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Soil Components, Volume 2, Inorganic Components

Edited by John E. Gieseking
Springer-Verlag, New York,
684 p., 1975.
$84.00

Reviewed by Douglas W. Hoffman
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Here is a book of great interest to the geologist and the soil scientist. The study of the different mineral species contained in the rocks that make up the earth's crust is primarily the domain of the geologist and mineralogist. However, minerals are important to soil formation and plant nutrition and familiarity with the principles of mineralogy is of great importance to the pedologist. As Professor Gieseking has stated, "...much of this volume is devoted to the arrangement of ions in crystalline mineral particles occurring in soils and the properties that these particles contribute to soil systems." In addition, the book provides a comprehensive reference for researchers in fields other than pedology.

This volume comprises 17 papers written by some of the best known researchers in the field. Each paper is a scholarly evaluation of the work conducted by the author and others in his area of concentration. Most of the chapters deal with the nature, occurrence, structure, properties and methods of study of minerals such as silicates, micas, smectites, kaolins, vermiculites, chlorites, interstratified clay minerals, fibrous minerals, allophane, feldspars, heavy minerals and bioliths. Water in soils and analytical techniques for characterizing soil minerals are discussed in the last few chapters.

The text opens with a modest account of the classification of soil silicates and oxides. Six types of silicates are recognized from the manner in which SiO_4 tetrahedra occur in the structure, and two systems of nomenclature have been employed. Since silicates are the most common minerals on the earth's crust one might have expected a somewhat more comprehensive statement of their role in soils at this juncture. However, the author's objective is to set the stage for the information concerning silicate minerals that follows and this is done with skill by presenting their classification. This first chapter is followed by two chapters dealing with micas. The descriptions of mica morphology are well done although they may be too detailed for readers except those whose expertise has been gained by studying these minerals in particular.

The same procedure is followed in ensuing chapters. Each mineral group is classified, described and its role in soils is given. There are, of course, a few exceptions. For example, little is said about the role of chlorites in soils in Chapter 7 which is devoted to them. However, the function of mixed-layer chlorites in soil is covered in the following chapter which may make up for any such omission. In general, though, there are remarkably few omissions. The review of feldspars as geologic thermometers is of interest to both geologists and pedologists and Chapter 11 dealing with the oxides and hydrous oxides of silicon is essential reading for anyone involved in studying soil development. The decomposition of primary silicates, the translocation of silica in solution and the deposition of silica are established featues of soil formation. In addition, knowledge of the nature and transformation of silica in soils is essential for an appreciation of many soil-plant phenomena. Chapter 11 applies much of that knowledge through the manuscript and its references.

The references given in this book are particularly good. It is regretable that few references, if any, are more recent that 1968. Indeed, most are 1965 or older. This is likely due to various problems which delayed publication. The book needs a section which ties the various chapters together. Some attempt has been made to point out the relationships among the various soil components but it would have been helpful, at least to some readers, if greater efforts had been made to integrate the information.

Soil Components volume 2 will be widely used as a reference. Its high cost will likely keep it off the bookshelves of individual researchers and that is a pity.

MS received September 17, 1975

Planetary Geology

By Nicholas M. Short
Prentice-Hall, Inc., Englewood Cliffs,
N.J. 361 p., 1975.
$17.95

Reviewed by D. W. Strangway
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In the past few years our knowledge of lunar and planetary geology has expanded with the intensive exploration of the moon and the terrestrial planets. The explosion in knowledge has been so great that we can almost consider that there has been a second revolution in the earth sciences. This revolution has involved many facets, not the least of which is the emergence of the geoscientist as a major influence in the use of high quality analytical tools. Already these effects have had major effects on the practice of almost every aspect of geology.

It has been difficult to get access to suitable material for teaching courses which have the moon and planets as a central theme. The arrival of this new text by Nick Short goes a long way to alleviate this problem. While few people will choose to use it as a formal text, it is the best and most current source I know covering the material. An earlier book by Hartmann, *Moons and Planets,* has been useful and a recent book by Ross Taylor, *Lunar Science: A Post-Apollo View,* is a useful summary of lunar science.

It has been useful to have a single source of information for reference. The first two chapters, A Prologue, and The Solar System, are general background material. The following two chapters, Meteorites, and The Origin of Planets are especially useful in a book of this type which sets the stage for planetary studies. The next seven chapters are adequate summaries of our new view of the Moon. The author has skillfully woven in information about the missions which help to preserve the excitement of the Apollo and the pre-Apollo excursions while retaining a good content of scientific material. As one might expect the chapter on cratering is especially well done. The section on geophysics tends to be experiment-oriented rather than addressing

geophysical problems.

Chapter 12 on Mars, Venus and The Planets Beyond, I found particularly good because they set in context our early stages of learning about the terrestrial planets. The last chapter on What Does it All Mean, attempts to set in context the view of planets and their evolution. The material is highly speculative and while any investigator would have emphasized his favourite points the chapter is quite well done.

There is no doubt that this is an important reference work about the newest frontier in earth science. I plan to adopt it as a source of reference material for my own introductory course on the moon and planets.

MS received November 13, 1975.

Computer-Based Systems for Geological Field Data

Edited by W. W. Hutchison
Chairman, COGEODATA
Geol. Survey Can. Paper 74-63,
100 p., 1975.
Canada $4.00, other countries $4.80

Reviewed by Kamal N. M. Sharma
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This publication is an outcome of a meeting held at UNESCO headquarters in Paris November 5-9, 1973. The meeting was sponsored by COGEODATA, International Union of Geological Sciences, in collaboration with the Division of Earth and Environmental Sciences, UNESCO and the Canadian Centre for Geoscience Data. It provides the reader a condensed description of the most important presentations, made at the meeting, *concerning the computer applications in* various domains of the earth sciences. Although many of these computerized systems have been the object of publication and presentation elsewhere, it is for the second time that they are grouped in this paper for easy access by earth scientists already engaged or interested in the use of computers. The earlier attempt was the publication of section 16 report of the 24th International Geological Congress, Montreal 1972.

The paper is divided into two parts. The first part deals with Geological Field Data Systems. A common point with all Field Data Systems has been the design and use of an input document to record geological data in the field, thus replacing the traditional field notebook. It is now an established fact, at least for big exploration projects, that well-designed input documents have proved to be time saving on the outcrop and have improved the quality of data collected. In Canada the pioneering work in the Field Data Systems was initiated by the Coast Mountains Project of the Geological Survey of Canada, the Project Pioneer of *the Manitoba Geological Survey and the* Grenville Project of the Quebec Department of Natural Resources. Subsequently similar systems have *been developed by the geological* surveys in Sweden, Finland, Denmark, Federal Republic of Germany and other provincial surveys and universities in Canada. This paper describes the techniques used in some of these systems. The final objective of all these systems is to generate maps displaying geological information, after various analyses of the field data, with the help of computer driven plotters.

The second part of the paper deals with Generalized Geological Data Management Systems developed by different institutions in France, Canada, Netherlands, U.S.A. and Czechoslovakia. These systems have a much wider scope as compared to Field Data Systems, as they possess interactive systems which treat geochemical data, mineral deposits data, petrological-petrographical data, *structural data, cartographic data,* environmental, social and economic data in various combinations.

All the articles in this paper are quite brief and well illustrated and represent the work of excellent editing. For persons who are interested in more detailed accounts of the existing computer-based systems in geological sciences, the bibliographic references given with each article should prove to be quite useful.

MS received September 25, 1975.