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to the Laboratory.

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CRUISE REPORT

FRV MARA

1-24 November 1971

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OBJECTIVES

- (a) To determine the response of Nephrops to electric fields. The principal aim was to induce the animals to leave their burrows, and correlate the observations with those made in aquarium tanks.
- (b) To test an electrified beam trawl, with the aim of gaining experience in the handling and operation of such a device.

GENERAL

Mara sailed from Buckie on Monday 1 November and proceeded, via the Caledonian Canal, to Loch Torridon where she anchored on Friday 5 November. She remained there until Thursday 11 November, then sailed to Stornoway. Weather conditions in Torridon hampered activities on several days but only one working day was lost due to bad weather. On Monday 15th an attempt was made to enter Loch Brollum to allow Mr Chapman and assistants to make resin casts of Nephrops burrows. This was abandoned due to adverse weather conditions, and Mara entered Loch Shell, where casts were obtained. Bad weather kept the vessel in harbour on 16 November, but on 17, 18 and 19 November the electrified beam trawl was tested off Loch Grimshader. Mara sailed to Loch Linnhe on 21 and 22 November, and on Tuesday 23 November the electrified beam trawl was towed over Nephrops grounds in Loch Linnhe.

The vessel entered the Caledonian Canal at Corpach on the morning of Wednesday 24 November. Tidal conditions required that she enter the Canal at this time so as to be available all day on the 25th for inspection by firms invited to tender for the refit. Mara was due to be tied up at Corpach for the crew's long weekend break.

RESULTS

(a) Occupied Nephrops burrows were sought by divers in water between 70 and 110 ft deep. Very few occupied burrows were found. A frame, holding a TV camera and pulse generating equipment, and supporting electrodes, was lowered from the vessel and positioned by the divers. Only three occupied burrows were located and subjected to pulsed electric fields, and an animal was forced from one of these. In deeper water, around 180 ft, it was not possible to conduct tests because shoals of whiting were stirring up the mud on the bottom, totally obscuring visibility. Handling the apparatus proved difficult on several days because of high wind strengths which caused the vessel to drag her anchors. The pulse generating equipment, TV system and other electronic gear all performed satisfactorily.

(b) An 18 ft beam trawl was chosen for the first trials because it would provide a rigid framework on which to support a housing for the pulse generator and an electrode array. The electrode array consisted of six stainless steel cables slung parallel to the towing direction, and connected alternately positive and negative. The footrope of the net was cut back to accommodate the array. The pulse generator housing was lashed to the centre of the beam. Power was supplied to the housing via a high tensile electrical cable. This cable was handled on a new hydraulic winch mounted on Mara's aft platform. Mara's DC supply was converted to 50 Hz AC by a static inverter and transmitted to the net at 240 V. The pulse generator delivered pulses at 2 Hz from a 1 Farad bank of capacitors at 40 V peak. The resistance presented by the electrode array was measured as 0.06 Ω . No problems were encountered with the pulse generating system. The beam trawl, normally used for catching flatfish on sand, was found to be very cumbersome to handle when rigged with the electrical fishing apparatus. It also dug deeply into the mud unless a large number of floats were attached to the beam. The electrified trawl was towed very slowly (< 1 knot) over Nephrops grounds in Loch Linnhe. The small number of tows in which Nephrops were caught did not give any conclusive information about the effectiveness of the technique, and further tests will be necessary. The best catch rate of 74 Nephrops in half an hour, with the power on, is however, encouraging, considering the special conditions of the experiment, and suggests that further trials are justified.

These trials showed that a beam trawl is suitable for conducting the initial experiments on electrical fishing, although a lighter beam trawl is required to make handling easier. The system tested on this cruise appears to be in a satisfactory condition for use in a comparative electrical fishing experiment.

Peter A M Stewart
22 December 1971