Contributions to the Climatology of British North America.

REMARKS ON THE PROGRESS OF CLIMATOLOGICAL INQUIRY IN CANADA DURING THE YEARS 1870-71.

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The following are some of the objects embraced in an organized Meteorological System.

1. To collect the climatological statistics of a country in an unwrought state, and to combine the materials thus collected so as to exhibit the general relations of the climatic elements, as functions of time, of place, and of each other.

2. To apply general principles to the determination of the conditions in any given case that will most probably succeed any actual combination of circumstances, and more particularly by giving notice by telegraph or otherwise of actual or of expected weather.

AGENCIES REQUIRED TO CARRY THE ABOVE NAMED OBJECTS INTO EFFECT.

I. A central Meteorological office.
II. A few chief Stations.
III. Several Reporting Telegraph Stations.
IV. Several Receiving Telegraph Stations.
V. A very large number of ordinary Stations.

I. *Meteorological Office.*

The functions of the Meteorological Office are to select and superintend the formation of new Stations; to select and distribute instruments; to issue forms for registration; to exercise supervision over all the Stations by visitation and correspondence; to receive and compile meteorological returns and publish deductions from them from time to time; to receive telegraphic reports and to issue regular weather bulletins and special warnings of expected storms.

II. *Chief Stations.*

The chief Stations, of which there should be three or more in each Province, are distinguished from good ordinary Stations, not so much in the perfection of their instrumental equipments, (although it is requisite that their arrangements should be exceptionally perfect) as in the *frequency* and *permanence* of the observations. At chief Stations the ordinary meteorological elements should either be recorded by a continuous automatic process, or the observations of these elements should be taken day and night, at equal intervals not greater than three hours; one object of this frequency being to determine the constants needful for reducing the observations made at longer and irregular intervals at ordinary Stations.

For determining *secular* changes and changes of *long period*, and also the *non-periodic variations*, in single years, and the corrections by aid of which the mean values of the elements found at Stations of short standing may be rendered comparable with those derived from a long series of years, it is requisite that the chief Stations should be *permanent*, although it is not essential that the system of observation should be equally onerous through all time.

The Superintendents of chief Stations, in addition to the primary duties just stated, will occasionally engage in services of an administrative kind, by aiding the central office in the distribution of instruments, &c, &c., in their respective districts.

It would be advantageous for the Superintendent to engage in the reduction of his own observations, and in other numerical operations bearing on Meteorology; but as this work can be done more economically at the central office, it should not be regarded as a part of his recognized duty.

The essential duties of the Superintendent of a chief Station are insufficient to occupy all his time; but they are so distributed over the day as to be altogether beyond the powers of one man, and very irksome even for two; hence he should have the partial services of two, or at least one assistant.

To secure the continuity of the observations, some pecuniary aid must be given; but it will usually be expected that the superintendent and his assistants will derive the principal part of their incomes from other sources. This however is a matter of detail on which no very precise rule need be laid down.

III. *Reporting Telegraph Stations.*

The duty of the superintendent of a reporting telegraph station is to send to the central office the readings of his instruments at stated hours, and also at extra times in certain prescribed circumstances. His instruments should be good and true; but refinement in the instruments and the observations is not requisite in the same degree as at the chief stations.

To secure regularity, a stipend must necessarily be attached to the office; but if observers be selected whose living is derived from employments which do not interfere with their work as observers, the stipend need not be large. In England the meteorological telegraph reporters are in nearly every case telegraph operators attached to railway stations; and if, as in England, the work is confined to sending reports of the *uncorrected* readings of the instrumentts (an arrangement which appears to be the safest as well as the most economical), our Railway station agents in Canada are for the most part admirably adapted for the service, excepting in those cases where the Railway business is excessive: but if the observations have to be corrected before they are forwarded to the central office, and if reports from other stations have to be compiled and published by the observer, the service becomes so onerous as to be altogether incompatible with the primary duties of a station master, and would need in every case to be in charge of a well salaried observer devoting his chief attention to this work.

IV. *Receiving and Publishing Telegraph Stations.*

At these stations statements relative to present weather sent through the telegraph from Head Quarters, warnings, or probabilities, are received and published by printed notices, by hoisting drums, or by other signals.

A receiving station *as such* need not be provided with instruments of any kind; and its duties may be performed by persons unacquainted with the processes of observing.

The duties of III and IV may be conveniently united in some cases; but there seems to be no good reason why this should be the rule, as the localities in which indications of approaching changes of weather first appear are not necessarily those whose commercial exigencies render a knowledge of probabilities most important.