IN CONFIDENCE:
Not to be quoted without reference to the Laboratory.

CRUISE REPORT

FRS "EXPLORER"

9-22 December 1969

OBJECTIVES:

The objective of the cruise was to conduct a mid-water trawling and echo-survey for blue whiting in the area between the Faroes and eastern Iceland.

NARRATIVE:

"Explorer" sailed from Leith at 1600 on 9 December and proceeded towards 64°N, 2°W. A bathythermograph survey was started at 1320 hrs on 11 December at 63°19'N, 02°50'W in an attempt to locate the boundary of the cold east Iceland current. Some fish traces were seen in this area but the ship continued north to 65°N and then steamed west. The area fished by the German research ship "Walther Herwig" in December 1967 (ca 65°N, 10°W) was reached at 2000 on 12 December but the weather was poor and fishing did not begin until the next day. A haul with the Engel trawl in daylight, using the Furuno netzsonde produced no fish, and one in the evening, in quite good traces, gave 2¼ baskets of blue whiting.

On the hypothesis that the main concentrations of blue whiting were further north in colder water, an echosounder survey was conducted north to 66°30'N and then back to 65°N, 6° 45'W. The latter position was reached at 0200 hrs on 16 December and, after a short survey to locate the most intense echo-traces, trawling began at 0900. The "netzsonde winch" broke down during this haul and, as the cable could not be retrieved by hand, it was cut. Trawling continued using the Furuno transducer, but on the first haul the net became fouled and was not disentangled until 2200.

During the same evening contact was made with the Icelandic research vessel "Arni Fridriksson" when it was learned that three Russian research ships had surveyed the area for herring a fortnight previously and that blue whiting had been found some 90 miles further south.

A haul from 2300-0200 hrs on 16/17 December in good traces yielded 4¼ baskets of blue whiting. Trawling continued until mid-day on 18 December but with little success. Since further trawling in this area seemed unlikely to give better results, the ship steamed south to 63° 30'N. The weather deteriorated rapidly, however, and the ship hove to at 0200 hrs on 19 December and then in variable weather made her way to Aberdeen where she docked at 1200 hrs on 22 December.

ECHOSOUNDING

The Marconi echo-sounder was run continuously in water deeper than 100 fathoms. The Kelvin-Hughes echosounder failed to function satisfactorily so was not used after a brief trial. Good mid-water traces were somewhat locally distributed and appeared to be most marked in water of surface temperature 2-4°C. Very few were found in the warm water of the north Atlantic drift or in the cold East Icelandic current. There was some evidence that traces attributable to two or more different organisms were present in some areas, but the only trace that was at all widespread was one which during the day consisted of a thin band (5-10 fathoms wide) at between 100 and 150 fathoms. After dusk, this trace rose to about 40-80 fathoms and became wider but at the same time more intense. It was very patchy and irregular in outline, especially during the day, so was thought to be caused by fish rather than planktonic organisms. Only small catches of blue whiting, however, were made when the trawl was towed through the traces.

MID-WATER TRAWLING

A total of nine hauls were made with the Engel trawl loaned by the Fisheries Laboratory, Lowestoft. In six of these, small numbers of blue whiting were caught, the maximum being ca. 800 ($4\frac{1}{4}$ baskets) in a three hour haul.

The blue whiting caught were in the length range 24-36 cm, with a mode at 29-30 cm, ie on average larger than blue whiting caught in bottom trawl surveys. Many of the fish were noticeably thin and a frozen sample has been collected to determine the weight/length relationship. Some of the fish had been feeding prior to capture and three samples, totalling almost a hundred stomachs, were collected at different times of day to examine the food (mainly a large euphausiid) and diurnal feeding pattern. Small samples of ovaries and testes were also collected for histological examination.

Small numbers of lumpsuckers Cyclopterus lumpus were caught in several hauls and single specimens of catfish (Anarhicas latifrons) in two.

Apart from the haul when the "netzsonde" winch broke down, only the Furuno net transducer was used. It was attached to the headline pointing upwards to record the sea-surface. The resultant "surface" trace was very clear but, in the absence of a functional means of increasing the gain, no fish or echo-traces of any sort were recorded. On one occasion the transducer was pointed upwards from the foot-rope, but this damaged the net. The batteries supplied for the transducer operated for only one or two hours (compared with the 25 hours expected), and standard batteries for only 40 minutes, barely long enough to position the net.

The depth at which the trawl fished was very dependent on the engine speed. After changing either warp-length or engine speed, the net took up to half an hour to stabilise its depth and even then fluctuated in depth by up to ten fathoms. During the single haul using the Kelvin-Hughes netzsonde, the net was fishing with a headline height of about seven fathoms. A series of calibrations of depth, warp-length, warp tension and engine and ship speeds was made.

BATHYTHERMOGRAPH SURVEY

The surface thermograph was run continuously throughout the cruise and a total of 27 readings were made with a bathythermograph lowered to a depth of 200-300 m. There was no evidence of a clear thermocline, and over most of the area east of Iceland the temperature at 200 m was little, if at all, lower than that at the surface. Thus the boundary of the east Icelandic current appeared to be poorly defined.

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26.1.70