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HYDROLOGIC INVESTIGATIONS CARRIED OUT ABOARD
THE VESSELS OF THE KALININGRAD COUNCIL FOR
PEOPLE'S ECONOMY IN 1961 IN SUB-REGIONS OF
IKNAF 2 and 3.

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In 1961 the crews of the Baltic NIRO and fishery surveyers performed 8 sections and 10 hydrologic surveys - Fig.1 shows the positions of the stations. The following are the periods of the work done:

| | |
|-------------|--------------|
| Section 6-A | April, 13-16 |
| | May, 19-21 |
| | July, 13-16 |
| Section 5-a | July, 16-19 |
| | May, 18-19 |
| | July, 17-19 |
| Section | May, 3-8 |
| Tack I | May, 14-15 |
| Tack IV | May, 24-25 |
| Tack III | April, 29-30 |

The section along the eastern slope of the Great Newfoundland Ground - July, 6-7. (II),

The section along the western slope of the Great Newfoundland Ground - July, 12-13 (V)

Hydrologic surveys: The Flemish Cape Ground - April, 15-19,
- June, 19-28,
- July, 1-3
- April, 22-23.

The region of the northern slopes of the Great Newfoundland Ground - April, 9-20
The region of the Sundal Ground - March, 26-31
The Hamilton Ground - April, 12-13
In the south of the Great Newfoundland Ground - July, 7-9
The South-eastern Shallow - July, 10-12

The diagrams of the hydrologic sections are subjoined.

Thus, all our surveys embrace the April-to-July period.

The work was chiefly aimed at exploring the hydrologic conditions on the fishing grounds and comparing them to those observed during the past years. Experience gained during the

recent years showed that the sequence of carrying out the hydrologic investigation should be a function of (1) the features of this or that fishing region and (2) a supposed location of the fleet. Thus, in April, the basic work was carried out in the South of the Labrador region (sub-region 2) and on the North Newfoundland Ground (sub-region 3K); in May, in sub-region 2Y, on the Great Newfoundland Ground and on the Flemish Cape Ground; in July, on the Hamilton Ground and the Great Newfoundland Ground.

Of all the sections the most significant are sections VI-A and V-A. The rest of the sections were surveyed but once and, consequently, are of but a slight importance.

Section VI-A (along 47°00')

April: the section was performed only at Station 4, the westward exploration being prevented by ice. Water of one degree below zero was met with in a bottom layer between 49°00' and 47°45'.

A sharp rise in temperature was observed only from 43°15'.

Salinity distribution was similar to temperature: low temperature correlated with poor salinity. According to the data of Stations 10 and 15, the region of warm water influx can be detected not only with the aid of temperature data but also by salinity. May: Throughout the section, the temperature raised by 1 or 2 degrees thanks to heating. At Station 8, a spot of cold water (-1) made its appearance at the depth of 50-100 m.

Warm water kept on intruding in the vicinity of Station 10 but the size of the intrusion decreased sharply. Warm water appeared in the bottom layer on the west slope of the Flemish Cape Ground.

The biggest change in salinity was observed between Stations 9 and 11.

July: Surface water heated up to 11°. A cold water spot could be still found near Station 8 but penetration of cold water to deep layers weakened. The whole of the Flemish Cape Ground is covered with uniform water of 3.9°-3.5° temperature.

Section V-A (along 47°50')

April: Cold water of 0° temperature can be met with only west of 48°00'. At Stations 6 and 7 an eddy of 3° temperature was noticed. East of the eddy the surface layer revealed the temperature of +2°.

May: In May the conditions of the section were nearly the same as in April. Slight changes came to (1) that considerably cold water observed in April at Stations 5 was not found in May and (2) that the amount of cold water increased at Station 7.

The above testifies to the fact that hydrologic situation in the region under investigation largely varies from month to month. To cite an example, there was no cold water in April on the slopes of the Great Ground whereas in May its prism increased and it occupied a large space, in July it drifted again to the shallow.

HYDROLOGIC CONDITIONS IN THE REGIONS OF FISH
SWARMS

Hydrologic surveys in the fishing regions showed that swarms formed under the conditions of certain temperature and

salinity in the bottom layer and drifted together with the water body of this temperature and salinity. This can be proved by the following Table based on investigations of 1959, 1960, and 1961.

Table I

PERIODS OF AND CONDITIONS FOR SPAWNING
CONCENTRATIONS OF THE
BASS

| Year | Periods | Depth, m | Temperature of bottom water, C° | Salinity of bottom water, ‰ |
|--|--------------|----------|---------------------------------|-----------------------------|
| <u>North of the Northern Newfoundland Ground</u> | | | | |
| 1959 | 15.IV-26.V | 290-320 | 3.5-3.8 | 34.90 |
| 1960 | 15.II-30.III | 290-380 | 3.6-3.8 | 34.90 |
| 1961 | 3.IV-02.VI | 290-320 | 3.6-3.9 | 34.90 |
| <u>South of the Northern Newfoundland Ground</u> | | | | |
| 1960 | 1 - 12.IV | 280-320 | 3.2-3.8 | 34.90 |
| 1961 | 8 - 15.IV | 320-300 | 3.4-3.8 | 34.90 |
| <u>Flemish Cape, the North-west Slope</u> | | | | |
| 1959 | 1 - 15. IV | 240-280 | 3.6-3.9 | 34.90 |
| 1960 | 1.IV-10.V | 250-320 | 3.5-3.8 | 34.90 |
| 1961 | - | - | - | - |
| <u>Flemish Cape, the North-east Slope</u> | | | | |
| 1959 | 1 - 20. V | 260-280 | 3.4-3.8 | 34.90 |
| 1960 | 24-28.IV | 240-270 | 3.6-3.8 | 34.90 |
| 1961 | 23-30.IV | 390-460 | 3.7-3.9 | 34.90 |

The tables show that during all the years, in each of the above regions the spawning of the bass formed at nearly the same temperature and salinity in the bottom layer. However, the periods and the depths of spawning varied to a considerable extent.

Experience gained during the past years testifies that good spawning grounds of the bass are, as a rule, not large and can be easily detected as a result of a simple hydrologic survey. Such surveys carried out during the periods prior to spawning can serve as a basis for forecasting the periods and locations of spawnings.

For the cod, alterations in temperature are, obviously, of less importance, as its swarmings were found in the bottom layer

at the temperature of from 0° to 2.5°, the spawning concentrations formed when the temperature was not lower than 0.6° and the post-spawning in the range of from 0° to +2°.

Table 2 gives a better idea of conditions and periods of the cod concentrations.

Table 2

PERIODS OF AND CONDITIONS FOR CONCENTRATIONS
OF THE COD

| Year | Area | Period | Depth, m | Bottom temperature, C |
|-------------------------------------|---------------------------|------------|----------|-----------------------|
| <u>Spawning Concentrations</u> | | | | |
| 1961 | Sundal Ground | 22-26.III | 240-280 | 1-2 |
| 1961 | Hamilton Ground | 22-26.IV | 280-290 | 0.6-2 |
| 1961 | Great Newfoundland Ground | 15-23.IV | 170-210 | 1.2-2.5 |
| <u>Post-spawning Concentrations</u> | | | | |
| 1960 | Hamilton Ground | 13.V-23.VI | 260-310 | 0.2-1.2 |
| 1961 | do | 13.V-30.VI | 290-320 | 0-2 |

The cod during the post-spawning period seems to largely depend on food and its spread in the area, in addition to its dependence on temperature. We know, for instance, that in 1960 the post-spawning cod concentrated within a limited area of the Hamilton Ground. In the same period, of 1961, under the similar conditions the area where the cods concentrated was considerably larger.

In July - December of both 1960 and 1961, the post-spawning cods concentrated in the south-east shallow of the Great Ground, at the depth of 45-80 m, the bottom temperature being 2-3°. The main cause for the concentrating of the haddocks in the region was food which was caplins whose swarms could be met with on sand and pebble grounds.

In the South of the Great Grounds, the haddocks spawned from May, 3 to June, 15 at the depth of 80-160 m and temperature 2.5 - 3.0°.

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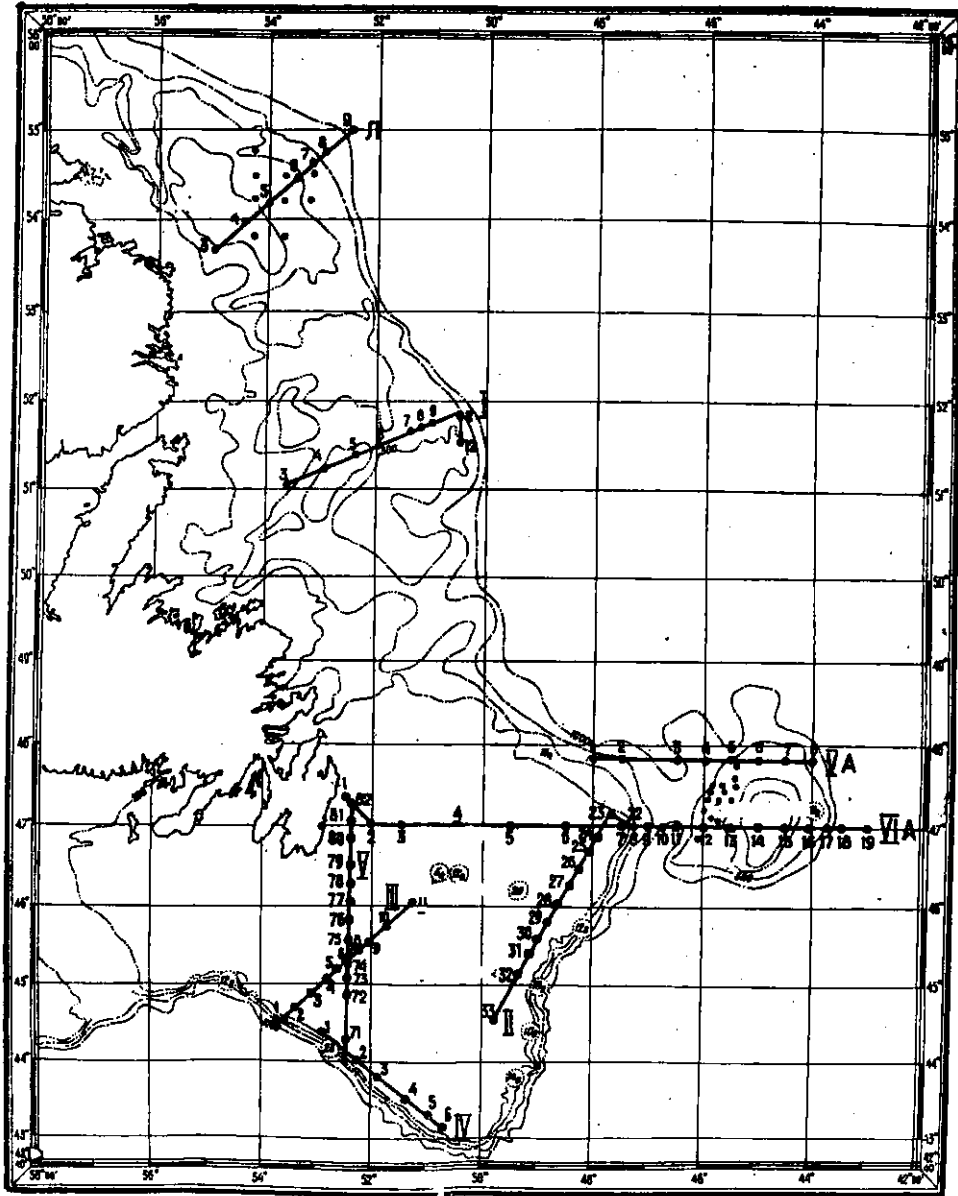


Fig. I Position of sections and stations

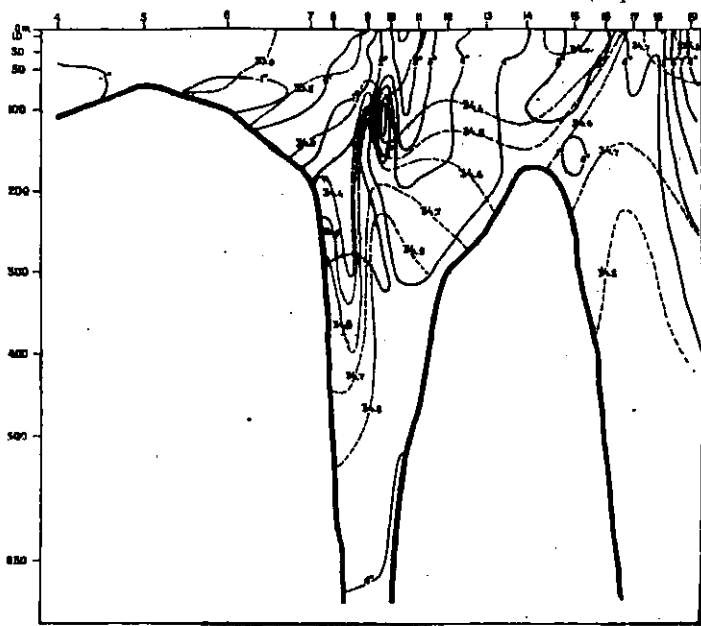


Fig. 2 Section VI-A Distribution of temperature and salinity, April, 13-19, 1961

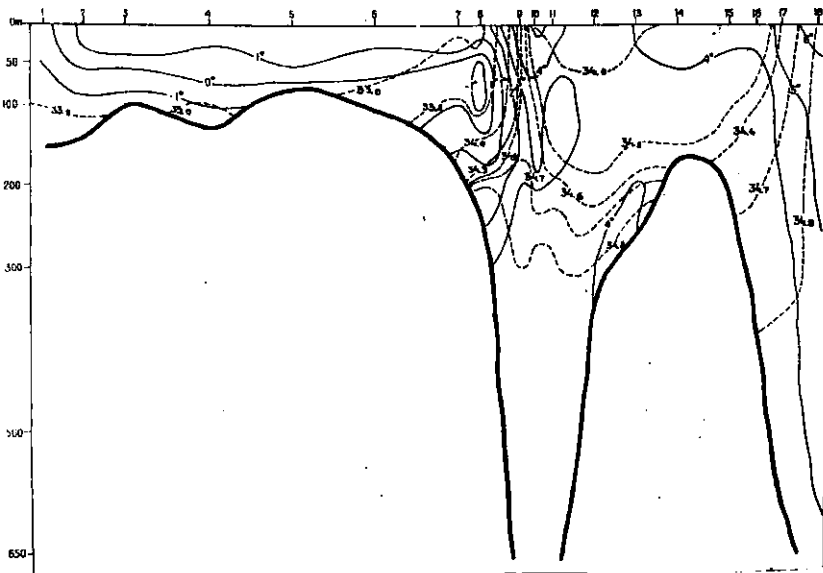


Fig. 3 Section VI-A Distribution of temperature and salinity, May, 19-21, 1961

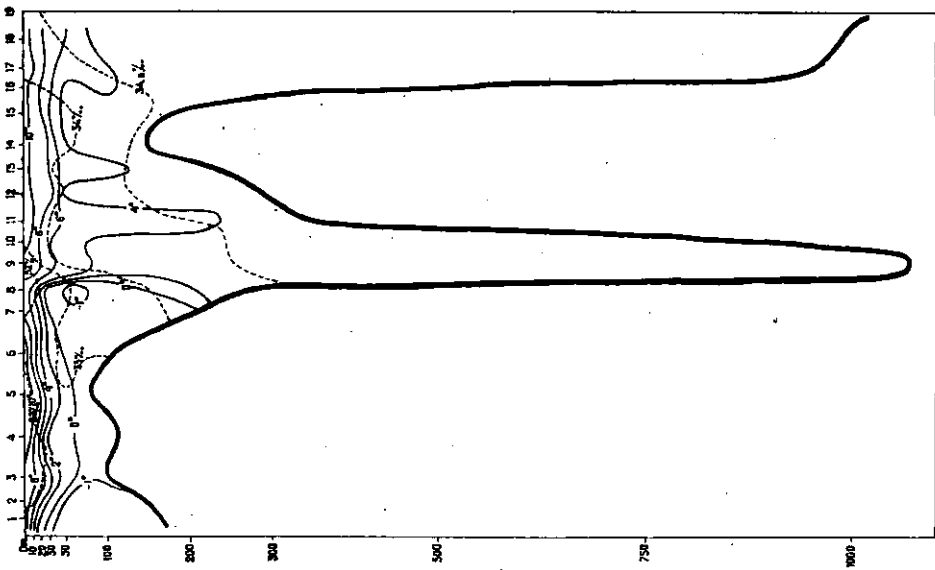


Fig. 4 Section VI-A Distribution of temperature and salinity, July, 13-1, 1961

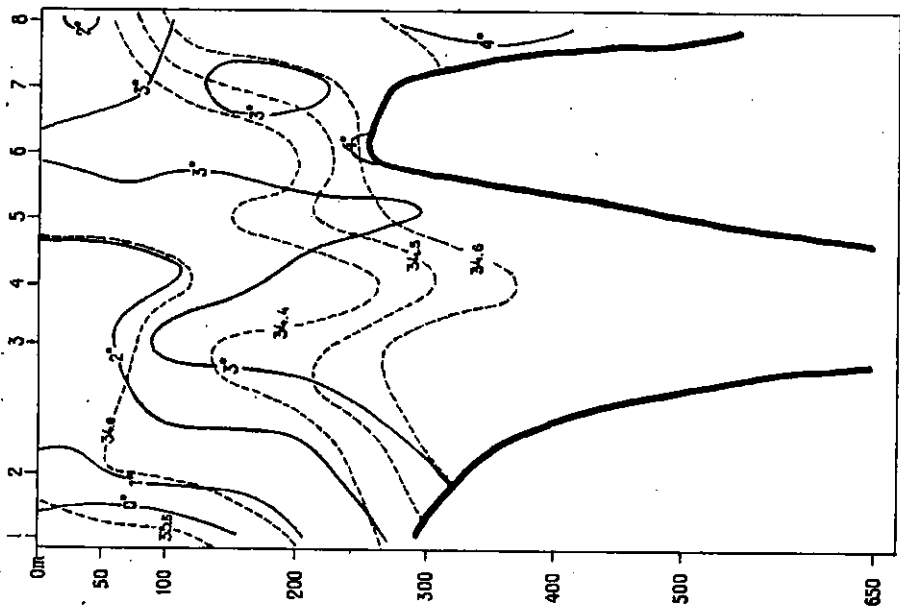


Fig. 5 Section V-A Distribution of temperature and salinity, April, 16-19, 1961

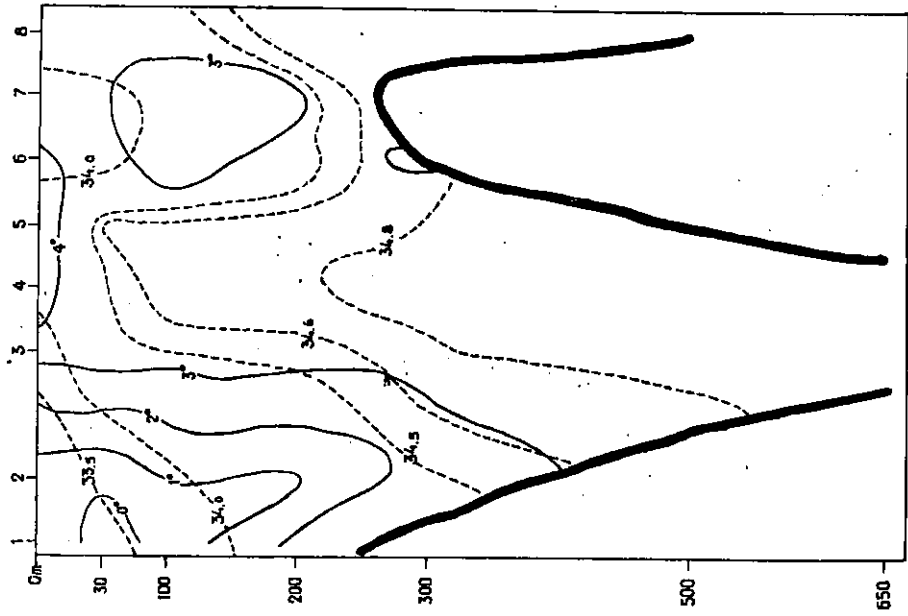


Fig. 6 Section V-a Distribution of temperature and salinity, May, 18-19, 1961

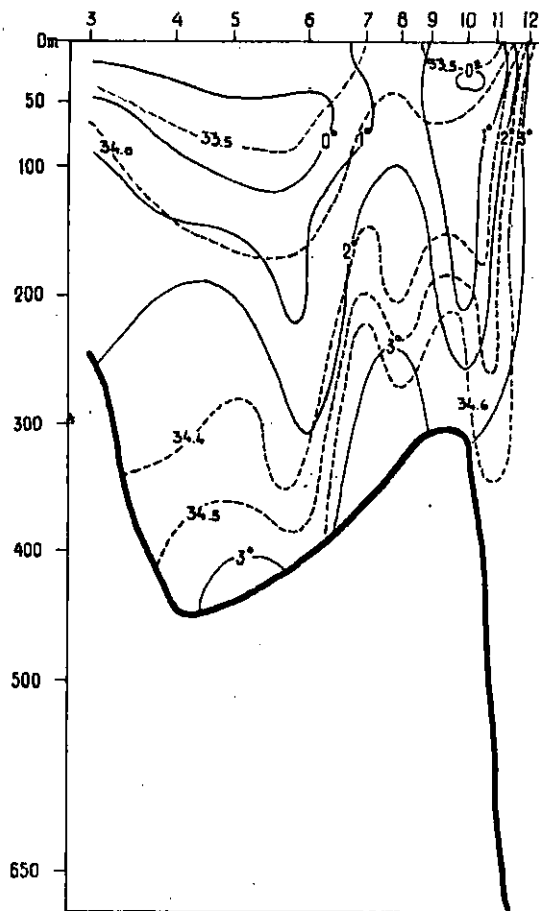


Fig. 7 Section I Distribution of temperature and salinity, May, 14-15, 1961

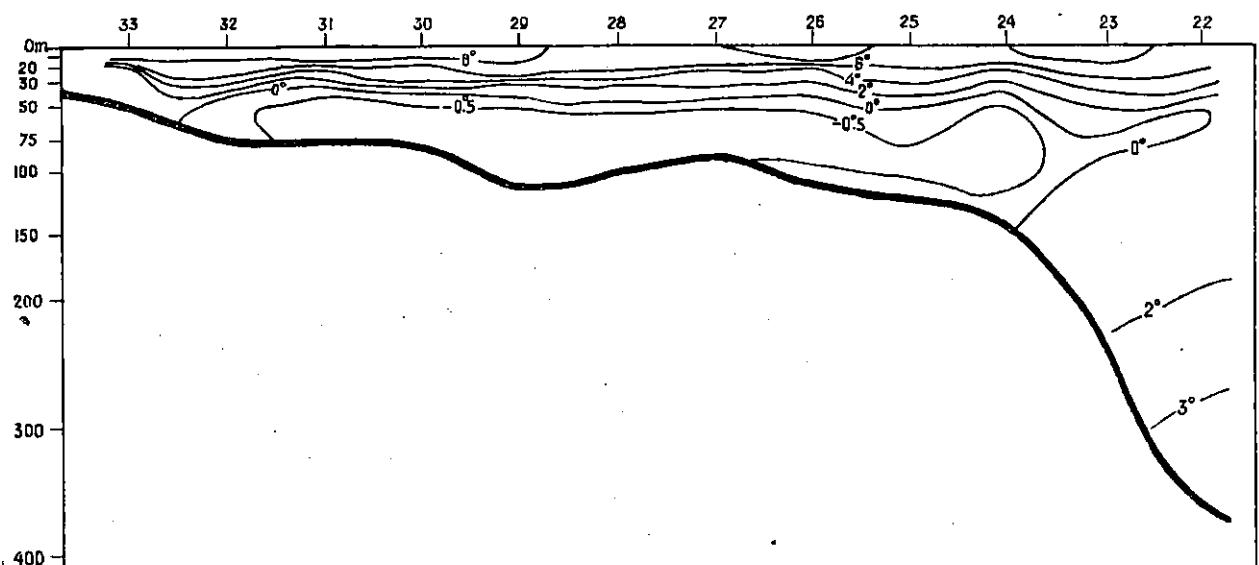


Fig. 8 Section II Distribution of temperature July, 6-7, 1961

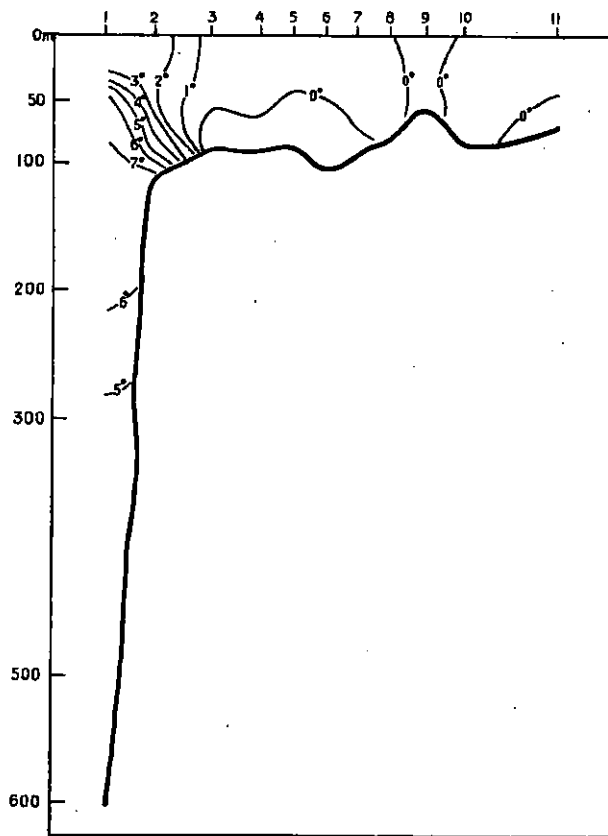


Fig. 9 Section III Distribution of temperature, April 29-30, 1961

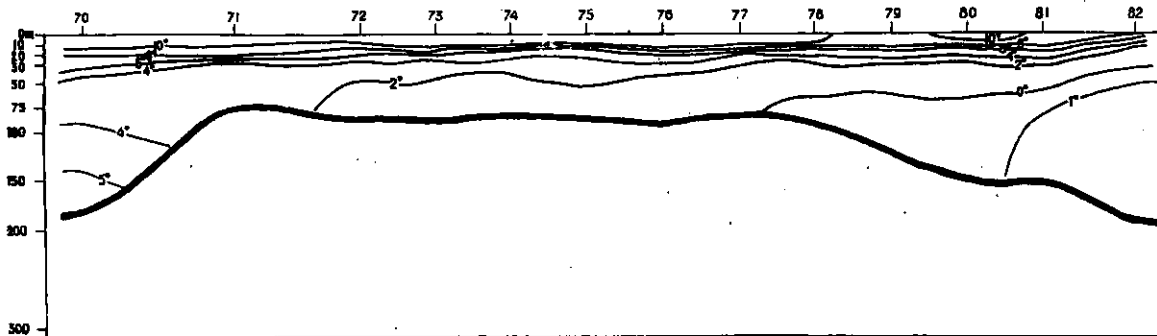


Fig. 10 Section V Distribution of temperature, July 12-13, 1961