have become increasingly recognised as important agents in the formation and diagenesis of rocks, especially the finer-grained sediments, including some important mineral deposits. Applied topics of increasing significance such as bioremediation are also well covered. There are few competing books and most of these are unsuitable for undergraduate courses, as they are largely in the form of conference proceedings. The recent advances in microbial biochemistry and genetics provide a wealth of new information on microbial activity with many new opportunities to understand the influence of microbes on geological processes. Kurt Konhauser's new book goes a long way in providing a concise review of this expanding topic. The first two chapters provide a well-illustrated introduction to microbial structure and metabolism. Students with some basic knowledge of chemistry and biology will have no problem understanding the principles involved. Processes such as membrane ion transport and redox reactions, so important to geomicrobiology, are particularly well explained and references to more detailed work are provided. I find his approach to the subject uncluttered. It is presented as a logical progression from the basic biology to the processes of sediment microbial ecology and biomineralization.

The book is well written for the most part, allowing newcomers to the subject to quickly grasp the relevant geomicrobial concepts. Although some of the diagrams have typographic errors, and in the tables and formulae there are occasional mistakes in the chemical symbols, they are for the most part clear and directly relevant to the text. Konhauser concludes with a chapter on Early Microbial Life. While it contains many references to geomicrobial processes, it is slightly at odds with the rest of the book and is a topic which is perhaps best considered in a wider context. Nevertheless, with its extensive references and lucid writing, this book is certainly one for the library shelf.

Allan Pentecost

PABIAN, R., JACKSON, B., TANDY, P. & CROMARTIE, J. 2006. *Agates. Treasures of the Earth*. 184 pp. London: The Natural History Museum. Price £16.99 (hard covers). ISBN 0 565 09195 6.
doi:10.1017/S0016756807003706

Agates are a fascinating and beautiful form of cryptocrystalline quartz and are very popular with gem and mineral collectors and indeed with the general public. This book is aimed at this popular market and is lavishly illustrated, but also contains something for the professional interested in the formation of silica. The volume gives an introduction to agates and then covers the major collecting regions with some emphasis on deposits in Britain and the United States of America.

The volume starts with a very brief introduction and a section on nomenclature that covers a plethora of variety and trade names applied to agates. Agate itself is of course merely a variety name for banded cryptocrystalline quartz. In the section entitled 'What is an agate?' Roger Pabian and his co-authors try to explain in simple terms the formation of agate. This is a complex subject and many aspects remain unresolved. What is clear is that agates crystallize from a gel and generally crystallization occurs a low temperature of 40 to 50 °C. The general process of formation of the banding is well explained by a set of excellent schematic diagrams. This section is followed by an illustrated guide to the different types of agate with some beautiful examples, including a photograph of an iris agate, a type of agate in which the banding is so fine and regular that the microstructure acts as an optical diffraction grating. The remainder of the book is largely devoted to information about the localities of agate deposits. Again this section is illustrated with some excellent specimens.

My only reservation is the inclusion of photographs of samples for which there are no locality data. The lack of accurate locality data for samples is the bane of museum curators' lives. A sample without accurate locality data is largely worthless and it sets a bad example for collectors to include photographs of material without proper data.

Overall this is a nice little book, the design and layout is excellent, and although aimed at the popular market, the authors are to be congratulated for including a fairly extensive bibliography. I am sure that this book with be popular with collectors and the general public.

Allan Pring

KENNEDY, B. A. 2006. *Inventing the Earth. Ideas on Landscape Development Since 1740*. xi + 160 pp. Malden, Oxford, Carlton: Blackwell Publishing. Price £50.00 (hard covers), £19.99 (paperback). ISBN 1 4051 0187 3; 1 4051 0188 1 (pb).
doi:10.1017/S0016756807003731

This book provides a commentary into how the science of geomorphology has developed since the 18th Century. The emphasis is on key episodes and individual scientists who are perceived to have contributed to the understanding of Earth surface processes and the resultant morphology of planet Earth.

The book begins with a succinct account of how scientific explanations (paradigms) are invented and some of the problems that are inherent with paradigm shifts. References are made to key natural philosophers (e.g. Kuhn/Popper) and the scientific principles/methodologies to which Earth scientists typically adhere. These philosophical and scientific principles are well illustrated with numerous examples of major geoscience paradigms (e.g. continental drift) and in my opinion make this chapter one of the more accessible introductions to the scientific methodology of geosciences around.

Early chapters of the book try to tackle some of the important questions that early geoscientists in the 18th and 19th centuries grappled with. For example, the uncertainties concerning the age and origin of the Earth are eloquently presented, outlining the initial influence and conflict with religious beliefs and their contrasts with the physical and natural scientific approaches of scientists such as Buffon, Hutton, Lyell and Kelvin (Chapter 2). Material is written with a balanced perspective and the reader certainly gets a feel for a time of scientific debate littered with claims, dismissals and counter claims. Hutton and Lyell receive a fairly detailed treatment (Chapter 3), outlining the geomorphological context of their theories and principles that are now perceived to be the birth of modern Earth sciences. The role of ice and its associated climate changes for sculpting landscapes is highlighted using the work of Louis Aggasiz (Chapter 4). The contributions of Charles Darwin to geomorphology (Chapter 5) are stated as 'genius' based upon his numerous observations of the forces of glacial, fluvial and marine agents for landscape erosion and not just his work on evolution.

The middle part of the book documents the advances that took place during the late 19th and early 20th centuries, most

notably driven by American geomorphologists. Chapter 6 examines the contributions of Gilbert and Powell through their expeditions and research into the fluvial landscapes of the American Southwest. The 'geographical' cycle of erosion by William Morris Davis is examined in Chapter 7, highlighting the influences of Darwinism for ascribing evolutionary stages of landscape development, although alternative landscape development models could have received a little more attention (Penck, King, etc.).

The last part of the book gives a 20th Century perspective on geomorphological advances, focussing upon Anglo-American fluvial geomorphology and hydrology, with only brief acknowledgements of other major paradigm shifts within the Earth Sciences such as absolute dating techniques, plate tectonics, climate changes and planetary geomorphology. Emphasis is given to the work of Horton and Strahler, who made significant advances in understanding slope and fluvial catchment processes and forms using a 'reductionist' approach, much of which is perceived to be a reaction to the work of W. M Davis. However, these latter parts of the book slightly disappoint and one could question whether some of the individuals and subjects tackled are truly responsible (or even could be) for driving contemporary geomorphological paradigm shifts. Only time will tell. That said, I feel there are some omissions from the late 20th Century. Geomorphological research seems to be revisiting the tenets of long term and large scale landscape development, with Earth scientists grappling with the relationships between the tectonic forcing of climate change and vice-versa, with the routine application of cosmogenic isotopes to quantify rates of erosion and surface exposure.

Overall though, this is an excellent book and is recommended to all geosciences students, academics and researchers. It is well written with a dry English sense of humour that makes an accessible and sometimes amusing read. The book made me want to read more about the history of geosciences and anything that does that must be good!

Martin Stokes

PEDLEY, H. M. & CARANNANTE, G. (eds) 2006. *Cool-Water Carbonates. Depositional Systems and Palaeoenvironmental Controls*. Geological Society Special Publication no. 255. vi + 373 pp. London, Bath: Geological Society of London. Price £90.00, US $162.00; GSL members' price £45.00, US $81.00; AAPG/SEPM/GSA/RAS/EFG/PESGB members' price £54.00, US $98.00 (hard covers). ISBN 1 86239 193 9. doi:10.1017/S0016756807003767

As a student my first experience of a modern carbonate environment was the red algal sediments of Mannin Bay in western Ireland, on a cold, blustery, wet late March morning. My second experience was in the Coorong in South Australia, on a rather cool, blustery, wet September morning. As a result the idea that not all carbonates form in balmy tropical seas was not new to me, and the interest in cool-water carbonates, especially through the mid–late 1990s and since, has confirmed my early experiences. Now more of us are aware that carbonate-rich sediments can form in many different climatic regimes without having to experience the discomfort of 'cool' waters.

This book contains 19 papers and an introductory review, and the editors inform us that it 'presents a large body of new research on Mediterranean-based cool-water carbonates'. Many of the papers were originally presented at the 2004 International Geological Congress in Florence. The editors emphasize in their review that consideration of microtidal, enclosed systems is a key aspect of the papers. It is important to differentiate carbonates deposited in microtidal, epicontinental seas from those formed in open-oceanic settings such as those of the Bahamas, and tidality is crucial. However, there are some ambiguous statements in the editors' review where they state 'It is now becoming clear that a distinction must be made between those deposits associated with macrotidal regimes (i.e. the world ocean sites) and those associated with land-locked water bodies such as the Mediterranean Sea'. The world ocean is not macrotidal, and the open ocean tidal bulge is as little as 0.5 m in amplitude, and not all ocean-facing coasts are macrotidal. The editors stress that microtidal seas have minimal fair-weather reworking, but of course that is a consequence of wind regimes, orientation to prevailing winds, and fetch and is not directly a consequence of tidal regimes. They do not discuss the role of tidality and stratification, and it seems likely that one of the most critical effects of microtidality or even atidality in epeiric seas was to prevent mixing, triggering shallow stratification. In their review the editors seem to imply on pages 2 and 7 that the Caspian Sea is a modern microtidal, cool-water marine system. It is a lake and has been for several million years.

The book contains eleven papers on present-day and Neogene carbonates in the Mediterranean, including examples of tectonic controls on sedimentation. The importance of red algae is clearly a theme in several of these papers. As a set these Mediterranean papers provide an insight into a very different depositional style from that of the southern Australian cool-water system and elsewhere. It would have been useful to have seen all this synthesized in a general model or models for the Mediterranean carbonate province. There are also papers on the Gulf of California, southern Australia, northeast Australia and New Zealand. The final three chapters focus on diagenesis and chemostratigraphy, including epitaxial cements and cement stratigraphy.

The key issues identified in the introduction by the editors are not always developed in the chapters and it could be argued that what we have are two books, one on the Mediterranean and the other a collection of cool-water carbonate papers. I think having case studies from other regions complements the Mediterranean papers and serves to emphasize the differences in depositional systems.

It seems that we have a possible paradox now emerging, contributed to by this book. We are getting a much better understanding of the processes, especially the physical ones, controlling cool-water carbonate systems than we have for many tropical ones. The paradox is that cool-water carbonates are not representative of the Phanerozoic carbonate record. Our often decades-old models for modern tropical carbonates are in need of such attention as cool-water ones have been receiving.

Who should read this book? If you are not interested in cool-water carbonates do not dismiss this book as there is much in here, with many alternative models to those limited and limiting ones we have from tropical systems. The papers in this book, especially the range of studies, have made me want to go through the book again to broaden my perspectives, and I thank the editors. Would I have bought a copy had I not received my review copy? Yes. Will I be recommending our library obtain a copy? Yes. It is a must for university libraries and many sedimentologists will want to have their own copies. I look forward, seriously, to reading the complementary volume on what might be very relevant to understanding ancient carbonates: Hot-Water Carbonates.

Paul Wright