

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1973 RESEARCH VESSEL PROGRAMME

REPORT: R V CIROLANA CRUISE 5

(Provisional: Not to be quoted without prior reference to the author)

STAFF

A J Lee
N Reynolds
R B Mitson
R R Dickson
G C Baxter
C R Hood
M G Pawson X
P Bryan (Grimsby)
N J Milner (NERC Student)

DURATION

Left Immingham 1603 hours 25 May
Arrived Great Yarmouth 1158 hours 20 June
All times are Greenwich Mean Time

LOCALITY

Norway - Bear Island - Spitsbergen.

AIMS

1. To survey the distribution of fish in the Bear Island-Spitsbergen-Hope Island area using acoustic techniques and midwater and bottom trawls.
2. To measure the water transport between north Norway and Bear Island by means of a moored current meter array and hydrographic sampling.
3. To monitor phytoplankton continuously and to sample flagellates in the area.
4. To test the SAT-NAV system in high latitudes.
5. To collect 20 live specimens of Lithodes maja for Professor Laverack (St Andrews University).
6. To collect 100 cod for Mr Platt (IMER).
7. To collect flatfish tissue for Dr Birley (Birmingham University).

NARRATIVE

25 May: 1603 hours, left Immingham. Proceeded to Barents Sea.

29 May: 1420 hours, Started to lay line of moored recording current meter stations between North Cape, Norway - Bear Island.

31 May: 0218 hours Completed laying line of current meter stations. The two northernmost stations (A and B) were not laid. Difficulties in deploying the new single point mooring system led to damage to the subsurface floats when laying the last but one station, (B). This meant that this station had to be withdrawn. There was then no longer any value in putting out the last station (A) because there would have been too large a gap in the section between stations A and C. Set course for North Cape.

1412 hours Started to work a temperature-salinity section along the line of recording current meters.

- 1 June: 0434 hours Completed hydrographic section. Set course for position on eastern side of South East Gullies on the Bear Island Bank.
- 0930 hours Started survey of the distributions of fish, using acoustic techniques and midwater and bottom trawls, and of surface and bottom temperature. Survey started on the eastern side of the South East Gullies and extended clockwise round the bank to the south and west of Bear Island and then along the western edge of the Spitsbergen Shelf to as far north as Isfjord Bank. Noise measurements showed that the repairs to the Kort Nozzle had reduced the noise level of the ship and so the acoustic survey was carried out at 10 Knots. It was interrupted by bad weather between 1800 hours 2 June and 0749 hours 3 June.
- 10 June: 2211 hours Completed survey at Hornsand Bank. Set course for northern end of current meter line.
- 11 June: 1653 hours Started to dodge on account of 40 Knots easterly winds. Proceeded slowly to position of northern current meter station (C) and waited in vicinity for weather to improve and swell to subside.
- 14 June: 0001 hours Started to recover current meter stations commencing at C and working southwards. The top current meters at stations C and D were found to have been ripped off due to the mooring wires' becoming fouled.
- 1110 hours Reached station F and found it missing.
- 1546 hours Reached station G. The surface buoy was missing but the meter wire pellet was found. This station was fitted with an acoustic release. It was operated and the current meters recovered.
- 1614 hours Set course for Station F.
- 1945 hours Started search for Station F. Neither the surface buoy nor the pellet was found and the station was not fitted with an acoustic release. A series of grapnel drags for the ground wire were therefore made in a box 2 n mi square around the station position. Nothing was found.
- 15 June: 1456 hours Abandoned search.
- 1617 hours: Started tests of Elac Sonar.
- 1730 hours: Completed tests. Set course for Tromsø. Carried out tests of the 100K Hz towed echo sounder en route.
- 16 June: 1400 hours Arrived Tromsø. Messrs Mitson and Pawson disembarked and proceeded to Bergen to attend ICES Symposium on "Acoustic Methods in Fisheries Research".
- 1655 hours Left Tromsø.
- 19 June 1940-1955 hours Replaced light on JONSIS B surface buoy.
- 20 June 1158 hours Arrived Great Yarmouth.

RESULTS

AIM 1. A band of bottom water with a temperature above 2°C was found stretching around Bear Island and along the western edge of the Spitsbergen Shelf. Cod and haddock were distributed thinly within it. The highest catch rates per hour were made in areas with the highest echo counts and were 10 baskets of cod south of Bear Island, 5 baskets of haddock on the southern side of the North West Gully, 20 baskets of cod on Turner's Ground (south side of the Storfjordrenna) and 5 baskets of haddock on Hornsand Bank. The larger cod (over 40 cm) were found south and west of Bear Island and on Turner's Ground, but they were taken in association with a large number of small codling. These small codling (30-35 cm) gave rise to strong echo traces stretching upwards from the bottom on the banks to the west of Spitsbergen between Bellsound and Isfjord: hauls with an Engels 1200 trawl on the Grimsby Ground gave 3 baskets per hour, but a bottom trawl would probably have caught much more. Haddock were found all the way along the western edge of the Spitsbergen Shelf from Bear Island to the Grimsby Ground, as were small numbers of blue whiting. Large numbers of small redfish (15-17 cm) were often taken and they gave rise to an extensive area of midwater traces at the mouth of the Storfjordrenna: hauls there with the Engels 1200 gave up to 24 baskets per hour.

The data collected during the acoustic survey have yet to be analysed in detail, but some promising results were obtained with the pulse height analyser, the signal spectra matching the size distributions of various trawl catches.

AIM 2. The difficulties with the single point mooring system meant that only a shortened section could be laid across the North Cape Current and the subsequent loss of some current meters also reduced its geographical coverage. Further, the bad weather experienced towards the end of the cruise prevented a second series of temperature and salinity stations from being worked.

However, there should be enough material to allow one comparison of the geostrophic and Lagrangian transports to be made and to show the changes in the tidal and residual current systems over a period of a fortnight.

AIM 3. The Turner fluorometer, fitted with a thermistor, was run throughout the cruise, except in the Norwegian fjords, to monitor chlorophyll and temperature in the surface waters. In the Barent Sea cultures were set up, samples filtered for spectrophotometry, and direct preparations for electron microscopy were made. Light microscope examination, including photography, of samples was done as opportunity arose.

The bulk of the phytoplankton was made up of flagellates. A green biflagellate organism about $2-3\ \mu\text{m}$ in diameter (probably a member of the Prasinophyceae) was dominant in most places where there were substantial amounts of chlorophyll and on occasion amounted to over 12,000 cells per ml. Phaeocystis was dominant in a few places between North Cape and Bear Island and also at one point to the west of Spitsbergen. Diatoms were very unimportant, Chaetoceros spp. being the one most commonly found. Cymodinium minutum was fairly widely distributed but few other dinoflagellates were seen.

AIM 4. The SAT-NAV system worked well although a program is required to smooth out the ship's speed input. Fixes were obtained regularly at about 20-40 minute intervals when the ship was in the Barents Sea and we now have a powerful tool for survey work in this and other such areas.

AIM 5. No Lithodes maja were caught.

AIM 6. Two samples each of 100 cod were frozen for Mr Platt, one from south of Bear Island and one from Spitsbergen. A seal that was caught in the trawl and had died shortly before being found in the cod-end was also frozen and brought back for the IMER Seals Research Unit.

AIM 7. Flatfish tissues from Greenland halibut and long rough dab were collected for Dr Birley.

MISCELLANEOUS

- (a) Pituitaries from cod and haddock were frozen for Mr Bye.
- (b) The Elac Sonar was found to have a performance well below specification.
- (c) The 100 kHz echo sounder mounted in a towed body was tested and measurements made which will allow development to proceed. The Triton echosounding equipment for the Lake Rudolf Survey (ODA) was also tested and various faults identified.
- (d) A separate report will be issued dealing with equipment performance.

SEEN IN DRAFT T H Finn
G W Argumont

A J LEE
2 July 1973

DISTRIBUTION

Basic List +

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