

BOOK REVIEWS

FRIPIAT J.J. (Editor). *Advanced Techniques for Clay Mineral Analysis* (Developments in Sedimentology, 34). Elsevier Scientific Publishing Company, Amsterdam, Oxford and New York, 1982. vi + 234 pp. Price Dfl. 100, US \$42.50.

In common with most books having their origins in conference proceedings, this compilation of selected invited papers from the 7th International Clay Conference (Italy, 1981) has a mixture of good, and less commendable, features. On the positive side, here is a book containing reasonably up-to-date descriptions of nine physical techniques which must be of interest to the clay mineralogist. On the negative side is the wide variation in approach adopted by the authors of the individual chapters. Also, if this volume is to be judged as a reference book rather than as a collection of conference papers, then the quality of some of the figures and the standard of English in some of the chapters is not adequate.

There is also a further consideration: namely, that a very similar book (deriving from a NATO Advanced Study Institute) appeared as recently as 1980*. In his preface, the Editor of the present work attempts to emphasise the differences between the two publications. He suggests that *Advanced Techniques* concentrates more on experimental results and their physical meaning, and is intended for a wider readership, than the NATO volume. However, comparison of the two books provides only limited support for this view. The similarities are compounded by the fact that some authors have contributed related material to both publications. Nevertheless, the two books are different in nature, and perhaps the following summary will help to make the differences clear. The NATO volume (477 pp.) provides a fairly detailed account of the following techniques and their application to clay systems: Mössbauer spectroscopy, neutron scattering, XPS [X-ray Photoelectron Spectroscopy, now essentially synonymous with ESCA] (2 Chapters), NMR [Nuclear Magnetic Resonance] (2 Chapters) and ESR [Electron Spin Resonance] (3 Chapters). There is also a short chapter on Photoacoustic spectroscopy. The present book (234 pp.) covers the same techniques in less detail, but additionally has chapters on thermoanalytical, HREM (High Resolution Electron Microscopy), UV/visible and far-infrared methods. Each book provides a short index (~10 pp.). Overall, there is a greater emphasis on applied aspects in the present work.

Most contributors to this book attempt a brief overall review of their subject, or at least of recent advances. Only one, B. A. Goodman (Mössbauer spectroscopy), chooses to illustrate selected areas of his topic, but in doing so provides one of the neatest chapters. The section on HREM seems to understate the progress made in recent years. Similarly, the NMR chapter is heavily biased towards ^2H work and gives little impression of the advances to be expected from the study of other nuclei (particularly ^{27}Al and ^{29}Si). The value of the theory summaries provided in most chapters (and forming a substantial part of several) is questionable. The non-specialist is unlikely to use many of the equations

* Stucki J. W. & Banwart W. L. *Advanced Chemical Methods for Soil and Clay Minerals Research*. D. Reidel, 1980. For a review, see *Clay Miner.* (1981), 16, 313.

given, and the specialist will find the material too condensed. Surely a more descriptive approach illustrated by examples of practical consequences would have been more useful.

From the above remarks, it will be seen that this book provides a rather less than ideal introduction to advanced analytical techniques. However, it is a useful reference work which many clay mineralogists will wish to have on their shelves alongside the volume by Stucki & Banwart.

C. S. CUNDY

TAN K.H. *Principles of Soil Chemistry*. Marcel Dekker Inc., New York & Basel, 1982. 267 pp. Price \$34.50 (20% higher outside the USA and Canada).

This text book is intended to bridge the gap between pure chemistry and soil science. It is aimed at those working in 'agriculture and other sciences, for example crop and plant sciences, irrigation, forestry, conservation, plant physiology, ecology, microbiology, geology, geochemistry, physics, chemistry and botany'. According to the jacket the text is 'invaluable for graduate and higher-level undergraduate courses'. It is within this novice/student framework that I tried to read this book and comment on it.

There are ten chapters: (1) Review of basic principles; (2) Electrochemical cells and chemical potentials; (3) Soil solution; (4) Colloidal chemistry of soil constituents; (5) Adsorption in soils; (6) Cation exchange; (7) Anion exchange; (8) Soil reaction; (9) Soil chemistry and soil formation; (10) Chemistry of soil-organic matter interaction. There are also five appendices: (A) Fundamental constants; (B) Greek alphabet; (C) Periodic classification of the elements; (D) X-ray diffraction 2θ d -spacing conversion Table (Cu-K α radiation); (E) System (sic) International (SI) units.

This book has the most laudable of aims, but defeats itself completely by being the most appallingly presented text that I have ever seen in print. It should be a cardinal aim of texts intended for student/non-specialist use that they be as clear and logical as possible. The book abounds in grammatical and spelling errors of such magnitude that it is difficult to believe the book ever passed before a native speaker of English. Simple spelling errors are tolerable even if inexcusable, but the grammatical and stylistic presentation are such as to render the meaning of whole paragraphs unclear, or—even more importantly in a book intended for students—to undermine one's confidence in what is written. For example, on p. 1 'Atoms of the same elements are similar in composition, but one element differs from the other in size, *position* and *movement* of its atoms (my italics), and on p. 213 'Reduction and oxidation reactions occur almost in any soils'. These merely give a hint of the idiosyncratic nature of the text.

Certain aspects of the science are in themselves confusing, from minor inconsistencies—such as Avogadro's Number (6×10^{23} on p. 3 but 6.0255×10^{23} on p. 225)—to the persistent variation of the Nernst equation (of which much use is made in this book) from

$$E = \frac{RT}{nF} \ln \frac{K}{M^n} \quad \text{to} \quad E = \frac{RT}{nF} \log \frac{K}{M^n}$$

with no explanation of the change in logarithm bases or appropriate numerical corrections. On p. 55 there is a discussion of Table 4.1 which claims the range of humic acid carboxyl groups in soils to be 1.5–2.7 mEq/g HA, but the table shows the range to be 1.5–9.2 mEq/g HA.