Interactions at the Soil Colloid-Soil Solution Interface, edited by G. H. Bolt, M. F. DeBoodt, M. H. B. Hayes, and M. B. McBride. NATO Advanced Science Institute Series, E 190. Kluwer Academic Publishers, Dordrecht, The Netherlands, 1991, 603 pp., ISBN 0-7923-1066-7. US$184.

This publication is based on the NATO Advanced Study Institute on interactions at the Soil Colloid–Soil Solution Interface held at the State University of Ghent, Belgium, August 25–29, 1986.

The book is extremely diverse in its content, reflecting the wide variety of interests of the various authors. Its subject matter ranges from highly technical chapters on the electrified interface of soil surfaces to more practical aspects of soil fertility and environmental problems.

Many of the chapters are excellent contributions to our knowledge of the subject as stated in the title of the book, but can stand on their own, without relating in any particular way to the rest of the book. Other chapters are also excellent in dealing with topics, though not falling precisely under the subject of the book, are of interest to many scientists.

Chapter 1 is a general discussion about inorganic and organic colloids to be found in soils. Some detail on their structures and surface properties is presented. The material in Chapters 2 and 3 deals with the electrified interface of the soil solid phase. It is really an expression of the historical predilection of a series of Dutch scientists to examine, discuss, and describe mathematically the nature of electrically-charged surfaces and their associated counterions.

Chapter 4 is an excellent discussion of surface complexation at hydroxide surfaces. It includes theoretical developments that deal with the chemical nature of surface hydroxyls of various kinds—acid-base equilibria, adsorption of cations and anions, metal ligand complexes, and adsorption/dissolution considerations. Chapter 5 is an excellent sequel that considers processes of heavy and transition metal sorption by soil minerals. Much of the chapter deals with spectroscopic evidence for the environment of metal ions, and metal-ion complexes on layer silicates, oxides, and allophanic clays. Chapter 6 also deals with heavy metal adsorption on calcium and aluminum hydroxides and their smectite complexes. Chapter 7 covers the reaction kinetics of phosphate with oxides and soil. It deals with theoretical aspects of phosphate reactions and rate processes in a mathematically quantitative way. Modelling of these processes makes up the latter portions of the chapter. Chapter 8 is a sequel where models for adsorption, solid solution and surface precipitation are compared.

Micronutrient adsorption by soils and soil colloids is the subject of Chapter 9. It is a detailed discussion of adsorption of minor elements required for plant growth onto soil organic matter, oxide minerals and soil oxides and layer silicates. Effects of pH and mechanisms of adsorption are dealt with, and use of adsorption data for predicting soil behavior is discussed. Chapter 10 discusses the application of sorption theory to the use of sorbents for eliminating heavy metals from waste water and contaminated soils.

Chapters 11 and 12 are concerned with the interactions of small and large organic molecules with soil colloids and soils. This largest section of the book provides its authors with the opportunity to express their ideas and views on this very complex and extensively researched area. In this connection, I found it to be a bit more parochial than perhaps is desirable in a review of this sort. Chapter 13 discusses complexation of metal ions by humic substances from a very basic point of view. Scientists concerned with water quality, particularly metal ion activities in water as affected by humic materials, will be very interested in this chapter.

Part 4 of this book (Chapters 14–17) deals with environmental aspects of soil fertility, soil acidity, and heavy metal mobility in soils.

As stated in the beginning, this reviewer found much of interest in this book. However, I also found it to be considerably less focused on the subject matter of the title than other books in this series (i.e., NATO Advanced Study Institute Series V. 63, *Advanced Chemical Methods for Soil and Clay Mineral Research*). It is almost as if Part 4 was tacked on to fill out the requirement for more pages (though not denigrating the quality of the chapters in that section). Many scientists will find the book to be a valuable reference; however, the price of $184 may prevent them from having it in their private libraries.

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