

FUTURE OPERATIONS.

In seeking the collection of meteorological data, there are two leading purposes to be kept in view. One of them relates to what may be termed the general statistics of climate. An acquaintance with systematic climatological statistics would enable us, with respect to any and each locality, to assign the *average* value of each element, such as temperature for example; the *average* frequency of each kind of phenomenon, such as rain, thunder, &c., &c.; the *average* periodic variations, and secular changes if any; the *average* variability of a non-periodic character, and the *average* mutual dependence of abnormal conditions.

The other object relates to the tracing out in individual cases the connection between successive atmospheric changes. Such problems demand an acquaintance with the contemporaneous meteorological conditions from hour to hour, at numerous points within the area of the region concerned, and involve difficulties of a much higher order, on the solution of which will hereafter depend our ability to trace out the probable course of coming storms, and to manage efficiently any system of telegraphic storm warnings. To procure data for the study, of this more difficult branch of the science, as well as for its practical application to current cases, comparatively little can be done without numerous well appointed stations, where observations with all the ordinary instruments, and particularly with the barometer and anemometer, may systematically be carried on. For the furtherance of climatological statistics on the other hand much valuable material may be acquired at a very moderate expenditure of labour and money.

In the *Year-Book* for 1870, it was suggested that persons who were not disposed to undertake the observation of all the elements at stated hours, might confine their attention to one or more kinds of observation which were there enumerated.

In order to facilitate their selection, the different classes into which it has been found convenient to arrange the minor (*) stations will now be described, commencing with those of which the greatest number, and for which also the least labour is demanded.

- I. Stations where the depths of rain and snow are registered. A record of the *times* at which rain or snow falls, together with a description of attendant circumstances, though not essential, add greatly to the value of the record.
- II. In addition to those in I. readings of the thermometer two or three times each day.
- III. Those in II. with records of extremes of temperature with self-registering thermometers, extent of sky clouded, direction and force or velocity of the wind, with or without the aid of an anemometer, and description of miscellaneous phenomena.
- IV. Those in III. with barometer and hygrometer, with or without solar and terrestrial radiation thermometers.

Printed forms for registration suited to each of the four foregoing classes, and accompanied by printed instructions, will be supplied gratuitously to any persons who will provide themselves with instruments, and send copies of their monthly records to the Toronto observatory. It is strongly recommended that instruments be sent to Toronto for verification before they are employed for the observations. (†)

Some of the meteorological statistics for the year ending 31st May, 1870, will now be given.

CLIMATOLOGICAL STATISTICS OF CANADA,

For the Year ending 31st May, 1870.

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The following tables include results of observations made in the Provinces of Ontario, Quebec, New Brunswick, and Nova Scotia. They are limited for the most part to temperature and the fall of rain and snow.

The results from Montreal, Quebec, and Halifax, are from MS. returns furnished by Dr. Smallwood, Captain Ashe, R.N. and Mr. F. Allison; those from St. John's, N.B., are from observations by Mr. G. Murdoch, C.E., and were partly taken from MS. papers, and partly from newspaper reports; and those from the Ontario Grammar School Stations, are extracted from the official MS. returns kindly lent to me by permission of the Rev. Dr. Ryerson, Chief Superintendent of Education for Ontario.

The mean temperatures, in every case, are *uncorrected* for diurnal variation. They are simply the arithmetic means of the observations made at the hours named below:—

Toronto	{ 6 A.M.	8 A.M.	2 P.M.
	{ 4 P.M.	10 P.M.	midnight.
Ontario Grammar Schools	7 A.M.	1 P.M.	9 P.M.
Montreal	7 A.M.	2 P.M.	9 P.M.
Quebec	Daily maxima and minima.		
St. John's	6 A.M.	2 P.M.	10 P.M.
Halifax	7 A.M.	2 P.M.	9 P.M.

In order to judge of the climatic condition of a single month or of a season, it is not only necessary that the values of each element under consideration be given absolutely, but also that they be compared with standard values proper to the time and place, and derived from the observations of several years. This has been done for temperature in Table II., wherever a standard could be procured founded on at least three years.

(*) They are called *minor* stations in contradistinction to the *normal* stations, where elevations of all the elements are made at equal intervals not exceeding three hours, for the purpose of computing certain *constant* numbers needed in reducing the observations made at the minor stations.

In the list for Nova Scotia, Sydney was entered as belonging to Class III.,—the entry should have been IV.

(†) It is hardly necessary to state that this verification will be attended with no cost but the carriage.