REVIEWS

E. R. POUNDER. *The physics of ice.* Oxford, etc., Pergamon Press, 1965. vii, 151 p., illus. (The Commonwealth and International Library. Geophysics Division.) 17*s.* 6*d.*

GLACIOLOGY is in dire need of a textbook. To do justice to all the aspects of this composite discipline it will take an author of rare versatility. Until he comes forth, any treatise on ice is welcome. In his preface, the physicist Pounder admits to a professional bias in the title of his book and proceeds to demonstrate that, if there is a bias, it is in the contents.

Ch. v–vii, constituting about half of the book, deal with the physical nature and properties, the molecular structure, crystallography, elasticity, strength, rheology, friction, density, and the thermal and electrical properties of both pure and salty ice. This concise and well-organized summary, written at about the senior undergraduate level, is clearly the most useful section.

The other half, ch. i–iv and viii, treats some geophysical aspects of ice and, if anything can be criticized, it is the seemingly random coverage and topical imbalance of this part. After having heard of the rheological nature of ice (ch. vi.1) the reader is not told of the whereabouts and rheological state of 99 per cent of the ice on this planet, and Greenland and the Antarctic are only mentioned as cold places which produce icebergs. If space was a limitation, then much of it could have been saved by omitting an elementary derivation of the diffusion equation and a lengthy discussion of some basic features of heat conduction which are not peculiar to ice. The whole complex of interactions between natural ice sheets and their meteorological environment is cursorily dealt with on three pages, while seven of them are devoted to ice-breakers and could have been used profitably for at least a passing mention of some of the more significant ramifications of ice, such as the ice phase in the atmosphere, snow and snow metamorphism, the statistics of ice occurrence, glacier flow, or permafrost.

On p. 8 it is proposed that anchor ice forms by radiational cooling of the river bed, a long-lived idea (probably since H. T. Barnes, 1928) which should not have survived a second thought by the author.

The right-hand side of the diffusion equation (56, p. 136) should read $\rho(\theta)\, C(\theta) \frac{\partial \theta}{\partial t}$ and not $\frac{\partial(\rho C \theta)}{\partial t}$. It denotes the change of enthalpy per unit volume which is, by definition, $dh \equiv \rho c_p \, d\theta$, and not $d(\rho c_p \, \theta)$.

Nevertheless, the book is a worth-while addition to glaciological literature, particularly useful to the glaciologist unfamiliar with the basic physics of sea and lake ice. Its lucid and readable style will make it a stimulating introductory text for students. It is simply but neatly produced and contains numerous instructive line drawings and three photographs.

N. UNTERSTEINER

A. MARUSSI. *Geophysics of the Karakorum.* Leiden, E. J. Brill on behalf of the Italian National Council of Research, 1964. xvii, 242 p., illus. (Italian Expeditions to the Karakorum (K^2) and Hindu Kush. Scientific Reports. 2. Geophysics. Vol. 1.) Guilders 58.

THIS book records and discusses the geophysical results of expeditions to the Karakoram carried out under the leadership of Professor Ardito Desio since 1953; the data obtained from 1961 onwards are to appear in a subsequent volume, and those included in the volume under review were obtained during nine months of field work in 1954 and 1955.

The only glaciological work undertaken by the expeditions was an estimation of the thickness of three glaciers (Kuthiah, Godwin Austen and Baltoro) by measurement of their