

Preliminary Report on the Hydrographic Sections made in the
Norwegian Sea 1958 by Geofysisk institutt, Bergen.

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In connection with the Polar Front Survey Programme, the research ship "Helland-Hansen" of the Geophysical institute in Bergen occupied two sections in the Norwegian Sea. Hydrographic observations were made in the two sections at two different seasons: the first cruise took place in March and the second one in October. The location of the sections in March is shown in Fig. 1. The route followed in October was almost identical with that of March. According to the plans for the Polar Front Survey, the same sections were to be occupied also by Soviet ships and/or by ships from the Norwegian Fisheries Directorate. It was reckoned that such repetition of sections might give useful information on the variability of the hydrographic conditions. On the cruise in March, 71 hydrographic stations were taken during the days 13.- 22. March. Salinity and temperature were observed, on a few stations also oxygen. On the cruise in October, 64 stations were taken during the days 16. - 26. October. The same elements were observed as in March. Echo soundings were made throughout both cruises, and a list of soundings is available for those interested. The soundings from the March cruise are considered to be specially valuable because of the good position fixings obtained on that cruise. The results of the observations on the March cruise have been submitted to this Council, and the October results will follow as soon as the titrations and computations are finished. The analysis of the results will, naturally, have to take place in connection with the whole Polar Front Survey. With this report, we shall only show the distribution of temperature in the sections, it appears in Figs.2 and 3.

The northern section is shown in the uppermost parts of the figures. In the eastern (right-hand) parts of the section, the usual wedge-like shape of the Atlantic water area is discernible by the course of the isotherms. The isohaline of 35 o/oo nearly coincides with the 4° isotherm, except for the western part of the October section. There is a considerable difference between the extent of Atlantic water in the northern section in March and in October. In March, the Atlantic water (salinity above 35 o/oo) stretches 120 nautical miles out at sea from the banks, with a cross-sectional area of 69 km². In October, the distance is 190 nautical miles and the cross-sectional area is 100 km². For the northern section in March, the volume transport has been computed for a part of the section limited vertically by stations 4 and 17 (where the 35 o/oo isohaline ascends to the surface), and horizontally by the surface and the 1000 db. isobar (or bottom). The 1000 db. isobar has been used as reference line in the part of the section where the depth exceeds 1000 m., and for the rest of the section Helland-Hansen's (1) method has been used, assuming zero current at the bottom. However, the significance of the computed transport value, viz. 3.1 mill. m³ per sec., must be judged with due regard to the above cited assumptions (2). A special feature to be noted is the ascending of the cold bottom water at the continental slope off Norway, as demonstrated by the course of the isotherm for - 0.8°C. This seems to be a permanent feature of all sections off the Norwegian southwest coast, and must probably have a dynamical significance. Finally should be noted the undulating form of the isotherms in the Atlantic water and in the transition zone between that water and the underlying bottom water, most clearly pronounced in southern section of October. There are conflicting opinions on the causes for this occurrence (2, 3, see also 4).

References:

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- 3) Helland-Hansen, B. and F. Nansen, 1909: The Norwegian
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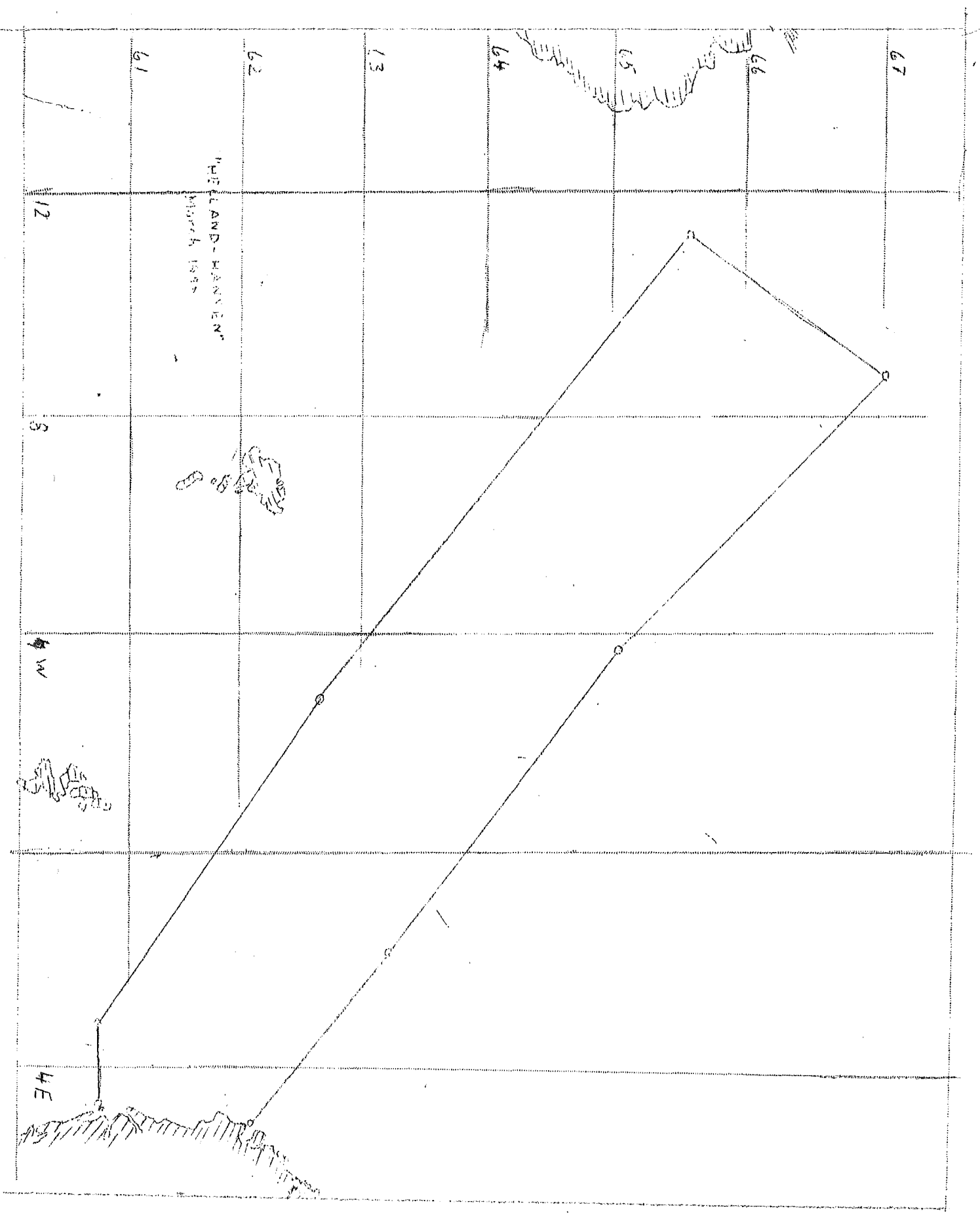


FIG. 1

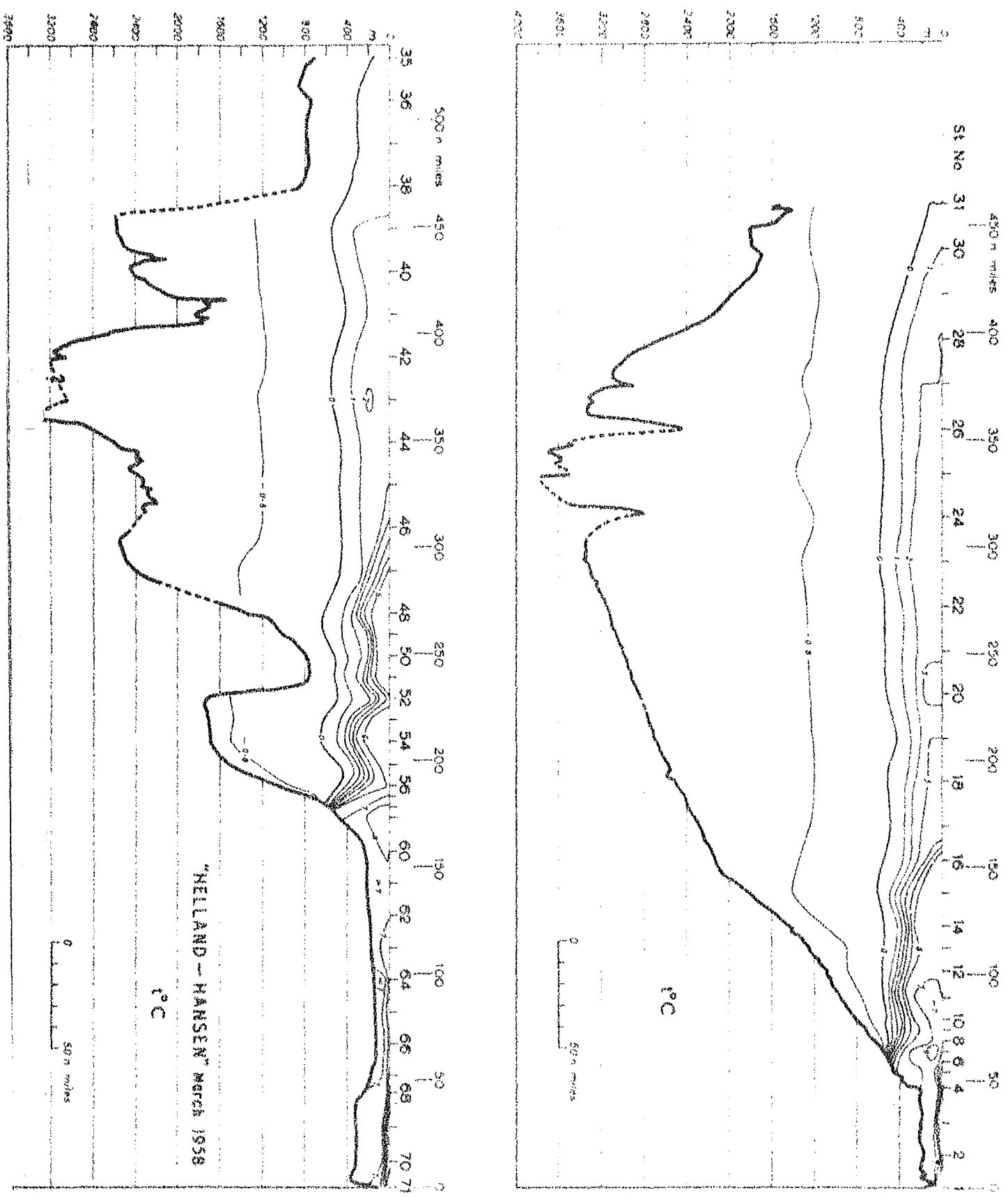


Fig. 2

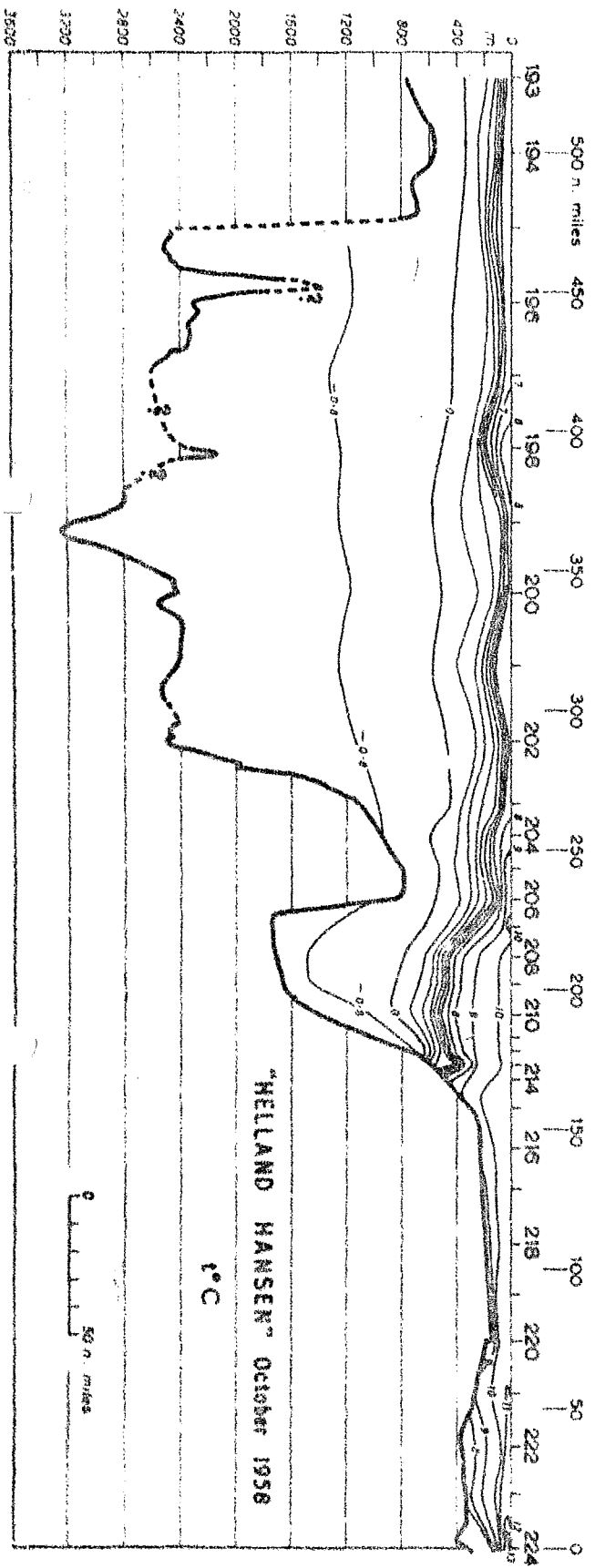
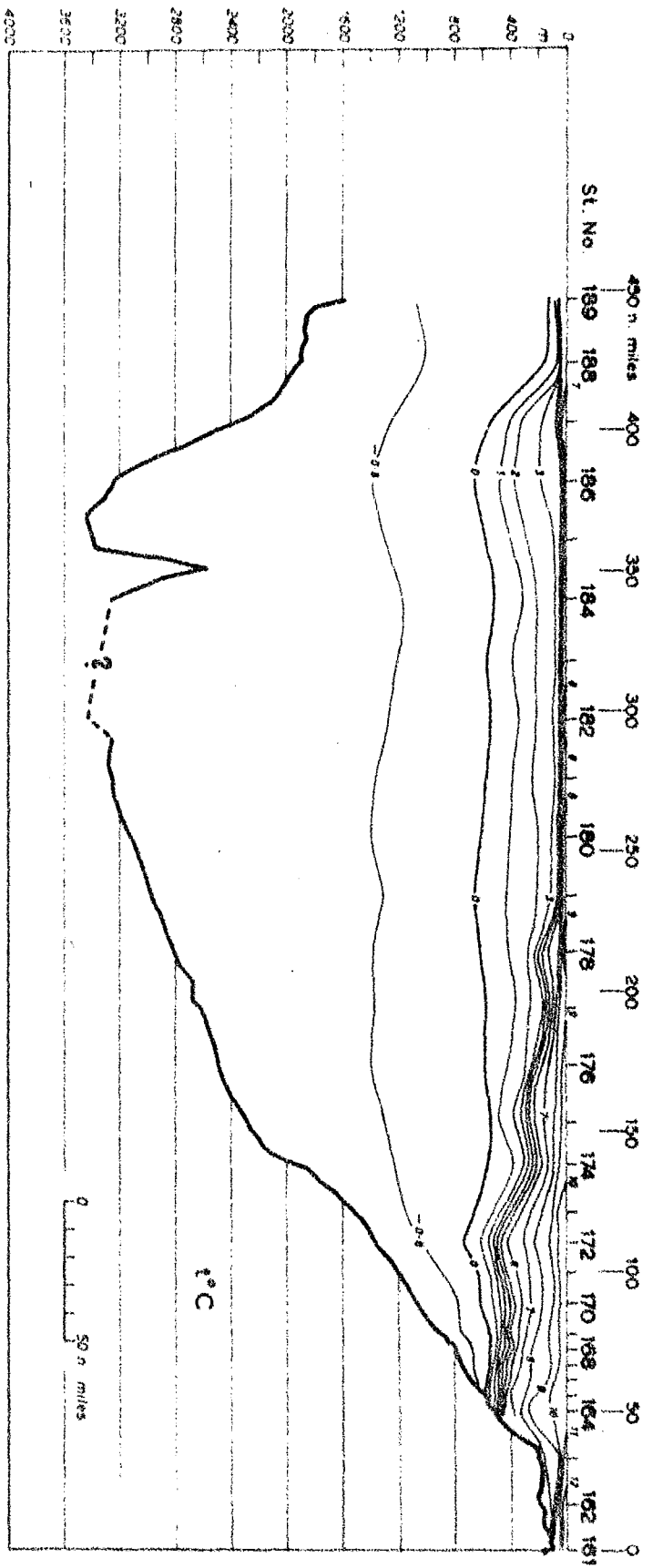


Fig. 3