

Book Reviews

PROCEEDINGS OF THE INTERNATIONAL CLAY CONFERENCE 1975. Edited by S. W. Bailey. Applied Publishing Ltd, Wilmette, Illinois, 1976. xvi + 691 pages. \$45.00.

The International Clay Conference is held every three years under the auspices of the Association Internationale pour l'Étude des Argiles (AIPEA). The most recent meeting of the group was organized by the Institute of Geology, National University of Mexico, and was held in July 1975 in Mexico City. This *Proceedings* volume contains 59 papers and 61 extended abstracts of papers presented at the conference. Contributions are from investigators who represent two dozen countries. The papers are grouped into seven Technical Sessions and four Symposia. These are, with the number of papers and the number of abstracts, respectively, in parentheses, as follows: Technical Sessions include (1) geology and diagenesis (10,6), (2) crystal chemistry/structure (12,7), (3) genesis and synthesis (6,4), (4) colloidal properties (2,6), (5) surface chemistry (7,8), (6) analytical techniques (4,1) (7) surface chemistry (7,8), (6) analytical techniques (4,1), (7) clay-pollutant interactions (3,4); Symposia include (1) kaolin (6,8), (2) zeolites (0,6), (3) soil studies (7,6), (4) soil mechanics (2,5). All of the abstracts and all but nine of the papers are written in English. The non-English articles are in French, and seven of them are found in the crystal chemistry section. All but one of the Technical Sessions begin with an introductory review paper by a session chairperson.

The book is sturdy, and the type is easily read. The number of misspelled words is minimal for a book of this size. A couple of figures cannot be deciphered because of their reduction to the printed page. Some of the abstracts are descriptive rather than informative. A few papers were noted that did not seem to give proper credit to early investigators. I found the purpose of one paper to be very difficult to understand. It read poorly too.

A summary of the findings from a cross section of the papers is as follows:

C. V. Clemency reported on the occurrence near São Paulo, Brazil, of two vertical veins of green, iron-rich, variably-expandable clay that cross-cut a red kaolinitic host rock. The green veins were shown to be amphibolite/basalt dikes originally; the red host was shown to be a schist/gneiss originally. A striking feature of this assemblage other than the color difference was the knife-sharp contact between the veins and the host rock, despite the alteration of the original minerals to clays. The author suggested the assemblage originated by weathering rather than hydrothermal alteration, because of the areally widespread occurrence of the relationships observed and the common attainment of the thickness of the saprolite, among other factors. Maintenance of the physical separation of the distinct weathering products was ascribed to a permeability difference within each material.

J. Mamy and J. P. Gaultier reported on the modifications they observed in potassium-exchanged Wyoming montmorillonite that had been alternately wetted and then dried at 80°C up to one hundred times. The exchange capacity of the clay fell to between one-half to one-third its original value, and the basal spacing approached 10Å, both of which were expected. From X-ray diffraction and SAD data the investigators suggested the modification of these properties was due to the development from an initial two-dimensional organization. Additional chemical data showing

that the increase in crystallinity they apparently effected was accompanied by an increase in layer charge or other chemical change in the clay was, unfortunately, not given. Aside from this paper, the establishment of criteria for judging the relative crystallinity of expandable clays from soils, shales, or recent sediments would be welcomed. The literature is replete with judgments maintaining that a given substance is "poorly crystalline" because of low intensity and broad maxima on an X-ray diffraction pattern. Sample preparations, interlayering, or orientation, among other factors, are often not given proper credit in making an assessment as to crystallinity.

K. Nagasawa and S. Miyazaki presented data on 57 halloysite samples from Japan of various origins. Their evidence showed that halloysites formed by the alteration of volcanic rocks had a rounded or scroll shape sometimes associated with tubes, whereas those formed by the weathering of feldspar or by the alteration of the matrix of sand had a tubular or lath shape. Halloysites which originated by hydrothermal alteration appeared to have a rather wide variety of morphologies. Some relationship between morphology and age was noted.

In a well-presented paper W. R. Almon and W. D. Johns reported on the kinetics and suggested a mechanism by which a fatty acid (behenic acid) was decarboxylated by a variety of clay minerals. The experiments were performed at temperatures simulating burial diagenesis, and the results indicated the clay-organic reactions could produce significant amounts of alkanes in geologically reasonable times. The catalytic decarboxylation reaction was viewed as occurring at electron acceptor sites within the clay mineral structure, such as octahedral aluminum at the edges of the layers or trivalent iron within the structure. Dioctahedral minerals were more effective catalysts compared to trioctahedral minerals, and the sorption of polyphosphate anions inhibited decarboxylation by about 36 percent.

An informative paper by H. H. Murray and S. H. Patterson described the location and occurrence of kaolinitic clays in the United States. The writers suggested that most valuable deposits have formed by sedimentary processes, but a small number are the result of hydrothermal activity, and others are residual accumulation. Most fire-clay deposits are associated with coal beds and are of Pennsylvanian age; most large kaolin and ball-clay deposits are found in sedimentary rocks of Cretaceous age and younger; hydrothermal deposits, including most halloysites, are believed to have formed in Cenozoic time; residual deposits that occur mainly on igneous and crystalline rocks are related to the present land surface or are found under younger rocks.

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PAPERS AND PROCEEDINGS OF THE NINTH GENERAL MEETING OF THE INTERNATIONAL MINERALOGICAL ASSOCIATION. Edited by H. U. Bambauer. E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, 1975. 629 pages, 278 figures, 76 tables. DM 168 (\$66.40).

Associated with the Ninth General Meeting of the International Mineralogical Association were a number of symposia whose pa-

pers were published in *Fortschritte der Mineralogie* as a Special Issue to Volume 52 (1974). The papers cover a wide range of topics in mineralogy and petrology and were selected to give an indication of progress since previous international meetings.

The only symposium that succeeded in giving a coherent and dynamic review is that on "Thermodynamics in Experimental Mineralogy and Petrology." As made clear by the Chairman, W. Schreyer, there has been a transition from traditional experimental phase-equilibria studies dependent solely on the phase rule to a more interactive research process incorporating a broader role for thermodynamics and basic thermochemical data and calculations. Six invited review papers, covering solid-solid equilibria, solid-solid equilibria involving solid solutions, dehydration reactions involving pure solids and solid solutions, solid-liquid equilibria, solid-solid equilibria involving multicomponent fluids and solid-liquid-fluid equilibria, give excellent summaries and illustrations of the use of theoretical analysis and thermochemical data in the evaluation of standard phase-equilibria studies. The problems of isolated research such as the assumption of equilibrium and the limitation to simple systems in the experimental studies, and the lack of high-quality thermochemical data for the theoretical analyses, are illustrated, and the focus is on the success of the interactive approach. Six additional papers reporting individual research show the value of a combined approach. All papers are of uniformly high quality and give an excellent lead to future areas of productive research.

Other sections have series of papers on isolated subjects under general topic headings. A selection of papers on "Mineral Genesis and Crystal Growth" examines the role of water in the replacement of silicates and precipitation of refractory sulfides from water-rich solutions. Crystal growth mechanisms are also examined and related to the genetic context of their environment. The set of papers are primarily illustrative of available techniques. A section of "Pegmatites and Pegmatite Minerals" has a review of pegmatites. Four other sections on "Secondary Minerals in Ore Deposits," "Cosmic Mineralogy," "Gem Minerals and Gemmology," "Ore Microscopy" and "Mineral Physics" include scattered papers of variable quality. A section on "Fluid Inclusions in Crystals" gives an interesting description of the variety of fluid inclusions and versatility of approach but lacks an analysis of quantitative data. Unlike the first symposium the other sections fail to give a feeling for progress over the last few years and their scattered quality reflects poor organization.

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SPACE GEOLOGY. By Elbert A. King. John Wiley and Sons, Inc., New York, 1976. xiv + 349 pages. \$16.95.

In his preface the author states "This book is intended for use as the main textbook in a senior or first-year graduate level course in

space geology (astrogeology, planetary geology or the like)." It would be interesting to know how many such courses are now given—rather few, perhaps, in view of the newness of the field and the extent and diversity of the literature. Elbert King has performed a yeoman service in providing a comprehensive and well-balanced textbook which should encourage the wider teaching of such courses. The book begins with a lengthy chapter on meteorites (68 p), followed by a short one on tektites (12 p), and chapters on craters (14 p), terrestrial impact craters (36 p), and impact metamorphism (22 p); almost a third of the book is then devoted to chapters on the Moon (92 p) and Mars (32 p), and the book concludes with short chapters on asteroids, comets, other planets and moons, and comparative planetology. This seems to be an admirable balance. The book is well illustrated, and each chapter has an extensive bibliography with a useful section entitled "Suggested Reading and General References." I found the book interesting and easily read, and believe that in coverage and length it fits the requirements of a university textbook and is also an excellent introduction and reference work to all aspects of space geology.

BRIAN MASON
Smithsonian Institution

RECENT CONTRIBUTIONS TO GEOCHEMISTRY AND ANALYTICAL CHEMISTRY. Edited by A. I. Tugarinov. Halsted Press (John Wiley and Sons), New York, 1976. 695 pages. \$57.50.

This volume is the translation of a Festschrift, published in Russian in 1972, honoring the 75th birthday in 1970 of A. P. Vinogradov (died November 16, 1975); some of the papers were originally written in English, and for most of these the publisher was able to obtain the original manuscript. The volume is divided into the following sections: cosmochemistry and meteoritics (9 papers); earth shells and experimental investigations at high pressures and temperatures (15 papers); geochemistry of individual elements and problems of ore formation (16 papers); isotope geochemistry and geochronology (9 papers); biogeochemistry and hydrogeochemistry (12 papers); analytical chemistry and some questions of general chemistry (14 papers). About two-thirds of the papers are by Russian authors, and the remainder are well-distributed, scientists from all continents except South America being represented. The wide variety of topics is a tribute to the wide-ranging contributions and versatility of the late Professor Vinogradov. However, this wide variety also militates against the usefulness of the book for the individual scientist, since few of us can match this versatility in our own work and interests. Additionally, since most of the contributions were evidently prepared in 1969 or 1970, some of them have been superseded by later work.

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NOTICES

Dr. R. V. Dietrich, who has succeeded Marjorie Hooker as the North American organizer for the Mineralogical Abstracts, is asking for volunteers to help with the regular abstracting of mineralogical journals. Interested persons are asked to write to Dr. Richard V. Dietrich, Department of Geology, Central Michigan University, Mount Pleasant, Michigan 48859.

The U.S. National Mineral Collection

The mineral collections of the National Museum of Natural History, Smithsonian Institution, Washington, D. C., are very extensive and are among the largest in the world. These collections are readily available to, and used by, the scientific community for worthwhile research. The museum maintains, in addition to the study and exhibit collections, a repository for *type* and *described* mineral specimens, *i.e.*, those from which data have been gathered, and usually published. The *type* collection presently contains over 500 mineral species and is continually growing. The number of *described* mineral specimens presently exceeds 4700 specimens. We should all be concerned about the preservation of minerals for which analytical data of any form exists. The data become far less significant if the specimens are lost, for they cannot be verified, amended, or enhanced by subsequent, perhaps more sophisticated, studies.

Far too often, minerals described in published papers are deposited in drawers or cabinets by the authors and subsequently forgotten. With the passage of time and continual shifting from place to place, these specimens are usually lost to science. Such loss, though unintentional, is an irresponsible disservice to our science. It is the rule rather than the exception and this should be changed for the betterment of mineralogy.

Just as it is important to publish our research and disseminate knowledge, so also is it important to see to it that the specimens involved are preserved. Repositories of described specimens should continue to grow in depth and quality to the advantage of all who study minerals. Authors are therefore asked, and strongly encouraged, to send all analyzed or otherwise described mineral specimens to the Department of Mineral Sciences, National Museum of Natural History, Smithsonian Institution, Washington, D. C. 20560. Acknowledgement of receipt will be by letter, and the specimens will be carefully curated. Postage franks are available upon request. In turn, the museum will continue to do its best to furnish research materials to the scientist upon written request.

PETE J. DUNN
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Short summer course in X-ray powder diffraction

A two-week short course in modern X-ray powder diffraction will be offered at the State University of New York at Albany from June 20 to July 1, 1977. The course will be tutorial in nature and will develop the basic principles and practical applications starting from elementary considerations. No previous knowledge or experi-

ence is required. The first week will cover principles and practice of instrumentation, specimen preparation, identification of powder patterns including complex phase identification, practical considerations on the use of the several indices with emphasis on computer retrieval and computer-assisted identification. The second week will cover qualitative identification of complex powder patterns, computer-assisted search for correct powder identification, quantitative analysis of polycrystalline mixtures of two or more phases, automated powder diffractometers and other topics in depth. Equal time will be devoted to lectures, laboratories and problem-solving sessions. A suitable amount of time will be set aside for discussion of individual problems. The registration fee is \$400.00 for one week, either week, or \$750.00 for the entire two-week session, payable in advance. For further information and to register please communicate with:

Professor Henry Chessin
State University of New York at Albany
Department of Physics
1400 Washington Avenue
Albany, New York 12222
(518) 457-8339
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Short summer course in X-ray spectrometry

A two-week short course in modern X-ray spectrometry will be offered at the State University of New York at Albany from June 6 to June 17, 1977. The course will be instructional and will develop the basic theory and techniques starting from elementary principles. No previous knowledge or experience is required. The first week will cover basic principles and techniques, and the second week will continue with further fundamentals and practical applications. Both weeks will illustrate and employ the wave-length-dispersive and energy-dispersive methods. Emphasis in the second week will be placed on advanced principles and techniques, absorption-enhancement corrections by several procedures including mathematical methods and computer automation of modern X-ray spectrometers. Equal time will be devoted to lectures and laboratory-problem solving sessions. A suitable amount of time will be set aside for individual problems. Registration may be made for one week, either week, at a registration fee of \$400.00 or for the entire two-week session at a registration fee of \$750.00, payable in advance. For further information and to register please communicate with:

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