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Physics and Geology (2nd Edition)

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Book Reviews

Physics and Geology (2nd Edition)

J. A. Jacobs, R. D. Russell and
J. Tuzo Wilson
McGraw-Hill, Inc.
622 p., 1974.
$18.85.

Reviewed by D. W. Strangway
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"Convection currents may exist deep in the mantle and probably were important in the earth's early history, and polar wandering may well be occurring. But neither one of these nor any other proposal yet made provides an account of the development of the earth's surface features comparable to that now possible by using the contraction theory."

This quote is taken from the first edition of Physics and Geology published in 1959, only 15 years ago. Since then the study of the earth has been completely revolutionized and the authors have carried a major role in this. The second edition of this book has been so totally rewritten that it represents a drastically different book than the original. I found the material in this book to be excellent and read it from cover to cover with great interest as it represents an account of the new view of our planet earth. The chapters which deal with the earth's interior and those which deal with sea floor spreading and global tectonics are especially well done and provide a fascinating account of the developments "since 1967."

Although the book is titled Physics and Geology an attempt has been made to incorporate a significant amount of geochemistry in the chapter on the universe and the solar system as well as in several other chapters and one could have wished for a more up-to-date account of developments in this area. The chapter of Physics of the Upper Atmosphere scarcely seems to be pertinent in a book largely confined to a study of the solid earth. With these minor reservations, the reviewer feels obliged to point out that this is an excellent and timely book which will serve as an excellent text as well as a chronicle of an exciting period in the study of the earth.

The authors state in their conclusion that ". . . it is at least clear that any theory must consider both continents and ocean basins and both geology and geophysics. These have too long been kept apart, and it seems essential that the teaching of both these subjects be united." The unification of the earth sciences is important and these authors and this textbook successfully point the way for the future in their skillful combination of geophysics and geology in a single textbook.

MS received, September 18, 1974.

Time Sequence Analysis in Geophysics

E. R. Kanasewich
The University of Alberta Press
Edmonton 352 p., 1973.
$9.95.

Reviewed by R. A. Wiggins
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Many geophysics departments have recognized the need for teaching a course on digital data manipulation. Generally most teachers faced with such a course have had to start from scratch, either designing the subject content or establishing a consistent nomenclature. Kanasewich's book should prove to be very useful text for such courses at an introductory level.

The content of the book is logically laid out and is thorough. A selection of chapter headings give a good indication of this: Convolution of a time series; Fast Fourier transforms; Laplace transforms, complex representation; Impulse response, convolution and the transfer function; Correlation and covariance; Aliasing; Power spectral estimates and spectral windows; Cross spectral analysis, coherency and bispectral analysis; Minimum phase and properties of an impulse response function; Deconvolution; Zero phase shift band pass filters; Wave propagation in layered media in terms of filter theory; Velocity filters; Maximum entropy and maximum likelihood methods of spectral analysis. There are also appendices on Fourier series and integrals; the Dirac delta function;