballast was released using the standard IOS release system. Each deployment used one retractor and one pyrorelease, with an additional retractor to operate the compass mechanism.

D. Edge

EPIBENTHIC SLEDGE

The BN1.5 Mark I was fished six times; on three occasions in the multinet mode, and three times as a photosledge. The fishing technique used was that developed on Cruise 514 (Challenger 5/82).

To prevent the lateral escape of organisms, the lower section of the sledge frame is routinely lined with 'Netlon', a stiff moulded plastic mesh. In the past, the 'Netlon' has been attached with cable straps, but has proved vulnerable to damage during launch and recovery, particularly in the surface surge. In an attempt to simplify the initial fitting and to obviate the

continuous maintenance usually required, the 'Netlon' was mounted in metal frames which were bolted to the sledge. Initial attempts to use the sledge were unsuccessful. Dynamic stability although never very high, was lost. Despite the addition of two 10" glass spheres to the sledge frame, a change of towing bridles, and various permutations of ship and winch speed, the gear turned upside down. Inversion usually occurred in the surface layer disturbed by the thrust of the propellor but stability was poor even at greater depths. Reversion to the old method of attaching the 'Netlon' achieved the desired effect, and no further stability problems were encountered. Although no obvious misalignment was apparent it was concluded that the frames held the 'Netlon' sufficiently rigidly for it to act as an hydrofoil.

The photographic survey was undertaken in the general vicinity of the 1300m transponder station (see report of Cruise 512 (Challenger 14/81)), an area known to contain dense aggregations of the large hexactinellid sponge Pheronema. With the double objective of altering the sledge configuration as little as possible, and avoiding an embarassingly large catch, the coarse mesh net was fitted but the cod end left unlaced. Despite the latter precaution, the net clogged with Pheronema on one tow, and some difficulty was experienced in voiding part of the catch before the sledge could be brought inboard. Total camera failure during the first haul and some loss of information from the other two was disappointing, but the results obtained extended our knowledge of this area.

R.G. Aldred, M.H. Thurston

OTTER TRAWL

The OTSB 14 was used on four occasions to provide additional data for seasonal studies of Porcupine Seabight fish populations. As light winds were experienced throughout the cruise, hauls were fished on courses of convenience rather than those dictated by weather. Difficulties were experienced during the 4300m haul (51608#1) due to low signal-to-noise ratio with 12000m of wire out, and the time of lift off is in doubt. Fishing efficiency was reduced during part of the bottom contact time of Sta. 51610#1 while the net was based over rough ground between two previously fished tracks. The remaining hauls were problem free and took good catches of fish and invertebrates. In the absence

of a fish expert, all material was returned to the laboratory.

M.H. Thurston

BATHYSNAP

Bathysnap III which had been deployed during the applied physics cruise in May 1982 (Challenger 8/82) was recovered and redeployed twice to be left on the sea bed at the end of the cruise. The instrument was recovered in December 1982 during Cirolana Cruise 10. The camera angle was changed from 30° to 26° and the lens height increased from 79 to 92cm resulting in an increase of the area photographed from 2.0 to 4.8m^2. To provide even illumination the flash height was increased from 56 to 150cm. A new Bathysnap (IV) with modified buoyancy frame and the new camera angle was deployed in 4101m of water but the sinking rate was so slow that it had to be redeployed with extra ballast. This was recovered on 12.9.82 during an Aberdeen University cruise (Challenger 13/82). Unfortunately the LED again failed and the beginning of the film was cut off during processing so that real times cannot be placed on the frames.

We are most grateful to personnel on Cirolana and on Challenger for their efforts in recovering the instruments.

R.S. Lampitt

MULTIPLE CORER

The SMBA multiple corer was used in conjunction with the IOS Mark 4 camera system on 17 occasions. A full or nearly full complement of cores 10-39cm long was obtained from each of the deeper stations. Only the compacted and well sorted sands at Sta. 51621 proved difficult to sample.

Table 1. Summary of cores recovered

Station	Depth (m)	Core tubes used	Cores recovered
51610#1	1998	10	8
51603#1	2670	10	10
51605#1	3420	11	10
51606#1	4092	11	10
51606#2	4088	11	9
51607#1	4495	11	10

Table 1 contd.

Station	Depth (m)	Core tubes used	Cores recovered
51612#1	2692	10	9
51614#1	456	10	10
51615#1	1345	10	10
51615#2	1357	10	10
51615#3	1362	10	10
51615#4	1361	10	10
51615#5	1361	10	9
51615#6	1356	10	8 (1 tube lost)
51620#1	398	8	8
51621#1	220	6	2
51621#2	217	6	2

Cores from all or most drops were subsampled for studies of meiofauna, Foraminifera and Xenophyophoria, chloroplastic pigments, and 'fluff'. The sampling programme was designed to provide material from as wide a bathymetric range as possible, and a number of samples from 1360m to look at smaller scale distributions. The samples augment those already taken from meiofaunal and chloroplastic pigment studies on Cruises 512 (Challenger 14/81) and 515 (Challenger 6/82), and for protozoan studies on the latter cruise.

Most sets of cores were subsampled for meiofauna using four 20mℓ syringes and for Foraminifera using two 20mℓ syringes. These subsamples were frozen, sliced into 1cm thick sections down to 5cm and each section preserved separately in 5% formalin. They will be used to study the vertical distribution and abundance of meiofauna and Foraminifera. Three 10mℓ syringe samples were also taken from each set of cores for analysis of the chloroplastic pigments.

Some of cores from each drop were used to examine and sample the fluff which lies above the sea bed at certain times of the year. This has previously been recorded using the sledge photographs and was successfully sampled by the multicorer at all stations deeper than and including the 1360m station. Samples were taken for light and scanning electron microscopy as well as for elemental and biochemical analysis. Some of the cores were sliced into 1mm horizons to examine the vertical changes over the top 12mm.

A few sinking rate determinations were made using aggregations of fluff obtained from core samples.

Photographs of the sea bed were taken with the camera mounted on the multicorer. These will indicate the distribution of the fluff over a $4m^2$ area.

A.J. Gooday, R.S. Lampitt, O. Pfannkuche, J. Watson

FREE VEHICLE GRAB RESPIROMETER

The FVGR consists of a tubular tripod frame approximately 3.7m high. Within this frame is a platform which can be dropped vertically within the confines of 4 guides. On its underside the platform carries 4 Ekman-type grabs each with a stirrer and a Clark-type oxygen electrode. The power pack and command module are sited on the upper surface of the platform. An acoustic pinger within the main frame fires pyro releases which allow the platform to fall, and which release ballast weights attached to the tripod feet.

The FVGR is deployed with the platform raised and grabs cocked. Once on the seabed the platform is released, the grabs penetrate the sediment which is allowed to settle. The oxygen uptake of the enclosed benthos is then monitored continuously and recorded on small chart recorders in the command module. All of the mechancial functions are controlled by internal timing and switching circuits. Prior to recovery the grabs are closed in order to retain sediment samples.

The respirometer was designed and partly built by the Deutsches Hydrographisches Institut, Hamburg, but due to lack of funds it was not completed. IOS were approached to complete its construction and test it, which was done at minimal cost despite making some changes to the original design. It was intended to have buoyancy attached to the top part of the main frame, so that the FVGR could be used in a free-fall mode. However, as about 22 17" diameter glass spheres would be needed to do this, it was decided to develop a reeler for deployment above the FVGR.

The cable reeler consisted of a polypropylene drum, about 0.5m in diameter by 0.75m long, into which almost 200m of 5 ton rope was layered. One end of the rope passed through the base of the drum and was shackled to the end of a steel bar which passed through the centre of the drum and into the jaws of a pyro release. The other end of the rope was fixed to the bar on which the pyro

release was mounted. On firing the pyro, buoyancy would carry the upper end of the rope to the surface and the FVGR could be recovered.

An initial test of the reeler had been made on Challenger Cruise 8/82, but the rope parted, perhaps cut by the pyro release. A polypropylene cover for the pyro release was made for the present trials, and no sign of damage to the rope was found. For this test the reeler was weighted with chain, lowered on the ship's warp and the pyro release fired allowing the weighted drum to sink further into the water. However, the warp was seen to jerk during hauling in indicating that the layered rope had caught up inside the drum and then suddenly released. In view of this and the initial testing on cruise 8/82 it was agreed that the reeler was in need of further development before use with the FVGR or other equipment could be contemplated.

In situ tests of the FVGR were carried out in 1360m of water using the main warp. The impracticability of maintaining the ship precisely over the instrument package meant that timing was critical, and two trials were partially invalidated by the pre-release of the FVGR platform, and by the whole instrument package being toppled over by an oblique pull on the warp. A third trial suffered neither fate and the following functions of the system were tested successfully:

- the commanding electronics monitoring the oxygen electrodes, some stirrers and the closure of the grabs,
- the release of the grab assembly,
- the release of weights which counter balance the positive buoyancy when used as a free vehicle.
- the pull out forces of the system.

These trial indicated that modifications are required to the grab lids and their seals, the attachment of the ballast weights, and the platform guides.

D. Edge, O. Pfannkuche, N.T. Timmins

UNDERWATER CAMERAS

IOS Mk. 4 camera systems were operated in conjunction with the epibenthic sledge, Bathtysnap and the SMBA multicorer system during the cruise.

Three normal epibenthic sledge hauls and three further stations using the sledge/camera combination as a photo-sledge system were completed. The first photo-sledge run proved to be abortive for reasons not yet explained but some results were obtained during all other hauls attempted.

Random operation of the frame count facility has now been eliminated by recent circuit modification but false triggering by the acoustic telemetry system was still in evidence.

The opportunity was taken to carry out trials with a modified Mk. 4 system during the final shallow water sledge station to assess the feasibility of adopting a 17 x 24mm frame format in a new generation of high capacity cameras. Results obtained were satisfactory and the decision has now been taken to proceed with this project.

A camera and flash unit were clamped to the frame of an SMBA multicorer with the object of gaining a series of sea bed photographs during coring operations. Initially the rapid dispersal of disturbed sediment created problems but these were finally resolved by triggering a shutter version of the Mk. 4 system at the instant of impact before foreign matter could obscure the field of view. Satisfactory results were therefore obtained during a high proportion of the ten stations covered.

The short term Bathysnap station completed during the cruise proved to be technically successful but some evidence of flash malfunctioning was discovered on results obtained from the system deployed in May during Challenger cruise 8/82.

E.P. Collins

BENTHIC INVERTEBRATES

Three hauls with the epibenthic sledge and four with the otter trawl yielded catches from depths of 158, 2220-2920m, 3310-3660m and 4270-4370m. The shallowest of these repeated a station (51217) sampled during Challenger cruise 14/81 at which the suprabenthic net had obtained an enormous quantity of zooplankton, mainly indeterminate juvenile copepods. This time the results were less spectacular possibly as the haul was made at night. The suprabenthic net contained only some 300mℓ of zooplankton although the benthic catch included an interesting variety of ophiuroids, asteroids, brachyurans (notably Atelecyclus and portunids) and pagurids, many of the latter in shells completely enveloped

by sponges.

The trawl sample from 2200-2240m (Sta. 51613) was dominated by the holothurian Paelopatides, a diverse assembly of asteroids (mainly Benthopecten, Hymenaster with some Bathybiaster, Plutonaster, Pseudoarchaster and Pectinaster) and the ophiuroid Ophiomusium lymani. The trawl and epibenthic sledge catches obtained at somewhat greater depths (2640-2740m, Sta. 51603, 51611) contained numerous Hymenaster but very few holothurians. Other significant elements were Glyphocrangon, pagurids, the ostracod Azygocypridina, whip-like alcyonarians and aphroditiid annelids. Fine residues from the sledge haul were dominated by white worm tubes, bivalves (mainly Kelliella and Nucula) and the foraminfer Bathysiphon folini. The epibenthic sledge catch from 2890-2920m (Sta. 51604) was sparse but included a large holothurian (Benthothuria), a number of Azygocypridina, numerous Glyphocrangon (60 specimens), three pagurids and, in the fine net, a spider crab (Neolithodes grimaldii). There was no sign of the holothurian Kolga hyalina which had been caught at similar depths on previous cruises.

A large catch was taken with the trawl in the range 3310-3660m (Sta. 51610). The dominant invertebrates here were holothurians, mainly Benthothuria with some Psychropotes and Paelopatides, and the asteroids Dytaster and Zoroaster were also abundant. The remaining fauna included pagurids, often with associated actinians, stick-like alcyonarians, sometimes draped with clinging ophiuroids, other ophiuroids, sipunculids and assorted molluscs.

The trawl obtained a much smaller catch at 4270-4370m (Sta. 51608). Holothurians (Psychropotes, Oneirophanta and Benthodytes with a few Pseudostichopus, Peniagone and Deima) were again abundant as were the asteroids Freyella and Hymenaster. A pagurid, Parapagurus pilosimanus, was fairly common and Munidopsis, Glyphocrangon, natant decapods, scaphopods, ascidians, sipunculids, annelids, a large nemertine worm, a variety of actinians, some gorgonaceans and two species of zoantharians (Epizoanthus sp. and E. cf. mackintoshi) were also present. This haul produced marginally the deepest record for the large foraminifer Bathysiphon rusticus.

A.J. Gooday

FORAMINIFERA AND XENOPHYOPHORIA

As on Cruise 515 (Challenger 8/82), an effort was made to document and recover the larger Foraminifera protruding about the sediment surface of cores. The greatest abundance of such Foraminifera was at 1345-1362m while none were observed in the shallowest and deeper cores (220m, 3420m, 4088m, 4092m, 4495m). The most obvious types were (1) a stick-like, vertically or obliquely embedded species of Rhabdammina (cf. linearis) at 1345-1362m, 1998m and 2692m, (2) various tree-like forms (including some possible notodendrodids) at 1345-1362m, (3) a large Pelosina with a buried body and protruding tube, also at 1345-1362m, and (4) several specimens of Marsipella at 400m and 1345-1362m. Also noted were a single dead xenophyophore (Reticulammina labyrinthica) at 2670m, and several very long (> 7cm), branched, thread-like specimens of Rhizammina (aff. algaeformis) lying on, or just below the sediment surface at 4092m and 4495m. Carefully recovered lumps of clinker from the 4092m cores were found to be encrusted with delicate agglutinating Foraminifera. Such foraminiferans are not usually present on dredged clinker, presumably because they have been removed by abrasion.

A.J. Gooday

ORNITHOLOGY

As on past cruises 10 minute observations were made at roughly 2 hour intervals throughout daylight hours as and when other duties permitted. Casual sightings were also noted. In all, 12 species of seabirds were seen, but only fulmars (Fulmarus glacialis), gannets (Sula bassana) and kittiwakes (Rissa tridactyla) were seen with any regularity. During 19-20 July, when the ship was 280km or more from land, virtually not birds were seen. The timing of the cruise was such that, at least in those species with markedly different adult and juvenile plumages, no birds of the year were seen out of sight of land. About 74% of gannets and 87% of kittiwakes seen were adult. Most lesser black-backed gulls (Larus fuscus) were seen further offshore than were herring gulls (Larus argentatus). Most storm petrels seen (Hydrobates pelagicus, Oceanodroma eucorhoa and 1 Oceanites oceanicus) were seen over the shelf-slope break or the upper slope.

M.H. Thurston

SLEDGE PHOTOGRAPHS

Five series of photographs were obtained using the sledge either in the normal mode or as a photosledge. At four stations between 1500 and 3000m, the surface of the seabed was unusually bioturbated with extensive pitting to a depth of 5 to 10mm. A detrital layer on top of the sediment surface was evident at some stations. Few megafauana were photographed except at St. 51619 (1505-1530m) where holothurians were particularly abundant. Benthogone rosea and Elpidia sp. were present but the commonest species was somewhat problematic. In the absence of a catch, it has been identified tentatively as Kolga hyalina. This holothurian had been previously recorded from 2700 to 4100m in the Porcupine Seabight.

D.S.M. Billett, R.S. Lampitt

WORKSHOP

This very useful facility proved to be invaluable during the cruise, particularly as the respirometer required a great deal of mechanical work prior to deployment. Unfortunately the workshop has been neglected in recent years and has tended to degenerate into a general store cum splicing facility.

The removal of appreciable quantities of broken gear and rubbish and a thorough clean were necessary before installing a grinder, small vice, bandsaw and personal tool boxes. A stock of metal and plastic material, an electric hand drill, extension lead, lathe chuck key, and chuck and key for lathe tail stock/pillar drill had been brought from IOS. The workshop staff of RVS Barry were very helpful and supplied additional items including some lathe tools and a selection of drills which was very much appreciated.

The lathe was used extensively, but it is in need of an overhaul. The main bearings are worn, the lead screw is bent and there is knocking in the train of gears which drives the lead screw.

It is not practical to restrict access to the workshop but the installation of a key operated mains switch for all the electrical equipment would exercise some control over the use of the machinery.

Due to circumstances external to the cruise, the reeler and the respirometer required several days work before they were ready for deployment and testing.

In order to prevent cutting of the reeler rope a polypropylene shroud was made to fit over the pyro release. Also, to reduce the chances of the rope being "pumped" out of the reeler drum during its passage through the water, 1/16" thick polythene covers were installed in the exit holes with the rope passing through much smaller split holes.

Work on the respirometer involved the manufacture of aluminium spacers to limit the penetration of the grabs into the sediment and aluminium base pad bushes for the weight retaining wires. Modification of various ballast weights was also required. Seals for the grabs and the covers housing the stirrers were made and fitted. Minor problems encountered during the putting together of the frame, platform etc. were overcome.

During the initial testing of the respirometer it was dragged along the seabed and suffered some minor damage, which had to be rectified before further deployments.

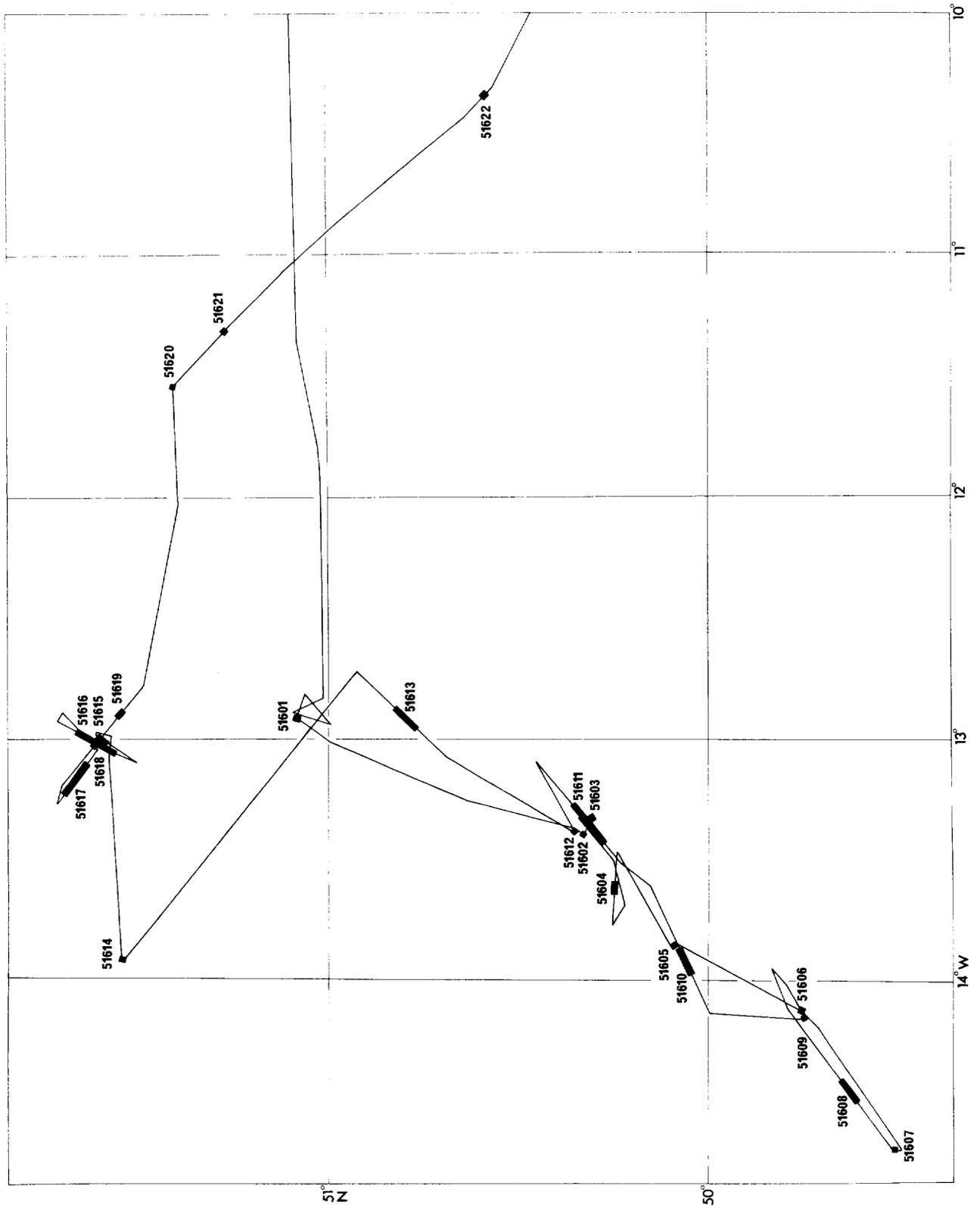
Other work undertaken during the cruise included modifications of multicorer weights, brackets on the epibenthic sledge and Bathysnap, and improvements to the OTSB 14 trawl door instrumentation. Plungers to facilitate core sampling, and spools for a film winder were made.

Work undertaken during the cruise is an indication of the importance of the workshop facility. Although there is the possibility of falling back on the engine room workshop, the environment there is very noisy, inconvenient of access, remote from scientific working areas and gear, and use of it depends on the good will of the Chief Engineer.

N.T. Timmins

STATION	DATE 1982	POSITION (START)* N	W	POSITION (END)* N	W	GEAR	SAMPLER DEPTH (m)	DURATION (GMT)	DISTANCE RUN (m) ODOMETER	CALCULATED	REMARKS
51601#1	17:7	51°05.2'	12°54.9'			MC	1998	1721			With IOS shutterless camera
51602#1	18:7	50°20.0'	13°24.3'			BSNAP	2734	0640/19-1140/21			Mark III
51603#1	18:7	50°18.5'	13°19.8'			MC	2670	0726			With IOS shutterless camera
51603#2	18:7	50°18.4'	13°23.7'	50°18.1'	13°24.2'	BN1.5/3M	2730-2740	1056-1114	599	869	IOS shutterless camera facing forward
51604#1	19:7	50°15.0'	13°38.0'	50°14.9'	13°36.9'	BN1.5/3M	2920-2890	0024-0048	613	1277	IOS shutterless camera facing forward
51605#1	19:7	50°05.4'	13°51.6'			MC	3420	0456			With IOS shutterless camera
51606#1	19:7	49°44.7'	14°07.9'			MC	4092	1011			With IOS shutterless camera
51606#2	19:7	49°44.8'	14°07.2'			MC	4088	1158			With IOS shutterless camera
51607#1	19:7	49°29.3'	14°41.8'			MC	4495	1732			With IOS shutterless camera
51608#1	19:7	49°35.6'	14°30.3'	49°38.8'	14°24.3'	OTSB14	4370-4270	2308-0036		9290	End position and time not certain due to poor monitor signal
51609#1	20:7	49°45.9'	14°09.2'			BSNAP	4117	1206/20:7-0710/12:12			Mark IV recovered on Challenger Cruise 13/82
51610#1	20:7	50°01.3'	13°58.0'	50°05.8'	13°49.2'	OTSB14	3660-3310	1759-2014		11540	
51611#1	21:7	50°17.2'	13°24.8'	50°21.4'	13°17.2'	OTSB14	2700-2640	0242-0438		11840	
51612#1	21:7	50°21.2'	13°23.1'			MC	2692	0927			With IOS shutterless camera
51613#1	21:7	50°45.9'	12°58.4'	50°49.7'	12°52.7'	OTSB14	2240-2200	2132-2305		9730	
51614#1	22:7	51°32.7'	13°54.9'			MC	456	0800			With IOS shutterless camera
51615#1	22:7	51°36.0'	12°59.3'			MC	1345	1904			With IOS shutterless camera
51615#2	22:7	51°36.0'	12°58.9'			MC	1357	1959			With IOS shutterless camera
51615#3	22:7	51°35.9'	12°58.7'			MC	1362	2046			With IOS shutterless camera
51615#4	22:7	51°35.3'	12°59.8'			MC	1361	2204			With IOS shutterless camera
51615#5	22:7	51°35.3'	13°00.5'			MC	1361	2336			With IOS shutterless camera
51615#6	23:7	51°35.1'	13°00.8'			MC	1356	0039			With IOS shutterless camera
51616#1	23:7	51°33.6'	13°02.4'	51°39.0'	12°57.7'	BN1.5/P	1365-1310	0749-1055	4361	11430	IOS shutterless camera facing forward
51617#1	23:7	51°37.5'	13°05.0'	51°41.6'	13°13.4'	BN1.5/P	1260-1025	1812-2118	2028	12670	IOS shutterless camera facing forward. Odometer functioned intermittently only
51618#1	24:7	51°36.1'	13°00.0'			BSNAP	1328	0559/24:7-0730/5:12			Mark III. Recovered on Cirolana Cruise 10
51619#1	24:7	51°33.2'	12°54.3'	51°32.8'	12°53.5'	BN1.5/P	1505-1530	0728-0750	497	1243	IOS shutterless camera facing forward
51620#1	24:7	51°24.2'	11°32.3'			MC	398	1444			With IOS shutterless camera
51621#1	24:7	51°16.0'	11°18.8'			MC	220	1620			With IOS shutterless camera
51621#2	24:7	51°16.1'	11°18.7'			MC	217	1638			With IOS shutterless camera
51622#1	24:7	50°35.2'	10°20.5'	50°34.8'	10°19.8'	BN1.5/3M	158	2248-2309	737	1161	IOS cine-mode camera facing forward

* For BN1.5 and OTSB 14 hauls, positions are for first and last bottom contact of gear, not ship positions. For BSNAP, positions are ship position at instrument launch.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