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

1976 RESEARCH VESSEL PROGRAMME

REPORT: RV CORELLA : CRUISE 11

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

STAFF

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DURATION

Left Lowestoft 1000 h 12 August
Arrived Lowestoft 0845 h 26 August

(All times are British Summer Time)

LOCALITY

West Central North Sea: North coast of Norfolk to 56°N.

AIMS

1 Investigate the distribution and abundance of planktonic fish eggs and larvae, zooplankton predators and competitors and the phytoplankton, using the Lowestoft multi-purpose plankton sampler.

2 Monitor sub-surface water continuously along the ship's track for temperature, salinity, transparency and chlorophyll 'a'.

3 Collect water samples from the pump for salinity and nutrient analysis; calibrate the fluorometer with chlorophyll 'a' extracts; measure phaeophytin and identify the phytoplankton contribution to chlorophyll 'a' fluorescence, including the preparation of slides for electron microscope examination of the micro-flagellates.

4 Carry out hauls with the 2 sq m Lowestoft frame trawl to sample young fish.

5 Carry out hauls with the 2 m diameter ring net within 10 mls of the coast, to sample lobster larvae.

6 Use the changing net sampler to investigate the vertical distribution of fish larvae and other zooplankton, alternating with water bottle casts for phytoplankton, chlorophyll 'a' and phaeophytin in relation to temperature and light penetration in the water column over a 26 h period.

7 Continue estimating sampling variance by carrying out replicate hauls and replicate grids with the multi-purpose plankton sampler.

8 Collect samples of fish for stomach content analysis, using the young gadoid midwater trawl.

9 Collect live plankton as required.

10 Collect fish samples (frozen) for metal analysis.

11 Carry out a Nansen water bottle series, for temperature and salinity at 10 m depth intervals, at the position of the River Tyne moored current meter station, and to release 100 seabed drifters at this point.

12 To release 700 seabed drifters at 14 standard stations on the plankton survey grid.

NARRATIVE

At 0940 h 12 August it was agreed that the N.E.2 current meter array which had been reported missing would be relaid during this cruise. The equipment would be loaded during the mid-cruise break for water and stores at a north east coast port.

RV CORELLA sailed at 1000 h 12 August. The environmental monitoring systems were calibrated and began continuous monitoring for the remainder of the cruise. The 30" TTN and auxiliary samplers were calibrated on passage to the first sampling station which was reached at 1500 h. The survey was interrupted at 0400 h 13 August when RV CORELLA made passage for Grimsby following a breakdown in the compressor unit serving the laboratory deep freeze. The units were being used for domestic purposes after a failure in the domestic system before sailing. RV CORELLA docked at Grimsby at 0800 h and whilst there, the heavy equipment for the current meter array was transported from Lowestoft and taken on board. With repairs to the compressor unit complete RV CORELLA sailed at 2030 h and resumed the survey at the Bull Light vessel at 2130 h. Thick fog then prevented further stations from being worked before 0500 h 14 August. The survey then progressed uninterrupted for the next $6\frac{1}{2}$ days, with some minor adjustments to the planned grid to allow the neuston net and Lowestoft frame trawl samples to be taken inshore during daylight. Four stations at the north east corner of the survey grid remained at 1350 h 20 August when passage was made from the vicinity of Alnmouth Bay for the River Tyne. RV CORELLA docked at Newcastle at 1710 h to take on water, stores, the remaining current meter equipment and to rig the current meter array.

RV CORELLA sailed at 1245 h 21 August and set course for the area of the N.E.2 buoy. Ten replicate hauls with the 30" TTN were then made before the current meter array was successfully laid at 0730 h 22 August. The remaining four stations of the survey grid were completed by 1645 h and the 30" TTN recalibrated. The vertical distribution of plankton sampler was then rigged and tested en route to an area off Robin Hoods Bay, where large numbers of sprat and mackerel larvae had been caught during the survey.

Vertical distribution of plankton sampling began at 0615 h 23 August and was completed at 0815 h 24 August. RV CORELLA then steamed to Filey Bay to rig the stern ramp for trawling. Sampling with the young gadoid trawl in the same area as the vertical distribution samples had been taken began at 1230 h 24 August and ended at 1000 h 25 August when five hauls had been completed. During trawling at 1400 h 24 August, a very dense patch of 'red tide' organisms was observed $2\frac{1}{2}$ mls NNE of Scarborough,

colouring the sea surface a distinct but patchy red. The complete phytoplankton sampling routine was performed on surface water samples from within the red patch. An attempt to relocate the patch on the following day met with only limited success. The distinct red colour had disappeared, to be replaced by a cloudy brown colour which was difficult to discern in the dense fog patches encountered. Vertical profiles for temperature and salinity, requested by Mr Wyatt, were taken inside and outside the patch as based on fluorometer readings. Sampling was complete by 1600 h 25 August when RV CORELLA set course for Lowestoft, stopping on the way at 1130 h 25 August, 11 mls off the north Norfolk coast to take the routine plankton sample for Dr Dodge.

RV CORELLA docked at Lowestoft at 0845 h 26 August.

RESULTS

All the aims listed except no. 10 were achieved. Fish were not obtained in the required areas for metals analysis.

The survey grid (Fig. 1) consisted of 127 stations of which 94 were 30" TTN sampling stations. The two square metre Lowestoft frame trawl was used on 52 of the stations and on 44 stations the 2 metre neuston net was used. A further 3 hauls were made with the neuston net during the 7 hauls of the vertical distribution of plankton series.

Preliminary examination of the plankton samples shows large numbers of sprat and ammodytes larvae distributed over a wide area of the survey. Mackerel larvae were abundant at many inshore stations and together with horse mackerel, further offshore, featured as young fish stages in the frame trawl and neuston net hauls. The only flatfish larvae observed were those of the dab, scaldfish and lemon sole. Metamorphosing dab larvae were found both inshore and offshore with the highest numbers of about 20 per sample, some 70 mls off the coast in 85 metres at a position 55°07' N 00°45' E.

Catches in the 2 sq metre Lowestoft frame trawl were low over all the grid and consisted mainly of a few small whiting, horse mackerel, and sprat larvae on the meshes.

One of the most exciting results to come to light during the cruise came from samples taken with the 2 m ring net rigged with buffs, and used to sample both the neuston layer and down to 1 metre below the surface. 74 lobster larvae in all stages up to 2 cm long 'lobsterlings' were taken between Spurn Point and Berwick Bay, mainly within 6 mls of the coast. Highest numbers for 15 minute tow at 2 knots were 8 larvae just north of Spurn Point, 10 larvae in the mouth of the River Tees and 6 in the vicinity of the Farne Islands (Fig. 2).

One has to look back in the published data to 1913 to find the last records of lobster larvae around the coasts of Great Britain. These results will begin to provide F.S.M.4 with much needed information on the temporal and spatial distribution of these larvae on the north east coast.

The 2 metre neuston net samples also produced many turbot larvae in varying stages of development. The highest number of 50 per haul occurred some 30 mls off the coast at the extreme northern end of the survey grid (Fig. 3).

The jellyfish Cyanea capillata, Cyanea lamarckii and Aurelia aurita occurred in large numbers in the neuston net and were also a problem from time to time in the frame net, 30" TTN, and young gadoid trawl.

The environmental monitoring system worked continuously throughout the cruise, but problems were experienced with the pH electrodes and with the calibration of the dissolved oxygen and turbidity meters.

Temperature patterns in the area are still notable for the large differences between surface and bottom temperatures, and the steep thermoclines in the area north of Flamboro' Head (Figs. 4, 5). The new digital display of temperature from the 30" TTN depth profile, worked well, and enabled the thermoclines to be recorded accurately.

The solarimeter and deck quantum cell were run continuously throughout the cruise. The deck quantum cell is now linked to an integrator which will allow a measure of the total incident energy over the survey grid to be obtained.

Four underwater spectroradiometer stations were worked. During the second station the selenium cells used on previous cruises were replaced by quantum cells which have a better spectral response. This means that all light measurements are now done by instruments having the same response within the photosynthetically active radiation (PAR) ranges.

Water bottle casts were made at the position of the Tyne buoy 55°04.45'N 01°15.7'W and 100 seabed drifters released. A further two water bottle casts were made during 'red tide' sampling off Scarborough.

700 more seabed drifters were released in batches of 50 at standard stations on the survey grid, including one set in the Humber sludge dumping area.

Live Calanus was collected for Dr Thompson and the routine plankton sample taken for Dr Dodge.

J H Nichols
2 September 1976

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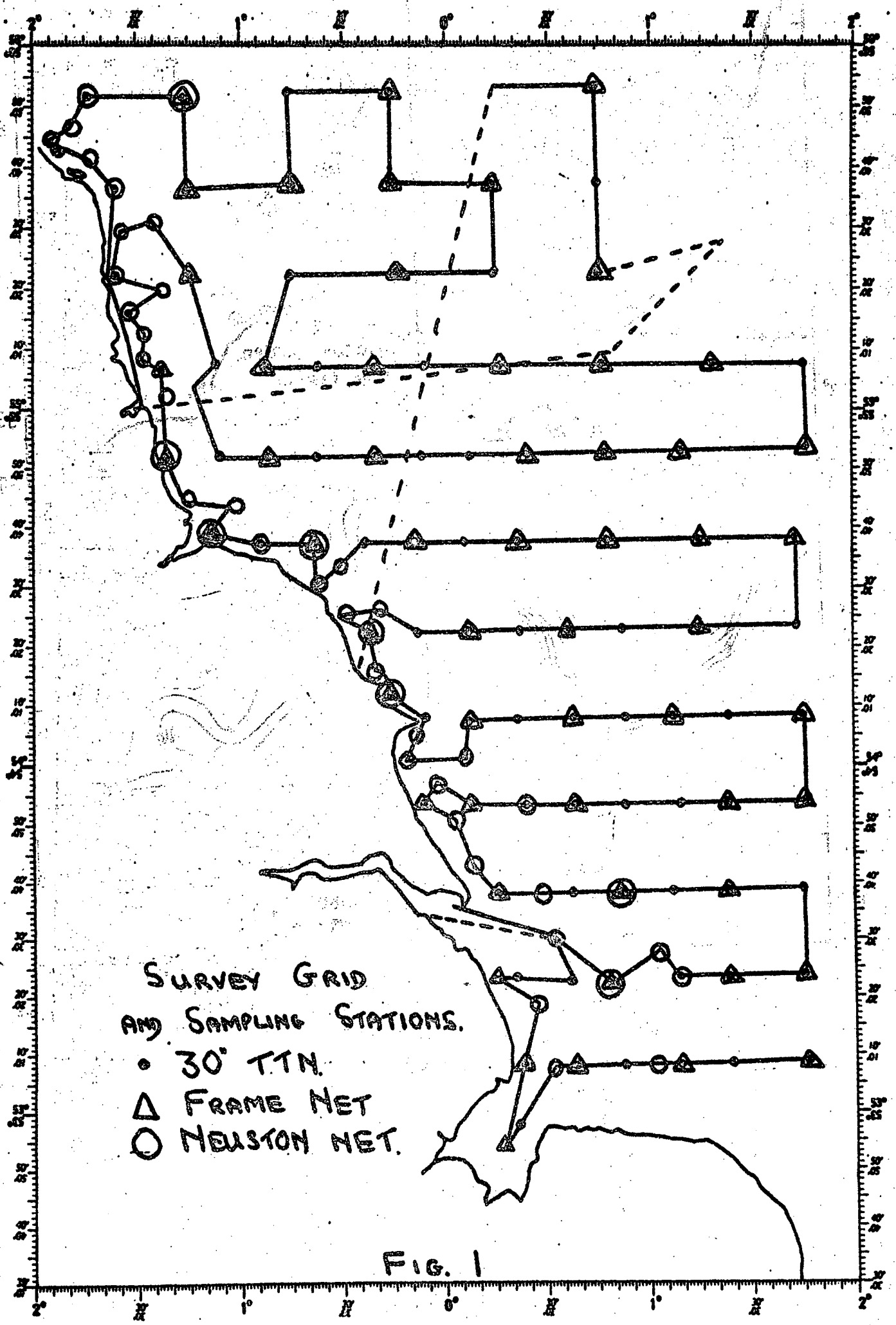
SURVEY GRID
AND SAMPLING STATIONS.
• 30" T.T.N.
△ FRAME NET
○ NEUSTON NET.

FIG. 1

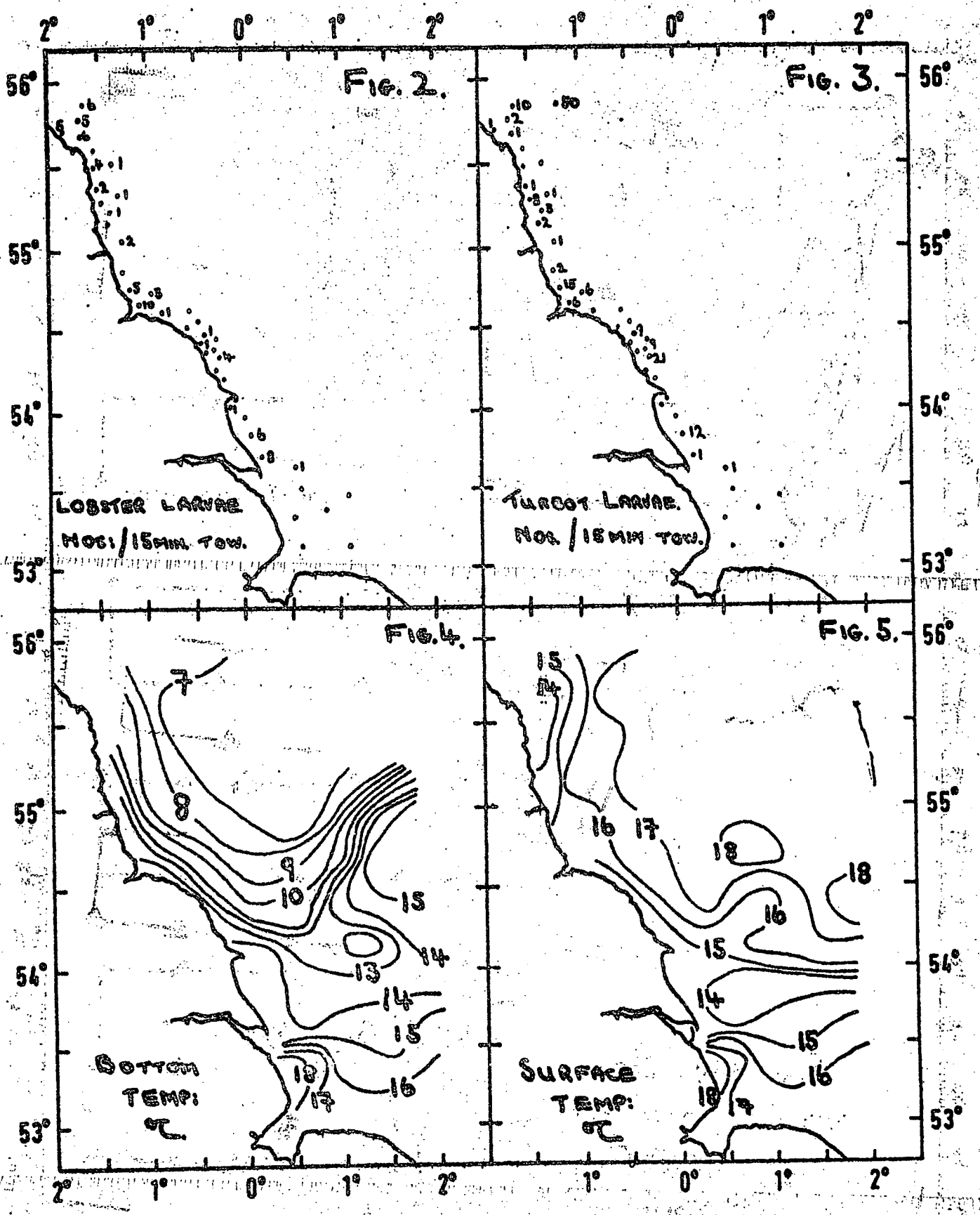
FIG. 2.
LOBSTER LARVAE
NOS. / 15MIN. TOW.
FIG. 3.
TURBOT LARVAE.
NOS. / 15 MIN TOW.
FIG. 4.
BOTTOM
TEMP:
°C.
FIG. 5.
SURFACE
TEMP:
°C
2°
1°
0°
1°
2°
56°
55°
54°
53°