Dr. Wood

S.16 5SR57

Confidential: Not to be quoted without reference to the Laboratory.

CRUISE REPORT

F.R.S. "SCOTIA"

12 - 27 June, 1957.

Narrative:

An initial delay of five days was occasioned by serious fault in the amidships hydrographic winch discovered when winding on new warp. "Scotia" left Aberdeen at 0000 hours on June 12th. The first station for bottom current measurements by current meter with special devices was occupied at 04.30 hours on June 13th. By 22.00 hours nine attempts to register bottom current had been made, only four of which were partially successful. No further experiments in bottom current measuring being possible for reasons given below, "Scotia" proceeded to the Faroe Bank where a trawl was taken and the line of hydrographic stations to the Butt of Lewis commenced at 09.10 hours on June 14th. The line was completed at 20.55 hours on June 15th, "Scotia" thereafter making for anchorage in Broad Bay. "Scotia" berthed in Stornoway on June 16th and Dr. Tait left the ship the following day for Aberdeen while "Scotia" returned to the Faroe Bank. There at 14.10 hours on June 18th hydrographic stations, northwards, were commenced. At 07.00 hours on June 19th the line was completed at 62°47'N 10°00'W and "Scotia" sailed for Faroes. The night was spent at Trangisvaag and the Nolsø-Flugga line was started at 11.30 hours on June 20th in good weather conditions but completed at 19.10 hours on June 21st in adverse conditions, when "Scotia" was forced to shelter in Balta Sound. A start to the Herring Larvae Survey was made, still in adverse conditions, on Sunday morning, June 23rd, and continued till the following day when a call was made at Lerwick for water and hydrographical replacements. Work was recommenced on the next day, June 25th, in somewhat better working conditions and the larger portion of the grid was completed before "Scotia" was forced by time to sail for Aberdeen where she berthed at 12.30 hours on June 27th.

Current Measurements:

The first experiment was abortive through failure of the two messengers operating the current meter.

The second experiment gave a current speed registration at approximately one metre from the sea floor of less than 0.1 Knot, no direction indication being given since the pellets had jammed in the communicating tube.

The whole meter was thoroughly cleaned, but on the third lowering three hours later the timing device, i.e. stop-watch in special casing, failed to function. For what it is worth an approximate estimate of bottom current speed by the revolution counter was calculated at 0.3 Knot; the direction indicator again failed to function.

On the fourth experiment, still without direction indication, 87 revolutions in 28 minutes meant practically no current at one metre off bottom.

The fifth experiment yielded only 42 revolutions in 30½ minutes, meaning negligible current, but a direction indication this time registered the direction of the movement as proceeding from almost due north.

It was as a result of the sixth experiment that a fault in the compass needle suspension was discovered and although substitution was attempted with some success, other faults developed, such as failure of the messenger release mechanism and of the timing device, which put an end to further experiments after the ninth lowering of the apparatus.

On the whole, the results obtained, unsatisfactory though they may be in an all-round sense, may be taken tentatively to support the previous finding in May 1953 of the relative absence of horizontal current on top of the Wyville Thomson Ridge, at its eastern end at all events.

Hydrography:

Temperatures in the top 200 metres water layer on the Butt of Lewis to Faroe Bank Section were a little higher than normal on the continental shelf where 12°C was registered falling to a more normal 9°C - 10.5°C towards the Faroe Bank. North of Faroe Bank temperatures declined to 8.5°C and fell at the northernmost station of 62°47'N 10°00'W to 5.8°C indicating the near presence of arctic water.

The 9°C isotherm slowly rose from a depth of 550 metres (uncorrected for depth until salinities are available) off the shelf to 100 metres at the Faroe Bank. The deep water north of the Wyville Thomson Ridge was warmer than normal with consistent temperatures of over 5°C at 600 metres, with only one temperature of 3.6°C south of the Wyville Thomson Ridge at a comparable depth. In keeping with this, there is only one record of a sub-zero temperature in the deepest water, indicating only a weak tongue of deep Norwegian sea water, which is surprising in view of what occurs on the Faroe Shetland section. Except immediately north of the Faroe Bank where a temperature of 6.6°C is recorded at 740 metres, bottom water was consistently just above zero and never sub-zero.

Between Faroe and Shetland the uppermost 200 metre layer of water was fairly consistently 10°C at the surface, falling to 8°C at 200 metres except in the centre of the section where a very large upsurge of deep Norwegian sea water, reminiscent of conditions last November, completely dominated the line. A temperature of 3.3°C at 150 metres at 61°21N 3°10'W with temperatures of 8°C at adjacent stations is indicative of this. The water to the south of this upsurge is considerably warmer than that to the north of it with the 8°C isotherm plunging to over 400 metres.

The uncorrected isothermal structures would give a preliminary indication of a comparatively large volume transport of oceanic water on both sections, flowing in the case of the Nolsø-Flugga section just to the south of this cold water upsurge.

Plankton:

Butt of Lewis - Faroe Bank Line

In the shallower water of the shelf in the Butt area were Limacina, Pleurobrachia Anonalacera, Mysids and young Herring together with fish eggs and Calanus.

In the area between Faroe Bank and the shelf occurred most of the records of Laodicea, Tomopteris, Turris, Cosmetira, Sagitta elegans, S. maxima, Deep Sea fish, Arachnactes, Dolioletta, Euchaeta, Clio, Siphonophores, Beroe and Physophora, all being for the most part associated with the area of warmest water.

To the north of Faroe Bank there were two stations showing a pocket of warm water at the 100 m. level; associated with these stations were recorded a fauna similar to that south of the Bank, i.e. Tomopteris, Sagitta maxima, Euchaeta, Siphonophores, Beroe, Clio, Laodicea and Clione.

At the northernmost stations Aurelia, Calanus and Physophora occurred and Standard net samples showed Phyto-plankton to be well represented.

The Faroe Bank area was generally poorer in forms recorded, although Phyto-plankton was abundant and it showed a lack of Euphausids.

Over the line as a whole Aglantha was present (except on the Butt shelf) whilst Thalassicolla was generally present in the upper layers and the deep water Cephalopod Taonidium in the lower layers.

Faroes-Flugga line:

The main hydrographical feature was an upwelling of colder water in the centre of the section. This feature served to separate the faunas to some extent.

The southern stations above contained Dolioletta and Clio together with poor catches of Calanus; in the north Aurelia and other medusoid forms were present. Calanus was more abundant and Phyto-plankton was well represented. The upwelling caused a break in the fairly continuous distribution of Siphonophores, Thalassicolla and Aglantha whilst it appeared to have little effect on the distribution of Euphausids; at the colder water stations Tomopteris occurred.

The presence of Dolioletta on the Butt-Faroe line and particularly on the Faroe-Flugga line is very early and can be compared to the situation in 1954.

East of Shetland Survey:

The area surveyed showed a general abundance of Calanus and this was reflected in good catches of the Copepod with the Plankton Indicator.

Trawling:

A trawl carried out at Faroe Bank contained a good catch of Haddock, Cod and Gurnards together with a few Halibut, Lemon Sole, Common Dabs, Megrins, Saithe and Ling.

A trawl, east of Faroe, contained a good catch of small Halibut, Sebastes and Cod together with some Haddock, Lemon Sole, Common Dabs, Catfish, Argentina and Tusk.

Echo Sounder:

Despite mechanical breakdowns echo sounding was carried out over the larger part of the East Shetland Grid. Traces were not numerous and were largely concentrated south of Shetland where Dutch and British vessels were at work.

J. B. TAIT

J.H.A. MARTIN

4th July, 1957.