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SOME RESULTS OF OCEANIC INVESTIGATIONS CARRIED OUT ON THE NEW SCOTLAND SHELF

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In 1960-1961, the Baltic Sea Fishery and Oceanography Research Institute carried out some searches on the New Scotland Shelf. The searches embraced the area from the Southern coast of the Newfoundland Island to the 37th parallel along the shelf.

Along these tacks, each 20 miles an observation with a bathytermograph was made; each 40 miles, in addition to a temperature analysis, water samples were taken for salinity analysis and plankton was landed with a small Jeddy net of gauze 38.

Table I shows the number of stations made.

Table I

Investigation period	t^o and S o/oo	t^oBT	PL	PHPL
May - June, 1960	115	110	110	49
Dec, 1960 - March, 1961	101	262	84	12
June-August, 1961	34	123	39	7

Legend: t^o and S o/oo - number of stations where temperature and salinity were analysed.
t^oBT - bathytermograph stations
PL - plankton stations
PHPL-phytoplankton stations

The hydrologic regime of the New Scotland Shelf waters is known to be influenced by a cold coastal current and a warm current of Gulf Stream which passes farther offshore, tidal phenomena and local metereological conditions. The bottom configuration is characterized of numerous hills, grounds, deeps, and deep canals all of which make water changes very complex. This causes many difficulties when analysing the hydrologic conditions.

When performing a search it is necessary as a rule to have a clear idea of main water currents as the areas of interactions of different waters are best for fish swarming.

The authors of this paper saw their task in detecting the spots where cold water intrudes warm water and as well as the spots where warm water comes up to the shelf. For this purpose, at each station the minimum and maximum values of temperature were chosen which allowed to judge about vertical distribution of water masses. Apart from this, the charts of horizontal temperature distribution have been plotted to show distribution of warm and cold waters in the area of the shelf.

The comparison of observations made in spring and summer of 1960 and 1961 revealed slight changes of water temperature at the same points or near them. This allowed to combine the two of the above observations.

Fig. 1 presents a picture of distribution of warm and cold waters according to the observations made in spring and summer. Cold waters drifting along the coast of the New Scotland turn counter clockwise in the Bay of Man and go along the U.S. coast. Throughout the length of the shelf, the currents branch from it in the direction of the continental slope. These currents get mixed with warm waters. The average depth of the main water body in the basic current is at the level of 75 m. When it intrudes into warm water it rises up to 30-50 m. The coldest section is the north-east part of the region (Grin and St.Pier Grounds). Here, waters of temperature below zero can be met with at the depth of 75-100 m. A small branch of cold waters comes to the eastern slope of the Banckero Ground.

Warm waters come up to the shelf at the depth of 100-200 m and fill in the deep canals between the grounds. Some influence of warm waters can be traced on the surface in the western part of the Emerald Ground and as far as the Middle Ground.

Both cold and warm waters have little biomass which is of a poor quality.Thus, above the grounds of Misen and Banckero, where biomasses contain less than 0,01 ml/m^3, typical cold water forms, such as Calanus hyperboreus, Metridia longa can be met with. Above the grounds of Grin and St. Pier but a few forms are found: Calanus finmarchicus, Calanus hyperboreus, Mitridia longa, oithona similis, Conchoecia . The biomass here is rather good - 0,1-0,2 ml/m^3 but it is formed thanks to peridenean forms in the heated surface layer. Warm water kinds of plankton Metridia lucens, Acartin clausi, Salpidae, Tomopteris helgolaudicus observed in the western part of the Emerald Ground and on the Middle Ground testify to the fact that this region is influenced by the Gulf Stream.

1) In the region of cold-warm water mixture largest biomass of plankton are found

2) Both cold water forms such as Metridia longa, Calanus hyperboreus, Limacina helicina and warm water forms such as Metridia lucens, Salpasp, Limacina retroversa are found here.

The obtained chart of the location of warm and cold currents (spring and summer) correlates with the chart of the biomasses of plankton. The regions of good biomasses can be found in the frontal zones and copy the configuration of cold currents south of the island of Sable and in the region of the Georges Ground (Fig. 2)

In winter time, the cold water currents are located almost similarly (Fig. 3). They protrude somewhat farther into the Ocean and partially alter their direction. However, the places where they go off the shelf are the same in spring and summer. This allowed to show the location of the maximum gradients of temperature as being more or less common for all the seasons (Fig. 1 and 3).

As the regions of much plankton and the located concentrations of herrings coincide with the boundaries of the maximum gradients, the lines plotted in Fig.1 and 3 can be taken as a clue for fish search. The search tacks should be located across the zones of the maximum gradients. It is important that these charts can also help to search the bottom fish, the difference being that in this case one is to be guided by the boundaries of the warm water currents.

Fig. 4 shows the currents of warm waters coming up to the shelf and the bottom fisheries in 1958-60. One can see that the fisheries are in the places where warm water comes up. No data were obtained on bottom fisheries on the southern slopes of the Lekhav and Emerald Grounds, but these regions seem to be good for swarming too.

Thus, according to the data of the 1960-61 expeditions cold and warm water plankton is characterized by little biomass and is of a poor quality.

The zone of the maximum temperature gradient is best from the point of view of food plankton.

This zone can be taken as a clue for fish search.

Captions

Fig. 1 Chart of location of warm and cold waters according to observations made during spring and summer.

Fig. 2 Distribution of plankton quantity (summer 1960).

Fig. 3 Chart of location of warm and cold waters according to observations in summer.

Fig. 4 Chart of location of warm waters and regions of bottom fisheries.

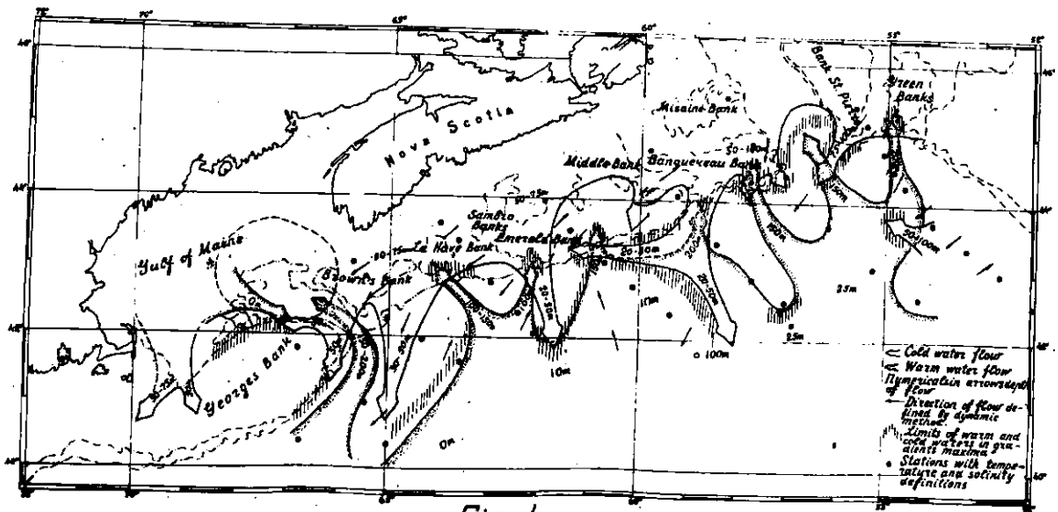

Fig. 1

Fig.I Chart of location of warm and cold waters according to observations made during spring and summer.

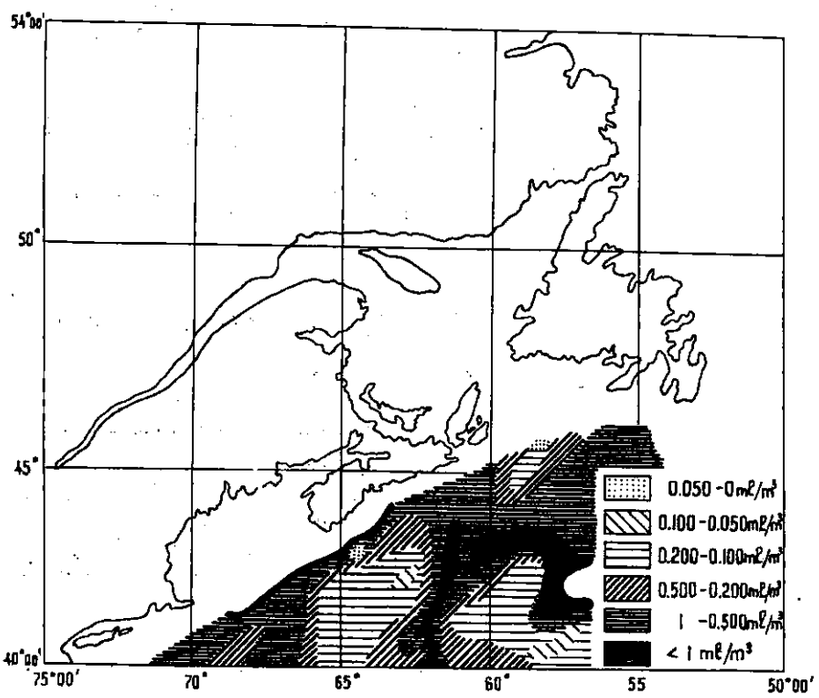

Fig. 2

Fig. 2 Distribution of plankton quantity (summer 1960)

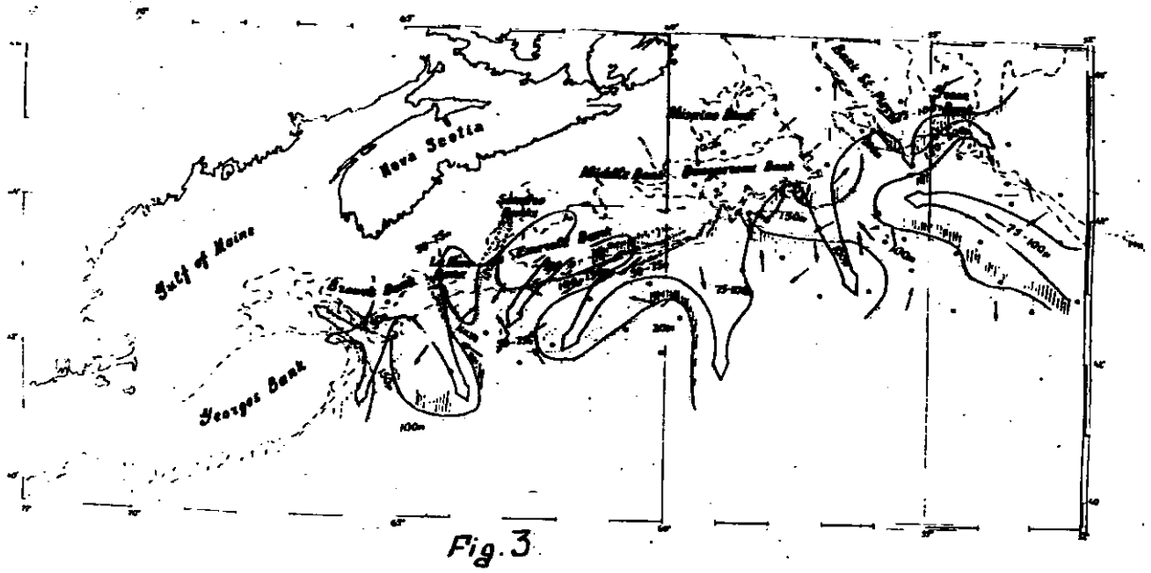

Fig. 3 Chart of location of warm and cold waters according to observations in summer.

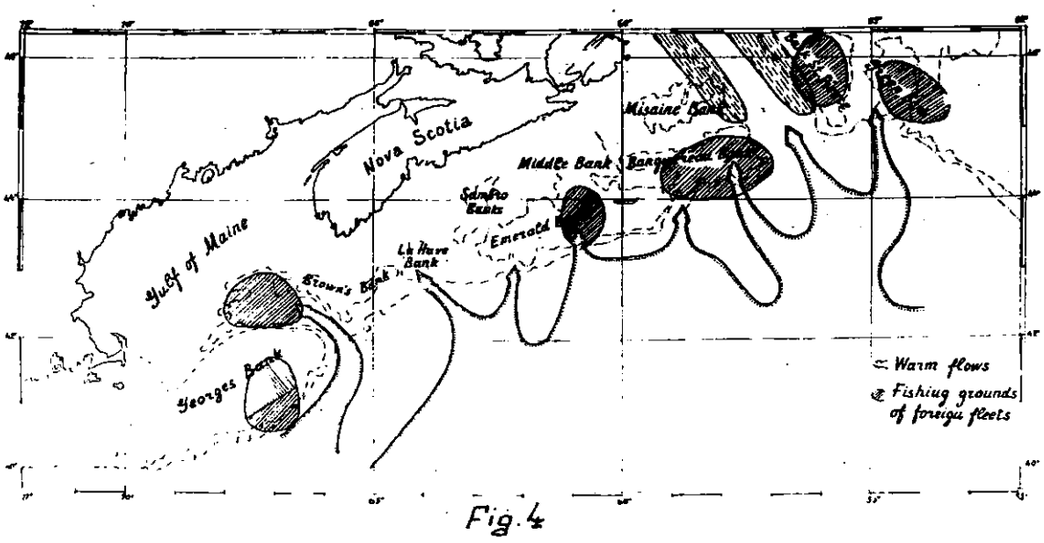

Fig. 4 Chart of location of warm waters and regions of bottom fisheries.