

Conversely, chapter 2 on geological rock record is valuable since it gives a non-geological reader a very direct impression as to how geologists work.

Part II deals with surface processes and is probably, from a geological standpoint, the most valuable part of the book. It relates surface phenomena to the environment. The topics such as landslides, water cycle and ground water and sedimentation are especially well presented, although deltas and associated phenomena, as well as oceanic processes, could have been treated more systematically.

Part III ideally should be the most basic part of the volume, yet it suffers from a somewhat uncoordinated approach. For instance, the chapter on plutonism precedes that on volcanism, magnetism and gravity are combined into too short a chapter and the chapter on crustal deformation carries a bias: orogenic movements are emphasised while extensional movements are virtually ignored. We are still in the throes of eugeosynclines and miogeosynclines. Chapters 22 and 23 on planets and matter and energy from the earth have the appearance of addenda, rather than integral part of the book.

Throughout the volume there are so-called boxes in which a more in depth treatment of specific issues, such as various calculations and elucidations are presented. Many of these are beyond the interest of elementary students who do not intend to become geologists. The same can be said about the suggested additional references at the end of each chapter, some of which are of research calibre.

The illustrations, and particularly photographs, are good throughout, although some of the graphs are too complex, while diagrams such as figure 17-18 are misleading in so far as it is not clear whether it is a map or a cross-section. There are remarkably few typographical errors.

If it is thought that this criticism is somewhat carping, it should be pointed out that at the time when the first edition of the book appeared, it was probably the most exciting elementary text in North America and elsewhere. The present edition does add something and introduces some aspects of new discoveries, but unsystematically and in my view, too selectively. Considering that many advances of the last few years have been on the borderline of structure and geophysics there is too little of this in the book. For instance, COCORP is briefly mentioned, but not in the index. References in the chapter on structure are restricted to M. P. Billings and E. S. Hills. Structural observations are adopted from texts with out-of-date interpretations. For instance in figure 17-4, crenulation foliation involving pressure solution is interpreted as shear. In a not entirely satisfactory section on orogenic belts (pp. 531-545) there are most curious statements such as that during collision "continental crust loses its rigidity", or that thrust-sheets often include "foreign fragments thrust inland". The next paragraph does talk about foreign terranes, but to an elementary student the equivalence of a terrane and fragment is not always clear, and aren't they supposed to be exotic terranes, anyway? Thus, the impression is given that the Taconian movements did not affect the Piedmont and that the Avalonian never existed. The relationship of high-grade crystalline cores of mountains (internides) to the low unmetamorphosed externides is not mentioned. The idealized section of the Canadian Shield (fig. 21-7) is uninformative and is basically wrong, since the long evolutionary nature of the shields is entirely lost.

All in all this volume at the present time is not as good as its predecessor was in 1974. It may be that the present times demand new constructions and new texts or it may be that this is just a transition stage toward the next impression when the book will be recast and would acquire a new vitality.

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Global geophysics

De Bremaecker, Jean Claud 1985. *Geophysics: the Earth's Interior*. John Wiley & Sons, New York. 342 pp. Price: \$29.95.

It is about a decade since a spate of books appeared propounding and explaining the theory of plate tectonics and reviewing our understanding of the way the earth works. Since then much of the tentative evidence used in establishing the theory of plate tectonics has been reinforced and new research has been centred on subjects like the dynamics of plate movement and lithospheric evolution. This book is derived from this body of knowledge and is the result of several years of teaching the subject. It is written for undergraduates with a background knowledge of mathematics and physics and who are familiar with the general concepts of plate tectonics. It is not another 'plate-tectonics' book but one which deals with the more global or academic aspects of geophysics as they relate to the structure, behaviour and processes of the earth's interior.

Geophysics is divided into the usual branches of seismology, gravity, geomagnetism and heat flow, and each branch is considered separately. The emphasis is on what each branch of geophysics tells us about the interior of the earth, and how answers are provided to specific questions. Instrumentation and measurements are covered only briefly, and at the end of each section rather than the beginning.

Such material only forms about half the book. The remainder is concerned with topics related principally to seismology and heat flow. In the part concerned with seismology there are sections on elasticity, harmonic analysis and linear systems, and in the part concerned with thermal aspects there are sections on viscous flow, temperatures in the earth and convection. The section on elasticity deals with stress and strain, elastic constants, and mentions the factors that need to be considered when using scale models in geology. There is a thorough explanation of the way fault-plane solutions are obtained and a discussion of attenuation of seismic waves and the quality factor. Simple but important facts are mentioned, for example, the fact that not all large earthquakes occur near plate boundaries, and the fact that tides are not caused solely by the gravitational attraction of the Sun and Moon. Some interesting pieces of information are included, for example, that Vening Meinesz was very tall and all the time he was at sea in a submarine making gravity measurements he was unable to stand upright.

The book is well written, there are a moderate number of equations, and ample figures. About one third of the figures are from other publications and some of these reproduce rather poorly, particularly when they have been reduced in size from the originals. Throughout the book there are short sections differentiated from the main text. These contain additional material, generally more mathematical in nature, and which are not essential to an understanding of the main material. Likewise, problems are given after some topics and the student advised to try and solve them. Several of the problems require the ability to write simple computer programs. This is surely a sign of the times. A set of solutions is not given in the book but is available from the publisher. There are six short appendices including lists of mechanical and magnetic quantities and basic information about the earth.

A reasonably priced book covering global geophysics at a moderately advanced level and suitable for college students is certainly needed, and this book goes a long way to satisfying that need.

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