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Polar Microbiology – Life in a Deep Freeze

R.V. Miller & L.G. Whyte
American Society of Microbiology, Washington DC, 2012.
ISBN 10 1555816045. 416 pp. £120.

The editors entitle the preface of their book “An Exciting Era in Polar Microbiology”. This is a fair statement because of the amount of information available, and the development of techniques. In addition recent concerted efforts to co-ordinate polar research have all reached a stage where the synthesis of the subject can be attempted with the aim of developing understanding from a whole book that is greater than the sum of the individual parts. This book takes a large step in this direction. This is a well presented book the origins of which are in the 2008 International Polar and Alpine Microbiology conference held in Banff, Canada. It is not, however, a conference proceedings. The individual chapters have been commissioned to provide an overview of the subject and draw together research from the International Polar Year in 2008. The book has 39 contributors with a strong North American presence. The book is divided into four sections: I. Microbial Diversity in Polar Environments, II. Adaptations and Physiology of Cold-Adapted Microorganisms in Polar Environments, III. Ecology and Biogeochemical Cycling of Polar Microbiology Communities, IV. Challenges to Living in Polar and Subpolar Environments, and comprises 14 separate chapters. The transition from consideration of the diversity of different groups, to adaptations and physiology, to ecology and then to future challenges offers a logical and structured approach to the subject which works well, presumably because the individual authors properly understood their mission and the editors worked hard to ensure good consistency and continuity between the chapters. In addition to leading the reader through the subjects, the individual chapters can stand alone, which is a useful attribute. Polar microbiology is an emerging set of disciplines potentially covering both the aquatic and terrestrial ecosystems which offer habitats where biological activity and processes are governed by extremes of water activity, and which also spans the extremes of latitude and altitude. Therefore polar microbiology spans a full range of taxonomic and physiological diversity. This book covers the topics well, although there are inevitably some gaps - for my part, I would have welcomed greater coverage of the protozoa and the algae, but this is a minor observation rather than a major criticism recognizing the fact that information and investigations on these groups are very sparse. The book is well-referenced, covering both the modern literature consistent with many of the authors being current researchers in their respective fields, and the older literature which is becoming increasingly difficult to

access. The book is also strengthened by careful indexing. Of course, I have not checked every entry, but the samples I did check were accurate and helpful. This is to the credit of the editors because multi-author books often suffer from weak indexing, but not so in this book. So would I recommend it? I certainly think it has a place in institutional libraries and would be interesting to advanced level undergraduate and specialist postgraduate students and researchers.

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Life in Antarctic Deserts and other Cold Dry Environments: Astrobiological Analogs

Editors P.T. Doran, W.B. Lyons and D.M. McKnight
Cambridge University Press (Cambridge Astrobiology Series), 2010.
ISBN 978-0521889193, 20 pp. £65.

This book, the 5th in the Cambridge Astrobiology Series, provides a broad review of research in cold and dry Antarctic environments, specifically those in the McMurdo Dry Valleys (MDV), with an astrobiological perspective. Terrestrial analogues are locations on Earth that share physical or chemical conditions or features with other planetary bodies, either at present or in the past. The study of analogues is a fundamental aspect of comparative planetary science and astrobiology. As Sun *et al.* indicate in their chapter: “Studies of microbial ecosystems in analogue environments are the only way to provide a realistic basis for speculations of extraterrestrial biota”. In essence, the search for extraterrestrial life begins here on Earth. The cold, dry conditions and various landforms concentrated in the MDV are widely considered to be analogous to places on Mars today or, in some cases, in the past. As well, numerous other terrestrial environments present features that are analogous features on Mars or other planetary bodies.

This is a long-overdue summary of research in the MDV and their study as analogues of Mars. Readers may be surprised to learn that NASA’s Jet Propulsion Laboratory had an active soil microbiology programme in the 1960s and this included fieldwork in the MDV. Some of NASA’s earliest grantees, including Wolf Visniac, also tested their life-detection instruments in the MDV. Despite the long recognition of the MDV as analogues to Mars and a half-century of astrobiology-related research there, this is, to the best of my knowledge, the first such broad synthesis of research in the MDV in the context of astrobiology.