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THE METEOROLOGICAL SERVICE OF CANADA

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ON the Director of the Dominion Meteorological Service and the staff at the Central Office devolve the following duties:

To establish and maintain meteorological observing stations throughout the country, in order that data may be available for an accurate determination of the climatology of the Dominion.

To publish accurate records of the weather which has prevailed during the various months and seasons of each and every year in all portions of the Dominion, that such records may be available for agricultural and immigration purposes, and in the future be available for the determination of climatic changes.

To issue forecasts of the weather to be published in the press. To issue storm warnings to all ports on the seaboard and the Great Lakes. To keep the public informed regarding the weather prevailing in all portions of the Dominion.

To furnish information regarding past weather to corporations and individuals who require the same for the settlement of lawsuits, etc.

To carry on original investigation—research work—regarding atmospheric physics, along such lines as may lead to a better understanding of meteorological phenomena and the laws which govern atmospheric changes. To investigate what connection may exist between solar physics and meteorological phenomena.

The maintenance of the observations at the magnetic observatory, now located at Agincourt, a village ten miles distant from the Meteorological Office, and the reduction of the results there obtained.

There are in the Dominion 360 stations where meteorological observations are taken. In the majority of instances the observing is performed gratuitously by persons who take an interest in such work and who have been supplied with the necessary instruments by the Government, but at some outlying stations where voluntary observations cannot be obtained, small gratuities are allowed. Then at some 36 stations scattered at about equal intervals across the Dominion small salaries are paid, the observers are obliged to conform to certain regulations, to observe at regular hours, never omit an observation, and twice each day telegraph a report to the Central Office.

The telegraph reports contain the following information: The height of the barometer (reduced to sea level

in order that all stations shall be comparable), the temperature of the air; the weather; the direction and velocity of the wind, clouds, and rainfall, if any. These reports are forwarded from Toronto to the U. S. Weather Bureau at Washington, which bureau, in exchange—there is complete reciprocity in the weather reports—supplies the Canadian service with some 50 or 60 reports from various parts of the United States.

A very comprehensive meteorological chart is thus provided twice each day on which to base forecasts. The observations are everywhere taken at about 20 minutes before 8 o'clock morning and evening 75th meridian time, the instructions being that reports shall be filed at the telegraph office at the exact hour. At 9.45 the weather map is usually ready for the forecast official to issue bulletins.

Now, as to these forecasts, experience combined with a natural aptitude for the work, has to the present time been found to be the chief essential for successful forecasting. The opinions formed are for the most part empirical, but they are not wholly so; thoroughly scientific methods are aimed at, and the probable effect of dynamical laws carefully considered.

The problems to be solved in meteorology, considering the subject in a general sense, as well as with regard to the improvement of the daily forecasts, are numerous and intricate; unknown quantities abound; we are living at the bottom of the atmosphere; not all this bottom has been explored, and its ever-changing conditions as regards temperature are kaleidoscopic; then again it is only but a few sporadic attempts that have been made to sound the atmospheric depths; to provide data for the solution of kinematics and mechanics. Why do not our universities assist? It cannot be that the subject is unimportant. It must be evident to all that a knowledge of the laws which govern climatic changes and the daily weather changes would be of incalculable value. Is it as Dr. W. N. Shaw, M.A., F.R.S., suggested in his address this autumn as president of the section of cosmical physics in the B. A. A. S., that the problems to be solved are most involved, and the reward of success probably small, while other paths of research may lead to wealth? He says: "And how does our academic organization help us in this matter of more than parochial or even national importance? There was a time when meteorology was a recognized member of the large physical family, and shared the parental affection of all pro-