This bulletin comprises a brief and preliminary study of data (1) obtained during the period July 22 to August 16, 1958, on a survey of Canadian coastal and Gulf of Alaska waters. The positions at which stations were occupied are indicated in Figure 1.

The principle observations made were those of salinity, temperature and dissolved oxygen at depths to 1200 meters. Determinations of silicate were made at eleven stations (96 to 106) and nitrate at two stations (99 and 104). Emphasis was placed on the peripheral regions and, while an attempt was made to occupy stations in mid-Gulf, the available ship time did not allow the desired coverage. This lack of data must be borne in mind when considering the descriptions to follow.

The plan (grid) of the cruise was similar to that of a survey carried out earlier in 1958 (2, 3). Additional data during the summer of 1958 was available from observations (4) made by members of this Group in C.N.A.V. Whitethroat while en route to and from the Western Aleutians (5).

In this bulletin the July-August 1958 data are compared with earlier data and reports. Direct reference to these is not made but five are cited (6, 7, 8, 9, and 10) which provide some of the background.

As shown in Figure 2, the salinity at a depth of 10 meters was lowest in the shallow water over the shelf areas and increased to seaward reaching an apparent maximum eastward of Ocean Station "P". The first feature is of course typical although it appears that in the northern part of the Gulf a greater than usual concentration of low salinity water may have occurred. The second is not typical. Furthermore, the high values estaward of Ocean Station "P" are accompanied by lower than usual values in the region of the cold core where previously, maximum values at this depth have been observed.
The salinity distribution at 100 meters depth is presented in Figure 3. Areas of low salinity at this depth indicate the greatest accumulation of fresh water in the upper zone. Relatively high salinity values were observed along the west coast of Vancouver Island and in the vicinity of the cold core. These are typical although in the former region the values are perhaps higher than usual. An interesting feature of the figure is the indication of a trough of low salinity water (≤32.7%) at this depth lying well seaward of the Canadian coast and extending from the southeastern sector northward into the Gulf.

The observed distribution of temperature at 10 meters depth is shown in Figure 4. The water in the vicinity of the cold core was the coldest while the warmest was that just seaward of the Washington coast.

A comparison with earlier reports suggests that in the oceanic region eastward of the longitude of Ocean Station "P" temperature values were not only above average but also above those observed in 1957.

In the Gulf coastal region temperatures at 10 meters depth appear colder than those observed in other years, although it is recalled that the 1958 observations in this region were made before the end of July. Available information indicates that there was perhaps more overcast and rainy weather in this area, including also the region of the weathership, during this summer than usual. This is in marked contrast to the situation in the Canadian coastal area where an exceptionally warm and dry summer was experienced. It appears that the data may reflect this difference.

The temperature inversion within the halocline which has been a marked feature of earlier data was less so during this period.

The geopotential topography referred to the 1000 decibar surface is shown in Figure 5. Again it is recalled that data are not available in mid-Gulf, and the contouring in this area is of doubtful significance. In any case, the general configuration suggests the existence of a somewhat different situation from that observed in 1956 and 1957 and, indeed, from that generally observed.

For example, the isobars in mid-ocean exhibit a stronger than usual north-south tendency, and in addition, there is evidence of a southerly movement in the water adjacent to the Canadian coast. This latter feature is perhaps the more interesting since it represents a marked departure from what is considered the usual. It is noted that the southerly movement is associated with a strong anti-cyclonic eddy off southeastern Alaska and with another eddy off the Washington coast with which it merges.

It is considered that the data confirm the existence of the reported northward intrusion of a warmer water into the area between the Ocean Station "P" and our coast, and suggests that it was accompanied by rather gross changes in water movement. For example, the southerly movement off our coast was apparently associated with the northward in-
trusion observed in the oceanic regime. A possible conclusion is that variations in oceanic conditions may not be reflected in coastal waters, at least to the same degree, through the influence of such a compensatory southerly movement.

It is admitted that this conclusion was suggested through a preliminary study of coastal data which did not indicate the occurrence of a warmer water. This latter analysis has to date been somewhat circumspect, and it is perhaps of particular interest that this be examined further.

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References


(2) No. 16 of (1).


(4) No. 28 of (1).


Figure 1: Approximate positions of stations and bathythermograph lowerings, North Pacific Survey, Continental Shelf and Gulf of Alaska, July 22 to August 16, 1958
Figure 2. Salinity at 10 meters depth.

Figure 3. Salinity at 100 meters depth.
Figure 4. Temperature at 10 meters depth.

Figure 5. Dynamic height anomaly of the sea surface relative to 1000 decibars.