

BOOK REVIEW

International Clay Conference, 1981: Proceedings of the VII International Clay Conference held in Bologna and Pavia, Italy, September 6–12, 1981, edited by H. van Olphen and F. Veniale. *Developments in Sedimentology* 35, Elsevier Scientific Publishing Company, Amsterdam, New York, 1982. xxiv + 828 pages. \$93.00, Dfl. 200.00.

International clay conferences organized initially by the C.I.P.E.A. and subsequently by the A.I.P.E.A. (International Association for the Study of Clays) have been held every three years since 1963, and books similar to the present one have contained a selection of the papers printed. The present volume, with about the same number of pages as its predecessors, contains the opening and closing lectures, respectively, by J. Konta (Czechoslovakia) on "The present state and development trends of clay sciences" and by the reviewer on "The teaching of clay mineralogy" and 5 plenary lectures on topics of broad interest, 10 introductory lectures to the main topics within sections, and a variety of papers which altogether add to 68 contributions. These papers amount to only about 25% of the more than 260 papers actually presented at the conference. The five principal sections are as follows (numbers of papers in parentheses): I. Crystal chemistry and structure (7); II. Colloidal properties, surface chemistry and catalysis (11); III. Geology, noncrystalline minerals, and geochemistry (18); IV. Genesis, diagenesis, and weathering (16); and V. Applications (14). The editors have achieved a good balance of papers on a wide variety of topics, and the chosen authors reflect the worldwide interest in the subject. The preface states that the reviewed and edited manuscripts were typed by the authors in camera-ready form and the volume was produced by photo-offset techniques. The quality of the paper and binding are excellent; the quality of the typing ranges from mainly good to occasionally poor. Most contributions are between 6 and 14 pages and average about 10 pages (as the editors requested), but a few are considerably longer. The price of the book is lamentably high, and many who would like to have a personal copy will probably have to forego the pleasure. In view of the high cost of the book, a few of the papers should have been retyped to conform more closely with the majority.

Section I, on crystal chemistry and structure, is the smallest of the five sections. Does this reflect a diminishing interest? B. B. Zvyagin (U.S.S.R.) provides an introductory survey of diffraction and other methods of studying mineral structures. G. Besson *et al.* (France and U.S.S.R.) illustrate the possibilities of a quantitative evaluation of disordered structures by a detailed study of nontronite. H. M. Köster (F.R.G.), under the title "Crystal structure of 2:1 layer silicates," discusses mainly chemical compositions. H. D. B. Jenkins and P. Hartman (U.K.) discuss electrostatic energy calculations for silicate structures; the paper will probably be too brief for many readers but it draws attention to an alternative approach to such studies. M. F. Brigatti (Italy) reviews data for the rather ill-defined smectite, hisingerite, and A. Wiewiora *et al.* (Poland) analyze some mixed-layer nickel-containing minerals. C. Otero-Arean *et al.* (France) apply proton N.M.R. to study the dehydroxylation behavior of kaolinite.

Section II, with eleven papers, has three introductory lectures by L. Heller-Kallai (Israel) discussing clay-salt interactions, B. K. G. Theng (New Zealand) clay-activated organic reactions, and F. D. Ovcharenko (U.S.S.R.) clay minerals as

catalysts. The increasing recognition of clays as possible catalysts for organic reactions probably justifies the 42-page length of Theng's article, the longest in the book.

Sections III and IV are related to the geology, geochemistry, genesis, diagenesis, etc. of clays; the 34 papers include three introductory and two plenary lectures. E. Galan (Spain) gives an interesting historical survey of the increasing use by geologists of mineralogical analyses of clays; he remarks that "up to now, no quick and accurate method for [clay] mineral quantification has been developed," and emphasizes the urgent need for such a method. The reviewer concurs, but the problem may have no easy solution. K. Wada (Japan) reviews noncrystalline clay minerals—chemical composition, crystalline state, synthesis, and surface properties. The apparent conflict in the title between noncrystalline and crystalline is not overlooked, and Wada discusses short range, long range, and intermediate ranges of order in opaline silica, allophane, imogolite, etc. F. C. Loughnan (Australia), in a stimulating paper on kaolins in sediments, emphasizes that their low-temperature development is possible "only from dilute, molecularly dispersed systems" and that "the critical factor is . . . the pH of the localized solutions; indeed the optimum pH . . . seems to be within a very narrow range." The plenary lectures in Sections III and IV are by F. Lippmann (F.R.G.) on the thermodynamic status of clay minerals and by G. Millot (France) on weathering sequences, "climatic planations."

Section V, on applications of clay science, has 14 papers and includes three plenary and three introductory lectures. The plenary lectures cover the role of clay minerals in the environmental sciences by M. L. Jackson and C. H. Lim (U.S.A.), the role of clays in petroleum generation during burial diagenesis, by W. D. Johns (U.S.A.) where the catalytic properties of clays may be of major importance, and clays in soils and sediments by R. M. Taylor (Australia). The introductory lectures consider the ceramic properties of clays (M. Kromer, F.R.G.), engineering and soil mechanical properties (J. E. Gilloft, Canada), and clays in relation to nuclear waste disposal (R. Dayal and R. J. Wilke, U.S.A.). The paper of Jackson and Lim brings to our attention the critical importance of trace elements in soils for the well-being of living forms, including humans. There are both upper and lower limits for the acceptable levels of these trace elements. The ceramic properties of clays, both before and after firing, depend in a complex way on the minerals present and their particle sizes. Is there any fully satisfactory correlation between green strength and mineral content of clays?

Any volume of this kind cannot be judged in the same way as a book by a single author. Every reader will find some papers of much greater interest than others. The present volume covers such a wide range of topics that I cannot visualize a clay mineralogist or clay scientist who will not find something of special value in this book.

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