

Section 5.—The Meteorological Service of Canada

See list at the front of this edition for special material, under the heading "Climate and Meteorology", published in previous editions of the Year Book.

METEOROLOGY RELATED TO THE SCIENCE OF AVIATION*

Introduction

In 1872, the Dominion Government authorized the organization of the Meteorological Service with headquarters at Toronto, in line with similar action being taken by other nations. This required the establishment of weather stations that could report observations to headquarters three times a day. These stations were located along the lower lakes, the St. Lawrence Valley and the Maritime Provinces. At the same time, arrangements were made to receive observations from a number of stations in the United States, Canadian observations being sent in return. This reciprocal arrangement has been maintained ever since and has continued to grow and expand with the expansion of both Services. By 1876 the Canadian meteorologists had acquired sufficient experience in the movements of high- and low-pressure systems to enable them to issue forecasts for the general public and for storm warnings.

Over the next fifty years or more, the problems were: (1) to increase the area from which observations could be obtained; (2) to explore the atmosphere to find out its physical conditions; (3) to investigate the physical processes operating in the atmosphere.

Observation Area.—The enlargement of the area from which observations could be obtained depended, in the early days, chiefly on the telegraphic facilities, and later on wireless; stations are now established over the North American Continent up to the rim of the Arctic where the number of stations has been gradually increased.

Atmosphere Exploration.—It was early recognized that it was necessary to obtain a knowledge of the physical conditions prevailing in the upper atmosphere before it would be possible to explain the processes operating therein. This exploration was commenced about the beginning of the century by sending up instruments attached to kites, which gave a record of the pressure, temperature and humidity. However, kites could not reach very great heights. To overcome this limitation, balloons were released with self-recording instruments attached and these gave a continuous record of pressure, temperature and humidity at all levels through which the balloon passed. Many of these instruments were recovered and from them the meteorologists were able to obtain a record of actual conditions in the upper atmosphere.

Such records, however, could not be used as a basis for forecasting since they were not recovered for several days—in some cases, months or even years. The advent of the aeroplane made it possible to obtain this information at once for forecasting purposes. Further progress was made with the development of short-

* Prepared under the direction of J. Patterson, O.B.E., LL.D., Director, Meteorological Service, Department of Transport, Toronto.