

In Confidence - Not to be quoted without reference to the Laboratory.

CRUISE REPORT

F.R.S. "SCOTIA"

March 15-31, 1965

Narrative

The cruise was due to start on 8th March, but delays during the refit resulted in the ship being unable to sail before 1300 hrs. on 15th March. Work commenced the same day at 1610 hrs. when a hydrographic and trawl station was occupied in the Buchan Deep. The ship proceeded overnight to the inner Moray Firth and five stations were completed by midnight on the 16th. It was then intended to go to the drift indicator stations off Wick, but weather conditions deteriorated rapidly and "Scotia" had to seek shelter in Deer Sound, in Orkney, during the forenoon and early afternoon of the 17th. However, she was later able to work two stations to the east of Orkney during the late afternoon and evening.

Late on the 17th course was set for the central stations of the survey area; on arrival conditions were found to be unsuitable for the range of work required at each station. After one Gulf III haul it was decided to utilise the period of bad weather by making a passage to the area of the "Egersund" herring fishery. Very bad weather conditions were encountered during the late evening of the 18th and early morning of the 19th and the "continuous" environmental survey did not commence until 1430 hrs. on the 19th. Work continued in the area from 5° to 10°E during the 20th and forenoon of the 21st.

"Scotia" returned to the routine survey area about 1230 hrs. on the 21st. Many of the western and northern stations were then worked until 1030 hrs. on the 25th when the ship docked at Lerwick for water. Mr. Brown left "Scotia" at Lerwick, as arranged, on the 25th to return to Edinburgh. On the morning of the 26th Mr. McPherson was taken ill, and it was decided that he should return to Aberdeen by plane.

"Scotia", with the scientific staff reduced to three, sailed from Lerwick at 1130 hrs. on the 26th and commenced work at 1535 hrs. at a position to the south-east of Shetland. Work then continued with little disturbance due to weather until 1745 hrs. on 30th March when the ship prepared to enter port. "Scotia" docked in Aberdeen at 0020 hrs. on the 31st and the scientific gear was unloaded at 0900 hrs.

Results

Northern North Sea fish and environmental survey

Hydrography

The surface temperature over the greater part of the area surveyed was near 6.5°C. In the inner Moray Firth a temperature of 4.99°C was recorded and to the north of Shetland the highest temperature was 7.81°C (both uncorrected).

Drift bottles were released at 9 positions and current indicators at the standard positions.

Light meter readings were taken at a number of positions east of 0°00'.

Chemistry

Salinity, oxygen, phosphate, nitrate, silicate and other special samples were collected as detailed in the programme but the analyses have not yet been completed.

Productivity

Chlorophyll a values and their geographical distribution were normal for March. Apart from a value of 12.2 mg/m³ recorded from the inner Moray Firth, the highest value was 1.2 and the lowest 0.2 mg/m³. Values greater than 0.5 were recorded in the area to the south of 58°30'N and in the area extending northwards along approximately 2°E.

The carbon samples have not yet been analysed.

Phytoplankton

Chaetoceros spp. were the dominant forms over the area of the routine survey - mainly C. atlanticum on the 61°01' line and from east of Shetland to 2°E, and mainly C. convolutum in the southern part of the survey area.

Dinoflagellates (Ceratium furca and C. fusus) were most abundant in the northern part of the area. Of particular interest is a record of C. azoricum, normally regarded as a warm water species, at D20c.

Zooplankton

Sampling with 1 m (26) nets was confined to the area north of 59°N and south of 58°N. In the latter area Physophora hydrostatica was recorded from surface and 20 m at J14a with Euchaeta norvegica at 20 m and Calanus hyperboreus at 75 m. Sagitta setosa was recorded (as rare) only at E13d.

North of 59°N S. serratodentata was present at all but two stations and Eukrohnia hamata at D19c, D21c and E21d. P. hydrostatica was recorded from the 61°01' line. Lensia conoidea and Dimophyes arotica were recorded from 100 m at E21d and Nematoscelis megalops was recorded from E19b and C18d.

Euphausiids were the dominant group in the Gulf III samples, the approximate settled volumes of which ranged from <1 cc to 25 cc. Meganyctiphanes norvegica was widely distributed to the north of about 58°30'N with a narrow tongue extending towards the Buchan Deep. Large numbers of M. norvegica were caught in the meshes of the wing trawl at E15a.

Multi-depth Plankton Indicator samples were obtained at 46 stations for the S.M.B.A. Edinburgh.

Phytoplankton was collected for Mrs. Reid and zooplankton samples deep frozen for Mr. Wilkins.

Trawling

A wing trawl with a small mesh codend was used throughout the survey. Hauls were of one hour duration.

Large catches of haddock were obtained in the area north of 59°30'N. The highest catch in this area was 5,555 haddock per haul.

The main concentrations of whiting (392 to 3,487 fish per haul) were in the Moray Firth and to the east of Orkney and Fair Isle. The largest catches of Trisopterus esmarkii were from the northwestern North Sea, the main centre of abundance being in the Moray Firth - up to 2,652 fish per haul. Apart from the Fladen, where up to 160 fish per haul were caught, T. esmarkii was absent outside the northwestern North Sea.

The largest catch of Cod was from one station in the Moray Firth, where 40 fish were caught.

Nephrops was well represented only in the Moray Firth (85 to 111 per haul) and east of Shetland (197 per haul).

Fairly large catches of Sebastes viviparus (68-132 per haul) were found to the south and east of Shetland at D19c and C18d.

Herring were found mainly in the Moray Firth (7 to 2,666 per haul) and in the area from 2°W to 1°30'E and from 57°00'N to 59°30'N (28 to 2,854 per haul). In the Moray Firth small fish (modal lengths of 13.5 to 16.0 cm), probably the 1963 brood, were the dominant size group present. Towards the east greater numbers of older fish (modal lengths 19.0 to 24.0 cm) were found.

Stomachs of haddock were obtained from 4 positions and stomachs of haddock, whiting, cod, hake, argentine, and long rough dabs from the Fladen. Herring stomachs were collected for S.M.B.A.

Deep frozen specimens of grey gurnards, rockling, ling and sand eels were brought back for Mr. Hawkins and Dr. Rae.

Blood of cod, haddock and whiting from east of Shetland was collected for Mr. Wilkins.

The incidence of nematode worms in cod was recorded.

Echo-survey

Only one large concentration of "plume" traces - probably herring - was found, at about 59°00'N 2°00'E. In the areas in which the main herring catches were obtained the echo sounder showed bottom layers (composed of small "ticks") by day and midwater layers by night. Similar echo records were obtained to the north and southeast of the main concentration of "plume" traces.

Herring-environmental survey in the area of the "Egersund" herring fishery

It was only possible to spend a short period surveying the area north of 57°00'N and from 5°00'E to 10°30'E. Only two trawl hauls were done, at P14c where 120 young herring (modal length 15.0 cm) were caught and at K14d where none were caught. No "plume" traces were shown by the echo-survey, but there were bottom layers by day and midwater layers by night along the southern edge of the Norwegian Deeps. The lack of herring agrees well with recent reports from Denmark.

The temperature of the Baltic outflow water was about 2.7°C (thermograph recordings). The spring phytoplankton outburst was well advanced with chlorophyll a values of 2.0 to 7.4 mg/m³. The diatoms Coscinodiscus spp., Skeletonema costatum and Chaetoceros spp. were the dominant forms.

The zooplankton standing crop was also high (up to approximately 50 cc settled volume) with large numbers of Meganctiphanes norvegica, Euchaeta norvegica and Calanus hyperboreus. The guts of the latter species were seen to be full of phytoplankton.

JAMES A. ADAMS

27th April. 1965