Sedimentology

Sand and Sandstone. F. J. PETTIJOHN, PAUL EDWIN POTTER, and RAYMOND SIEVER. Springer-Verlag, New York, 1972. xvi, 618 pp., illus. $31.10.

Sand and Sandstone is a 600-page book which attempts to summarize the current state of the art in the continuing study of these materials. The success of such an attempt depends to a large degree on the talents, backgrounds, and interests of the summarizers, and this is evident in the book. Some topics are covered exhaustively; others are treated much more generally; and there are some seemingly important areas of research that are omitted entirely.

In the first category lies sandstone petrography. All three authors have a wealth of experience in this area and it shows clearly. Approximately one-third of the book is devoted to mineralogic and petrologic attributes of sandstones, and the treatment is thorough and comprehensive. Particularly outstanding are the large number of superbly reproduced photomicrographs of thin sections that are effectively used to illustrate points made in the accompanying text. Supplementing this (in the appendix) is a detailed description and analysis of the Trivoli sandstone in the Illinois basin. This portrait requires eight pages and serves as an excellent model of the way in which a sedimentary petrographer should approach a rock unit.

The discussion of sandstone diagenesis is generally well done, although the chapter contains several minor substantive errors. Equilibrium coexistence of calcite and aragonite is *not* restricted to a unique temperature and pressure (p. 407). In supratidal flats the magnesium-calcium ratio is increased by precipitation of gypsum, not calcite and aragonite (p. 422). Later, on the same page, temperature is cited when pressure is intended.

In the class of inadequately treated topics I would place the interaction between grains and fluids: the mechanics of entrainment, transport, and deposition. Only 40 pages, about 7 percent of the book, is given to these topics despite their importance and the enormous amount of literature devoted to them during the past decade. I interpret this as reflecting the interests and experience of the authors. I am sure they could have expanded and improved this section. I wish they had done so.

In the third category, that of topics that are essentially omitted entirely, is weathering. Chapter 8 is titled "Production and provenance of sand" and the first substantive subheading is "How sand is formed." This 2½-page section lists weathering as one of five basic processes in sand formation, and about one-fifth of the section is devoted to it. The lack of attention to weathering (the word is not even listed in the subject index) is to me a rather unfortunate aspect of the book, for a great many of the observations by petrographers of grain properties are probably best explained by weathering phenomena.

In summary, I found *Sand and Sandstone* rather uneven—superb in some areas, deficient in others. It certainly deserves to be in the geology sections of all libraries and on the shelves of sandstone petrographers. However, considering its inadequacies and its price of $31.10 (due in part to the abundance of beautiful photomicrographs) it fails to achieve the authors' stated objective of being "useful as a text or supplementary text." As a student I would gladly have helped plot the assassination of a professor who required a text costing as much as 30 issues of *Playboy*.

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Acoustical Theory

The Foundations of Acoustics. Basic Mathematics and Basic Acoustics. EUGEN SKUDRZYK. Springer-Verlag, New York, 1971. xxviii, 790 pp., illus. $73.80.

In 1954, Eugen Skudrzyk published a massive text in German with the title *Die Grundlagen der Akustik*. The volume was more than 1000 pages in length. Its 36 chapters covered virtually the entire range of topics of audio acoustics, including material on speech, noise, hearing, and music.

This volume, with its 790 pages, might be taken for a second edition or an English translation of the previous work. The title indeed suggests that it at least covers the same subject. The situation, however, is otherwise. Skudrzyk has restricted his attention almost completely to what formed the first 12 chapters of the German volume. Since these made up only about one quarter of that work, it is obvious that the new book contains a vast amount of new material.

The new material is heavily mathematical in character. In the German work there was a flavor of experimental application to many of the parts of the text, but these have faded here, and the approach is uniformly theoretical.

Among the attractive features of the book is a greatly expanded treatment of Fourier analysis, including Fourier transforms and correlation analysis. The author then proceeds logically into probability theory, noise, and signal processing.

All of the above constitute about one-third of the book. The middle section concentrates on development of the wave equation and its solutions, and the final third is an exhaustive mathematical treatment of acoustic diffraction, with application to problems of arrays and membranes as sources.

The monumental dimensions of this book make criticism of omissions almost absurd. Nevertheless, some word of caution as to coverage in the text is necessary. Skudrzyk notes in his preface that the goal of the book is to make a thorough and readable presentation of the background of mathematics, dynamics, hydrodynamics, and physics, as well as of statistics, signal processing, and electrical theory, that is needed for research in acoustics today. Judged on these bases, the work is authoritative, detailed, and effective. The all-embracing title of the book, however, makes one regret that there is virtually no treatment of transducers, ultrasonic frequencies, or underwater sound.

The price of the book is horrifying. Even at current prices, the book is far too expensive, and will be bought only by the wealthier libraries.

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Books Received

Analog-Digital Conversion Handbook. Daniel H. Sheingold, Ed. Analog Devices, Norwood, Mass., 1972. Variously paged, illus. Paper, $3.95.

Analysis of Public Systems. Alvin W. Drake, Ralph L. Keeney, and Philip M. Morse, Eds. M.I.T. Press, Cambridge, Mass., 1972. x, 532 pp., illus. $14.95.

Annual Reports in Medicinal Chemistry. Vol. 7. Richard V. Heinzelman. Academic Press, New York, 1972. x, 316 pp., illus. Paper, $9.