CRUISE REPORT

F.R.V. "SCOTIA"

August, 1949.

OBJECTS:

The objects of this cruise were as follows:-

(a) To obtain plankton samples over herring spawning grounds with a view to charting distribution of herring larvae.

(b) To obtain data on temperature and salinity conditions in the neighbourhood of spawning grounds.

(c) To sample the fish population by trawl. In addition the echo-sounder was used extensively in an attempt to find traces of fish.

NARRATIVE:

The "SCOTIA" sailed from Leith in the early afternoon of Wednesday, 10th August with Mr. Ellis and Mr. Craig aboard and proceeded to Aberdeen. Three tow-net stations were done and the ship docked at Aberdeen the following morning.

Plankton jars and some trawl gear were collected from the laboratory and the ship sailed again in the evening, Mr. Currie now having joined the scientific staff.

New silk tow-nets were bent on after leaving Aberdeen and each one was fitted with a filtering bucket and attached by a clip.

The pre-arranged programme was carried out, all the stations being done in quite good weather. No serious snags were encountered and the ship returned to Aberdeen on the evening of the 17th August.

RESULTS:

Plankton: The tow-nets used were new 1 metre silk nets with the plankton being collected in brass filtering cups. These cups appear satisfactory for collecting and emptying out of the plankton samples but it is suggested that a better system of attaching them to the net be devised, other than the brass clips used during the cruise.

As the cruise was planned partly from the point of view of distribution of herring larvae the samples were scanned for the occurrence of these. No detailed examination has yet been made, but the preliminary search showed small numbers of these larvae from samples taken at 10 metres at A.15d and C.13a. As many of the samples are very dense other larvae may be concealed by copepods, etc. in the jars, and will be collected and recorded when the samples are analysed.

Some species occurred very plentiful throughout the cruise, principally Limacina, Calanus, Sagitta, Hyperia galba, and Themisto.

Themisto gracilipes was extremely dense in the surface tow-net at B.14b.

Larvae of Ammodytes and other fish were noticed in many of the samples.

Vertical Hensen hauls were taken at all stations north of Clyth Ness but nothing special was encountered in these samples during a preliminary examination.

Hydrography: Drift bottles were released and salinity samples and temperatures were taken in accordance with the programme.

The observed temperatures were:-

(1) East Scottish Coast - surface temperatures were of the order of $12\frac{1}{2}^{o}$C., the deeper water being 2-3° cooler. 20-30 miles offshore the thermocline occurred at 30-40 metres whereas inshore the cold water occurred only at one station, North of Kinnaird Head. The thermocline was here situated at 80-90 metres.

(2) East and North Orkney and Whiten Head - Temperatures here were about $12\frac{1}{2}^{o}$C. and fairly uniform from surface to bottom.

(3) Fair Isle - Here was encountered some of the coldest water we observed, the water column having a uniform temperature of 11.2°C.

(4) West Orkney and North Minch - A surface layer at 13°C. extends to 50 metres. Below this temperatures were very irregular, dropping as low as $10\frac{1}{2}^{o}$C.

Winds have been in the main from a westerly direction blowing moderate to fresh.

A new barograph was installed at the beginning of this cruise and readings were taken throughout but it has not yet been accurately standardised.

Trawling: Trawls of one hour were made with the 30' Otter Trawl at most of the stations and the catches were very good throughout the cruise.

In the previous cruise a great deal of trouble was experienced in shooting this trawl, but during this cruise there was only one foul shot, probably due to strong tidal action. The catches also were very much better than those of the previous cruise, which may be due to a greater abundance of fish on these grounds or perhaps due to the better working and greater efficiency of the gear.

The best haul of the cruise was off Noup Head, where $1\frac{1}{2}$ baskets of mixed witches and megrims with $1\frac{1}{2}$ baskets of haddocks and other fish were caught.

The chief species caught during the cruise were megrims, lemon soles, witches, cod, haddock and whiting.

In almost all cases the hauls were very mixed both in age composition and in species composition. Very large hauls of dogfish, Squalus, sometimes over 100 in number, were encountered principally on the north and west coasts of Orkney and scales were scarce on the accompanying fish. Stomachs of whiting, megrims, witches and lemon soles

were kept for further examination.

The only unusual fish occurring in the trawl were 8 specimens of the lesser forkbeard, Raniceps raninus, ranging from 27 to 54 cms. These were caught off Noup Head.

Invertebrates were plentiful throughout the cruise but nothing unusual was encountered, the principal forms being Pandalus, Eoligo, Asterias rubens, Porania and occasional dense hauls of Nephrops, Pecten, and Echinus esculentus.

Use of Echo-sounder for fisheries work:

At all stations the echo-sounder was used with increased gain on both the surface and bottom phases. Fish shoals were observed close to bottom on several occasions. On the surface phase, continuous echoes were recorded which appear to be connected with the working of the instrument and not to reflections from the water.

It is apparent that "SCOTIA'S" echometer will be of use in locating fish shoals and further research is indicated.

I am indebted to the work of Mr. Craig and Mr. Currie at sea, and particularly to Mr. Craig for his advice on and assistance in the preparation of this report on hydrography and echo-sounder work.

ROBERT W. ELLIS.

1st September, 1949.

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APPENDIX TO AUGUST CRUISE OF F.R.V. "SCOTIA".

Use of the Echo-sounder for Fisheries Work.

During the Faroe-Rockall cruise in July the echometer was in use for bottom survey work and little fisheries work with it could be done. It was however ascertained that with gain slightly above normal, the P.N. water bottle could be followed down to 100 fathoms.

The appearance of a reflecting series of layers at about 10-15 fathoms was also noted for investigation.

During the present Orkney cruise arrangements were made to run the echometer at greatly increased gain. During hydrographic stations the bottom contour and detail above it has been observed, and during tow-netting, the upper water layers in the range 0-35 fathoms.

With the ship under way at normal speeds it seems unprofitable to use high gain on account of the heavy interference which appears, obscuring all fine detail.

Results.

(1) Surface layer traces - The three most remarked layers at 9, 13½ and 15 fathoms retain their position on all traces to within a half fathom. It seems clear that they are due to some feature of the echo-sounder and convey no information about the sea. The station at ZZ.160, 0750 hrs. shows one distinct spot at 19-22 fathoms which may be due to some pelagic fish. Higher gain was therefore used on this phase and the fact was accepted that no detail was visible at less depth than 15 fathoms.

(2) High gain traces on bottom phase - Only in three cases has sufficient gain been used. At 0700 hrs. 14/8/49 and 1930 hrs. 13/8/49, showechoes from about 5 fathoms above bottom, these may be fish traces, and 2245 hrs. 12/8/49 shows a mottled appearance throughout. The meaning of these latter traces is not yet known. It would be interesting to compare these with traces from the "CLUPEA'S" echo-sounder.

It seems apparent that the "SCOTIA'S" echo-sounder will be of use in spotting fish and further work must be done on future cruises.

Robert W. Ellis

2nd September, 1949.