



BOOK REVIEWS

Not so dry bones

McNEILL ALEXANDER, R. *Bones: the uniformity of form and function*. 1994. Weidenfeld and Nicolson, London. £19.99 hardback, 224 pp. ISBN 297 83326 X.

This may not be the most obvious title to attract a palaeontologist, but look a bit closer and this is essentially a 'bumper book of comparative anatomy', and therefore an ideal introduction to explaining the function of all those old bones that you've picked up in the Oxford Clay and elsewhere.

McNeill Alexander, a guru amongst vertebrate zoologists, with the immeasurable aid of photographer Brian Kosoff, has produced a book of outstanding beauty which attempts to explain the way in which bones of differing mechanical properties match varying functions in the vertebrate skeleton. The book could quite easily stand on its own as a collection of plates, and sometimes the link to the accompanying text is somewhat tenuous. This does not, however, reduce the worth of the text, which eloquently explains the connection between bone form and function, using a number of 'classic' case studies.

All the plates show bones of various sorts, stripped of their flesh, and are therefore dead-ringers for the fossils that we palaeontologists are more used to studying. The book takes the hard parts of an animal whose life habits are well-studied, and explains how functional requirements are met by bone structure. The deduction process works in reverse for we comparative anatomists, and gaps in the equation can be filled with evidence from such studies.

The structural properties of "that bone you found in the Rhaetic" can, therefore, be used to explain what function it may have performed. Was the over-riding requirement that the bone was light, or strong, or flexible? Did that make the animal a fast runner or a slow plodder?

For myself, the most interesting chapter was that on teeth (chapter 6). The discussion is not centered directly upon tooth structure but on tooth combinations and related feeding mechanisms. The plates exhibit a

number of skull arrangements typical of predatory fish, and of carnivorous and herbivorous mammals, etc. Such evidence for feeding designs in extant animals is invaluable in reconstructing the lifestyle of long-extinct vertebrates.

The running theme, not surprisingly, is one of evolution and this is elaborated upon in the penultimate chapter where past evolutionary history is also taken into consideration in attempting to understand vertebrate skeletons more fully; some features are merely remnants of redundant designs and may not have served a useful purpose in life. Overall, the progression from chapter to chapter can be used not only to help you rebuild an entire skeleton, but also to determine how the animal may have walked, swum or flown, how it obtained food, what it ate, and possibly even to deduce its phylogeny.

I am left unsure of the intended target audience, possibly amateur zoologists, but whether intentional or not, it neatly fills an open niche for vertebrate palaeontologists, amateur or professional. The book has few drawbacks, and many of the plates, produced in high-resolution colour, would not look out of place on sale at a branch of Habitat. This is a sexy book, find £20 and buy a copy!

Philip Donoghue

Where to go

NUDDS, J. R. (Ed.) *Directory of British Geological Museums*. 1994. Geological Society Miscellaneous Paper No. 18, Geological Society on behalf of the Geological Curators' Group. £14.95 paperback (£9.50 to members of The Geological Society), viii + 141 pp. ISBN 1 897799 08 X.

In addition to essential information about museum locality and contact addresses, this directory contains a wealth of data relating to collections and services. There are sections on history, principal collections, major strengths, published catalogues, displays, public services, research facilities, education and staff, all in the form of concise written descriptions or listed information. The text is divided into sub-sections with clear headings. Photos and illustrations are used to good effect throughout, adding visual appeal to the contents

as well as breaking up the text. The layout is generous with each entry beginning on a new page. Although there is no index, this is not a great hindrance as the book benefits from its simplicity, and entries are easy to find using the contents page.

The directory covers only those museums with public collections, in England, Scotland, Wales and the Channel Islands, together with major institutions in Northern Ireland and the Irish Republic. In addition, an appendix is provided of museums not included in the main text, for which no information was presumably available at the time of going to press.

The directory was produced on behalf of the Geological Curators Group, whose aim is to improve access to, and knowledge of, geological collections for everything from leisure and tourism to education and science. The objective of this publication is to bring together complementary information about museums and their resources, which to date has generally only been available in specialist literature. For the most part this is achieved, with the directory providing concise information that can be followed up by a telephone call, letter or visit. There are a number of sections of information which will be useful to specific groups such as teachers and amateur geologists planning educational trips, but the range and diversity of information supplied means that it has potential appeal to people with a wide scope of interests. Thereby, the directory fills a very useful niche by making basic reference information easily available in a very usable and attractive form.

Steve Powell

Teach yourself evolution

SKELTON, P. (Ed.). *Evolution: a Biological and Palaeontological Approach*. 1993. Addison Wesley Wokingham, in association with the Open University. £23.95 paperback, 1064 pp. ISBN 0 201 54423 7.

Are you looking for that chunky paperback that will keep you amused for a few days on holiday this summer? A bit of light reading to while away the hours in the departure lounge or on the train? If so, then this book is certainly not for you. For one thing, it would probably take you over your baggage allowance. In excess of 1000 pages and weighing in at more than 2.5 kg, it is of a size rarely encountered even in the most rambling of PhD theses these days. It is also a real heavyweight in terms of content.

Before I deal with the content, something of an introduction to the nature of this book is necessary. It represents the efforts of 11 biological and palaeontological authors, pulled together into an integrated whole by Peter Skelton, and, as the preface will tell you, it forms "the basis for the Open University's third level Science Course, S365 *Evolution*". This *raison d'être* throws up a few quirks: I found the self assessment questions (SAQ's if you're into TLA's) at the end of each chapter rather irritating, for example (especially those which I couldn't answer!). But these SAQ's are clearly vital to the stated primary purpose of the book, and such trivial gripes are far outweighed by points of real merit. Chief among these

must be the impressive depth and scope that results from the interdisciplinary nature of the authors; I doubt that there is anyone who considers themselves a palaeobiologist who could, hand on heart, say that there was nothing here that was new to them. Every time I dipped in, I came across something of interest about which I wanted to know more, and I was rarely disappointed.

As an introductory text *Evolution* is pitched fairly high, and it does require some familiarity with basic biological and palaeontological knowledge. It is divided into four thematic sections, three of which expand upwards and outwards from evolution at the level of individuals and populations, through evolution at the level of species, to evolution at levels above the species. The fourth section documents case studies on the origin of life, and on the impact of humans on evolution. Rather than a historical narrative or systematic view of life, these four sections provide a process-orientated approach. This means that if you want to read up on, say, land snails you will have to look at three separate short sections in chapters on Reproductive Patterns, Geography and Macroevolution, and Natural Selection. But this is not a weakness; the purpose of the book is simply different, and the fact that you can use it in this way in a pinch reflects the variety of the examples that serve to illustrate major processes. Many of these little cameos are in themselves fascinating points of biological or palaeontological trivia woven into the broader evolutionary context of the book. Why are aboriginal Australian peoples unable to digest milk? What are the costs of sex? And, my personal favourite, what are the lessons of adaption and survival that can be drawn from the carcass of a "moderately fat badger", killed in a road accident after a life in the wilds of Milton Keynes.

So, if what you're after is a comprehensive and thorough review of just about all aspects of biology and palaeontology that contribute to the understanding of evolutionary processes, then this is an excellent place to start.

Mark Purnell

Blume-ing marvellous

BLUME, H., *Colour Atlas of the Surface Forms of the Earth*. 1991. English translation 1992. Belhaven Press, London. 140 pp. ISBN 1-85293-206-6.

A picture, it is often said, is worth a thousand words. This saying has rarely been more true than when applied to this book. With over 200 high quality colour photographs and 30 monochrome line diagrams, Blume's atlas provides access to an impressive range of landforms from many different environments worldwide. The author is one of the world's leading experts in geomorphology, and this volume is an English translation of a work which, according to the editors, "... encapsulates most coherently the German traditions in geomorphology".

The contents are subdivided on more or less conventional lines. An initial short introduction describes the fundamentals of plate tectonics, the relative dimensions of relief units (including two small-scale geomorphological maps), and the effects of climate on relief generation through time. There is emphasis

on the complex origins of present-day landforms, especially in northern temperate latitudes, where altitude has a significant effect on climate.

This brief introduction merely sets the scene. The book comprises a further ten chapters with the landforms classified along logical lines; glaciated, marine, volcanic, karst, etc. Each chapter starts with a brief description of the processes involved in the respective landform genesis. Fluvial denudation landforms are classified as either climate-controlled or structure-controlled and described in separate chapters. Explanatory figures are included in these written introductions and are commonly drawn from actual examples.

It is after the written introductions to each section that the book comes into its own. Every page is beautifully illustrated by 2 or 3 colour photographs, each demonstrating a specific geomorphological feature with an explanation of its origin. The explanations are lucid but not overlong. This might lead to the accusation that the book lacks sufficient depth, but this would entirely miss the point. Its strength lies in the quality of the photography. Detailed explanations of landform genesis can be found elsewhere, and a small but comprehensive bibliography is included at the end.

On occasions, when photographing landforms, photographers attempt to get too much into a picture. This results in loss of detail, especially when the picture is reduced to fit onto part of a page. The picture then requires explanatory labels and arrows. This does not occur in Blume's atlas. Only a few of the photographs are credited, so it must be assumed that the bulk of the photographs come from the Professor's personal collection, as there are no views that are readily recognisable as having appeared elsewhere. He is not only an accomplished photographer, he is also widely travelled. The examples come from all climates and all continents except Antarctica. Only a few, such as the Grand Canyon and the Giant's Causeway, would be instantly recognised by most people. The Sugar Loaf at Rio de Janeiro is cited as an example of exfoliation weathering — the remnant volcano example is from the Yemen — and it is curiously refreshing to see a book of this type omitting a photograph of Ayer's Rock. Occasionally, the European origins of this book are betrayed; Chesil Beach should always be a *tombolo* and never a *nehrung*, but this is a trivial point. By depicting little-known locations and 'alternative' views of the more well-known ones, Professor Blume has made a significant contribution to the geomorphological literature, and any school, college or personal library would be enriched by a copy of this book.

Most landforms have been generated by weathering and erosion and, given time, will disappear altogether. This must apply even to "constructive" landforms such as volcanoes, reefs and beaches. It is appropriate, therefore, for the final section of this book to be devoted to anthropogenic landforms. Man, with his quarries, road construction and deforestation has been known to give erosion a helping hand from time to time. This chapter contains such examples, together with other features such as rice and vineyard terraces and fortifi-

cation structures. Curiously, the final example has the longest explanation in the entire book; it is of a land reclamation area in Schleswig-Holstein which, should the quality of the photography in the book not be enough, manages to leave the reader with a note of optimism.

Robert E. Brown

Making the most of fossils

GOLDRING, R. *Fossils in the Field*. 1991. Longman Scientific & Technical. £19.99 paperback, xiv & 218 pp. ISBN 0-582-0621-6.

This book has been written to help geology students plan, investigate and evaluate the information potential of fossiliferous sediments, so as to make the most of each field excursion. It assumes a basic knowledge of the plant and animal phyla, some mapping experience, familiarity with the geological time scale and the basics of sedimentology. It needs to be used in conjunction with a book on fossil recognition.

The author shows how data gathered while studying fossils in the field can be used to gain a deeper understanding of the palaeoecology, sedimentology and stratigraphy at each location. This is a very clearly written book and contains many diagrams and tables that stimulate the imagination and encourage the student to think widely about every aspect of the palaeo-environment in which the fossil organisms lived. This paperback is probably already proving its value and may well be showing signs of wear in the hands of second and third year geology students. This review is aimed, however, at professional and amateur geologists who may be looking for insight into the value of fossils and the wealth of information that can be deduced from each fossiliferous locality. If your immediate urge on locating a fossil is to extract and then identify it, then this is the book for you. It will encourage you to appreciate the substrate in which you find the fossil. Some people claim to find fossils rather boring. This book will stimulate their scientific assessment of the associated sediments and lead to a greater appreciation of the wider concepts of palaeoecology, which are so clearly described.

The book is divided into two halves. The first half is concerned with preparing the reader for investigating fossiliferous locations in general. Categories of information obtainable from fossiliferous sites are identified and a classification of fossiliferous sediments is described. These are then ingeniously combined in tabular form. This information is then applied to classic examples of ancient and modern sites. A chapter on field strategies follows, which includes suggestions on pre-excursion investigations and a very detailed listing of the different types of bed which might be encountered and the palaeoenvironments they represent. There are instructions on the drawing of graphic logs and the rationale of sampling. The different strategies required for examining autochthonous buildups are well described and graphically illustrated. This is followed by a fascinating chapter on taphonomy, which for those who have not come across the term before is described in the comprehensive glossary (Appendix F) as "All the changes that occur to an organism between death

and discovery as a fossil''. The first half of the book ends with a few pages explaining pseudofossils and commonly-made stratigraphical and structural errors.

In the second half, each chapter looks at the investigation of fossiliferous localities from a different perspective. These include palaeontology and palaeoecology, sedimentology, stratigraphy, structural geology and geophysics. The book is completed by appendices containing a wealth of useful information.

This is a well written book which should enhance the value of field work for all who read it, even if they only manage the first few chapters and use it for reference. We strongly recommend it.

Philip and Judy Small

NOTES FOR CONTRIBUTORS

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