

ideal as the basis for an upper-level undergraduate or graduate course, and sufficiently detailed and authoritative that it can act as a comprehensive and up-to-date reference work. Since no other publication covers this field, and because the author perceives well the far-reaching implications of the subject matter, it succeeds also as a basic source book for botanists, foresters, glaciologists and hydrologists. The bibliography is most impressive, but unfortunately there is no author index. This is a mere token criticism, however. Although a specialist work, this book should be on the shelf of all climatologists and all those interested in the mountain environment.

Comparing three such different books is an invidious task, one which we shall not attempt. The fact that, in a "small" discipline like climatology, such diversity is possible illustrates the mushrooming growth of the subject in recent years. The different approaches of Trewartha and Horn on the one hand and Oliver on the other are an indication of the extent to which the subject has developed. Both Oliver's and Barry's books show how much climatology impinges on many other disciplines, and are harbingers of future developments. □

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## Earthly delights . . .

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*Essentials of Earth History: An Introduction to Historical Geology*, 4th Edn. By W. Lee Stokes. Pp.577. ISBN 0-13-285890-8. (Prentice-Hall: 1982.) \$25.95, £19.45. *Evolution of the Earth*, 3rd Edn. By Robert H. Dott and Roger L. Batten. Pp.573. ISBN 0-07-017625-6. (McGraw-Hill: 1981.) \$31.50, £17.50.

TO WRITE a well-balanced, comprehensive textbook at the introductory level about the history of the Earth, palatable to both arts and science students alike, offers something of a challenge, particularly at the present time. Results of space exploration, as well as new findings in plate tectonics and evolution (dare I mention the word?) must be fitted into one compact volume along with at least some of the basic principles of stratigraphy.

Exciting introductory textbooks are rare. My own favourite used to be the second edition of Arthur Holmes's *Principles of Physical Geology* (Ronald Press, 1965), a book written in a bold, masterly style, brimful of ideas and still retaining a freshness some 20 years later. But what of present-day texts?

Under review are new editions of two

books that have been popular in North American universities for some years. Both are well-written, profusely illustrated, accurate and surprisingly similar both in scope and in content. Diverse topics such as the evolution of the Solar System, the origin of life and palaeomagnetism are included, along with a generous serving of historical geology. Both books retain layouts similar to the earlier editions. Stokes's text, however, has been extensively rewritten and many new illustrations either supplement or replace those of the previous work.

Stokes's approach is the more cautious and circumspect of the two. Although *Essentials of Earth History* tends to be written in a dry, somewhat formal style, the book is by no means dull. The well-illustrated volume contains a number of excellent photographs, including some from the recent Pioneer and Viking missions. Most chapters are self-contained (Chapter 7, "Cosmic Beginnings", was particularly enjoyable). And, under the heading "Search for an Ethic" in the final chapter, it was interesting to see at least a token attempt to reconcile present evolutionary theory with religious beliefs. Stokes, throughout most of the book, seems to have the knack of anticipating students' questions and needs; rather than evading contentious issues, the author confronts most of them head on.

The book by Dott and Batten is generally more direct and the reader is led at a fairly brisk pace from start to finish. The diagrams are superb and are among the clearest that can be seen in any introductory textbook. Topics such as geochronology, plate tectonics and the early evolution of the Earth are handled with a minimum of jargon and in a straightforward, concise style. However, I suspect that those chapters dealing with historical geology, mainly of North America, may overwhelm most students; each of them contains too much detail and too many disjointed topics. Although the introduction of many concepts within each chapter was probably meant to challenge, the overall effect may be to daunt all but the most enthusiastic students. Chapter 14, for example, includes discussions about sedimentary cycles, the red-bed problem, the Appalachian Orogeny, the significance of thrust-faulting and Palaeozoic land floras!

Nevertheless, either book would make a good introductory text, though less stratigraphy and a little more about igneous and metamorphic rocks (mentioned but briefly) would certainly extend the scope of both of them. An interesting feature of each book is a glossary of geological terms — to any student just coming into the earth sciences this is particularly useful. □

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## . . . heavenly bodies

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*Earthlike Planets: Surfaces of Mercury, Venus, Earth, Moon, Mars*. By Bruce Murray *et al.* Pp.387. Hbk ISBN 0-7167-1148-6; pbk ISBN 0-7167-1149-4. (W.H. Freeman: 1981.) Hbk \$27.50, £20.40; pbk \$15.95, £10.95.

THE constant development of the planetary sciences presents problems for the writers of textbooks, since such works are in real danger of being significantly out of date, at least in parts, by the time they are published. This problem is avoided by the authors of *Earthlike Planets* by omitting all mention of the gas giants, Jupiter and Saturn, and their satellites (targets of the most recent planetary probe missions), and confining attention to the more truly Earth-like inner planets — Mercury, Venus, the Moon and Mars. Many aspects of the major stages of evolution of these bodies are now well understood and it is becoming possible to make useful comparisons between these planets and the Earth, both in terms of the histories of their interiors and of the geological, physical and chemical processes which have moulded their surfaces.

Indeed, this book is explicitly committed to the concept of comparative planetology and the first four chapters deal with various aspects of the study of all the inner planets taken as a group: a summary of changing ideas on the ways in which these bodies were formed; a global description of the surfaces and atmospheres; a review of processes modifying planetary surfaces (impact by meteoroids and asteroids, mass movement under gravity and, where appropriate, wind erosion and fluvial action); and a survey of the volcanic and tectonic processes which renew planetary crusts. The next three chapters are explicit attempts to synthesize the planetary history for each of the Moon, Mercury and Mars. Finally, emphasis returns again to comparisons, with a review of those processes which appear to have influenced all of the inner planets to varying degrees — impact modification of the earliest-forming crust, magmatic and tectonic evolution of the interior and, on the planets with atmospheres, climatic change.

Each chapter ends with a well-chosen list of books and papers for further reading, and an excellent guide to sources of planetary photography is included as an appendix before the index. *Earthlike Planets* is probably the best general introduction to planetology available at the moment and will find a place in undergraduate courses at all levels. It is equally suitable as a starting point for a postgraduate student entering the planetary science field. □

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