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Preliminary results of ICNAF larval herring cruise, *Anton Dohrn*, 30 October - 13 November 1972 in Georges Bank and Gulf of Maine areas[1]

by

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Introduction

At the 1972 ICNAF Annual Meeting it was agreed to continue and intensify the ICNAF Joint Survey of Larval Herring in the Georges Bank - Gulf of Maine areas. This program was set up in the 1971 Annual Meeting to study the distribution, abundance and dispersal of larval herring in these areas. Results of the first Joint Survey during autumn 1971 are summarized in the Report of a Working Group (Res.Doc. 72/123).

In 1972 this program was continued by a series of cruises carried out during September through December by research vessels from USSR, USA, Poland and Fed. Rep. Germany.

In the present paper preliminary results from sampling aboard the German research vessel *Anton Dohrn* during the period 30 October - 13 November 1972 are given.

Material and Methods

Sampling was carried out over a standard station grid which differs slightly from that used in 1971. The proposed cruise track was followed with some few exceptions on Georges Bank and in the area south west off Nova Scotia due to unfortunate weather conditions (Fig. 1 and 2).

At each station a single oblique tow was made using paired 61 cm Bongo nets with mesh sizes 0.333 mm and 0.505 mm, respectively. With the ship travelling at about 3.5 knots the Bongo gear was deployed at about 50 m/min (speed of warp going out) and retrieved at about 10 m/min. Maximum depth of gear, checked after each tow by time-depth recorded reading, was about 100 m or, in case of shallower water, about 10 m above the bottom. The volume of water filtered during tow was calculated from flow meter readings. On most stations additional sampling with a neuston net was carried out. Samples were preserved in 4% buffered formalin.

Temperature values were obtained from surface to bottom by BT (114) and STD (79) measurements at 120 stations. Additionally, 13 hydrographic casts were carried out. Salinity values were obtained by STD and hydrographic series also.

For preliminary analysis only plankton samples from bongo nets of 0.505 mm mesh sizes were examined. Under a dissecting microscope all herring larvae were removed and separated into three size categories (<10 mm, 10-15 mm, >15 mm), based on measurements of total length to mm below. The numbers of larvae under 10 m^2 of sea surface was then calculated for the sampled depth range, separately for these three size categories.

Results

Distribution of larval herring

The calculated numbers of larval herring under 10 m^2 sea surface are given in Fig. 3-6. In general, the distribution of herring larvae during first half of November was roughly the same in 1972 as in the previous year, indicating the area southwest off Nova Scotia, the Georges Bank, and the Nantucket Shoals area as distinct spawning grounds.

[1] Revision of Sp. Mtg.Res.Doc. 73/19 presented to Special Commission Meeting, FAO, Rome, January 1973.

Off Nova Scotia, however, very young larvae were encountered only on the two most eastern stations and in much lower numbers than in 1971, whereas maximum number of larger larvae (>15 mm) was one order of magnitude higher this time.

On Georges Bank the highest numbers of small larvae (<10 mm) were again found on the northern edge. The more southerly site of peak concentrations of larger larvae correspond with the drift of larvae in a clockwise gyre as mentioned in the Report of the Working Group (Res.Doc. 72/123). However, the total area of larval distribution on Georges Bank was apparently smaller this time, extending only from latitude 40° to 42°N, whereas in 1971 the distribution extended about 30 miles further to the north and south. Moreover, the maximum number of 141 larvae per 10 m^2 was one order of magnitude lower compared with the same period in 1971 (about 1,400 larvae/10 m^2).

In the area of Nantucket Shoals, on the other hand, the distribution of larvae was very much the same in both years during the period considered. However, the size of larvae caught during this last cruise was generally smaller (mainly <10 mm) than in 1971 (mainly 10-15 mm), The maximum number of about 1,400 larvae per 10 m^2 was about half that in the previous year.

Hydrographic situation

Figures 7 to 13 show the hydrographic conditions at selected levels as well as the salinity distribution in the surface and near bottom layer. As compared to the conditions observed by *FRV Walther Herwig* in the same area and at the same time last year (see ICNAF Res.Doc. 72/44, Serial No. 2825, p. 12-20 by W. Lenz), we can say that in the surface layer we find a decrease of approximately 1.5°C on the Georges Bank and in the northern part, whereas at the southern slope of the bank more Gulf Stream water occurs as compared to 1971.

In the near-bottom layer we have also a decrease of approximately 1.5°C and in the northern part of the area in question - south of Nova Scotia - we have a greater influence of colder water than in 1971, up to 3.5°C.

The horizontal maps show nothing much striking at the levels of 10.30 m and 50 M depth. A comparison with the investigations carried out in 1971 is impossible yet because no maps have been drawn for these levels.

Discussion

The Joint Survey of Larval Herring in the Georges Bank - Gulf of Maine areas has been carried out for the second time now. All data collected by the various participants have to be pooled before meaningful comparisons can be made. However, the comparatively low numbers of larval herring on Georges Bank during last November indicate already a low spawning in that area in 1972, as the time period of this cruise was situated somewhere in the middle of the season, so that it is unlikely that the results have been effected very much by possible shifts in the time periods of hatching. This, on the other hand, was apparently the case in the area of Nantucket Shoals, where results from 1971 indicated maximum hatching in that area during the second half of October, as considerable numbers of larvae were detected first in early November, but most of them had already a size of 10-15 mm. The much higher numbers of small larvae (<10 mm) but somewhat lower total numbers during the same period in 1972 indicate a later time of maximum hatching in this year.

We anticipate that quantitative estimates which may be used as a measure for larval production and the information from hydrographical data will be considered in a comprehensive paper based on the pooled data.

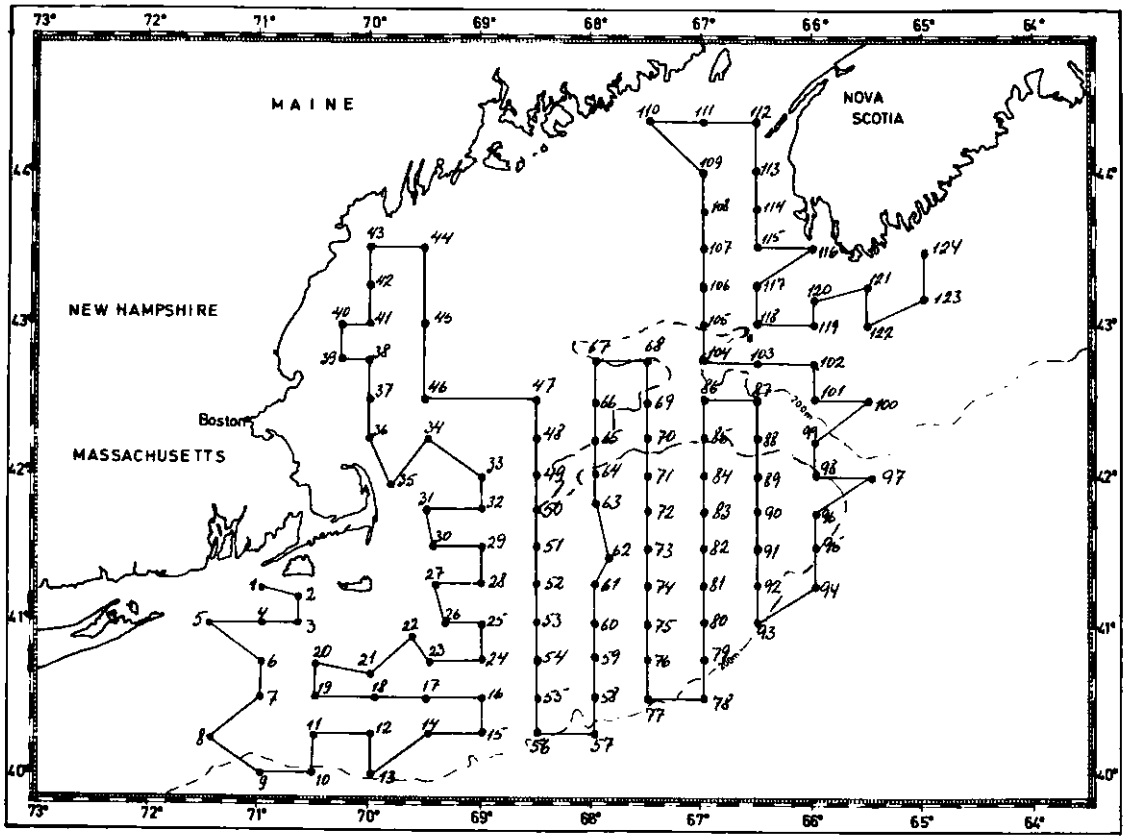

Fig. 1. Standard cruise track for ICNAF Larval Herring Survey, 1972.

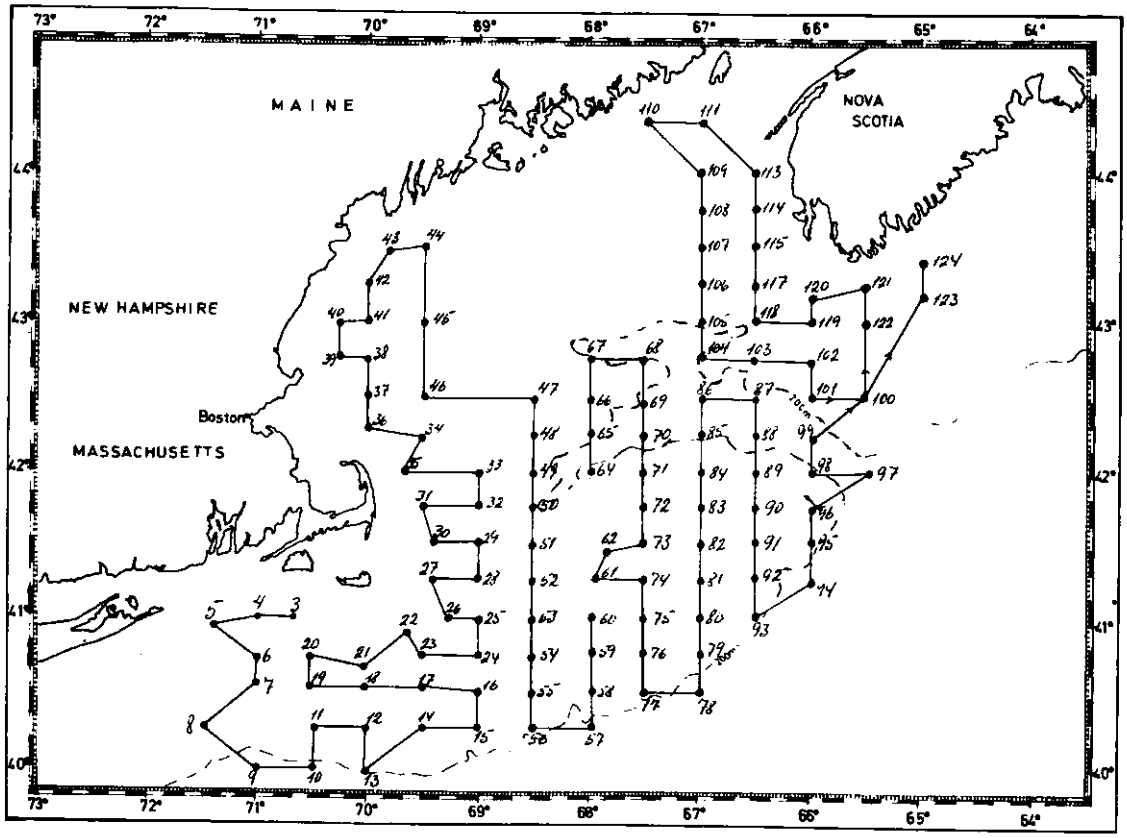

Fig. 2. Cruise track of *RV Anton Dohrn*, 31 October - 12 November 1972.

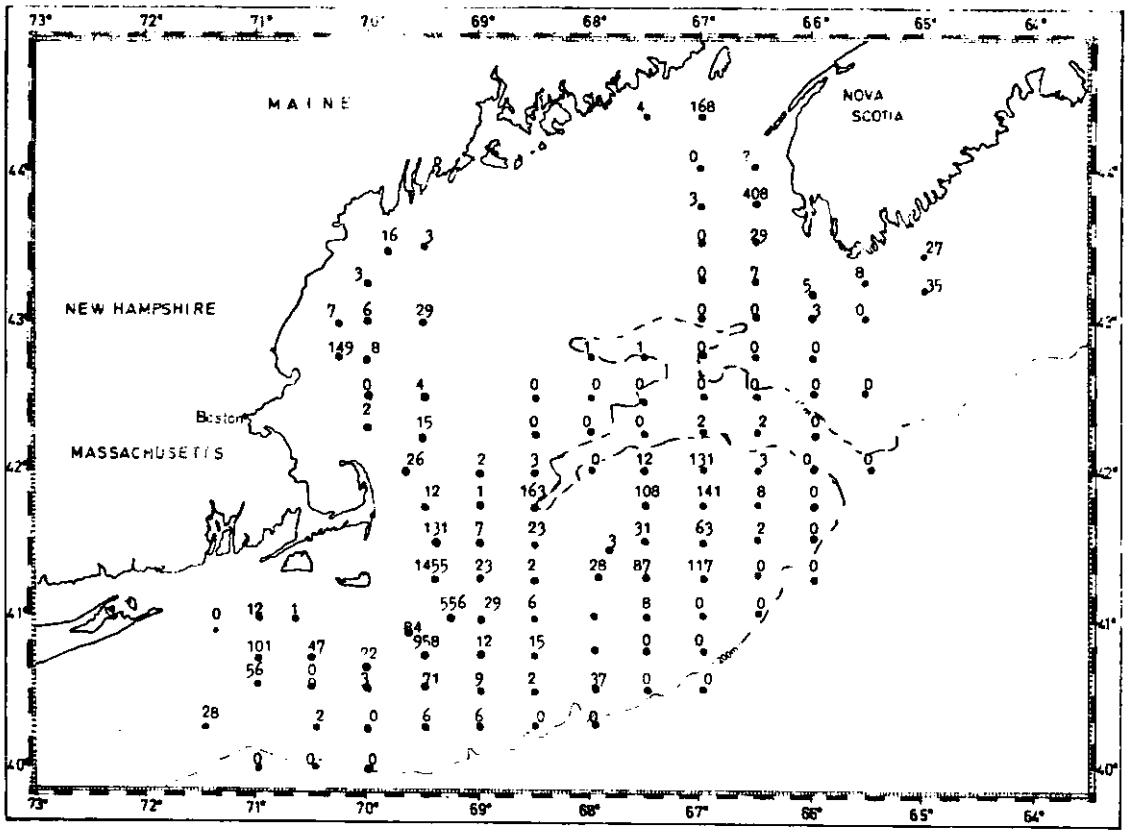

Fig. 3. Total number of larval herring per 10 m^2, *RV Anton Dohrn*, 31 October - 12 November 1972.

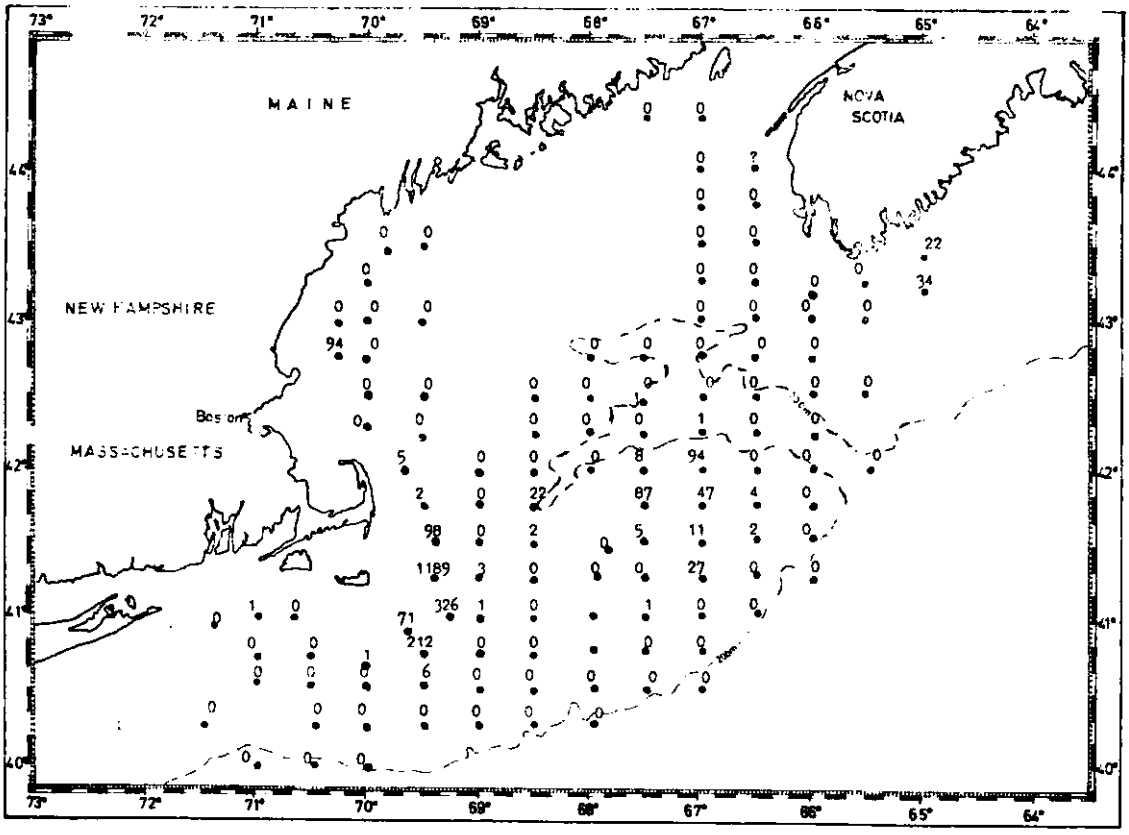

Fig. 4. Number of larval herring (<10 mm) per 10 m^2, *RV Anton Dohrn*, 31 October - 12 November 1972.

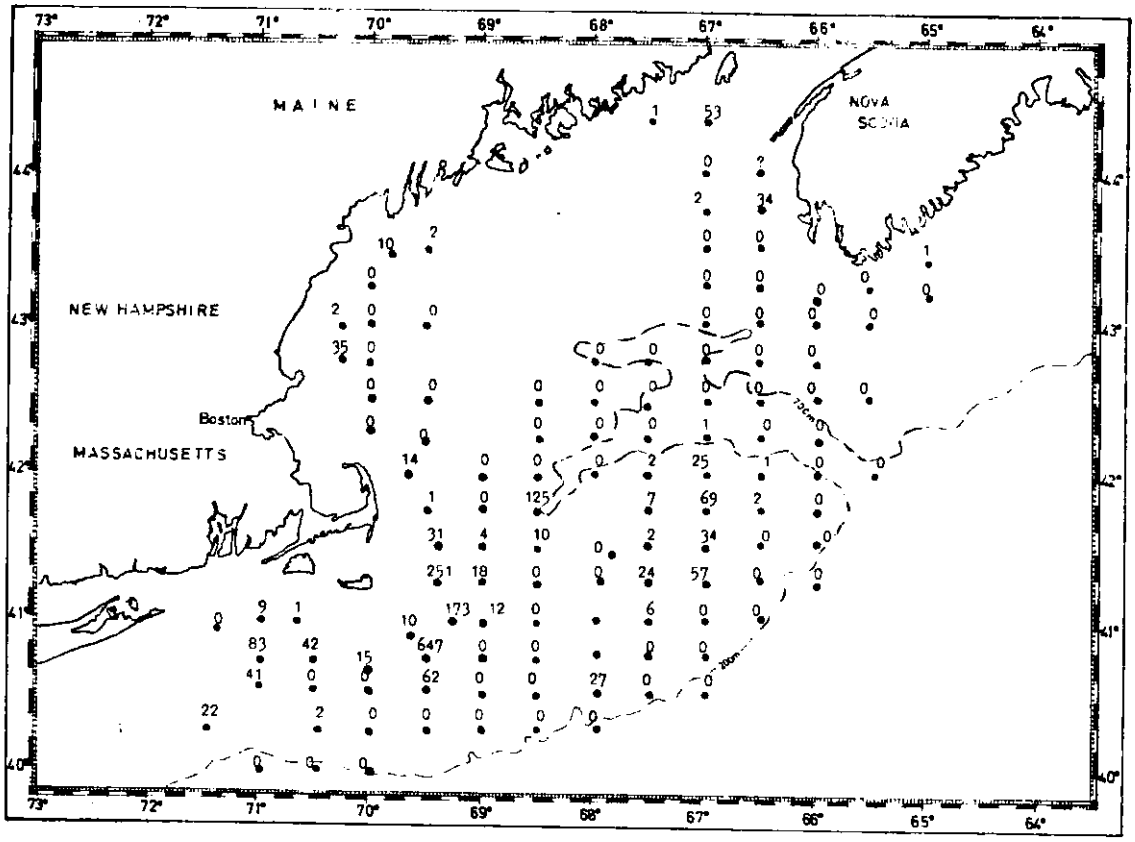

Fig. 5. Number of larval herring (10-15 mm) per 10 m^2, *RV Anton Dohrn*, 31 October - 12 November 1972.

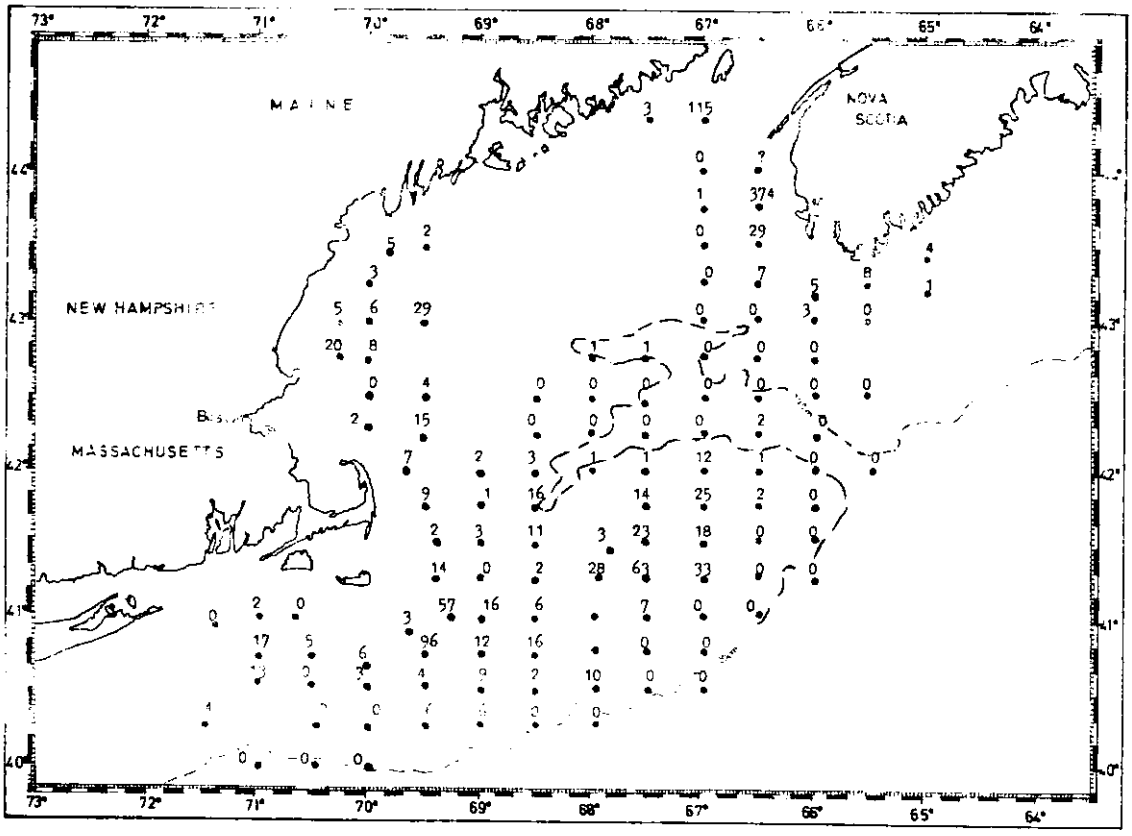

Fig. 6. Number of larval herring (>15 mm) per 10 m^2, *RV Anton Dohrn*, 31 October - 12 November 1972.

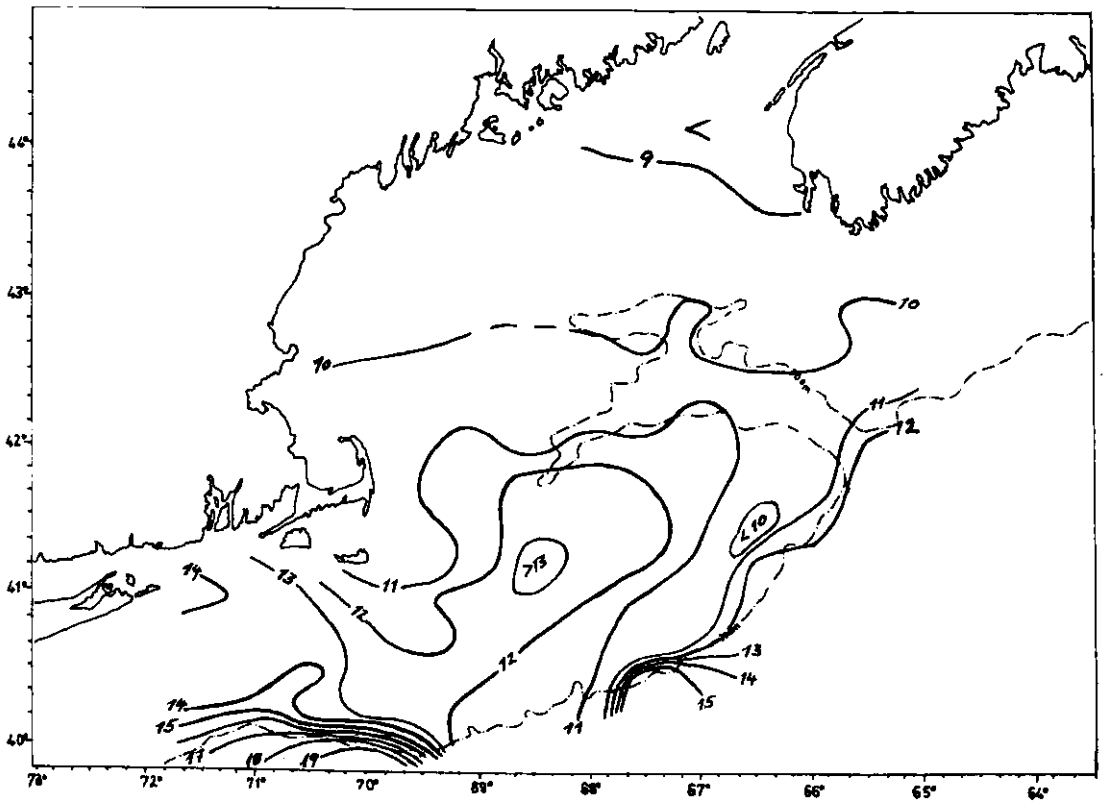

Fig. 7. Temperature distribution (°C) at the surface (0 m), *RV Anton Dohrn*, 31 October - 12 November 1972.

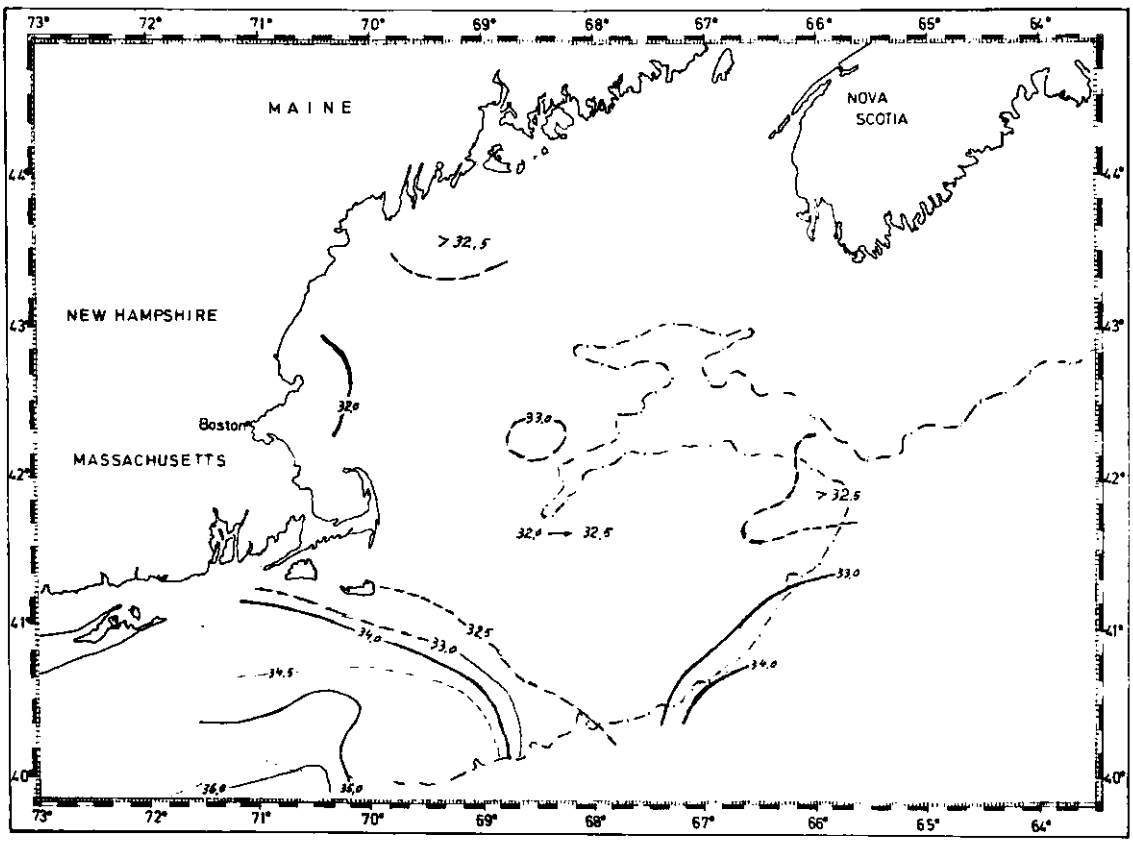

Fig. 8. Salinity distribution (‰) at the surface (0 m), *RV Anton Dohrn*, 31 October - 12 November 1972.

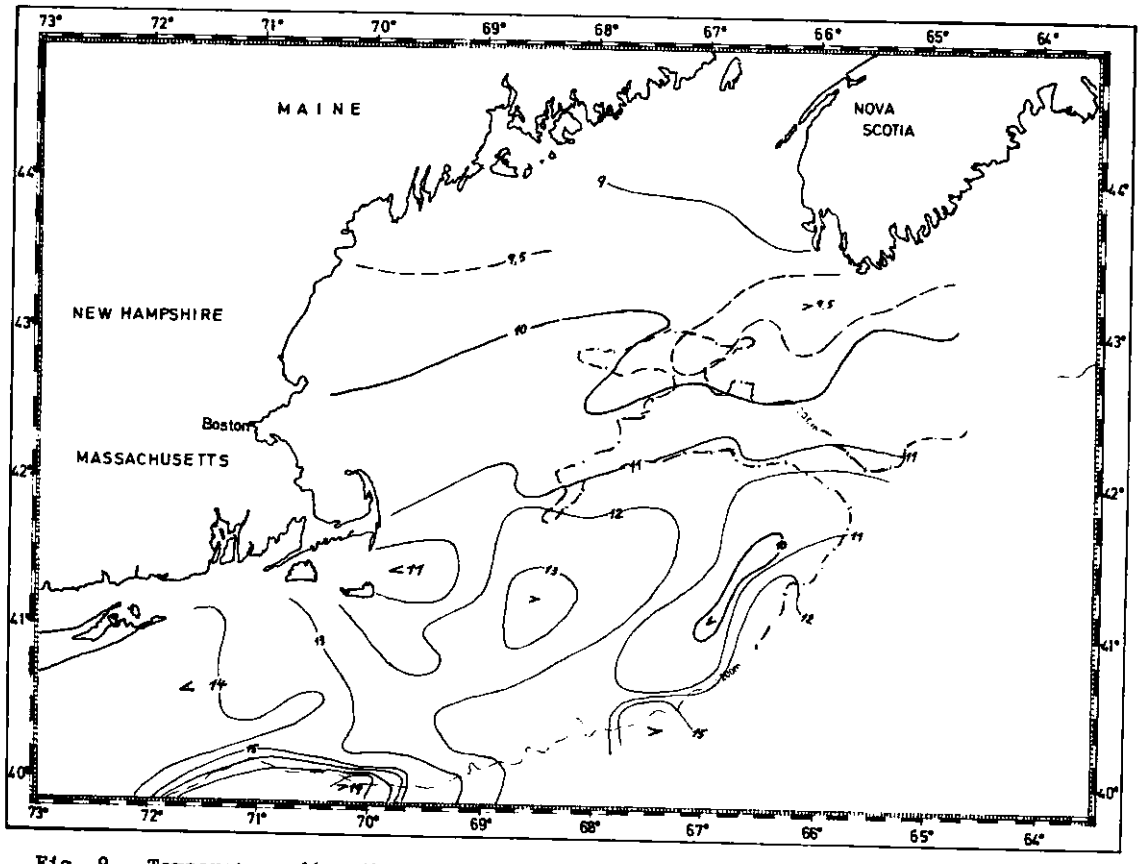

Fig. 9. Temperature distribution (°C) at 10 m, *RV Anton Dohrn*, 31 October - 12 November 1972.

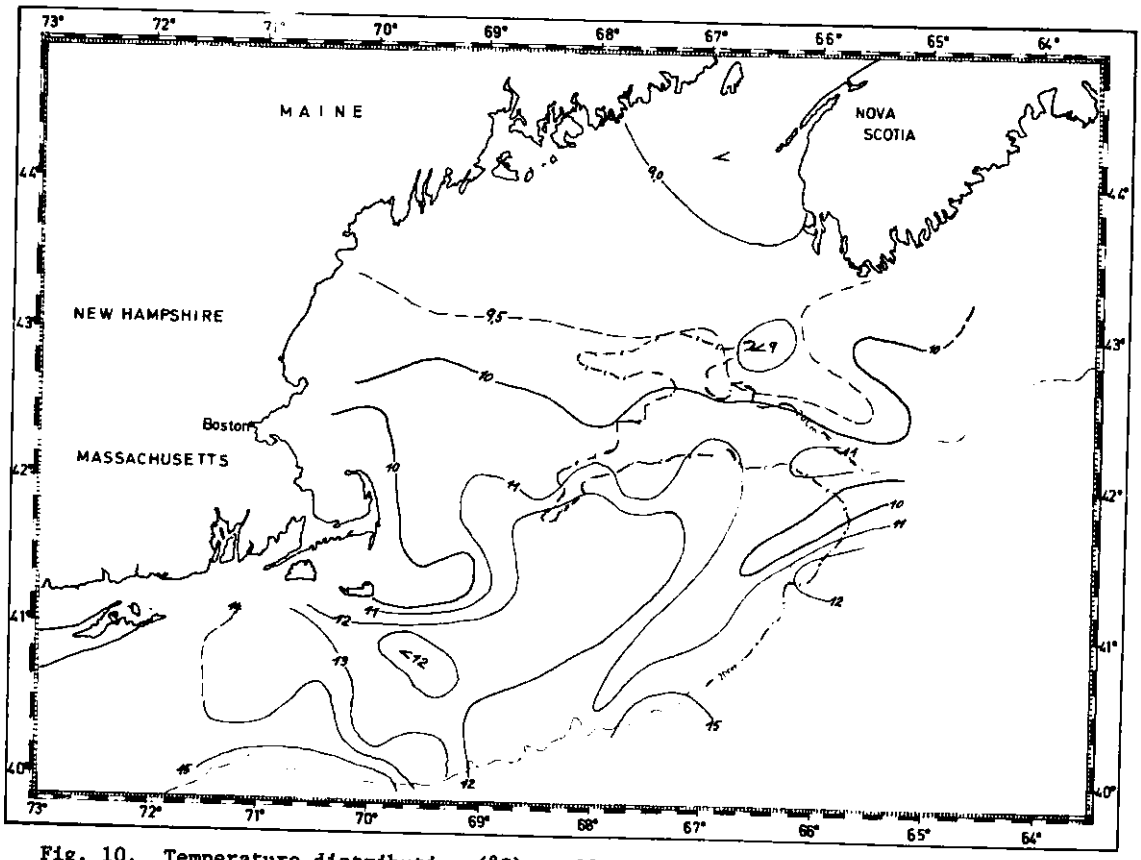

Fig. 10. Temperature distribution (°C) at 30 m, *RV Anton Dohrn*, 31 October - 12 November 1972.

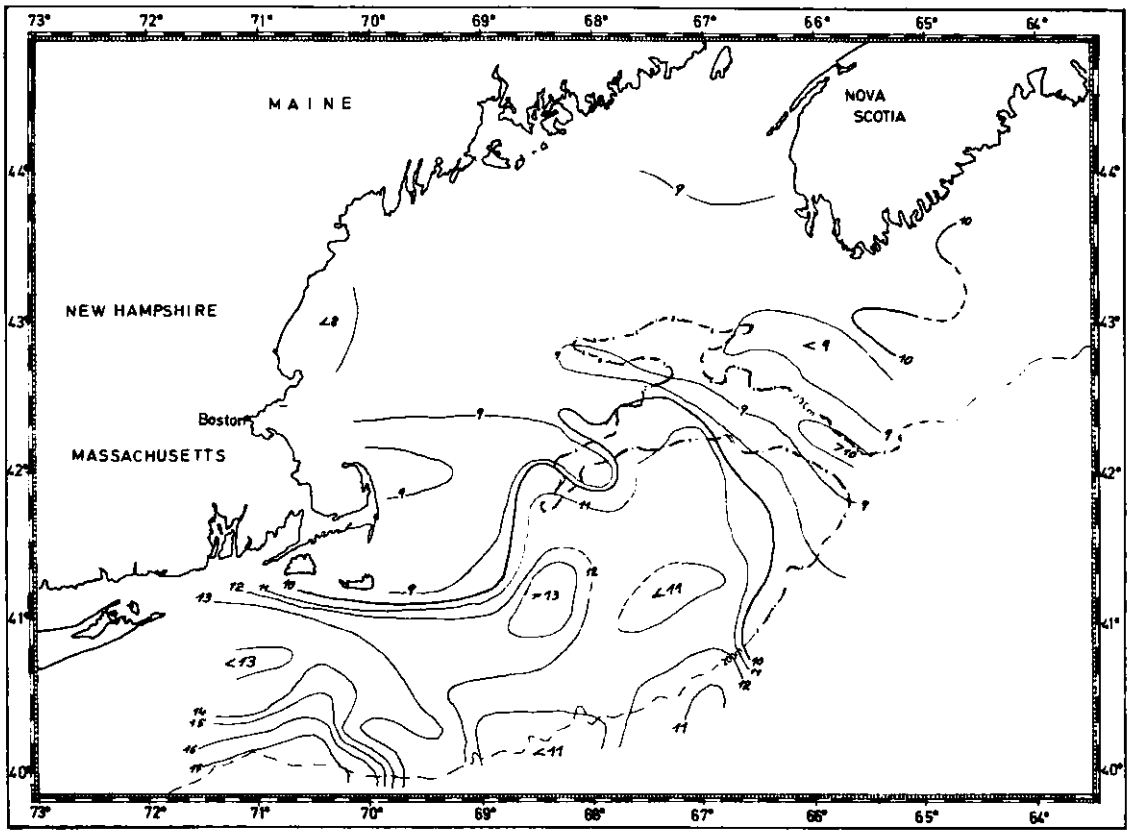

Fig. 11. Temperature distribution (°C) at 50 m, *RV Anton Dohrn*, 31 October - 12 November 1972.

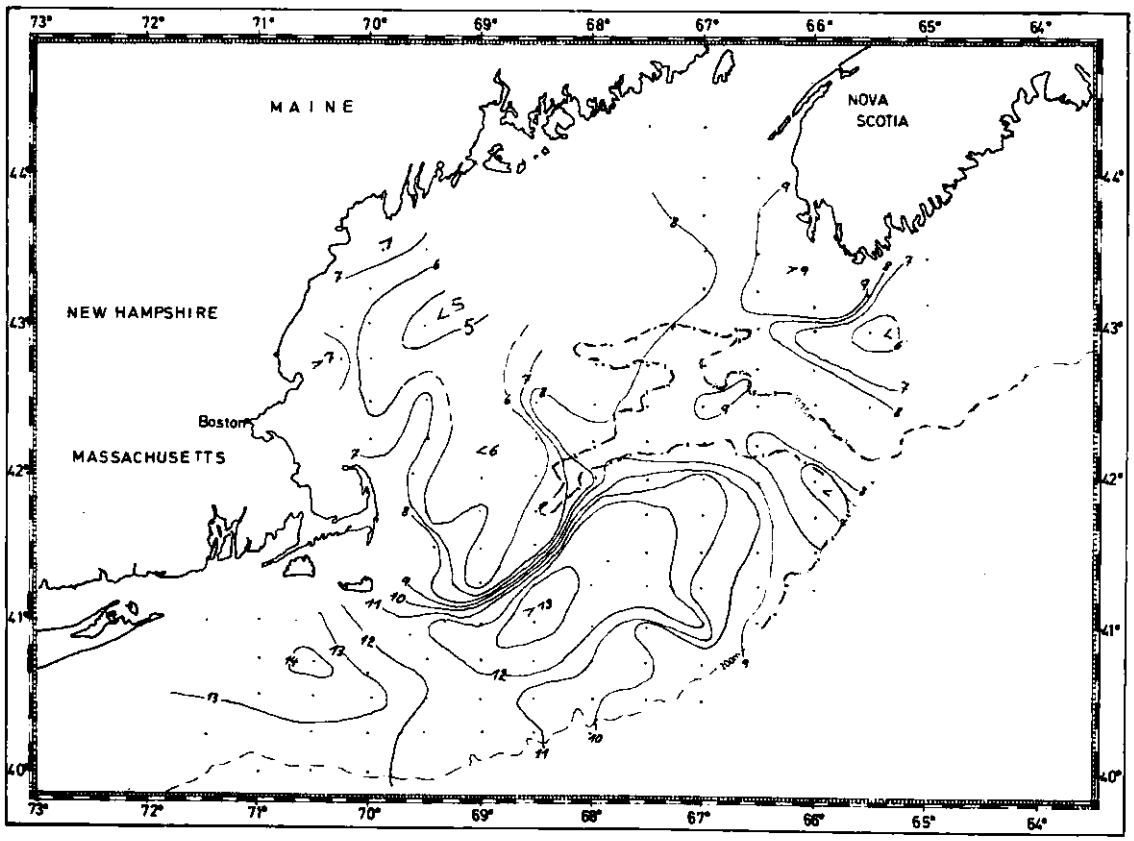

Fig. 12. Temperature distribution (°C) near bottom, *RV Anton Dohrn*, 31 October - 12 November 1972.

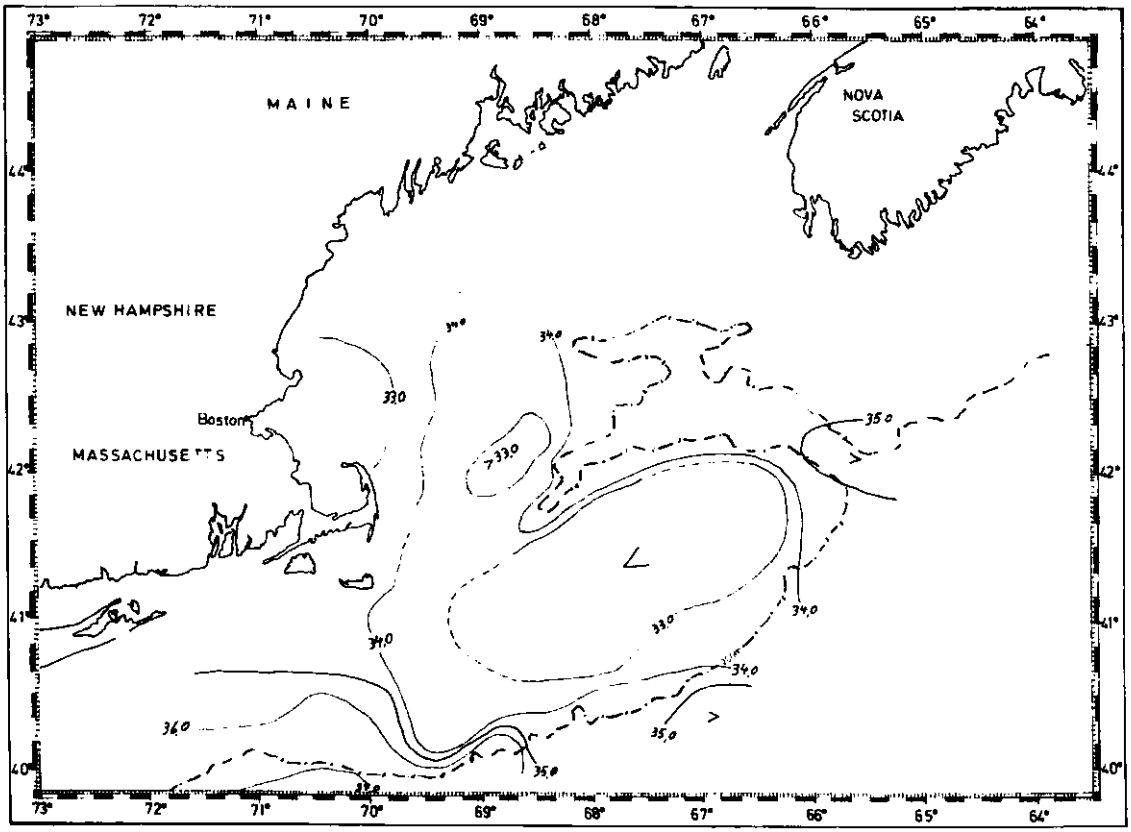

Fig. 13. Salinity distribution (‰) near bottom, *RV Anton Dohrn*, 31 October - 12 November 1972.