

IN CONFIDENCE: NOT TO BE QUOTED WITHOUT REFERENCE TO THE  
LABORATORY.

8MR70

## CRUISE REPORT

FRV 'MARA'

14 September - 9 October 1970

## OBJECTIVES

This cruise was divided into two parts: a three-week experimental seine net programme and an underwater visibility/photometry programme, with the following principal objectives:

## PART 1

1. Further observation and recording of the behaviour of round- and flatfish during demersal seining.
2. Recording the change in shape of a "wing" seine net by means of instrument records of spread, headline height and photographs of warp divergence determining the warp tensions developed during fishing, and the sinking rates and behaviour of the ropes during fishing.
3. Underwater photometry to correlate underwater visibility with fish behaviour.

## PART 2

1. Comparison of surface spectral irradiance using the quantaspectrometer (DAFS) and the Gamma spectrophotometer (MAFF).
2. Determination of beam attenuation coefficient by the use of the ~~meter~~ and by taking black body readings.
3. Measurement of diffuse attenuation coefficient by the twin cell selenium-cell photometer and by vertical target sightings.
4. Determination of underwater visibilities using standard techniques and photographs of targets, taken for densitometric analysis.

## NARRATIVE

The first week of the cruise was based on Buckie and despite exploration along the south side of the Moray Firth and into the Dornoch Firth, no haddock were found in suitably shallow water. The second week, based on Wick, was somewhat hampered by easterly winds and resulted in no greater numbers of fish. A return to Buckie for the final week of the seine net programme was dictated by the need for co-operative working with FRV 'Clupea' on sea trials of the 'Towed Underwater Vehicle' mock-up.

The photometry programme during the final week was conducted five miles off Buckie and when NW winds proved too strong at the mouth of the Cromarty Firth.

## RESULTS

The instrument programme proceeded smoothly and effectively, but studies of fish behaviour were much curtailed by the shortage of fish in suitable depths. The gear used was a Stewart 420 rigged in exactly the same way as

that used in the previous seine net programme by "Boy Andrew" ('Mara' Cruise 27 July-29 August) which had not been instrumented. Not only is the wing trawl a much larger net than the haddock seine used in previous years but it closes in a completely different way; it tends to close into a U-shape whereas the haddock seine closes as a V-shape. The result is a much larger volume in the mouth of the wing trawl than the haddock seine at an equivalent wing to wing distance.

Records were made of surface light intensity and diffuse attenuation coefficient using the twin selenium cell instrument. In association with underwater 'black body visibilities' this allows an estimate to be made of parameters affecting underwater visibility.

A Plessey current meter for tidal recording was not available for this trip and therefore no flatfish tagging, to determine their orientation to tidal currents, as was intended, was conducted.

The second part of the cruise provided a valuable opportunity to test the IRD quantameter which scans the spectrum from 400 nm to 700nm with the Gamma spectrophotometer (brought from MAFF by Dr Arnold). The former instrument is designed for field use and produced spectra at surface, 2.5, 5.0, 10 and 15 m depth. A drawback is the time taken (c. 75 secs) for a complete scan. Detailed results await the spectral calibration of the instrument.

Correlation between the visual determination of beam attenuation coefficient ( $\mu$ ) by sighting a matte black surface horizontally underwater, and the results of the  $\mu$ -meter are still somewhat erratic and requires further observations.

#### CONCLUSIONS

The two seine net cruises this summer on FRV "Mara" compared with 1969 have shown that a good year-class of haddock 1967 can be seen in shallow water as two-year-old fish but not as three-year-olds. Therefore future operations must either be restricted to working on good two-year-old broods or a greater depth limit must be set, involving the use of deep diving apparatus.

C. C. HEMMINGS  
12 November 1970