



BOOK REVIEWS

Geology For All

Murck, B. W., Skinner, B. J and Porter, S. C.. 1986. *Environmental Geology*. John Wiley & Sons, Inc, New York. Price (paperback). US\$22.95, £19.99, ISBN 0-471-30356-9.

The book was sent to the *Journal of Structural Geology* for review, despite its title covering a subject not commonly investigated in this Journal. It was passed to me for perusal, a geochemist with some environmental experience. The book only touches my environmental interests with one sentence mentioning microbial methylation of mercury, one small paragraph mentioning chlorinated organics, and only one photograph of my research area, titled "Chemically polluted waste water, Merseyside, England". Yet my opinion, an organic geochemist speaking to structural geologists, is: Seriously consider buying it for yourself, definitely make sure the library has sufficient copies, and try to get a few fixed with chains or electronically tagged so that they don't walk away.

The book is not a detailed treatise on the environment. It takes the student and teacher from first principles (e.g. what is a mineral?) to the point at which, with guidance, the student can tackle the journals. There are no references for further reading, leaving the teacher completely free to carry on the education process according to personal taste. The book is not the environmental Gospels of Murck, Skinner and Porter.

There are 5 sections. The introduction starts with a stunning colour infrared satellite of the Nile and Upper Egypt, setting the stage for a discussion of the book's concerns: geology, the environment, earth systems and cycles, resources, waste and human interactions. In Part One, the first section introduces the planet and plate tectonics. The next chapter introduces what are usually termed cycles, plate tectonics, rocks, and uniformitarianism. The following chapter introduces the mantle and core, minerals, and their properties. In Part Two, the reader is introduced to geologic hazards, their assessment, hazard maps, prediction, and the role of geoscientists. The following chapters discuss specific aspects in detail: earthquakes, volcanic eruptions, tsunamis, landslides and mass-wasting, subsidence, floods, ocean and weather, and meteorite impacts. Part Three starts with a discussion of renewable and non-renewable resources. This is followed by chapters on fossil fuels, energy alternatives, mineral resources, soil resources, and water resources. Finally, Part Four considers aspects which might be more usually described as environmental. After an initial discussion on waste management, the remaining chapters consider waste disposal, contaminants in the geologic environment, and atmospheric change.

In reviewing this book, I went through it three times. Initially I progressed as far as the second chapter. The chapter is written in the simplest terms, and I would have no hesitation in using the text to teach to undergraduate earth science majors or majors taking earth science as a subsidiary, non-scientists or school children. Innocuously introduced, however, at the start is a fundamental concept in classical thermodynamics, but with no mention of thermodynamics. The text and example is so lucidly written that I am considering using this section in an introductory thermodynamics course. This is then followed by an equally innocuous discussion of fluxes of elements between, for example, the oceans and atmosphere, which I would not hesitate to use for high school children. The two standard text books on fluxes prior to this book, however, I would not recommend to anyone except those some way into their doctorates, or further. In the teaching and writing of a broad context text book aimed at the novice, it is difficult not to sacrifice rigour for the sake of communication ease. I found no evidence of this sacrifice. In my third reading, I looked specifically at chapters whose contents contained my research areas (ore deposits, fossil fuels, and pollution), with the objective of being purposefully critical. I found some points where my and the authors approaches differed, but these were trivial nuances, which increased my respect for what is written.

I was impressed furthermore at the consistent approach in every chapter to help the student learn, in addition to a relaxed text and excellent, thoughtfully chosen, illustrations. At the end of each

chapter, there is a summary of key points, followed by a section containing key words (in addition to a glossary at the end of the book). Finally, there is a section of questions and activities. The activities are intelligent, chosen to be suitable for all standards of students, and include simple experiments. There are three appendices, on Units and conversions, the Periodic Table, and the Geologic Time Scale. One aspect which I considered original and probably effective, is the extensive use of graphs. These range from the time scale of processes (sound wave to formation of ore deposits and mountain ranges) to climatic predictions. The flavour is very much that of the Nuffield approach in the U.K.

My enthusiasm for this book arises from my view that communication from the expert to the teacher to the novice is the prime issue. A good teacher can address an issue at almost any level, ranging from kindergarten to postgraduates to mature students in evening classes. A clear understanding of the science, examples from everyday life, and very extensive use of some of the best colour photographs and diagrams that I have encountered, make this book exceptional. By the time I had finished the first chapter, I wished that I had had such a book previously for teaching. In the preface, there is a listing of additional source material, including Instructors' Manuals, Slide sets, and CD-ROM sources. For the teacher who has to address broad issues in the geosciences, whether a structural geologist or organic geochemist, this book should be rewarding to use.

I have not encountered text books of this calibre before, and hope that it will set the standard for many more. In the preface, the authors claim their reason for writing the book as "We love geology. We love to study, teach and learn about geology". In this case I believe these claims. I have one negative comment for the publisher. The book is paperback, and will erode with heavy use. The price is excellent for students, but for libraries and teachers, the publishers should consider a more durable cover. If you have to teach broad course earth sciences, seriously consider buying it. If you want a book at 1970s prices packed with thoughtfully chosen, good quality colour photographs and diagrams for personal pleasure or teaching from kindergarten to post graduates, with a text designed for teaching, consider purchasing it. If one simply wants a book to decorate the coffee table, this is it.

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Andy Gize

Seismic Encyclopaedia

Sheriff, R. E. and Geldart, L. P. 1995. *Exploration Seismology*, 2nd edition, Cambridge University Press, List price £75, US\$30 (hardback) £29.95, US\$49.95 (paperback).

The (1982) first edition of Sherriff & Geldhart's text has been on my bookshelf since the time I was a PhD student studying to become a structural geologist using geophysics, particularly exploration seismology, as the principal tool of my trade. That two volume encyclopaedia of exploration seismology will be replaced this year by a single volume update. Encyclopaedia is the right description here because this book contains just about anything one might want to know about exploration seismology. It attempts to provide basic descriptive introductions for those unfamiliar or casually interested, detailed explanations for those already working within the field, and substantial theoretical mathematics for those wishing to understand the underpinnings of the techniques used in the developmental, acquisition, processing and interpretational aspects of exploration seismology.

Most, if not all, exploration seismologists will want to have the new second edition. It is more comprehensive than some of its competitors such as Yilmaz (1981), more in depth than some others such as Hatton *et al.* (1986), yet remains accessible. Structural geologists will probably find only a few chapters of relevance to them, just as seismologists would find a comparable text in structural geology selectively useful.