

assembled, as this was, from pieces done at different times by different translators. Place-names follow several different systems of translation or transliteration, and are often misspelt in addition. Very oddly, some initial Y's are printed as G's (Genisey and Gana, for instance, for Yenisey and Yana). The old bugbear of re-transliterating Western names from Cyrillic has led to Elzmir for Ellesmere (p. 265), Kanfi for Cagni (p. 117), Quarayaq and Qariaq for Qarajaq (p. 124, 125), and many other curiosities. Table 21 (p. 56) contains three numerical errors, three misprints and a misspelt place-name.

These mistakes are just some of those found at a few spot checks. To discover them all would be a long job, for clearly there are very many. One cannot escape the conclusion that they rob the translation of much of its value. No doubt the careful checking and editing needed to make it really reliable would have been so costly that, had this been proposed, the complete translation would quite probably never have been published at all. And that, in spite of everything, would have been a pity. At least the glaciologist with no Russian can now get some impression of any section of Zubov's book of interest to him. But if he wishes to follow up a particular point, he would do well to have the original checked over again by a Russian speaker.

TERENCE ARMSTRONG

L. DUFOUR and R. DEFAY. *Thermodynamics of clouds*. Translated by M. Smyth and A. Beer. New York and London, Academic Press, 1963. xiii, 255 p. (International Geophysics Series, Vol. 6.) \$10.

To those of us who take delight in a physical interpretation of the various forms of water manifest in Nature, the process of change of state is, perhaps, the most interesting. The initiation of one phase in another, for example cloud drops or snow crystals from the vapour, ice from the liquid, or Tyndall flowers from the solid occurs either at small centres formed by random molecular motion, or at small foreign particles which happen to be present. It is possible, in principle, to describe these events in thermodynamic terms providing we introduce the interfacial tension and surface area as functions of state. In the first six chapters of this book the authors discuss this thermodynamic formalism in some detail. This is followed by three chapters concerned with the conditions under which drops of water, aqueous solutions and ice crystals can be in equilibrium. The book concludes with a discussion of the theory of homogeneous nucleation of water drops and ice crystals, and its comparison with experiment.

In as far as the book is concerned with equilibrium conditions and homogeneous nucleation, it has a somewhat limited interest for those concerned with real clouds, which form under conditions which are often far from equilibrium, and where nucleation processes may be dominated by the presence of foreign particles of variable concentration. Sufficient effort has not been given to a critical appraisal either of the thermodynamic approach itself, or of the experimental evidence in the section on nucleation—which is a field notorious for spurious results. As a result this book will probably appeal only to a small number of specialists in the field.

J. HALLETT

H. WEXLER and others, ed. Antarctic research; the Matthew Fontaine Maury memorial symposium. . . . [Edited by] H. Wexler, M. J. Rubin and J. E. Caskey, Jr. *American Geophysical Union. Geophysical Monograph* No. 7, 1962, x, 228 p. \$10.

ONE of the symposia held under the auspices of the tenth Pacific Science Congress (Hawaii, 21 August–6 September 1961) commemorated the instrumental part played by the American scientist, Matthew Fontaine Maury, in pioneering “co-operative international studies of the oceans, the atmosphere and polar regions”. The intention of the symposium was to review all aspects of Antarctic research initiated during the International Geophysical Year, 1957–58, and to present the more outstanding results of work carried out in that period.

The 24 papers included in this volume are naturally divided into two main sections: geography, solid earth and upper atmosphere; meteorology, oceanography and glaciology. Although most of the papers are of no direct concern to the glaciologist, ten of them contain important glaciological information in a concise and easily readable form.

In his paper "Glacial and subglacial geography of Antarctica", C. R. Bentley reviews all the available results of geophysical field-work that has been carried out to delineate the surface profile of the Antarctic Ice Sheet and the configuration of the ice-covered bedrock. His data on ice surface and rock surface elevations are admirably summarized in two diagrams and the sources of the data are also tabulated. One of the important aspects of this paper is adequate referencing which will undoubtedly help future researchers on this topic.

Some aspects of the Pleistocene glacial geology of south Victoria Land are discussed by R. L. Nichols in "Geology of Lake Vanda, Wright Valley, south Victoria Land, Antarctica". His acute observations in Wright Valley confirm the four-stage Pleistocene glaciation also recorded by others elsewhere in Victoria Land, and he draws attention to the significance of elevated lacustrine features associated with the saline Lake Vanda.

"The amount of ice on planet Earth", a topic that has occupied the attention of glaciologists over the past century, is re-examined critically by E. C. Thiel in the light of over-snow geophysical traverses undertaken in Antarctica by five nations. The accurate determination of the volume of the Antarctic Ice Sheet and associated ice shelves is supported by five well-executed colour diagrams. Thiel estimates that 89.4 per cent of the 26.7×10^6 km.³ of ice on the Earth are stored in Antarctica and, if this melted suddenly without isostatic compensation, sea-level would rise 66.3 m. P. A. Shumskiy, in his paper "Glaciology of Antarctica", is more concerned with the mathematics of the surface profile of the Antarctic Ice Sheet and its relationship to the subglacial bedrock configuration.

R. L. Cameron and C. B. Bull describe their detailed experiments near Wilkes station in "The thermal diffusivity and thermal conductivity of glacial ice at Wilkes station, Antarctica". The somewhat higher values obtained for these physical properties of ice seems to be explained by thermal conductivity and diffusivity being higher at lower temperatures, impurities within the ice, convection in air bubbles, the effect of thermal radiation within the ice and the absorption of solar radiation. "The stratigraphic distribution of particulate matter in the firn at Byrd station, Antarctica" is described by E. W. Marshall. His careful description of the techniques used to obtain quantitative results are as valuable as the results themselves, and he has adequately demonstrated that these techniques can now be used in the field because of the lighter weight of the equipment.

The physical characteristics, nourishment, wastage, movement and mass balance of ice shelves are described by J. H. Zumberge and C. Swithinbank in "The dynamics of ice shelves". Ice shelves, which are a particular feature of the marginal areas of Antarctica, have received a great deal of attention in recent years, not only because of their unusual features as an expression of the outflow of ice from an ice sheet but because of their importance as a geological agent especially during the Pleistocene glaciation. This paper summarizes and refers to all current knowledge of ice shelves; it should serve as a useful basis for later work.

Glaciological papers which are not concerned with Antarctica include "New Zealand glaciology" by R. P. Goldthwait and I. C. McKellar, and "Argentine glaciology" by B. S. Colqui. The preliminary results of basic observations on some New Zealand glaciers are recorded in the first paper. An inventory of Argentine glaciers is included in Colqui's paper, which also gives an account of the progress of glaciological work.

This small but extremely informative volume is well edited and printed, and it is truly a credit not only to the editors but also to the individual contributors. The idea of holding such a symposium was conceived by the late Harry Wexler, whose deep interest in and genuine enthusiasm for "Antarctic research" will be remembered by all who knew him. To him this volume will be a lasting memorial.

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