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On the Periodical Rise and Fall of the Lakes.

By MAJOR LACHLAN, *Montreal.*

Few countries can boast of objects of more imposing natural grandeur, or deeper philosophical interest, than are presented in Canada—in the vast extent and other striking peculiarities of its magnificent inland *fresh water* seas, and their noble connecting rivers and unrivalled catnaacts, coupled with the singularly anomalous nature of its climate and seasons, compared with European countries in the same parallels of latitude; and an additional geographical interest may be considered as attaching to it, in the magnetic meridian passing through it—the line of “No variation” curving through part of its mediterranean waters.*

The investigation of the causes and effects of these great physical phenomena might well engage the attention of a whole life of patient observation and study; and such, doubtless, will at no distant day, be the case; but in the present state of things, in so young a country, all that can be expected is the occasional contribution of the unpretending philosophical *gleamer*; and, as such, I now venture to lay before the Canadian Institute the following desultory observations on the periodical rise and fall of our great Lakes, in the hope of strengthening the arguments adduced by me in the Paper which I had lately the honour of submitting to it, in advocacy of the establishment of a system of simultaneous meteorological and tidal observations throughout British America—as not only a great philosophical desideratum, but also likely to prove of substantial service to the country, were it only to make us better acquainted with the great benefits derived and derivable from the climatic influence of our mighty inland waters.†

In the introduction to my former paper, I was led to remark that it is now seventeen years since my attention was first attracted to these interesting philosophical subjects, by remarking the great difference in the newspaper reports of the temperature, direction of the winds, and state of the weather in different parts of the Province at the same time, as compared with each other, and by having at my residence on the banks of Lake Erie been for seven years in the habit of noticing the constant extraordinary fluctuations in the level of that noble Lake; at times consisting only of slight irregularly recurring oscillations; at others, showing a sudden change of level, apparently caused by the temporary im-

* To do justice to the subject treated of in this Paper, a good map of British America should be at hand to be referred to, and, above all of, that graphic “Map of the Valley of the St. Lawrence,” constructed by T. C. Keefer, Esq., in which the striking connection of the whole system of Lakes is so well portrayed.

† As a remarkable instance of the *tempering* influence of the proximity of the Lakes, it may here be mentioned, that in the immediate vicinity of Cleveland, the temperature during 10 years has in no instance fallen below Zero, while at Colombo, Lamicella, and Cincinnati, from 120 to 150 miles farther south, it has frequently sunk to 5 deg. and 10 deg. below it; and that in Northern Ohio, generally, the tender vegetation is usually cut down within five days of the 25th October, whereas the Lake shore remains untouched for two weeks later; and during the winter, when deep snow falls elsewhere, there is comparatively little near the Lake.—American Journal of Science, 2d Series, vol. 13, pp. 215 to 219.

pulse of passing storms; at others, evincing a longer continued state of elevation or depression, in evident accordance with the more enduring influence of winds blowing from the same quarter for days together; and at others, and more especially and unaccountably, of a longer maintained rise of several feet above the usual level, sometimes lasting for a whole season, or even more, as was the case during the memorable years, 1838-39—regarded at the time by some of my neighbours as the traditional seven years' flood.

Being much struck with these singular phenomena, and yet not being sufficiently at leisure, as well as feeling myself otherwise disqualified for attempting a scientific investigation of their causes, I nevertheless naturally felt a strong desire to ascertain what had been, or might, from time to time be written on the subject by more able philosophical observers; and I accordingly made a practice of taking notes from all such published works, and other sources of information, as referred to them, as they happened to fall in my way, until I had, in the course of years, accumulated a mass of miscellaneous memoranda—not to call it testimony—on the subject, of so conflicting a character as frequently rather to add to the perplexity than promote the elucidation of the object in view; and the consequence was, that, after vainly attempting to classify and reconcile the information therein contained, regarding the rise and fall of the Lakes generally, and comparing it with my own passing observations and enquiries respecting Lake Erie in particular, I came to the conclusion that there was still *in* a room for further investigation, as all the Lakes did not appear to be always governed by simultaneous influences;* and, therefore, that the only chance of arriving at a correct knowledge of the state of the whole matter would be the adoption of some such course of long-continued meteorological and tidal observations throughout the country, as that which I ventured to propose in my last paper.

Having in that communication enlarged principally on the value of a wide-spread series of simultaneous meteorological observations, as the more important branch of the great object in contemplation, I propose to confine myself, on the present occasion, to the no less interesting, though minor, part of the undertaking—aiming at the institution of a simultaneous record of the daily variations in the level of the great Lakes, with the view of throwing light on, and, if possible, deciding the three following doubtful points: 1st, How far there is any foundation for the traditional report, that there is a septennial rise and fall in the waters of the Lakes, and if so, to what height; and whether such phenomenon takes place in all the Lakes simultaneously or otherwise. 2d, The amount of the better known annual variations in the level of the different Lakes; and how far these changes occur in each at the same time; and whether they are solely due to the annual amount of the rain and snow in the surrounding country, compared with that of the evaporation during the summer months, or to any other cause therewith combined. And 3d, How far the daily or other more frequent oscillations, or irregular tides, observable in the different Lakes, are general, and arise from the temporary force and direction of winds passing over their surface, or are peculiar only to certain localities; and whether they are in any sensible degree influenced by atmospheric pressure, or lunar attraction, or otherwise. All which, it is hoped, would in the course of time be satisfactorily decided, by a daily record of the actual level of the Lakes, combined with that of the prevailing winds and weather, at a

* This will be found patiently illustrated in a tabular view of the Rise and Fall of Lake Erie, incorporated in this paper.