

ANNUAL MEETING - JUNE 1969HYDROGRAPHIC CONDITIONS IN THE  
LABRADOR AND NEWFOUNDLAND AREAS,  
1968.

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In 1968, oceanological observations were conducted during two sea trips in the 1, 2 and 3 Subareas of ICNAF:

1. The counting of the young fish was conducted in the areas of the North Newfoundland, Grand, Flemish Cap and Saint Pierre Banks from April 2 to June 25 as well as standard hydrographic sections (I A' - 7 A' - Fig. 1) with complex of observations (t, S ‰, O<sub>2</sub>, PO<sub>4</sub> - P, NO<sub>3</sub> - N) were made during the tenth cruise of the R/V "Rossia".

2. During the eighth cruise of scouting BMRT "Neptun", some temperature measurements were made at the section 8 A through the Hamilton Inlet Bank during the periods from October 31 to November 2 and from 11 to 13 December, whereas the trawl stations off Labrador - from 26 December to 8 January, 1968/69.

In April - May 1968, the water temperature from the surface up to the bottom was 1 - 2° higher than in 1961, 1962, 1966 and 1967 at the Grand and Flemish Cap Banks, but from 0.6° to 1.0° below in the southern part of the North Newfoundland Bank

In May - June, the inflow of <sup>the</sup> Gulf Stream warm waters became more intensive at the southern and south-western areas of the continental slope of the Grand Bank, as a result the near - bottom temperature rose up to 8° - 10° at depths 100 m - 300 m in comparison with 6° - 7° in the years with normal temperature conditions. The average temperature in the layer 0-200 m on the South-western slope of Grand Bank was in May the same as in 1963 (1.94° - 2.29° C) and 0.5 - 1.0° higher than in 1961 (in

May of the previous years we did not conduct hydrological observations on this slope).

We had data on the observation of water temperature along the section 8 A through the Hamilton Inlet Bank in August - December 1958, 1962, 1964, 1965-1968. We adjusted the data to those of the first November to make them comparable. For this purpose, all the data on temperature in layers were plotted on the graph by dates, when they were obtained (Fig. 2).

For some years, a series of continuous observations were completed during some months (1962, 1964, 1966 - 1968). As a result, average daily changes in temperature were calculated for every layer. It should be noted that these changes for the surface layer from September to November were negative due to atmospheric cooling. In the layers 50 - 200 m, 200 - 500 m and 0 - 200 m the temperature rised from September to November, as in autumn months the increase in the warm subsurface component of the Labrador Current took place (Barmakin, 1968).

Then, all the observations given for different months were adjusted to November 1 by interpolation and extrapolation (Table I).

Table I

Average temperature (°C) of the cold component of the Labrador Current at the section 8 A (area AB - Fig. I), adjusted for the first November for different years and layers.

Depth m	1958	1962	1964	1965	1966	1967	1968	Average	Anomaly, 1968
0 - 50	1.28	1.58	0.98	1.30	2.41	2.00	2.29	1.69	+0.60
50 - 200	0.59	1.34	-0.18	1.06	1.44	0.89	-0.18	0.71	-0.89
0 - 200	0.79	1.49	0.17	1.13	1.72	1.19	0.50	1.00	-0.50
200 - 500	-	1.70	0.98	-	2.47	0.95	0.31	1.28	-0.97

As seen from the Table, in November 1968 the temperature of the cold component of the Labrador Current in the layers below 50 m was 0.50° - 0.97° below the average long-term, and in the

surface layer 0-50 m -  $0.60^{\circ}$  above it. Thus, as a result of a higher intensity of the cold component of the Labrador Current, the water temperature in November was the lowest for the last four years in spite of the higher sun heating in summer, which was mentioned above.

As Table 2 shows, from the first November to the twelfth December 1968, the lowering in temperature (from  $2.29^{\circ}$  up to  $-0.10^{\circ}$  in the 0-50 m layer and from  $0.50^{\circ}$  up to  $0.18^{\circ}$  in 0-200 m) was observed in the surface layers, the section 8 A (the area AB, Fig I) due to cooling. At the same time, the temperature in the layers below 50 m rised sharply due to the inflow of the warm component to the slope: from  $0.31^{\circ}$  up to  $1.24^{\circ}$  in the layer 200-500 m and from  $0.18^{\circ}$  up to  $0.26^{\circ}$  in the layer 50-200 m. But, according to the observations at the bottom stations in the near-bottom layers of the South Labrador and North Newfoundland Bank (Fig. 3) late in December and in January 1969, the waters with the temperature below  $2^{\circ}$  spreaded 10-15 miles easterner than in the same months 1963/64 and 1966/67. Basing on the temperature in the near-bottom layers, the winter 1968/69 is believed to be similar to the winter 1964/65, that can be especially confirmed by the observations in the pre-winter period 1968 (Table I).

Preliminary data on water temperature at the section 8 A (parts B and C - Fig. I) were obtained by BRT "Volgograd", on 28 February, 1969.

Those data also confirm the conclusions on the decrease in temperature of the cold component of the Labrador Current for ~~this~~ this year.

These obseriations can be compared with those for 27 February, 1967. Table 2 shows those observations for different layers at the section 8 A, parts B and C.

Table 2

Water temperature at the section 8 - A  
(parts B and C), February 1967 and 1969

D a t a	Parts of the section and layers, m									
	B					C				
	0-50	0-200	50-200	200-500	200-500	0-200	50-200	200-500	200-500	200-500
27 February, 1967	-1.06	0.42	1.01	3.09	2.53	3.46	3.77	3.87		
28 February, 1969	-1.10	0.20	0.70	2.70	-0.80	1.30	2.00	4.00		
Difference in temperature, 1969-1967	-0.04	-0.22	-0.31	-0.39	-3.33	-2.16	-1.77	+0.13		

As seen from the Table, to the end of February 1969 in comparison with 1967 a strong cooling of surface waters (0-50 m layer) of the part C, section 8 A was observed at the same time as the decrease in temperature in the core of the cold Labrador Current (50-200 m layer).

References

I. V.V. Burmakin, 1968 Hydrological conditions in the Labrador and Newfoundland Areas in 1967, ICNAF Ann. Meet. 1968, Res Doc. N 37.

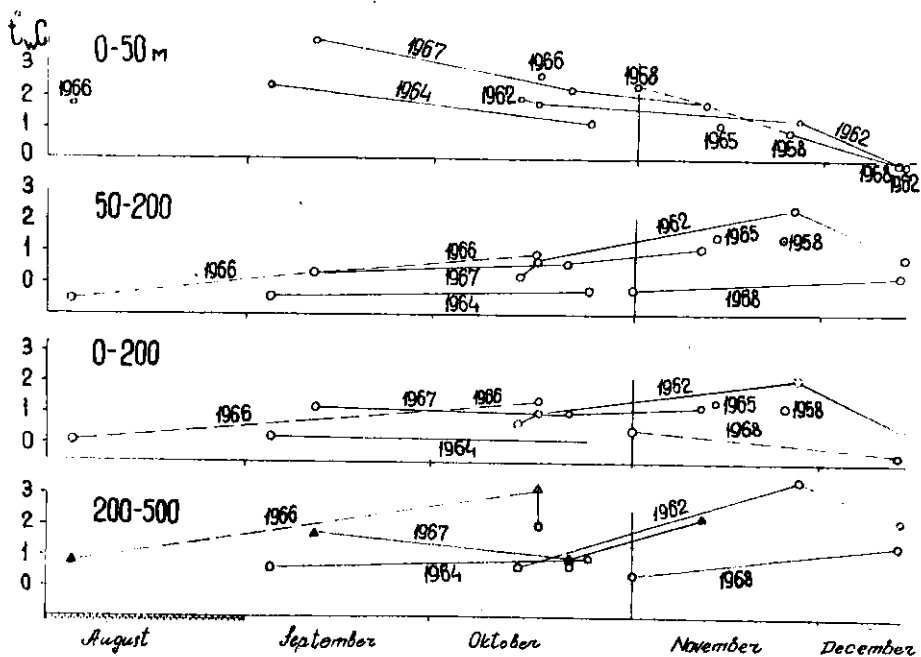


Fig. 2. Changes in water temperature from August to December 1958, 1962, 1964 and 1965-1968 in the cold component of Labrador Current (area A B) at Section 8A, across Hamilton Inlet Bank, layers 0-50, 50-200, 0-200 and 200-500 m.

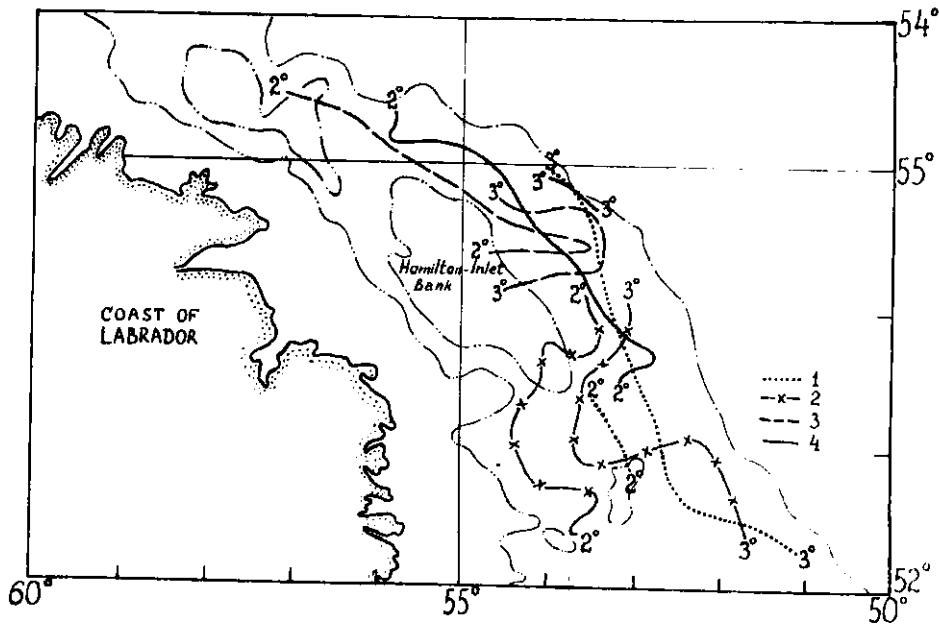


Fig. 3. Position of the 2° and 3° isotherms, December-January: 1. 1963/64; 2. 1964/65; 3. 1966/67 and 4. 1968/69

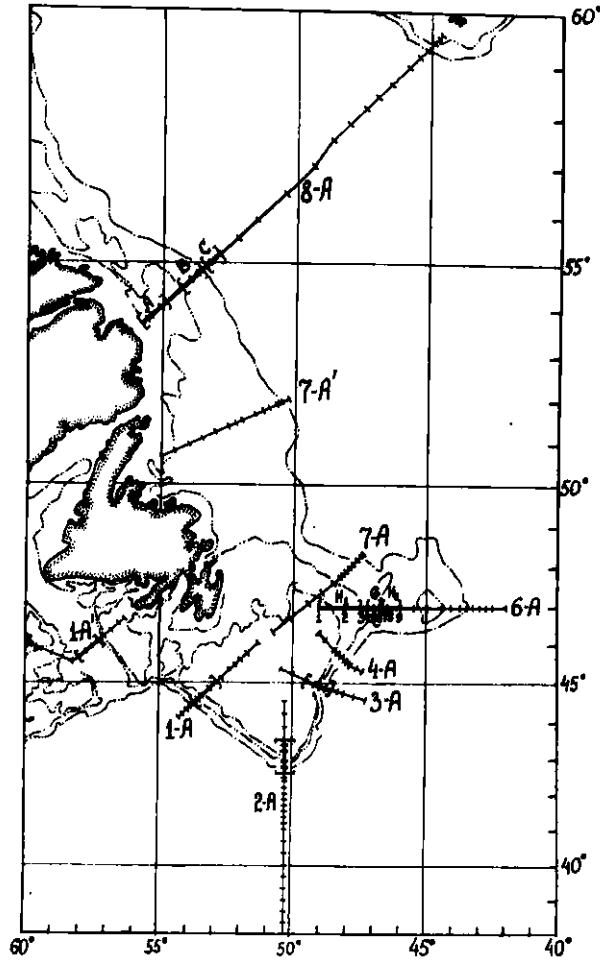


Fig. 1. Location of standard hydrological sections in the areas of the Labrador and Newfoundland.