MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1970 RESEARCH VESSEL PROGRAMME

REPORT: RV CLIONE: CRUISE 5

(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF

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DURATION

Left Lowestoft at 1200 hours 10 March

Arrived Lowestoft 11.30 hours 26 March

All times are British Standard Time

LOCALITY

North Sea

AIMS

To observe the trawl on RV CORELLA with ARL Scanner on board RV CLIONE.

NARRATIVE

CLIONE left Lowestoft at 1200 hours 10 March and sailed for IJmuiden to fit the dome. On the following day she joined CORELLA on the Rising Ground. Few fish were caught there and on the 12 March both ships reached the Flamborough off ground, where again few fish were found. The weather was poor and so was the ARL Scanner picture. On the 13 March both ships worked off the Tyne in about 40 fms with little result. Dr Harden Jones joined on the morning of 14 March. In good weather both ships worked on the Berwick Bank and on the Wee Bankio off the Firth of Forth; the scanner picture was poor and on 18 March Mr Mitson arrived in Leith and was taken aboard. A day was spent working on the scanner and the picture was improved.

Hauls were made in the Firth of Forth in 10,20 and 30 fms on sand and on mud with short and long bridles on the trawl. Over a period of days it became possible to choose the best conditions for work on describing the gear. The noise bands were most pronounced on sandy bottoms. Eddy Trails were detected on both sorts of sea bed, but they differed in character. It is possible that grooves in the mud made by the doors were detected.

Measurements were made on the screen of certain trawl dimensions. Very few fish were caught in this area. A large shoal of sprats was detected and examined in vertical and horizontal scan; it is likely that individual fishes were resolved, at least at close range. The whole shoal was detected to a range of 250 yards.

During the period 20–22 March both ships worked on sandy ground near the Berwick Bank and in the Farn Deep. Quite good pictures of the trawl were obtained in 40 and 50 fathoms on mud and the gear was detected in 60 fms but the picture was not very good. Over the range of depths studied there were two ways of obtaining a good picture, by setting the angle of tilt such that the trawl appeared just ahead of the main reverberation from the bottom ie., at relatively high angle of tilt, or just beyond it, at a relatively low angle of tilt.

Doors were seen as strong signals sometimes casting a shadow. The head rope with floats and the ground rope with bobbins were both visible and so were the dan lenos. The cod end was marked with 6 floats and the bag of net sometimes cast a shadow. Eddy Trails appeared from doors, dan lenos and from bobbins under the best conditions. When a tickler was used, it was seen.

On the 22–24 March in good weather some fish were found on the muddy ground east of the Tyne. CORELLA caught up to 5 baskets/hr of cod and whiting and there were heavy traces of sprats in the area, which were being caught by one or two industrial trawlers. Signals from fish were seen now and again in the path of the trawl and on one occasion a shoal was seen to lift over the headline. At a catch rate of 5 baskets/hr, a single cod might be expected once every three or four minutes; on the screen fish were not detected at this rate although more might be seen on film later. The trawl floats were distinguishable and so fish of 60 cm should be detected under the right conditions. However to study fish behaviour in relation to the gear unequivocably, a higher density of fish is needed.

In 30–40 fms on mud, the noise-bands from doors, bobbins and dan lenos were much reduced. With bobbins replaced by rubbers, the trawl could be viewed from astern rather than from the side because the noise band due to the bobbins was eliminated. Hence the best condition for studying the fish would be astern of the trawl (or even ahead of it) on mud in 30–40 fms with a catch rate greater than 30 baskets/hr; then signals should be seen every half minute or so, as singles.

An attempt was made to assess the problem of forward search by towing a "Caterpillar" from CORELLA. This is a length of chain, 60 feet long, attached to the trawl warp. At the end distant from CORELLA, 5 trawl floats were floated 2 fms from the chain; at intervals along the chain floats were attached at varying distances and heights off the bottom. The 5 float marker at 2 fms off was detected easily to a range of 200 yards in 30 fms and to 275 yeards in 50 fms; three floats, each 1 fm off were detected at a range of 200 yards in 50 fms of water. Hence under favourable conditions of aspect it should be possible to detect a single cod of 60–70 cm in length, one fathom off the bottom at a range of 200 yards in 50 fms of water. This is feasible from the geometry of the system even taking into account the error in range due. The spread of the beam in range in forward search; the maximum upward bias is 15–20% at tilts of 20–30°.

So in the vertical mode it was not surprising that the headline could be detected clear of the bottom at ranges of about 150 yards. Similarly the whole Eddy Trail system was shown to start at the door and spread in height backwards. Sometimes the approach of small fish shoals to the whole system was shown in this way, in vertical mode. The trawl was also examined with the transducer used as an echo sounder with the beam athwartships. The distribution of Eddy Trails was shown clearly and on one occasion after much trial and error the headline of the trawl was shown completely.

During the cruise considerable trouble was experienced with an interference pattern which varied with the ship's movement. Because the manual gain had to be adjusted continuously (and of course the Reverberation controlled gains did the same) the picture was less than optional. When the transducer was tilted under calm conditions, the interference patterns were curved up at the edges of the picture; if it was brought back to the horizontal, the patterns were curved down. It is likely that the pattern is caused by the bars of the cage; under the best conditions they were counted.

MAIN RESULTS

1. The best condition for observing the bottom trawl is in 30–40 fms on mud. All main parts of the gear were seen at one time or another including Eddy Trails.

2. Fish were seen, individually and in shoals, but it is unlikely that the catch rate was high enough to yield decisive results.

3. In forward search, trawl floats one fathom off the bottom were detected at a range of 200 yards.

D H Cushing
1.4.70

SEEN IN DRAFT: MRS

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AJL

DISTRIBUTION

Basic list

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