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reference to the Laboratory.

## CRUISE REPORT

F.R.V. "CLUPEA"

19th February-9th April 1968

Objectives

- 1) To carry out a herring egg survey on Ballantrae Bank.
- 2) To study the dispersion and drift of herring larvae from the Bank in collaboration with "Scotia", and to obtain measures of growth and mortality of the larvae.
- 3) To obtain ripe herring from trammel net hauls for artificial fertilisation and to set anchored cages for studies on egg and larval development.

"Clupea" left Buckie on 19th February and sailed to the Clyde via the Caledonian Canal. Reaching the Clyde on 22nd February the trammel nets were set on Ballantrae Bank before the ship made for Ayr to pick up the scientific staff. The trammel nets were hauled in the following morning and a catch of about  $1\frac{1}{2}$  crans of ripe and running herring was obtained. After selecting ripe gonads from a number of herring for artificial fertilisation, "Clupea" sailed for Lamash Bay to set anchored cages for the studies on egg and larval development. Twenty-four cages, each with about 250 fertilised eggs, were anchored on the south side of Lamash Bay.

The survey for herring eggs on Ballantrae Bank was begun at the beginning of the following week. Grab hauls were first made over the area where the egg patch was located in 1965 and 1966. Herring spawn was only found at the inner edge of this patch. The eggs were distributed over an area about 450 yards long by 320 yards wide. The density of eggs varied, a small number of samples contained eggs  $\frac{4}{5}$  layers thick, but the majority of samples were much less dense.

About  $\frac{3}{4}$  mile to the north of this small patch another larger area of spawn was located in a region on Ballantrae Bank where spawn had not been detected in grab surveys made in previous years. This egg patch extended from east to west across the bank. It was about  $\frac{1}{2}$  mile long and 200-400 yds wide. The egg density varied over this area from a carpet of  $\frac{4}{5}$  eggs thick to a few eggs per haul.

The majority of the eggs appeared to be in an advanced stage of development, some of the embryos had pigmented eyes.

During the remainder of the cruise, work was frequently interrupted by bad weather. In the ensuing fortnight repeated sampling of the egg patches was combined with some plankton sampling for herring larvae. Yolk-sac larvae were first caught on the 7th March and thereafter grab samples showed much reduced quantities of spawn, some of which were decomposing.

On 21st March it was decided to concentrate on larval sampling. Much of the work thereafter was done on a grid of stations around a parachute drogue being tracked by "Scotia". Unfortunately, no real concentration of larvae was found in the vicinity of this drogue.

In the last week of work "Scotia" had left the Clyde after lifting the drogues. "Clupea" then surveyed the whole of the Clyde area from Corsewall Point to Lower Loch Fyne. Herring larvae were taken in small numbers at scattered points over much of the area but no major concentration of larvae was found anywhere. The scientific staff disembarked at Ayr on the 9th April while "Clupea" proceeded to the Caledonian Canal to return to the east coast.

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13th May 1968.