

Serial No.1083Document No. 16ANNUAL MEETING - JUNE 1963

Canadian Research Report, 1962

C. Subareas 4 and 5, Oceanography

by L. M. Lauzier and N. J. Campbell

Co-ordination and expansion of effort by several agencies are providing more intensive Canadian research in many phases of oceanography. The responsibility to fulfil Canadian commitments to ICNAF falls upon the Fisheries Research Board of Canada, with its various establishments on the east coast. Co-operating agencies were the Bedford Institute of Oceanography of the Department of Mines and Technical Surveys, the Marine Division of the Department of Transport and the Institute of Oceanography of Dalhousie University. Vessels employed in the research program were C.G.S. A.T. Cameron, C.N.A.V. Sackville, C.H.S. Baffin, C.G.S. John A. MacDonald and M.V. Harengus.

Monitoring of oceanographic conditions along the Halifax section over the Scotian Shelf and across Cabot Strait was continued during 1962. An effort was made to cover the Halifax Section more frequently than in previous years. The seasonal coverage is reported here.

The temperature and salinity distributions for the section off Halifax, N.S., are given in Figure 1. During 1962, the intermediate cold-water layer, present from spring to autumn, had a tendency to be less developed than in the previous three years. The maximum temperature in the deep waters of the Scotian Gulf showed little variation from February to September; on the average they were higher than during the period 1959-1961 but always below the long-term average. On Emerald Bank the bottom temperatures in February were the lowest ever observed at that time of the year. On the average, the bottom temperatures observed in May, July and September were below the seasonal normal by 1.5°C but higher than those observed during the previous three years. The waters along the edge of the continental shelf were featured by a steep vertical temperature gradient, resulting from incursions of warm, high-salinity waters of oceanic origin.

The Cabot Strait section was covered in February, June and November. The conditions in February 1962 were similar to those of 1957, as far as the temperature of the surface mixed layer was concerned; below-zero waters extended across the Strait in both years. The warm, deep layer in February 1962 had decreased in volume since November 1961. The maximum temperature observed in the warm layer was slightly lower than the long-term average, but much lower than in winter 1957. By summer, the temperature and the volume of the deep layer had increased to values greater than those observed in 1961, and the intermediate cold-water layer was not as developed as in 1961. Conditions observed in November suggest that the deep layer had regressed to smaller volume than at the same time in 1961. Within the surface layer the November temperatures were definitely lower in 1962 than in 1961, which, with an increase in the thickness, seems to indicate that the autumnal cooling in 1962 was more intense than in 1961.

Emphasis has been given to studies on the variation of properties related to the phase of tide. Repeated simultaneous current, temperature, and salinity observations were taken in Gaspé Passage. Repeated temperature and salinity observations

were also taken in Cabot Strait. Preliminary analysis points to no systematic variation of properties related to the phase of tide.

The study of the temperature conditions along the western slopes of the Laurentian Channel was continued in 1962, and showed a variation in the thickness of temperature layers from north to south, at least during the winter season.

Summer and winter temperatures on offshore banks, as observed during groundfish survey cruises from 1958 to 1962, were analysed. An estimate of temperature coverage shows that more than 55% of the area studied had a bottom temperature lower than 4.0°C during summer and winter of a cold year (1959) and that less than 17% of the area had a bottom temperature lower than 4.0°C in an average year. These observations are related to those carried out along the Halifax section over a longer period of time.

The coastal surface temperatures were monitored at six stations from the Bay of Fundy to the Gulf of St. Lawrence. The 1962 surface temperatures were below the long-term average by 0.2 to 1.0°C. The bottom temperatures at these coastal stations were below average during 1962, with a greater departure from average in the Halifax region than in the Bay of Fundy area.

The surface and bottom non-tidal drift studies were continued in 1962. Increased effort in the bottom drift studies are providing coverage of many areas of the Scotian Shelf and the eastern Gulf of Maine as well as the southwestern Gulf of St. Lawrence. Radar drift poles and Pisa tube techniques were used in the Cabot Strait region. At 180 metres, on the bottom of the western slopes of the Laurentian Channel, Pisa tube measurements over a period of 66 hours gave an average velocity of 0.11 knots at 130°. Starting in mid December 1962, sea-bed drifters were released at a daily rate of 3 at each of 4 stations across Cabot Strait. It is hoped that many of these drifters will be recovered during the winter fishery in the area.

Studies undertaken by the Fisheries Research Board in the field of submarine geology and geochemistry currently pertain to the Gulf of St. Lawrence, the Scotian Shelf and the Grand Banks areas. The calcium carbonate cycle is being studied in the Gulf of St. Lawrence with special attention given to the sediment-water interface.

The benthic biological studies initiated in the Gulf of St. Lawrence in 1961 were modified in 1962, emphasizing the relationship between biological communities and sedimentary properties of a few distinct but homogeneous sectors of the bottom.

Assessment of sampling techniques has been carried out. The variability of species composition and of total biomass of communities has been studied. The greatest variations occurred in sediments of unsorted gravel rather than on level bottom composed of sand or mud.

---ooo0000---

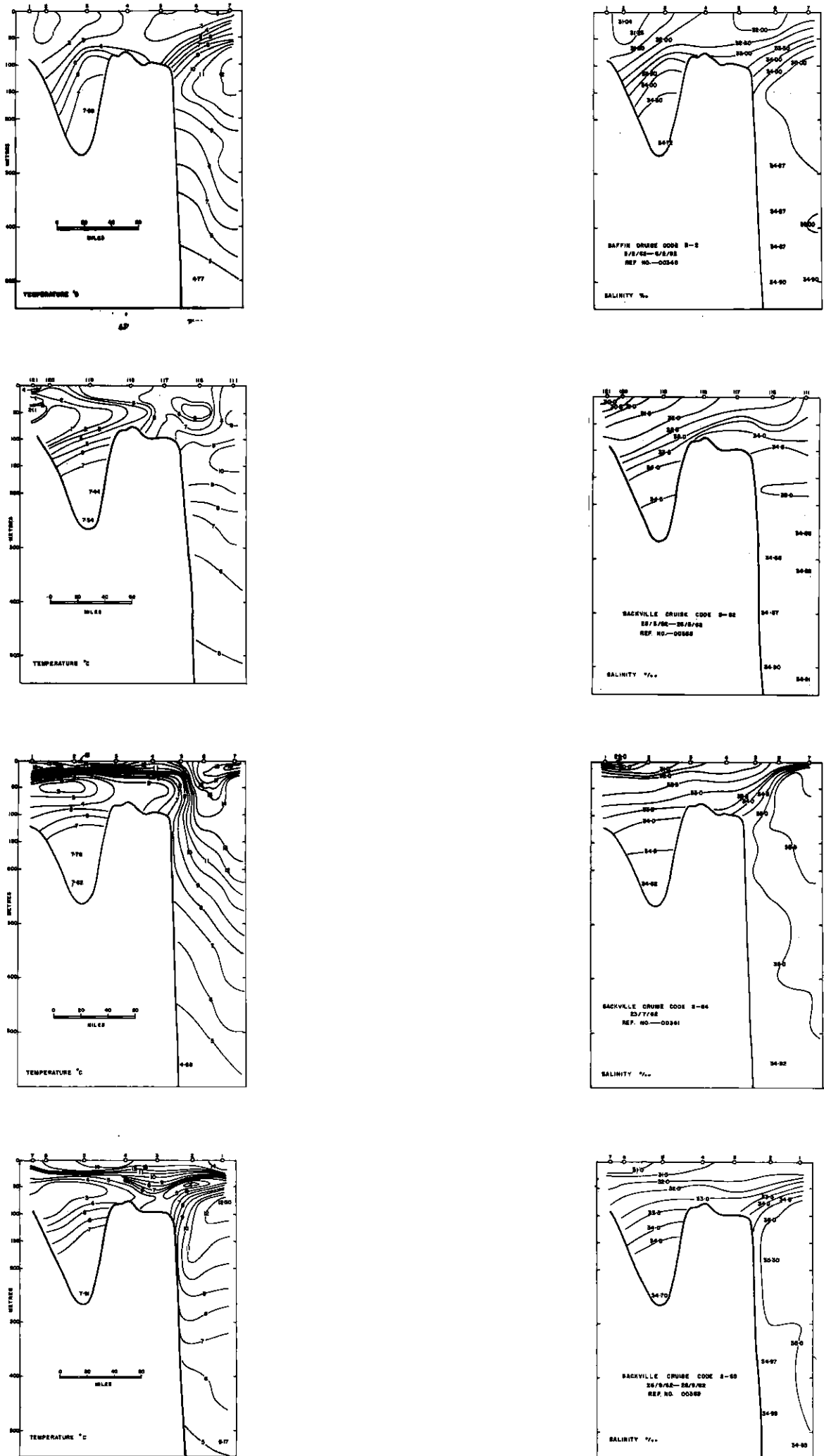


Fig. 1. Hydrographic sections off Halifax, N.S., 1962; Temperature °C, Salinity ‰.