REVIEWS

N. N. Zubov. *Arctic ice*. San Diego, U.S. Navy Electronics Laboratory, [1963?]. vi, 491 p., illus., maps.

At last one of the fundamental works on floating ice is available in English. The work is Zubov's *L'dy Arktiki* [*Ice of the Arctic*], published in Moscow in 1945; and the translation, which was done piecemeal at various times by the U.S. Navy Hydrographic (now Oceanographic) Office and the American Meteorological Society, has been assembled and published by the U.S. Navy Electronics Laboratory.

Zubov insisted (he died in 1960) that his book was neither a textbook nor a monograph, but his own personal opinions, based extensively on his own work, about which he was becomingly modest. But in effect it has been both a textbook and a monograph, for Zubov skilfully brought together the pertinent findings of Nansen, Malmgren, and others, and, joining them with his own wide and long studies on the subject, produced a book which has had no equal in any language. It covers all floating ice: sea ice, river and lake ice, and icebergs, but sea ice naturally occupies far the greatest amount of space. The arrangement of the material is logical and makes use easy (in spite of the absence of an index). Zubov was an oceanographer, and properly included three chapters of straight oceanographical background. His other nine chapters are concerned with types, properties and behaviour of floating ice. His bibliography contains 179 items, 31 of them his own works.

Important as this book has undoubtedly been, much research has been done since it was written. Although published in 1945, the text was completed in 1943, and is in part a revision of an earlier work, *Morskiye vody i l'dy* [*Sea water and ice*], published in 1938. Yet the interest of the work is by no means only historical. Not all of the branches of sea-ice study have progressed notably in the last two decades, and in some, Zubov's statement is still a valid summary of existing knowledge. In any case, the need for a translation is justified by the frequency with which later Soviet glaciologists refer to the original in their own work.

The English edition, however, although well produced from the technical viewpoint, calls for criticism of both the translation and the editing. The admittedly difficult problem of rendering ice terms from the Russian, where they are numerous, well defined, and generally used with precision, into English, where there are fewer such terms and there is still argument about some of the definitions, has not been faced satisfactorily. The Russian word *l'dina* would be correctly translated as "ice floe", but the term used on various occasions (for example, p. 260) is "ice beam", which can only cause mystification. *Torosheniye* is sometimes correctly rendered as "hummocking", but often also as "heaping" (p. 254), which is less happy, and sometimes as "jamming" (p. 260), which is definitely misleading because that happens to have a rather different technical meaning. Confusion also results from the fact that the reader cannot tell whether the English words used are the correct equivalent term in English, or just a direct translation of the original. Thus the phrase "pack ice" is used twice in different meanings on one page (107): as a translation of *plovuchiye l'dy*, for which it is the correct English equivalent, and as a translation of *pakovyy led*, for which the correct English equivalent would have been "polar ice". Apart from ice terms, there are straight mistakes of translation: *moshchnost'* should be "thickness", not "power", in the contexts found here (p. 120, 289), *guba* should be "bay", not "lip" (p. 267)—an astonishingly elementary mistake. Some phrases are in a sort of Anglo-Russian which is difficult, if not impossible, to follow. Thus "The chief formation of ice hummocks from marginal crushing or from complete break-up depend on the physical and especially on the mechanical properties of ice" (p. 261) would be easier to grasp if translated "The preferential formation of hummocks of either the fractured type or the crushed type depends on the physical and, especially, on the mechanical properties of the ice". Such sentences are far from uncommon.

Nor is there much evidence of the sort of editing that was clearly called for in a translation

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.