Konferenzen to summarize past accomplishments, identify priorities and technological needs, and make recommendations for future work. In short, it is a comprehensive review at the state-of-the art level. The book comprises 20 papers written by some of the most respected scientists in the field. There are sixteen background papers on such topics as the dating by physical and chemical seasonal variations and reference horizons (C. U. Hammer), ionic deposits in polar ice cores (H. B. Clausen and C. C. Langway, Jr.), past environmental long-term records from the Arctic (W. Dansgaard and H. Oeschger), long-term environmental records from Antarctic ice cores (C. Lorius and others), and the deposition mechanisms of atmospheric contaminants to snow surfaces (C. I. Davidson). At the workshop the participants were divided to examine the following questions: 1) how do glaciers record environmental processes and preserve information?; 2) what anthropogenic impacts are recorded in glaciers?; 3) how can an ice core chronology be established?; and 4) what does the long-term ice core record tell us about global changes in the environment? Four important review papers with similar titles complete this book.

It is a book to be highly recommended and an essential reference for ice core researchers in the years to come. The price is reasonable for a well-illustrated hard-cover book. (Jefferson Cardia Simões, Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER UK.)

ANTARCTIC MICROBIOLOGY

MICROBIAL ECOSYSTEMS OF ANTARCTICA. Vincent, Warwick F. 1988. Cambridge, Cambridge University Press (Studies in Polar Research). 304 p, illustrated, hard cover. ISBN 0-521-32875-6. £37.50.

The 1980s have seen accelerating increases in our knowledge of micro-organisms in the Antarctic. Emerging from a phase of species isolation and description, Antarctic microbiological research is now concerned with processes of community function and with biochemical and physiological adaptations to the singular nature of Antarctic environments. Warwick Vincent has compiled a summary and synthesis of knowledge up to 1988, drawing upon some 500 sources.

The book systematically considers eight major habitat types covering the glacial, marine, freshwater and terrestrial. Each chapter treats environment, microbial communities, microbial processes and trophic structure. Keeping the book to a reasonable size has meant each main ecosystem being limited to about 20 pages (except 'Lakes and Streams', which get a double share), so the information provided is necessarily selective rather than comprehensive. There is emphasis upon studies on continental high longitude Antarctica, understandably from a New Zealand author, and rather less upon those on the Antarctic Peninsula and sub-Antarctic islands with which European scientists are perhaps more familiar. In an informative chapter on microbial strategies, Vincent rightly emphasises the importance of adaptations to diel, seasonal or irregular fluctuations in environmental variables, including a useful discussion on the value of Arrhenius curves in the study of temperature relations. Regrettably the interesting applications of Ratkowsky's equation by Franzmann and others at the University of Tasmania are not mentioned in this context.

The book concludes with a consideration of medical and pollution microbiology in the Antarctic, a huge subject in itself which can only be of increasing significance in future years. A useful glossary and compendium of environmental data are appended. This book is not a critical research review, but serves the probably more valuable function of making its subject accessible to the wider readership of general microbiologists and environmental scientists; it will also find a place in graduate and undergraduate teaching. It is highly enjoyable and readable. (Humphrey G. Smith, Biological Sciences, Coventry Polytechnic, Coventry CV1 5FB UK.)

UNDERSTANDING ICE

LIVING ICE: UNDERSTANDING GLACIERS AND GLACIATION. Sharp, Robert P. 1988. Cambridge, Cambridge University Press. 225p, illustrated, hard cover. ISBN 0-521-33009-2. £15.00, $29.95.

In this book Robert Sharp, Professor Emeritus at the California Institute of Technology, gives the reader the benefit of his 40 years of research and teaching experience in glaciology and glacial geology in a nontechnical style of writing. The purpose of the book is "to touch upon some basic aspects of glaciers, their behavior, and the principal ways they shape the landscape. Information is presented in an informal, conversational manner ...". The author has done the job well. The title *Living ice* is an indication of the manner in which one can associate with the dynamics of glaciers and the work they perform. Indeed, glaciers are hard workers, as evidenced by the products of their toil.

The book is, in some respects, a takeoff from *Glaciers*, an earlier publication of Sharp's published in 1960 by University of Oregon Press. Many of his excellent photographs and illustrations appear in both. *Living ice* is well illustrated with 76 black-and-white and eight colour photographs, most of them taken by Sharp and his colleagues to show examples of glaciers and related features in mainly Alaska, Yukon Territory and Blue Glacier in Washington, USA. A useful aid throughout the text is the boldface type for terms defined later in the glossary, which lists about 360 of them. An annotated list of 13 references is included for supplementary reading.

The book consists of nine chapters, beginning with how a glacier is made (take a lot of snow, as much as possible), followed by chapters on the types of glaciers and how they move. Later chapters are on erosion and its products. Each chapter concludes with a summary. The final chapter deals with the past and the future; that is, the most recent continental ice ages and their proposed causes, and what the future holds.

The conversational style of writing is especially appealing, enhanced with numerous similes and metaphors