

BOOK REVIEWS

TECNOLOGIA DE ARGILAS APLICADA ÀS ARGILAS BRASILEIRAS. By Pêrsio de Souza Santos. Vol. 1, *Fundamentos*. Vol. 2, *Aplicações*. Editora Edgard Blücher, Ltda., and Editora da Universidade de São Paulo, São Paulo, S.P., Brazil, 1975. 802 pages. Price not given.

These two volumes cover the basic fundamental knowledge of clay minerals and clay materials (Vol. 1) and their applications in technological processes (Vol. 2). They are based on a graduate course extending over two semesters in the Department of Chemical Engineering in the University of São Paulo and are intended to provide a scientific background for research to be incorporated in doctoral theses. Although much of the material can be found elsewhere (which is inevitable), I have the impression, even with my very limited knowledge of Portuguese, that they are not just a rehash of old material but in various ways are a fresh approach based on the author's extensive acquaintance with the clays of his own country. Volume 1 opens with short chapters on what are clays, types of clays, classification, nomenclature and structures of clay minerals, formation and geology of clays. Thoughtfully, the author gives a Portuguese-English vocabulary of clay mineral terms and an explanation of English terms in Portuguese. A sequence of chapters on the clay-water system, the selection of clays for industrial purposes, laboratory testing of clays, and the usual methods of clay identification, chemical, X-ray, thermal, and electron microscope, completes volume 1. The text leans towards being practically useful and gives considerable factual information about the clays of Brazil. A list of 58 clays, classified according to use, gives their thermal behavior at various temperatures. Their physical properties, such as modulus of rupture for clays dried at 110°C; change in linear dimensions from 110°C to 950°, 1250° and 1450°C; water absorption; variation of apparent density, are shown in diagrammatic form. Many of the data are based on standardized methods used by Professor Souza Santos for the evaluation of Brazilian clays. Volume 2 discusses the technology of clays in the ceramic industries, whitewares, refractories, porcelains, lightweight aggregates, in the cement industry, and in the rubber, plastics, paper and petroleum industries. Clays and bauxites as sources of alumina and aluminum are discussed, and also the nickel-containing silicates. Although there are no general indexes to subject matter and names, readers (if they read Portuguese) will have no difficulty in finding desired information from the detailed tables of contents. Each chapter has a long list of references with full titles of articles. The second volume concludes with 199 problems and suggestions for further study. The books are printed very clearly, the paper is of excellent quality (Brazilian kaolin?), and the strong paper binding is pleasant and serviceable.

G. W. BRINDLEY
Pennsylvania State University

PHILOSOPHY OF GEOHISTORY: 1785-1970. Edited by Claude C. Albritton, Jr. Vol. 13, *Benchmark Papers in Geology*. Dowden, Hutchinson and Ross, Inc., Stroudsburg, Pennsylvania, 1975. xiii + 386 pages. \$24.00.

Claude Albritton, whose "Fabric of Geology" has done so much to turn the attention of geologists and students to serious thought

about the origins and significance of our ideas, has here selected fifteen papers on the philosophy of geology. Volume 13 in the well-known series *Benchmark Papers in Geology* begins and ends with modern analyses of geologic time by Stephen Toulmin and David B. Kitts. In between Dr. Albritton starts with Hutton and Playfair; continues by illustrating the origins of classical geological thought with a polemical exposition of uniformitarian doctrine by Lyell and a spirited defense of catastrophism by Whewell, the latter in the article in which the two doctrines were christened.

If Hutton and Playfair seem refreshingly direct and rational in the manner of the 18th Century, the later articles (Chamberlin, Gilbert, Johnson, Davis) seem somewhat dated. Could there be a discrepancy between the intellectual talent that led Chamberlin to the brink of deducing radioactivity in the earth's crust, and the requirements of abstract philosophy? Of the fifteen authors, one, Toulmin is a non-scientist. His article is an illustration of the usefulness of significant background either in geology or in its history and preferably both, for the construction of a philosophy of the subject.

The three modern papers with which the volume concludes (G. G. Simpson, R. Hooykaas, and D. B. Kitts) are complementary in the sense that, with very distinct views, nevertheless taken together, they express a consensus. What an improvement in the quality of our literature and our conferences would result if our graduate students were to read these papers! It is not simply their intrinsic quality but the effect of their juxtaposition and in particular against the background of such classics as Chamberlin's "Method of Multiple Working Hypotheses" that make them so effective. The usefulness of the *Benchmark* series in bringing together this juxtaposition demonstrates the power of the collective enterprise that is science. The whole is greater than the sum of its parts when those parts include papers of such power and distinction as these.

CECIL J. SCHNEER
University of New Hampshire

AN INTRODUCTION TO THE CHEMISTRY OF ROCKS AND MINERALS. By Max B. Perrin. Halsted Press, New York, 1975. 97 pages. \$5.95.

This is the ninth in a *Studies in Chemistry* series edited by B. J. Stokes and A. J. Malpas. The editors state that "Each book in this series is intended to provide an up-to-date and authoritative treatment . . . which . . . will stimulate the interest of chemistry students in an area of their subject outside the scope of the normal [advanced highschool] textbooks.

Although the author has fairly well summarized a few aspects of the occurrence, investigation, and chemistry of minerals and rocks, much too much of his treatment is neither up-to-date nor authoritative. It is, instead, replete with inaccuracies, inadequacies, and inconsistencies.

For students who use this book, there may be inane unlearning processes in their futures. For mineralogists, petrologists, and geochemists, there is nothing except a reminder that we must be ever diligent to communicate clearly, especially with professionals in other fields.

R. V. DIETRICH
Central Michigan University

MANUAL OF OPTICAL MINERALOGY. By David Shelley. Elsevier Scientific Publishing Company, New York, 1975. xiii + 239 pages, 133 figures. \$26.95.

This well-produced book, designed to satisfy the requirements of an undergraduate course in optical mineralogy, is divided into seven chapters: an introduction to crystallography (10 p.), the polarizing microscope (7 p.), principles of optical mineralogy (17 p.), laboratory techniques (28 p.), routine laboratory procedures (5 p.), determinative tables (26 p.), and mineral descriptions (130 p.), followed by four pages of references, a comprehensive index, and an interference color chart. As the author notes his preface, theory is kept to the bare essentials necessary for understanding the rela-

tionship of optics and crystallography. Anisotropic minerals are discussed solely in terms of the uniaxial and biaxial indicatrices. A brief but adequate account of the use of the universal stage is included. The mineral descriptions (127 in all) are comprehensive, with excellent orientation diagrams, and numerous figures relating optical properties to composition in solid solution series.

The author comments: "It is hoped that the book will be useful as such for all stages of undergraduate and later work." It appears admirably suited for that purpose; it is a pity that the price is rather high for the average student.

BRIAN MASON
Smithsonian Institution

List of Books Received

DISTINCTIVE PROPERTIES OF TURBIDITIC AND HEMIPELAGIC MUD LAYERS IN THE ALGERO-BALEARIC BASIN, WESTERN MEDITERRANEAN SEA. By Nicolaas A. Rupke and Daniel Jean Stanley. Smithsonian Contributions to the Earth Sciences, number 13, Washington, D. C. 1974. iii + 40 pages.

GEOCHEMISTRY OF WATER. Edited by Yasushi Kitano. Benchmark Papers in Geology, volume 16. Dowden, Hutchinson & Ross, Inc., 1975. Distributed by Halsted Press, New York. xv + 455 pages. \$27.00.

GLACIAL DEPOSITS. Edited by Richard P. Goldthwait. Benchmark Papers in Geology, volume 21. Dowden, Hutchinson & Ross, Inc., 1975. Distributed by Halsted Press, New York. xiv + 464 pages. \$29.00.

RECENT RESEARCHES IN GEOLOGY: A Collection of Papers in the Honour of Professor A. G. Jhingran on his sixty-fifth

birthday. Volume 2. Chief Editor V. K. Verma. Hindustan Publishing Corporation, Delhi-110007, India, 1975. Distributed in the U. S. and Canada by International Scholarly Book Services. vii + 361 pages. \$14.00.

THE PROBLEMS OF CRYSTAL CHEMISTRY OF MINERALS AND ENDOGENEOUS MINERAL FORMATION. (In Russian) Academy of Sciences of the USSR, All-Union Mineralogical Society. Publishing Office "Science," Leningrad, 1967. 239 pages. 1 ruble, 68 kopecks (approx. \$2.25).

SUBJECT AND ALPHABETIC INDEX, A BIBLIOGRAPHIC GUIDE TO THE "MEMOIRS OF THE ALL-UNION MINERALOGICAL SOCIETY" 2ND SERIES, 1967-1971. (In Russian) Academy of Sciences of the USSR, All-Union Mineralogical Society. Publishing Office "Science," Leningrad, 1974. 131 pages. 49 kopecks (approx. \$0.65).