

PREFACE TO THE FIRST EDITION

It is now fifty-three years since the appearance of the great *Treatise on Meteorological Apparatus and Methods* written by Cleveland Abbe. Since then there has been no general textbook on the subject in English, and no summary other than the excellent articles in the third volume of Glazebrook's *Dictionary of Applied Physics*, published in 1923.

Thus there would appear to be a need for such a book at this time. My apology for undertaking to write it is that the circumstances of my occupation have kept me in touch with both British and American practice, not to mention the numerous improvements in meteorological apparatus which have originated in the Meteorological Service of Canada under the guidance of the present Controller, Mr. John Patterson.

This unofficial function of liaison officer is assumed the more willingly because I believe that the practice in each country contains much that is good, and not a little that can be improved by a study of other methods. Nevertheless it should be made clear that the opinions expressed in this book are entirely personal, and not necessarily the official views of the Service.

The plan of the book follows that of the lectures on meteorological instruments that I have been giving for the past six years to graduate students in the course of meteorology at the University of Toronto. I have made no attempt to include every available instrument, not even every contemporary design. I have tried to emphasize the underlying principles; and I have also set down a number of practical matters that a practising meteorologist ought to know. The history of the subject has been omitted with regret, in order to bring the book within the compass desired by the publisher. Fortunately there are copies of Abbe's *Treatise* here and there, and the student who is interested in the history of meteorological instruments should borrow one and read it. The scope of the subject has also been artificially restricted to include only those instruments which are found at *meteorological* stations, omitting radiation instruments (an immense field) and instruments for the measurement of the electrical and optical state of the atmosphere, as well as instruments for the study of atmospheric pollution. These omissions are justified by the fact that only a small minority of meteorologists ever have occasion to operate such instruments.

Much more could have been written on radiosondes; but in the present state of the technique it seemed better to abstain from lengthy discussions which might be rendered irrelevant by some unforeseen improvement.

While the book is intended primarily as a text, I hope it will be of use to all who make or use meteorological instruments. To facilitate further study, a number of references to original papers have been selected from the

enormous literature of the subject, but there has been no attempt to compile a bibliography.

In a few instances the mathematical demonstrations involve the simplest and most common differential equations, generally only elementary calculus. I believe that the non-mathematical parts of the book will be clear to those who do not wish to work through the theory.

The co-operation of several manufacturers has materially reduced the labour of preparing the illustrations. This is acknowledged in the captions of the illustrations concerned. In two cases (Figs. 60 and 125) it was thought better to make line tracings from the manufacturer's photographs. All the figures that appear without acknowledgment have been drawn or photographed by the author, in some instances using, with permission, drawings belonging to the Canadian Service.

I wish to thank the Chief of the United States Weather Bureau, and various American officials, especially Mr. A. H. Mears, Chief Engineer of the Instruments Division, for the most whole-hearted co-operation, without which the preparation of this book would have been very much more difficult. Finally I wish to thank Mr. J. Patterson, Controller of the Meteorological Service of Canada, Mr. A. Thomson, Assistant Controller, and my colleague Mr. R. C. Jacobsen, for helpful criticism of various parts of the manuscript.

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W. E. K. M.