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## A NOTE ON THE BREAK-UP OF LAKES AND RIVERS AS INDICATORS OF CLIMATE CHANGE

by

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Historical records of the dates when ice completely clears from a lake or river have been useful indicators of past climatic variations in Europe and Japan where records have been kept for several centuries (Hutchinson, 1957). Long-term records are much more limited in North America because break-up dates have been recorded continuously at only two or three locations for a little over a hundred years. The purpose of this note is to examine the long-term records that are available for evidence of climatic variation.

Figure 1, a plot of some long-term river and lake ice break-up records obtained from the literature (Canada, Met. Branch, 1959; Ragotzkie, 1960; Sokolov, 1955) shows deviations of average dates of break-up for consecutive ten-year periods from the long-term average for: the River Neva, USSR; Lake Kallavesi, Finland; Lake Mendota, Wisconsin; and the Saint John River, New Brunswick. These break-up records are compared with long-term ten-year moving means of spring air temperatures at Toronto compiled by Thomas (1968).

This plot shows that ice tended to clear from lakes and rivers at these four locations about 10 to 15 days earlier in the 1950's than in the 1870's. Spring air temperatures at Toronto have also increased significantly during generally the same period, even after allowance for possible urban warming effects.

These relatively short-term changes in climate are of interest not only to climatologists but also to all concerned with the development of Canada's northern resources. Changes in climate sufficient to affect break-up dates are probably sufficient to significantly affect navigation conditions in ice-covered Arctic waters. It is hoped that improved methods of observing ice by aircraft and satellite will improve the historical records of freeze-up and break-up, particularly at locations not likely to be affected by future man-made changes.

## REFERENCES

- Canada, Meteorological Branch, 1959: Break-up and freeze-up of rivers and lakes in Canada. Circular-3156, Ice-2, 92 pp.
- Hutchinson, G.E., 1957: A Treatise on Limnology. Chapter 7, The Thermal Properties of Lakes. John Wiley & Sons, New York, 1015 pp.
- Ragotzkie, R.A., 1960: Compilation of freezing and thawing dates for lakes in north central United States and Canada. Tech. Report No. 3, Univ. of Wisconsin, Dept. of Meteorology, 61 pp.
- Sokolov, S.S., 1955: Decreasing duration of freeze-up as related to the warming of the climate. Translated from PRIRODA, 7, 96-98, by E.R. Hope, Defence Research Board, Canada, DRB, T197R, 3 pp.
- Thomas, M.K., 1968: Some notes on the climatic history of the Great Lakes Region. Proceedings, Entomological Society of Ontario, 99, 21-31.

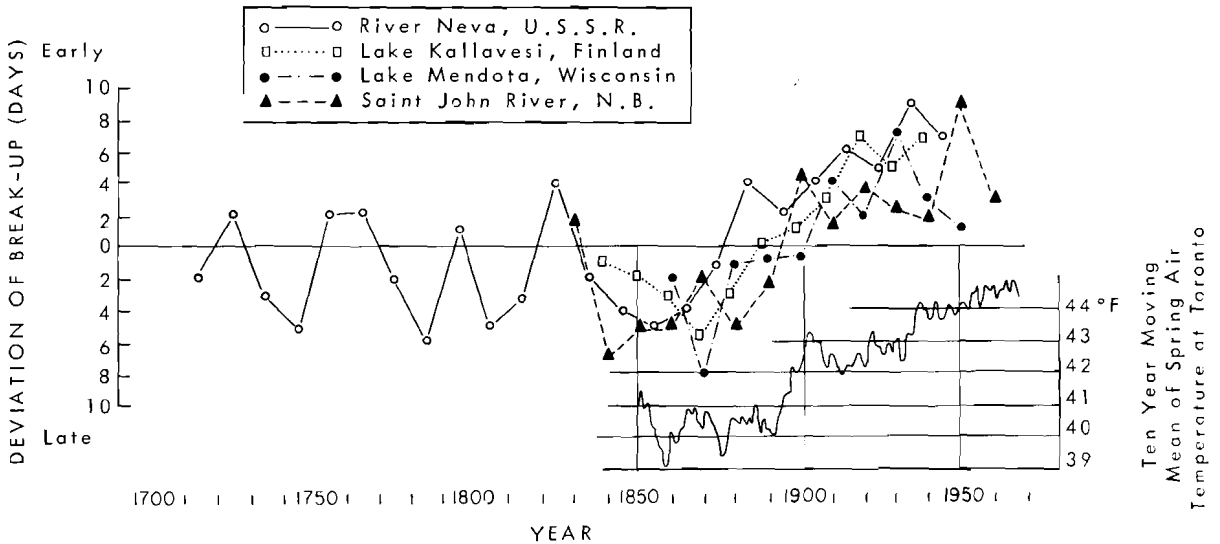


Fig. 1 PLOT OF DEVIATIONS OF BREAK-UP (AVERAGED FOR CONSECUTIVE 10 YEAR PERIODS) FROM AVERAGE FOR PERIODS OF RECORD.