

compaction/diagenesis and dynamic basal water flow. From this perspective the book conspicuously fails to address two technical issues that are commonly so much more critical in the definition/evaluation of stratigraphic traps than for layer-cake geometries in structural traps: namely loop-level imaging and the calibration/prediction of rock properties. Shooting 3D seismic is only a beginning. For example, how best should one preserve true relative amplitudes through the seismic processing sequence, generate sedimentologically-defensible horizon attribute maps, design sedimentologically-smart horizon-picking algorithms, best use AvO and dedicated shear wave data in determination of lithology/pore-fill, trade large offsets against bandwidth? The need to explore for stratigraphic traps is obvious – what we want are better tools.

Creative sedimentary geophysicists will get little technical advice or inspiration from this book, nor should it compete strongly for scarce library funds.

David James

LI, R. & COOPER, P. 2006. *Early Silurian (Llandovery) orthide brachiopods from Anticosti Island, eastern Canada: the O/S extinction recovery fauna*. Special Papers in Palaeontology no. 76. 71 pp. London: The Palaeontological Association. Price £39.00 (paperback). ISBN 1 4051 6012 8, ISBN13: 9781 4051 6012 4. doi:10.1017/S0016756807003135

For students of marine Silurian megafossils there are globally two major sites for superlative specimens: the island of Gotland for the latest Llandovery–very Late Silurian, and the island of Anticosti for the earliest Llandovery into the latest Llandovery. The new treatment of the orthide brachiopods in this Special Paper substantially helps to update our understanding of the group's Llandovery record. The Special Paper is well written, provided with excellent illustrations and a text that carefully describes the taxa involved. Also provided is a brief account of the Anticosti litho- and biostratigraphy, together with a brief history of prior palaeontological investigations of Anticosti fossils, chiefly brachiopods. A detailed locality Appendix is a valuable adjunct for specialists, together with a warning (p. 11) about locality name changes during the past 150 years of publication on the fossils.

Variation was studied relative to length and width of the abundant taxa, but other characters remain to be considered. For those taxa represented by a good size range of specimens a study of their ontogeny, particularly internal features, remains to be carried out. For some taxa there is a need for further investigation of internal features by calcining shells followed by careful shaving away of the calcined material to reveal internal features preserved on the moulds.

Art Boucot

CARRANO, M. T., GAUDIN, T. J., BLOB, R. W. & WIBLE, J. R. (eds) 2006. *Amniote Paleobiology. Perspectives on the Evolution of Mammals, Birds, and Reptiles*. vi + 547 pp. Chicago, London: University of Chicago Press. Price US \$95.00, £60.00 (hard covers), US \$40.00, £25.50 (paperback). ISBN 0 226 09477 4; 0 226 09478 2 (pb). doi:10.1017/S0016756807003196

A memorial volume dedicated to Jim Hopson, who, during the past 40 years, has revolutionized our understanding of basal mammals, *Amniote Paleobiology* comprises a series

of papers authored by his former post-graduate and post-doctoral students at the University of Chicago, most of them unsurprisingly focusing on aspects of mammalian palaeobiology. Given the title, I was hoping for a volume composed of papers on large-scale evolutionary processes and incorporating techniques that would be applicable to all areas of vertebrate palaeontology. However, I was disappointed to find that most of the papers are descriptive, narrow in scope, and would only really appeal to those with extensive knowledge of the group in question.

The text is divided into five parts: the first, titled 'New Fossils and Phylogenies', comprises five papers on diverse topics from a re-description of a mandible of the early tetrapod *Whatcheeria*, which, given the in depth discussion on phylogenetic characters, would have benefited from a new phylogeny, to a phylogeny of living and extinct armadillos. Part two, 'Large-scale Evolutionary Patterns', comprises three papers, two of which, those by Parrish, and Rougier & Wible, appear to be essentially review papers, and offer little new information. Part three, 'Functional Morphology', includes an important contribution by Paul Sereno, in which, among other things, he proposes new phylogenetic definitions for mammalian higher taxonomy. Part four, 'Ontogeny and Evolution', includes an interesting contribution by Richard Blob, in which he examines the utility of limb-bone scaling in cynognathian cynodonts for usage in assessing metabolic modes, although the other papers in this section are somewhat disappointing. The final section, 'Reflections on James Allen Hopson', comprises a biography and a bibliography of Hopson's publications.

The quality of papers and editorial style varies widely throughout the book; in places the text is too chatty and informal, noticeably in the contributions by Lombard and Bolt, and that of O'Keefe. Quality of the illustrations is also extremely variable: those of Lombard and Bolt are beautiful, while in other contributions they are rather lacking. Munter and Clark would have benefited from line drawings of the pelvis of the theropod dinosaur being described, rather than the unclear photos presented, while O'Keefe's figures are recycled from his earlier publications, do not illustrate the braincases being described, and as such render the paper almost impossible to understand for the non-specialist. Although contributions to the book were apparently peer-reviewed, one feels that some of the papers may not have made it to publication in journals where the peer-review process was more stringent.

Although there are several fascinating and important papers in this book, it is hard to see to whom the volume as a whole would appeal: the topics are too disparate and narrow to warrant the title.

Susannah C. R. Maidment

THOMAS, P. J. HICKS, R. D. CHYBA, C. F. & MCKAY, C. P. (eds) 2006. *Comets and the Origin and Evolution of Life*, 2nd ed. xvii + 346 pp. Berlin, Heidelberg, New York: Springer-Verlag. Price £54.00 (hard covers). ISBN13 978 3 540 33086 8. doi:10.1017/S0016756807003603

Where, when, and how life began are the ultimate scientific questions to which there are, as yet, no answers. But evolve we did, so another question is, from what? *Comets and the Origin and Evolution of Life* is an updated and extensively rewritten second edition of a 1997 conference volume. Since the publication of the original work, there have been theoretical and practical advances in this fast-moving field. For example, several cometary and asteroid sampling missions are either,

like *Rosetta* and *Hayabusa*, in progress or, like *Stardust*, have delivered material back to Earth.

In the first chapter, Oró, Lazcano & Ehrenfreund provide an historical background, and pose the question central to the book: 'Did comets play a role in the origin and early evolution of life on Earth?'. Varying views from the fifteen authors of the further eleven chapters follow, and definitive answers are just as elusive as they were a decade ago. While there is general agreement that comets delivered prebiotic organic materials and water to the early Earth, it now seems possible that the Earth's early organic inventory included both 'external' organics, and 'internal' organics synthesized in the atmosphere, or in the oceans. And while comets may have played a vital role in the origin of life, conversely they may also have been inimical to its development.

In Chapter 2, Delsemme addresses the complex problem of the origin of the Earth's atmosphere and oceans into which prebiotic organics were introduced. Maurette (Chapter 3) also reviews the evolution of the atmosphere, and considers the role of dust (micrometeorites) as probable cometary material delivered to the Earth. Advances in the remote search for organic macromolecules in comets, star-forming regions, and interstellar clouds is the subject of Chapter 4 by Huebner & Snyder. Greater computational power has allowed more accurate simulations of cometary impact, and Pierazzo & Chyba (Chapter 5) compare and contrast models of survivability of prebiotic organic matter during impact delivery to the Earth, Mars, the Moon, and Europa. In Chapter 6, Chyba & Hand consider the delivery of organics in the broader context of the Late Heavy Bombardment by comets 3.9 Ga ago.

The next three chapters by Zahnle & Sleep, Glikson, and Morrison, respectively, focus on the role of cometary impact in the destruction of life. They suggest that the sterilizing effects of giant impacts may have posed a severe challenge to the survival of early life on Earth. Glikson (Chapter 8) presents some tentative supporting evidence for this from 3.8–2.4 Ga rock sequences in the Pilbara (Western Australia) and the Kaapval (South Africa) cratons, while Morrison (Chapter 9) assesses the threat of cometary impacts with the Earth. In Chapter 10, Podolak & Prialnik model the conditions where liquid water, fundamental to life, may be released in comets.

Embodied in this volume is much of the current knowledge on the constitution of comets. Sadly, due to publication timing, while remote cometary observations from space missions are included (Kissel & Kreuger, Chapter 11; Kreuger & Kissel, Chapter 12), the early results from the study of the material returned to Earth from Comet Wild 2 by *Stardust* are not. Moreover, although data from carbonaceous chondrites are sprinkled throughout the book, there is no extended treatment of the work by organic chemists on these primitive Solar System materials as possible proxies for cometary material. Nevertheless, I highly recommend the book to all involved in Earth and Planetary sciences, and the text, which is clearly written and illustrated, is also accessible to a much wider readership.

Alex Bevan

CATUNEANU, O. 2006. *Principles of Sequence Stratigraphy*. ix + 375 pp. Amsterdam, Boston, Heidelberg: Elsevier. Price Euro 80.00, £55.00, US \$86.95 (hard covers). ISBN 0 444 51568 2.
doi:10.1017/S0016756807003627

After a contentious and often turbulent start, sequence stratigraphy is now widely accepted as an additional tool

in the kit of sedimentary geologists striving to interpret the record of sediments and sedimentary rocks. Elements of what we now understand as sequence stratigraphy had been rumbling along in the background for some time before the explosion that started to appear in the scientific literature in the late 1970s. It is easy, with the benefit of hindsight, to find key elements of the concepts in papers published during the 1950s and 1960s but we had to wait until the 1970s for these elements to be organized into a coherent framework. That this phase took place largely within the confines of a commercial company (Exxon) using seismic and related data that were far from being in the public domain imparts a very distinctive character to the development of the concepts. Much of the early criticism of sequence stratigraphy relates to this point. Some also erroneously saw sequence stratigraphy as an attempt to replace existing, established approaches. In fact it is a complement to these approaches and by reviving the importance of time in relation to sedimentation, sequence stratigraphy reinstated the link between sedimentology and biostratigraphy. This is perhaps best exemplified by the revival of chronostratigraphic charts (or Wheeler diagrams) that did not feature during the era of facies analysis. As a student of the facies analysis era I find my ignorance of Wheeler diagrams at that time as nothing short of criminal, but I was not alone.

There was perhaps a further reason why the concepts were initially given such a hostile reception. In the early key publications of sequence stratigraphy models such as the global sea level curve and the passive margin 'slug' were emphasized at the expense of the methods that had been used to develop the models. It took many people time to look beyond the models and see that there were novel methods embedded in seismic and sequence stratigraphy that could be used without devotion to the models. The principal strength of Catuneanu's book is that it sets out to explain the methodology of sequence stratigraphy as applied to surface and sub-surface data rather than focussing on the models. This tactic is clearly stated in the Preface and is executed throughout the text. As a practical, pragmatic statement of sequence stratigraphy, Catuneanu's text stands apart from competitor texts in an extremely positive way.

Following a short Introduction, the book reviews the Methods of Sequence Stratigraphic Analysis as applied to surface exposures, core, well logs and seismic data (Chapter 2). The concept of Accommodation is then reviewed, particularly as applied to shoreline behaviour (Chapter 3). The nature of Stratigraphic (or Key) Surfaces is then explored (Chapter 4), setting up the subsequent chapters (5, 6) on Systems Tracts and Sequence Models. The latter chapter discusses sequences in fluvial, clastic coastal/shallow marine, clastic deep-water and carbonate depositional settings. The book concludes with a discussion of Time Attributes of Stratigraphic Surfaces (Chapter 7) and the Hierarchy of Sequences and Sequence Boundaries (Chapter 8). The organization of the book is logical in the main, but I would have preferred to see the chapter on Time Attributes of Stratigraphic Surfaces (Chapter 7) linked to the earlier chapter on Stratigraphic Surfaces (Chapter 4). The text is well written and is richly illustrated with high quality, colour diagrams and photographs that are comprehensively explained in extended figure captions, imparting a 'stand-alone' feel to the illustrations.

The account of sequence stratigraphic approaches and methods steers a sensible course through the issues and terminology that dogged the early days of sequence stratigraphy. The basic principles of sequence stratigraphy and the usage