

CRUISE REPORT

F.R.S. "SCOTIA"

5th to 16th August, 1952.

OBJECTS - The objects were:-

1. Hydrobiological-plankton-echometer survey of the areas to the north and east of the Moray Firth herring survey area (herein referred to as the Fair Isle-Fladen grid).
2. Experimental fishing with pelagic and ground trawls. (Experiments with submerged drift-nets included in the programme were later withdrawn).

1. Departure was delayed 24 hours to allow contractors to inspect the vessel for the installation of the line hauler for the Greenland trip and by the difficulty in procuring a stoker. "Scotia" eventually sailed short-handed at 1330 hours on August 5th. A direct run, via Fair Isle for bearings, was made to Station 1 in accordance with the preferred plan to work the grid in numbered sequence. The full programme was carried out except for Station 11 which was omitted owing to the presence of the Lerwick drifter fleet and curtailment of a portion of the plankton work between Stations 67 and 72 on account of weather. "Scotia" returned to Aberdeen at 05.30 hours on the 12th.

HYDROGRAPHY: Temperatures and salinities were taken at surface, 10m. and bottom, free phosphate at 10m. and the bathythermograph at all stations.

Temperatures showed a wide range over the area. Surface water varied 3.5°C. increasing from 10.7°C to 13.5°C in an easterly direction across the Fair Isle grid with readings of 13.5 to 14.2 continuing southwards over the Fladen section. Bottom temperatures ranged from 6.2°C. to 11.7°C. Values of the surface order, tending to homogeneity, occurred over the western half of the Fair Isle traverses, meeting, with a noticeable convergence between Sumburgh Head and Lat. 59°N., a cold layer covering the easterly stations and extending into the northern portion of the Fladen area.

Free phosphate results will be incorporated in the "Clupea" and "Silver Scout" report on their concurrent survey.

PLANKTON: Hensen net hauls were taken according to programme and 1m. silk oblique hauls at all but three of the positions specified.

Collections in general were good, poor samples being the exception and confined mainly to the fringes of the area. Calanus f. and Limacina r. yielding high volumes in places, notably areas D.16, 17, and 18, and Sagitta e. and euphausiids - these featuring most prominently north of Lat. 58°30'N. - were the main constituents. Cosmetira and Aglantha were also found widely distributed though rarely in quantity. Other forms included Turris (In D.18, B.16 and C.13), Laodicea and Tomopteris in B.16 and Pleurobrachia in coastal waters. Young fish, chiefly flats, were a feature of many hauls.

ECHOMETER: The laboratory echometer was run continuously during the 6½ days and worked satisfactorily except for 30 miles of the 1200 covered. Traces of all recognised types were met with in varying degrees of intensity and extent at one or more positions throughout the greater part of the route traversed, particularly along the 58°55'N and 58°45'N lines and over the entire southern half of the Fladen grid between 57°05'N and 57°45'N. In one or two, but not all, cases bottom traces coincided with herring trawler operations. The traces were preserved and have been charted.

2. The necessary gear including the herring trawl in lieu of the "Scotia's" bottom net was taken on board on the 12th, and departure effected at 0830 hours on the 13th to Stations 80-83 where suitable traces had been earlier observed and where experiments, in the company of many herring trawlers, were eventually centred over a 20-30 mile radius. "Scotia" returned to port at 1330 hrs. on the 16th.

PELAGIC TRAWL: Off-bottom traces were of comparatively brief duration thus limiting the number of hauls. Excluding one fouled shot seven hauls were made with this net, rigged in various ways, towed at varying speeds and in most cases calculated to be passing through traces - all however without success so far as the capture of herring was concerned. One haul taken on the bottom following a good herring trawl catch yielded one herring and a few white fish. In two hauls cyanea were taken in the net. Some significance might be attached to this in connection with the question of the opening of the net while fishing and to the fact that a larger quantity occurred when additional floats were fitted on head-lines and footrope weighted.

The various rigs tried are given below. Dan lenos were discarded after the second haul following some damage to one wing. Extra floats, a light bosom and chains were added to the net in order to give greater depth between headrope and footrope, with results as mentioned above. Unfortunately one of the two depth recorders was found to be leaking, preventing a possible measurement of the gape. The Larsson boards appeared to give a good spread but less wide, it was reckoned, than when operated from "Explorer", the warp spread gauge made for the latter proving unworkable on "Scotia". Some improvement in spread appeared to take place using "Scotia's" otter boards though still less, since the gauge proved still to be too small, than with Larsson boards on "Explorer". The "Explorer's" declination gauge required to be fitted with legs to reach over the higher "Scotia" rail to the warps. A record of angle measurements and calculated depths for different warp lengths and towing speeds was kept. Speeds employed ranged from 70 to 100 revolutions.

The tests on this occasion, though disappointing, were not regarded inconclusive in every respect. It became apparent, however, that larger scale experiments embodying the full series of variables possible with the Larsson board slots and ring holes in conjunction with existing "toads", additional floats and weighted footrope etc., and probably repeated with otter boards, would be desirable before any alterations in the construction of the net itself were likely to be considered.

Pelagic Trawl Rigs

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| Hl. | 1. | Larsson boards, "toads", dan lenos. |
| | 2. | " " " dan lenos (damaged). |
| | 3. | " " " no dan lenos. |
| | 4. | " " " no dan lenos. |
| | 5. | "Scotia" boards, larsson "toads", no dan lenos. |
| | 6. | " " metal floats in place of toads, no dan lenos. |
| | 7. | " " " " " " " bosom, chains,
no dan lenos. |
| | 8. | Larsson boards, "toads" plus metal floats, bosom and footrope
chains, no dan lenos. |

HERRING TRAWL: Four hauls, one of which -- an initial trial haul -- was abortive, were taken with this net over the same grounds as the pelagic gear. The three successful hauls yielded 249, 79 and 1553 herring of which samples of 150, 79 and 150 were preserved for Laboratory examination. Measurements on board of the remainder showed a size range of 17-31 cm. with a mode ca. 27/29 cm. Maturities ranged from Stage I to V, the majority being between III and V.

J. M. LAMONT
25th August, 1952.

Restricted Circulation

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