Geology Applied to Engineering

*by **Terry R. West**, published by Prentice Hall, Englewood Cliffs, New Jersey 07632, ISBN 0-02-425881-4, 560 pages, 1995, $74.67.*

Review by **Christopher G. Kendall**

This book is aimed at undergraduates and graduates students who need a background in geology with an emphasis on environmental concerns as related to construction. The objective appears to be to help provide a geological overview when locating, designing, and constructing and maintaining engineering projects. It should also help geologists to gain an understanding of the importance of geology to engineering applications, so forming a counterpoint of geology for engineers. The book follows the expected outline of an introductory book in geology, with a brief chapter on Earth and its relationship to outer space, the architecture of the earth's surface and the configuration of the interior of the earth. There is a chapter on minerals, igneous rocks, sedimentary rocks, and metamorphic rocks. Each of these chapters, beginning with the one on the description of igneous rocks onward, contains a section focusing on the engineering considerations. Chapters include one on the importance of the engineering properties of rocks, including tests on the constructional materials, their mass properties, strength, and the relationship to Portland cement concrete, the elements of soil mechanics, soil structure, compaction, effective stress, shear strength of soils, consolidation, etc. There is a chapter on rock weathering and soils, the processes involved and again the engineering properties of soils and how one classifies a soil profile, etc. There are the usual chapters on stratigraphy and geologic time, structural geology, running water, river systems, glaciers, all with an engineering perspective. There are also descriptions on physiographic provinces and engineering problems, landslides, subsidence, and slope stability, ground-water geology, coastal processes, arid environments and wind, earthquakes and geophysics, subsurface investigation and site selection, and engineering geology and environmental geology.

The book is clearly aimed at engineers or geologists needing an engineering background, who also need an introductory text which expresses classical geological from the perspective of the engineer. The book is packed with clear line drawings of physical relationships, many in the form of graphs, also there are abundant black and white photographs which may be of special interest to engineers. I thought that the appendix on geological maps was useful, providing information on township and range, mechanisms for indicating geological information on maps, and techniques for reading topographic maps, etc. There is an outline on how the tabulate information on rock properties as they relate to engineering. There are numerous exercises scattered through the book, each chapter ending with a series of questions or problems and references which would help the reader understand the topics described in that chapter. The exercises are rigorous and complete, so that a student could use these as a means of self teaching. The book is essentially a classic well illustrated text, that one would expect from a company like Prentice Hall. Terry West has undoubtedly been helped in making this book so readable by an army of illustrators and editors but his book is a great contribution. Perhaps not as colorful as other illustrated texts of geology this book is packed with important information for engineers or geologists who will be working with engineers. This is a useful book and should form a strong basis for a relatively rigorous course in geology as it is related to engineering problems. Readable, clearly illustrated and useful text for the introductory student. In a time when geology is changing its direction forwards environmental and engineering considerations this book probably should be a must for many young geologists at their beginning of their career.