

BOOK REVIEWS

GRADSTEIN, F., OGG, J. & SMITH, A. 2004. *A Geologic Time Scale 2004*. xix + 589 pp. + chart in folder. Cambridge, New York, Melbourne: Cambridge University Press. Price £80.00, US \$140.00 (hard covers), £40.00, US \$70.00 (paperback). ISBN 0 521 78142 6; 0 521 78673 8 (paperback). doi:10.1017/S001675680521141X

It is said that geology is as much history as science. Certainly, many areas of our subject depend on a reliable time scale for their proper execution, be it correlating geological histories from region to region or quantifying the rates of geological processes. Whilst refinements to specific parts of the time scale are regularly published piecemeal in the literature, it is sometimes worth while to stand back and survey the time scale as a whole, focusing as much on overall philosophy and methods as on detailed progress and problems. The first two editions of *A Geologic Time Scale* (Harland, W. B. *et al.* 1982 and 1989, Cambridge University Press) provided just such overviews. The new third edition is not just an updated version of these earlier reviews; it is much expanded and completely rewritten. It is therefore heavier and more expensive. Is it worth its weight for the general geologist?

The new volume is divided into four parts, embracing a total of 23 chapters. The editors are responsible for parts I and IV, but the majority of chapters are written by 37 other specialists in particular methods or geologic periods. Part I is an introduction to the concept and history of the time scale and to the principle and construction of the chronostratigraphic scale. Part II then covers related concepts and methods: biostratigraphy, orbital cycle stratigraphy, the geomagnetic time scale, isotope geochronology, strontium isotope stratigraphy, and geomathematics. Part III covers the time scale period by period, and makes up about two thirds of the text. There are two chapters on the Precambrian, one describing the scale subdivided using numerical ages, and another urging a more natural subdivision, as in the Phanerozoic. Part IV is a summary of the complete time scale. There are three short appendices and a full hundred pages of bibliography.

Although the introductory chapters provide valuable technical summaries, it is the chapters on individual periods that will attract most readers of this volume. There is an admirable degree of editorial conformity between chapters, with such elements as geochemical and sea level trends, a table of key radiometric dates, and of regional subdivisions, as well as both colour and black-and-white versions of the detailed time scale. A poster-sized version of the whole time scale is included with the book.

This is a volume that should be in all good geological libraries. Relevant parts of the volume should be read by each of us who routinely use the time scale: too many authors still use it in a cavalier way, without appreciating its subtleties, problems, but inherent elegance. *A Geologic Time Scale 2004* is a worthy successor to Brian Harland's earlier editions, though regretfully he did not quite live to see publication of the third edition, which is dedicated to his inspiring leadership in practical stratigraphy.

Nigel Woodcock

FASTOVSKY, D. E. & WEISHAMPEL, D. B. 2005. *The Evolution and Extinction of the Dinosaurs*, 2nd ed. xiv+485 pp. Cambridge, New York, Melbourne: Cambridge University Press. Price £35.00, US \$80.00 (hard covers). ISBN 0 521 81172 4. doi:10.1017/S0016756805221416

First published in 1996, this is a classic book about dinosaurs written in an open and accessible way by two experienced authors and, in the second edition, considerably enhanced by the marvellous graphics of the artist John Sibbick (I would buy the book just for the artwork – but I am perhaps biased in that regard).

As with the previous edition, Fastovsky & Weishampel are endeavouring to reach the broader end of the undergraduate curriculum, by producing a non-threatening book for non-major science students opting for a course on 'Dinosaurs' in the USA university market. I am delighted to see that the book has been fairly heavily edited and revised since the earlier version, with the effect of removing, or considerably reducing, the terribly heavy-handed jargon-ridden style that spoiled (for me) the first edition (no doubt this went down a treat with the intended audience). The book has clearly also benefited enormously and directly from the production of the massive compilation on dinosaurs: *Dinosauria* (California University Press and edited by Weishampel, Osmolska & Dodson) that appeared in timely fashion in 2004.

For those familiar with the first edition, suffice it to say this is far better, more up to date and better illustrated. For those not familiar with the book, it serves as an excellent primer on and about dinosaurs. However, rather than taking a strictly 'dino-nerd' approach (a simple litany of the dinosaurian facts as currently understood) they have taken the general level of interest in dinosaurs as a starting point for creating a scientifically-based investigative approach to the topic, by attempting to provide clear and relatively unambiguous answers to the questions – How are they studied? How do we know one dinosaur type from another, and how are they related to one another? What are the principles that allow us to understand more of their biology when they are all extinct? – as well as covering many of the more blindingly obvious ones – How big? What was the earliest? Why did they die out? Were they 'warm-blooded'? Are birds really dinosaurs?

For the type of undergraduate audience at which this book is aimed I am sure it is ideal and will be compulsory reading. This is an excellent introduction to this field of interest and, within a British university context, would merit being on reading lists for courses such as 'Evolutionary Palaeobiology' or 'Vertebrate Evolution' as a text to refer to (in the library) as background reading in order to pick up useful information about this specific group of creatures.

For the uninitiated this should prove to be a thoroughly good read; the chapter structure generally breaks the book into a number of accessible essays that, after the inevitable introductory sections (some 90 pages of 'hows,' 'whys' and 'wherefores') can be dipped into more or less at will, and as interest dictates.

David Norman

MCILROY, D. (ed.) 2004. *The Application of Ichnology to Palaeoenvironmental and Stratigraphic Analysis*. Geological Society Special Publication no. 228. v+490 pp. London, Bath: Geological Society of London. Price £95.00, US \$159.00; GSL members' price £47.50, US \$79.00; AAPG/SEPM/GSA/RAS/EFG/PESGB members' price £57.00, US \$95.00 (hard covers). ISBN 1 86239 154 8.
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Over the last four decades ichnology, the study of trace fossils, has gained broad acceptance as a highly useful tool in palaeoenvironmental studies. Often trace fossils are the sole biogenic tools for this purpose. For this reason, any palaeontologist, sedimentologist or petroleum geologist should be interested in this topic and know how to use ichnology. The new book *The Application of Ichnology to Palaeoenvironmental and Stratigraphic Analysis*, edited by Duncan McIlroy, is a must-read for anybody with interests in the field of ichnology. Apart from a few questionable taxonomic assignments, and only moderate, but not bad, quality figures, and the relatively high price of £95 (=145 Euros) there is nothing negative to write about this well edited and thoroughly reviewed book.

The book covers a wide range of ichnological topics presented by a long list of various authors amongst whom the most respected ichnologists can be found. Editor Duncan McIlroy provides a very good introduction with a general overview on the state of the art of ichnology, including a brief discussion on the frontiers of this science as a whole. The subsequent 18 contributions include review articles and novel research papers, which cover studies from microscopic and macroscopic borings, burrows, chambers, tracks and trackways of invertebrates from the continental and the marine realm to dinosaur footprints. Among the research papers are classical ichnological studies as well as contributions dealing with sequence stratigraphy, taxonomy and evolution of trace fossils to the formation and preservation of fossil tracks to name a few. This large mixture shows how complex ichnology is as a science, but also makes the book interesting for beginners as well as for experts. As usual the scientific quality of the particular articles varies, but this final judgement is up to the individual reader. However, in general all contributions are worth reading.

Among this bright range of very good articles there are two highlights that deserve extra mention and may well be considered milestones in the field. The excellent analysis and interpretation of tracks exemplified from the dinosauria by Phillip L. Manning is a definite must-read for all ichnologists and especially for vertebrate ichnologists. This detailed study offers an overview and deep insight to the complexity and imponderables of track formation, preservation and the hidden traps waiting for interpreters of gait and posture, locomotion and behaviour. Anybody who has read this contribution will subsequently be much more critical when reading vertebrate ichnology articles; as I said, it is a milestone. The second outstanding contribution is Jorge F. Genise's ichno-taxonomy and ichnostratigraphy of chambered trace fossils in palaeosols attributed to coleopterans, ants and termites. This article represents state of the art modern insect ichnology and shows how much detail has to be worked out and considered prior to a proper taxonomic classification to support a working ichnostratigraphy.

In summary, my overall impression of the book is very positive and I can only hope it will become a standard text-book for the education of modern palaeontologists,

sedimentologists, and petroleum geologists. Congratulations to a very fine piece of work.

Michael Schlirf

MALPAS, J., FLETCHER, C. J. N., ALI, J. R. & AITCHISON, J. C. (eds) 2004. *Aspects of the Tectonic Evolution of China*. Geological Society Special Publication no. 226. vi+362 pp. London, Bath: Geological Society of London. Price £80.00, US \$134.00; GSL members' price £40.00, US \$67.00; AAPG/SEPM/GSA/RAS/EFG/PESGB members' price £48.00, US \$80.00 (hard covers). ISBN 1 86239 156 4.
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China contains large-scale, active tectonic zones that make it an excellent place for the study of continental tectonics and basin evolution. Young fault zones related to the India–Asia collision and/or the subduction of oceanic crust at the east Asian margin are superimposed on a complex mosaic of older structures, which record the Phanerozoic assembly of a large part of Eurasia. This book contains 17 papers on many aspects of this evolution, sensibly grouped into four sections by time. Between them they cover much of China and a couple of adjacent areas, with concentrations on the geology of the North China Block and southern Tibet. The papers arise out of a workshop held at the University of Hong Kong in 2002, which is the institute of all four editors.

The papers vary considerably in style and quality. There are data-rich compilations of radiometric ages and isotopic compositions that will be useful resources for years to come. I single out Bor-Ming Jahn's review of granitoids in the Central Asian Orogenic Belt (also known as the Altai) and Brad Hacker *et al.*'s synthesis of the Qinling–Dabie orogen as two prominent examples. There are also less successful studies of more local areas that will not be of the same value, a couple of which are not up to the standards that the Geological Society would require for publication in its *Journal*. Several papers come across as reviews by authors who have presented their original data and ideas elsewhere, but they are useful papers all the same. Jonathan Aitchison *et al.*'s contribution falls into this category, suggesting an Oligocene onset for the India–Asia collision. Whether the idea will ultimately prove to be right or wrong I do not know, but it is certainly provocative and very interesting. An overview of the tectonic evolution of east Asia would have been useful at the start of the volume, but several such papers exist elsewhere that are fairly recent. Given the amazing neotectonics of much of China, it is a pity that only one paper in this volume is on this subject: a study of recent earthquakes in Taiwan by Wu *et al.*

It is notable how many authors are from China's own institutes, with the Academy of Sciences especially strongly represented. There has been an upsurge in the last few years of Chinese geologists ambitious to publish their work in the international literature, and with high quality data and ideas to match their ambition. The many papers in this volume co-authored or solely authored by Chinese geologists are good examples of this flexing of China's intellectual muscles.

Overall, this volume will be a very useful resource for anyone who works on the regional geology of China and neighbouring areas. It contains papers that are important for particular tectonic zones, but which will not justify spending the list price of £80 (discounts, as ever, for members of GSL and several other organisations). There is not enough novel material that the book will have much appeal for people interested in tectonic processes in general.

Mark Allen