consequence, Graham suggests that the distinction between Antarctic scientific research and commercial activity is extremely cloudy and may as well be considered together in regard to equitable benefit-sharing and environmental protection. Rather, bioprospecting could be considered as 'information harvesting' and he points out that merely controlling access to minute quantities of Antarctic biological resources cannot deliver either equitable benefit-sharing or environmental protection.

Towards the end of the book the editors provide a synthesis which highlights the different issues posed by bioprospecting in Antarctic. This chapter does not present easy solutions, and freely admits that the bioprospecting issue has '*no referee, apparently no rules and uncertainty whether some conventions of behaviour are relevant or not*'. However, their clear listing of effects that bioprospecting may have on the Antarctic Treaty System may be a useful blueprint with which to initiate more concerted explorations of the issues in the future.

The last chapters gives a brief summary of the sessions held by each of the breakout groups at the meeting, namely '*Science and Commercial Issues*', '*Environment, Ethics and Equity Issues*' and '*Legal Issues*' and, since they cover material well presented in the chapters, could have been omitted without loss. The book ends with an extensive appendices section (82 pp) that contains copies of several Antarctic Treaty System and international treaties and conventions that are referred to in the book. Many of these legal documents are readily available on the internet, so it may have been adequate to refer to reference sources rather than include this information. The book ends with details of the 'Bioprospecting in Antarctica' workshop including a list of participants.

The editors must be congratulated on pulling together the wide-range of views and issues associated with Antarctic bioprospecting in such a comprehensive and reader-friendly manner. I know of no other resource that deals with the topic in such a complete and thought-provoking way and recommend it to anyone requiring an informed insight into Antarctic bioprospecting.

KEVIN HUGHES

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Antarctic Ecology: From Genes to Ecosystems. Part 2: Evolution, Diversity and Function

Edited by A.D. Rogers, E.J. Murphy, A. Clarke & N.M. Johnston
Philosophical Transactions of The Royal Society Series B, **362**, 2183–2378, 2007.

If science books are on the wane, then thematic issues of journals seem very much to be in vogue. A healthy science community needs opportunities to compile, critique and synthesise understanding of key topics, and thereby identify those which have been satisfactorily resolved, those which have not, and those which are genuine priorities for future work. When done well attaining a breadth and depth which lies beyond individual review papers, this is a role which historically books, both monographs and edited volumes, have long and effectively fulfilled. However, with research funding, promotions and esteem for many scientists depending increasingly heavily on the impact factors of the journals in which they publish and the citations that their papers accrue, a heavy selection pressure has fallen against this approach. Short-sighted as this pressure undoubtedly is when applied so severely, one rather obvious response is to publish such work in the journals themselves. The solution is far from perfect, but well executed it should make for many stimulating thematic issues.

Antarctic Ecology: From Genes to Ecosystems. Part 2: Evolution, Diversity and Function is the second of two thematic issues published in *Philosophical Transactions of The Royal Society Series B*, aiming to integrate new developments in understanding of the evolution and functioning of Antarctic ecosystems. The first (Antarctic ecology: from genes to ecosystems, Part 1 *Philosophical Transactions of The Royal Society Series B*, **362**, 3–166) was concerned with patterns of abundance and diversity and ecosystem function at large scales in Antarctic marine ecosystems, evidence for climate change, and its likely consequences in Antarctica. The present volume, edited by the same quartet, addresses "the evolution of the terrestrial and marine biota of the Antarctic, and explores the relationships between genome function, physiology and ecology".

With nine main papers plus a brief introduction from the editors, this volume is perhaps a little shorter but not that different in size from a typical edited science book. It includes amongst the contributors several key active researchers in the field of Antarctic biology. Taking them simply in their sequence in the volume, these papers consist of reviews of the molecular evidence for the evolution of the Antarctic biota and determinants of its spatial distribution (Rogers); the ecophysiology of the Antarctic icefishes (Cheng & Dietrich); thermal specialization of Antarctic ectotherms (Pörtner *et al.*); molecular diversity and genomics of Antarctic marine microorganisms (Murray & Grzymski); biodiversity and ecology of Antarctic lakes (Laybourn-Parry & Pearce); impacts of global changes on above- and below-ground biotic interactions in the Antarctic Dry Valley systems (Wall); spatial and temporal variability of terrestrial Antarctic biodiversity (Chown & Convey); fisheries in the Southern Ocean (Kock *et al.*); and environmental forcing and marine predators in the Southern Ocean (Trathan *et al.*).

This coverage does not, and makes no claim to, provide a comprehensive overview of the evolution of the Antarctic

biota, nor of the relationships between genome function, physiology and ecology in the Antarctic. Rather, it comprises a series of typically well-written, well-informed, and well-reasoned papers, conveying foremost the fascinating depth of current understanding of some key issues in Antarctic biology. They make good reading both for those directly concerned with Antarctic biology, and those less so, and would provide a nice basis for a graduate class in the topic. One imagines that some of these reviews will become standard citations for the issues in hand, and that those citations may well have long half-lives.

This said, to someone who is not deeply immersed in the Antarctic literature, these papers seem to beg one overriding question. Why does Antarctic biology sometimes seem to remain so disconnected from much of biology at large? Time and again, papers in this volume provide convincing arguments as to the wider implications of Antarctic science, particularly in the context of some of the pressing issues facing humanity (most obviously climate change). And yet, time and again, I found myself wondering why connections were not being drawn more strongly to the wider literature, and why only by reading a volume explicitly on Antarctic biology was I finding some of the best examples there seem to be to illustrate my lectures and writing on biodiversity at large. Perhaps addressing those issues would also make for a good thematic journal issue (if not an edited book).

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Deep-Time Perspectives on Climate Change: Marrying the Signal from Computer Models and Biological Proxies

Edited by M. Williams, A.M. Haywood, F.J. Gregory & D.N. Schmidt
The Geological Society, 2007.
ISBN 1-86239-240-4, £95 (fellows £57)

In recent years, the development of new proxies, approaches and data interpretation techniques has significantly improved the possibilities and accuracy of reconstructing past environments from geological records. Hand-in-hand with this progress a rapid increase in the number of climate simulations is available from a broad range of General Circulation Models (GCM) which contributes to a much better understanding of future and past climate change. Although highly complex, climate models still represent a simplification of the real world and their performance and reliability have to be validated using proxy data from past climate records. Bringing together the two groups of "data collectors" and modellers and facilitating their interaction is the major aim of this book on deep-time perspectives on climate change. The high-quality printed book, nearly 600 pages thick, unites climate modelling, palaeoceanography and palaeontology to address fundamental events in the climate history of the Earth over the past 600 million years. However, the vast majority of the 26 peer-reviewed articles are related to the last 70 million years, clearly reflecting how data availability and our knowledge about the Earth System decreases the further back we go along the geological time scale.

The book focuses on different aspects of palaeo-environmental science such as proxy methods, the controlling mechanisms of climate change, extreme climate modes and climate transitions. Most contributions are written in a review-style, which makes this book a valuable source for up-to-date literature search and global palaeo-data syntheses. Examples of such very useful literature and data compilations are a comprehensive review of Phanerozoic climate modes, controls and geological proxies by Vaughan, a review of the Early Permian fossil record of Gondwana by Stephenson *et al.* and a discussion of the role of marine organic carbon reservoirs during the Early Palaeozoic Icehouse by Page *et al.* Price & Grimes and Hart bring together terrestrial and marine geological records documenting Late Cretaceous climate variability. For the Neogene, Dowsett presents a summary of Pliocene global sea surface datasets, whereas Fauquette *et al.* and Jiminez-Moreneo *et al.* provide a more regional compilation of Miocene and Pliocene vegetation data for the Mediterranean. A meaningful discussion on the potential use and application of selected palaeoceanographic proxies in reconstructing past sea surface conditions can be found in Lawrence *et al.* (alkenones), Kucera & Schoenfeld (foraminifera), and Lear (Mg/Ca palaeothermometry).

Many contributions in this book concentrate on geological transitions or climate extremes and discuss their controlling mechanisms. Vannier describes the Early Cambrian origin of complex marine ecosystems and the role of ecosystem-build-up processes versus non-biological factors. Armstrong compares Cenozoic and Ordovician glaciation and proposes a unified theory, which rejects the axiom that Ordovician glaciation was unique in Earth History. Twitchett discusses triggers for mass extinction at the Permian-Triassic boundary and critically reviews the runaway greenhouse model. The termination of the Mesozoic, characterized by another mass extinction at the Cretaceous–Tertiary boundary, is surprisingly not the subject matter of a separate contribution in this book. Cenozoic changes from greenhouse to icehouse climate conditions are presented in a considerable detail. Unfortunately, most Paleogene to Neogene contributions focus on palaeoceanographic proxies only, whereas compilations of terrestrial palaeobiological datasets are mostly restricted to the Mediterranean. Sluis *et al.* and Coxall & Pearson, respectively, present a thorough and well-written review of