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CRUISE REPORT

F.R.S. "SCOTIA"

28th June-25th July, 1966

Narrative:

"Scotia" sailed at 2200 hours on 28th June and made a passage in bad weather to the Norwegian coast. During this time a member of staff became seriously ill and the ship went into Stavanger from 1000 to 1600 hours on the 30th June so that he could receive hospital treatment.

The tracking of parachute drogues started on the 1st July. Generally three were tracked simultaneously using an anchored dahn as position marker and a total of 15 observations were made. The success of this part of the work was largely due to the efforts of the captain and ship's officers. 24 hydrographic stations were worked including the section that formed part of the I.C.E.S. Skagerak survey.

"Scotia" docked in Stavanger at 0912 hours on 8th July. Dr. Steele and Messrs. Martin and Whyte returned to Aberdeen by air, and Messrs. Adams and Hunt joined "Scotia" at 1730 hours having arrived by air from Britain. Mr. Ballance left "Scotia" on the morning of 9th July.

With Messrs. Adams, Hunt and Pirie as scientific staff "Scotia" departed from Stavanger at 1030 hours on 9th July, and surveyed the Norwegian Deeps until 1100 hours on 13th July when work started on the line of stations from the Norwegian Deeps to the Buchan coast. Poor weather conditions were encountered on the latter part of this line which slowed down the ship's progress considerably, but the line was completed at 1545 hours on 14th July and "Scotia" proceeded to Aberdeen where she docked at 2215 hours. Mr. Pirie left the ship.

During 15th July equipment used during the hydrographic survey off south-west Norway was unloaded, and further equipment for the trawl survey taken on board. Oil and ship's stores were obtained.

Messrs. Groves and Ritchie joined "Scotia" on 16th July and the ship sailed at 1100 hours. Passage was made to the eastern part of the trawl survey, but weather conditions were unsuitable, and it was not until 1835 hours on 17th July that an attempt was made to occupy a station. Work then continued uninterrupted by weather till the morning of 22nd July when "Scotia" had to shelter off the east of Shetland - first off Haaf Gruney Island and then off Noss Sound. Work recommenced on 23rd July at 1130 and there were no further delays. The cruise ended in Aberdeen at 1930 on 25th July.

Results:

Hydrography

The area worked was approximately on latitude 58°50'N over the Norwegian Deeps. A detailed study of the drogue movements is being made. Current strengths over 12 hour periods were normally about one-third of a knot. The movement was generally northerly on the eastern side of the Norwegian Deeps and southerly on the west side. In nearly all cases the surface and deep water movements were in the same direction.

During Part II of the cruise a tongue of warm water ($>14.5^{\circ}\text{C}$) and low salinity ($<30.0\text{‰}$) - probably Baltic outflow water - extended northwards on the surface along the western boundary of the Norwegian Deeps, having a water mass of lower temperature and higher salinity to the right.

Over the rest of the area surveyed, surface temperatures ranged from 10.5-11.3°C to the east of Shetland, Fair Isle and Wick to >14°C in isolated patches about approximately 1°E. Salinity data are not yet available for this part of the survey.

Surface samples for oxygen, phosphate, nitrate and silicate were obtained from selected stations and current indicators were released at the standard positions.

Phosphate free sea-water was collected for Mr. Burns.

Productivity

Seventy-one chlorophyll a surface samples were obtained and will be determined within the next few weeks. Particulate organic carbon samples₃ were obtained at 12 positions. The lowest carbon concentration - 31 mg/m³ - was recorded from Statistical Square D15 and the carbon concentration increased outwards from this area to 429 mg/m³ over Smith Bank and 255 mg/m³ over the Norwegian Deeps.

Standard net samples were obtained from ten positions.

Zooplankton

The most marked impression gained from sampling with the 1m 26 nets was of the abundance of zooplankton over most of the area surveyed. Rich Calanus collections were obtained to the east of 0° and in particular over the northern part of the Norwegian Deeps and on the 61°01'N line. To the north-east and south-east of Shetland Spiratella retroversa was the dominant organism. Clione limacina, together with smaller numbers of Pleurobrachia pileus was very abundant at 20m at Statistical Square D15b.

Apart from some Meganyctiphanes norvegica over the Norwegian Deeps, euphausiids were conspicuous only in the western part of the survey area. Very poor catches of zooplankton were obtained in the outer Moray Firth and at D14b.

Seventy-one Gulf III hauls were obtained. Biomass determinations will be made as soon as possible.

Multi-depth Indicators were obtained by Mr. Hunt for S.M.B.A.

Trawling

A wing trawl with small mesh codend was used throughout the survey. Only twenty hauls of one hour duration were possible, but these were distributed to give a fairly good coverage of the shelf area of the northern North Sea.

The main haddock concentrations (109-498 fish/haul) were in the west, north-east and south-east of the area surveyed. In the western and north-eastern concentrations, but for one exception, only fish of 21-55 cm length range were caught. In the south-eastern concentration 0-group fish (modal length 8 cm) formed the bulk of the catch of 160 haddock in one haul.

The main whiting catches (74-654 fish/haul) were from the outer Moray Firth and the main concentration of T. esmarkii (128-317 fish/haul) from near the Fladen area.

The highest cod catches were from east of Unst (81 fish/haul) and Smith Bank (153 fish/haul).

Nephrops were found only at one station (Statistical Square B14a) where 1158 Nephrops were caught.

Herring catches, with an average for positive hauls of 44 fish/haul, were almost entirely restricted to the area 3°00'W - 1°30'E and 57°30'N - 59°45'N. Their length range was 13.0 - 33.5 cm.

98 Cod were tagged.

The incidence of nematode worms in cod was recorded, and cod gall-bladders collected at three stations.

Haddock stomachs were obtained for food and feeding studies and the intestinal tracts of cod, whiting and haddock were preserved for parasitological examination.

Samples of sand eels, red gurnards, tusk, adult male skate and echinoids were obtained for a number of workers. Live lemon sole were taken back for Mr. Symonds.

Echo-sounding

Preliminary analysis of the echo-traces showed a general distribution of tick and plume traces throughout the greater part of the area surveyed. Of particular interest was a number of large plume traces over the deep water off the south-west Norwegian coast associated with the water mass to the east of the Baltic outflow.

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5th August, 1966