JOURNAL OF EDUCATION, Upper Canada.

VOL. XVI. TORONTO: APRIL, 1863. No. 4.

CONTENTS OF THIS NUMBER.

I. PAPERS ON METEOROLOGY IN CANADA—(1) "On Magnetic Disturbances at Toronto" (2) Meteorological Stations at the Senior County Grammar Schools of Upper Canada. (3) Abstract of Observations made at some of the Senior County Grammar School Stations. (4) Atmospheric Phenomenon in Toronto (5) Striking Phenomenon at Goderich. (6) Meteorology in Lower Canada (7) How to Use a Barometer. (8) Natural Barometers. (9) Natural Weather Indicator. (10) Animal Barometers. (11) Meteorology for the Farmers 49

II. PAPERS ON NATURAL HISTORY—(1) School Boys and Birds in Australia. (2) Lecture on the Utility of Birds. (3) Protection of Insectivorous and other Birds beneficial to Agriculture. (4) Birth of a Salmon. (5) New Salmon River in Ireland 58

III. PAPERS ON PRACTICAL EDUCATION—(1) Fault-Finding at Recitation. (2) Value of a Visit to the Schools 59

IV. PAPERS ON THE PRINCE OF WALES—(1) The Laureate's Ode. (2) The Royal Marriage: The Reception of the Princess Alexandra. (3) The Ceremonies at the Royal Marriage. (4) Queen Victoria and her Balmoral Dependents. (5) The English Boys of Bonn. (6) American Eulogy of the Prince of Wales' Marriage. (7) The Princess of Wales and the Royal Family. (8) The Prince of Wales in the House of Lords 59

V. EDUCATIONAL INTELLIGENCE 64

PAPERS ON METEOROLOGY IN CANADA.

1. EXTRACTS FROM A PAPER IN THE *CANADIAN JOURNAL* FOR 1863, "ON THE MAGNETIC DISTURBANCES AT TORONTO, DURING THE YEARS 1856 TO 1862, INCLUSIVE," BY G. T. KINGSTON, M.A., DIRECTOR OF THE MAGNETIC OBSERVATORY.

A few years prior to the establishment of the Colonial Magnetic Observatories in 1839–40, the attention of philosophers in Germany had been directed to certain magnetic phenomona, consisting sometimes in abrupt changes of short duration, and sometimes in a long continued abnormal condition of the magnetic elements. These disturbances as they are termed, at first attributed to variations in atmospheric temperature and other local causes, were discovered by comparing preconcerted contemporaneous observations to prevail simultaneously, and to correspond in direction, and to great extent also in amount, at different and distant parts of Germany. The improbability of local origin which this synchronism in their occurrence indicated, and the probability wherewith it suggested some extra terrestrial influence, was greatly strengthened by the observations at the observatories at Toronto, Hobarton, &c., which first brought to light the fact that the disturbances occurred simultaneously, not only within a small region in Europe, but also at stations widely removed from each other on the earth's surface. It was found, however, that the disturbing influence would frequently affect different elements at two distant stations, or the same element to a different extent or in an opposite direction.

It was further made known that the disturbances, though in the ordinary sense irregular, are subject in their frequency and aggregate amount to definite periodic laws, manifesting a preference, so to speak, for certain hours of the day and night, and for certain months in the year.

The existence and general character of this periodicity was exhibited by the approximate methods employed in the earlier volumes of the colonial observations, but it was by the more accurate system first developed by General Sabine, in the 3rd volume of the Toronto Observations, and since applied by him to the observations of other stations, that the periodic laws were rendered definite and precise.

In the method referred to, the disturbed values of an element under discussion, are confined to those which differ from the normal value of that element proper to the hour by an amount equal or exceeding a certain definite limit, such normal being the average of the values of the element for that hour, during a month or some other suitable group of consecutive days, excluding all the disturbed values and including all others; the magnitude of the disturbance being measured by the difference between the actual and the normal value of the element.

The disturbance limit for an element, determined on with reference to the amplitude of its regular periodic variations, is generally different at different stations; but for the sake of inter-comparison must be constant at the same station.

Of the facts revealed by discussing the disturbances at several stations, the following are among the most prominent:—

(1) The frequency and amount of disturbance of the declination, inclination, and force, have a diurnal and an annual period.

(2) The disturbances of the elements without regard to sign, the disturbances in which the needle is deflected to the east, and those in which it is deflected to the west of its normal position, as well as the disturbances which increase, and those which decrease the force and inclination, have all distinct and often different periodic laws.

(3) The periodic variations at different stations, though possessing the same general characters, exhibit in their epochs of maximum and minimum, very great diversities.

(4) In addition to the diurnal and annual periods, the yearly aggregates of disturbance for each element and at every station are subject to a periodic increase and diminution, occupying a cycle of about ten years, which corresponds both in its length and in the epochs of maximum and minimum, with a periodic variation in the number of groups of spots on the surface of the sun. The disturbances discussed, and the results announced by General Sabine, in the 3rd volume of the Toronto Observa-