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No. 1006

**Bottom Temperatures in Jervis Inlet,
British Columbia**

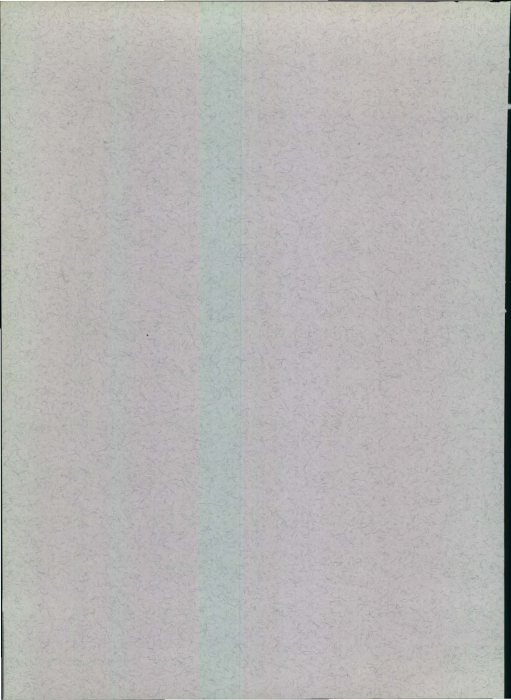
by

R. H. Herlinveaux

Biological Station, Nanaimo, B.C.

November 1968

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BOTTOM TEMPERATURES IN JERVIS INLET, BRITISH COLUMBIA

During the period December 19, 1967 to June 22, 1968, a trial was carried out on some recording equipment on the bottom (355 m) of Jervis Inlet by Mr. T. Hughes* at a position shown in Fig. 1.

The equipment was designed and assembled by T. Hughes. The basic purpose was to determine if industrial-type batteries could be used as an electrical supply for running electrical recording equipment for long periods of time at considerable depth. The results of his findings are being prepared for a separate report.

While this equipment was being assembled, Mr. Hughes was prevailed upon to include a modified Rustrak temperature recorder in the watertight container shown in Fig. 2. The temperature sensor was a thermistor mounted inside the steel chamber. This report is on the temperature results obtained with this recording equipment.

Jervis Inlet, from its head, extends seaward in a number of distinct "dog-legs" for about 45 nautical miles (Fig. 1). The bathymetry indicates there are two "sills" located as shown in Fig. 1. These "sills" affect the bottom water exchange, which has been discussed to a certain degree by Pickard (1961).

Results

The temperature recorder started on December 19, 1967, when the unit was lowered into place, and continued until May 31, 1968, at which time the Rustrak ceased to operate. The maximum and minimum temperatures recorded for each day are shown in Fig. 3. Bottom temperatures at the start on December 19, 1967 were steady at 7.0°C and reached a low near the end of March (March 22 to April 1), when the maximum temperature was 6.7°C and minimum was 6.6°C (Fig. 3).

The range of diurnal variation was negligible from December 19 to January 7, then it gradually increased to a maximum diurnal range of 0.3°C on March 18. From then on, the diurnal variation gradually decreased to about 0.1°C at the end of the recording. The overall temperature variation for the 6-month period was 0.4°C (7.0-6.6°C).

*T. Hughes, Defence Research Establishments, Pacific.

Discussion

The diurnal temperature variation in the ambient water may have been a little greater than recorded, considering that the temperature recorder was inside a large container. However, since the steel housing provided good thermal conductivity and a period of 12 hours was available for attainment of diurnal temperature equilibrium, it may be assumed the recorded minimum and maximum temperatures would be insignificantly different inside and outside the container.

The bottom temperature recorded in Jervis Inlet suggests there is very little daily or seasonal temperature variation during the five winter and spring months of measurements. This small variation may be due to the "sills" in Jervis Inlet, which possibly restrict bottom water movements into and out of the Inlet.

The diurnal temperature variation may be considered as an index of bottom water exchange. Such exchange must have started around January 8, 1968, reached a maximum around the end of March, after which it appears to have gradually diminished.

There were no wind records made in the area at the time of the water temperature measurements. The nearest location of wind records was in the Strait of Georgia. These show that the most prevalent characteristic during the entire period is the diurnal variation of wind speed. The next most prominent feature was the periodic change in wind direction.

It is believed that the predominant diurnal variation observed in the temperature records is related to the diurnal winds in the area. The periodic change in the mean temperature was probably related to the major alterations in speed and direction of the general wind field.

The predominant tendency for the bottom temperatures at 355 m, described here, was toward a diurnal periodic variation. Pickard (1961) showed that there was an internal wave of semi-diurnal period at 100 m, which closely followed the tidal movement. It is possible that at 355 m, semi-diurnal tidal influence has been filtered out. Part of the filtering may be due to a combination of bathymetry and the location of the observation near the head of the Inlet.

Conclusion

The experiment demonstrated that 6-month, continuous records of bottom temperatures at considerable depth can be made with the type of self-contained system developed at DREP.

The bottom temperatures near the head of Jervis Inlet ranged from 7.0°C to 6.6°C over a 6-month winter-spring period. This 0.4°C range is similar to that reported by Pickard (1961) for his period of observations in 1957-58.

References

- Pickard, G. L. 1961. Oceanographic features of inlets in the British Columbia mainland coast. J. Fish. Res. Bd. Canada, 18(6): 907-999.

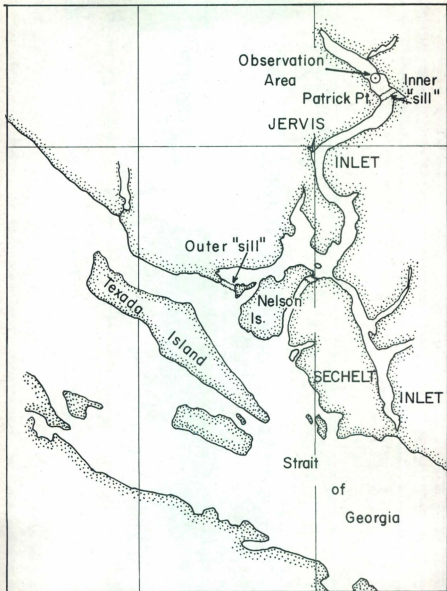


Fig. 1. Jervis Inlet, showing area of observations.

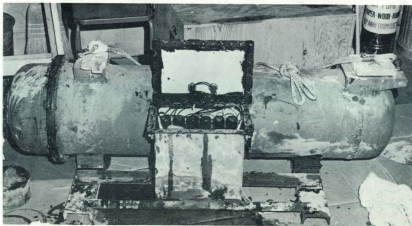


Fig. 2. Water-tight instrument cylinder with the battery pack in the foreground.
(Photo courtesy of T. Hughes, Defence Research Establishment Pacific.)

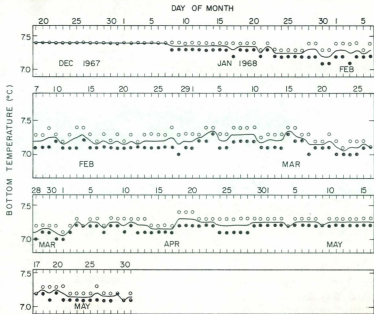
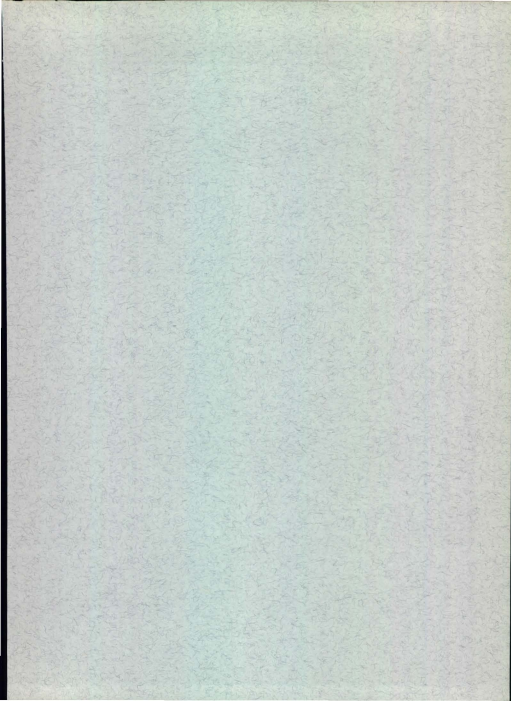


Fig. 3. Maximum and minimum daily bottom temperatures recorded in Jervis Inlet, December 19, 1967 to May 30, 1968.



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Government Printing Bureau for the
exclusive distribution by Fisheries
Research Board of Canada,
Huntsville, B.C., Canada