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## CRUISE REPORT

F.R.S. "EXPLORER"

12th June-7th July 1968

Part I June 12th-18th.

Objective

Fish capture experiments using detachable codends.

Narrative

"Explorer" sailed on the mid-day tide on 13th June and proceeded to fish suitable grounds to the south east of Aberdeen. Initially, very good catches of cod were obtained. However, haddock or whiting were the primary objective for this cruise and so other grounds were tried until, on the second day, suitable catches of haddock were obtained.

"Explorer" remained on this ground, about 30 miles off Aberdeen, for the duration of the cruise. The weather was good and work was able to proceed unhampered until the ship returned to Aberdeen on 18th June.

Experimental Procedure

Throughout the cruise the experimental codends performed very satisfactorily. Fishing was good and after some initial trials it was found that 15 minutes towing, before the codend was detached, provided satisfactory numbers of fish for each haul. After some preliminary trial hauls, experiments of three kinds were performed:

- (a) Three codends were detached and raised from the bottom (35 fm) to the surface in times ranging from 17 to 42 hours.
- (b) Two codends were detached and left on the sea bed for 5 and 20 hours respectively before being hauled directly to the surface. The stomach contents of the fish thus caught were sampled for comparison with the stomachs of fish captured and raised to the surface directly in the normal way. This was done as a means of determining rates of digestion over various periods of time.
- (c) To simulate a possible procedure for releasing tagged fish on the bottom, one of the codends was lowered to the bottom with both live and dead fish inside. This was set to open automatically after about an hour, and then, one hour after that, the codend was raised to the surface to see if the live fish had escaped and the dead fish had been retained.

Results

- (a) Of the three codends that were raised to the surface slowly, only the 17-hour one contained fish. There were no fish in either of the other two owing to a minor defect in the door closing mechanisms that had permitted the fish to escape. However, the condition of the fish in the 17-hour codend was very good. Altogether in the codend there were:

241 small haddock  
69 medium sized haddock  
2 medium cod  
1 large whiting  
7 lemon soles  
2 Gurnards

When these were taken on board there were only 9 small haddock and 1 large haddock dead or dying. The remainder of the fish were alive and, apart from the lemon soles, swimming actively. The overall impression was of line caught rather than trawl caught fish. During the next five hours, haddock, and especially the smaller ones, began to die off rapidly. It is uncertain to what extent this was due - to the after effects of capture or to overcrowding in the tanks. It was quite clear, however, that the deck tanks were grossly overcrowded and after 5 hours the numbers of fish were reduced to about a third. Thereafter only two deaths occurred up to the time of docking on the 18th.

The condition of the fish was judged from both external and internal factors. Externally, about 30% of the 1+ haddock had some scale damage although in relatively few individuals was it at all extensive. Of the larger fish, only 15 haddock showed signs of any scale damage and in only 5 individuals was this regarded as serious. About 20 haddock of various sizes were examined internally and all had ruptured swimbladders. The two cod were also examined. One of these had a ruptured swimbladder and one had not. The single, large whiting, which appeared to be in perfect condition was found to have an intact swim bladder. When "Explorer" returned to Aberdeen, 30, live, 1+ haddock were collected by Dr. Pytler for the University of Stirling and 17 of the medium haddock and the two Gurnards were transported to the Marine Laboratory aquarium. The remainder were killed for further examination.

- (b) Regarding the digestion experiment, satisfactory numbers of stomachs were obtained and the results are being analysed.
- (c) Regarding the simulated tagged fish release experiment, 25 live haddock and 20 dead haddock were put in the cage. When it was taken on board after the experiment, all 20 dead fish were still present and all but 3 of the live fish had escaped.

R. JONES.

Part II June 20th-July 7th 1968.

### Objectives

To work the new standard Faroe-Shetland hydrographic lines and to carry out a routine trawling survey at Faroe.

After leaving Aberdeen on the 20th June, "Explorer" arrived off Sule Skerry in the early hours of the 21st and commenced occupying (in turn) the 9 stations that comprised the new hydrographic line across the Faroe-Shetland Channel. This work was hampered by rather strong northerly weather conditions and also by the many faults that developed in both the electric winches.

The Munken Rock station was completed after being 30 hours en route and the trawling programme begun immediately, and continued for the next 6 days.

After a short break in Klakksvik where the electric winches were repaired, "Explorer" was able to complete the trawling programme in a further two days. One day of the time in hand was spent using the Snellers on the haddock patch just north of Sydeno.

"Explorer" worked the Nolso-Flugga hydrographic line on the way back, and before docking in Aberdeen on the 7th July, collected sedimentation samples from four positions round the Moray Firth, in connection with the mussel toxicity investigation.

## Hydrography

Temperatures and salinity samples were taken only on the two hydrographic traverses of the Faroe-Shetland Channel.

Surface salinities which ranged from 35.30 to 35.42‰ over the western section and from 35.24 to 35.38‰ over the eastern section, indicated that very little arctic water had penetrated across the Nolso-Flugga line. The South-east quarter of the Faroe shelf itself also showed stronger than usual oceanic influence, the salinities here being ca. 35.30 throughout the water column.

The pattern of temperatures across the two lines was similar - decreasing from 11.60°C to 8.85°C from south to north across the channel.

## Plankton

The standing crop of zooplankton over the survey area was relatively high, and crustaceous material was well represented in most samples. The most frequently occurring euphausiids Meganycitiphanes norvegica and Thysanoessa longicaudata were widely distributed, often in large numbers, the former mainly in the furcilia stages.

Aglantha digitale and Laodicea undulata, the most common medusae sampled, were also widely distributed, occurring in large numbers (especially Aglantha) in most hauls. Halopsis ocellata was also common in many samples. Of special mention, Pelagia noctiluca in small numbers in the hauls taken at most stations below 61°21'N, and one Cyanea lamarckii was caught in rectangle YY22b.

The chaetognaths Sagitta elegans and Eukrohnia hamata were sampled at most stations in quantity, and at the deeper stations Sagitta maxima was usually in evidence.

Species of a more oceanic nature were taken in the southern part of the survey area and these included Salpa fusiformis, Doliioletta gegenbauri, Cosmetira pilosella, Dimophyes arctica, and Sagitta serratodentata.

## Trawling

Of the 41 one-hour trawl hauls made during the survey, the first 20, on Faroe Bank and in the south and west of the plateau, were made with a manilla trawl. This gear suffered splits in the belly and wings, so that catches from them, which averaged 6 baskets cannot readily be compared with the subsequent 21 hauls made with a courlene trawl, in which little damage was experienced and which averaged 20 baskets. These 21 trawls covered positions in the north and east of the islands.

Haddock was the dominant species taken in most of the hauls, the largest catches of which were taken to the north of the islands, where two hauls produced aggregates of 949 and 989 individuals with a size range from 15-67 cm, the bulk of the catch being of large fish. The haul with the largest aggregate however, was made on Sando Bank, where 1355 fish were counted. Of these only 25 were retained in the cod end; the remainder were small fish from 13-20 cm, that had escaped into the small mesh cover.

Cod of a size range from 34-104 cm, occurred in numbers varying from 20 to 160 in most of the catches, the largest again coming from the north. A sample from each catch was examined for worms.

Sando Bank proved to be the best ground for Saithe; a total of 723 fish (42-100 cm) were taken in 4 hauls. This species also occurred in much fewer numbers in hauls to the north of the islands.

Whiting of a large size (19-52 cm) were recorded in small numbers (from 1 to 10) at widely scattered positions over the survey area. Two hauls, one to the east and the other to the west of Sando island, produced the largest catches of 56 and 64 fish respectively. All whiting were preserved for laboratory examination.

Lemon Sole was the most frequently occurring flat fish. The largest catches were taken at positions to the north of the islands. Over most of the survey area, plaice were caught in small numbers, but at one station to the north of the islands (rectangle YY23a) a catch of 65 plaice was taken.

Halibut in very small numbers were taken in most hauls all round the islands, while skate, (Raja batis and R. montagui) were taken in small numbers in hauls west of Sando island.

Among the preserved samples brought back to the laboratory were three specimens of ambi-coloured lemon soles, a dab showing head-reversal and a cod of 60 cm with a large red and pink sub-cutaneous mark over the whole of the dorsal side of the head.

#### Echo Sounding

The bridge echo-sounder was used to make an annotated record of the profiles of both the hydrographic lines.

R.B. BURNS.

1st September, 1968