

BOOK REVIEWS

Asbestos and Other Fibrous Minerals. By H. Catherine W. Skinner, Malcolm Ross & Clifford Frondel. Oxford University Press, 1988, 204 pages, \$52.50.

Asbestos and Other Fibrous Materials was waiting to be written for many years, primarily for reasons further clarified in the subtitle: Mineralogy, Crystal Chemistry, and Health Effects. It is gratifying to see the subject of fibrous materials and their relation to health tackled by a team of authors as competent as Skinner, Ross and Frondel. The book combines a treatise on the structure of fibrous materials, authoritatively written, with a review of the pathology of body-tissue cells in response to infestation with such materials. It is produced in dark blue hard cover measuring 16 × 24 cm. Printed on 204 pages of acid-free paper, the contents, quality of printing and careful reproduction in black and white of photographs and diagrams, will make this volume an asset to any client library, well worth the quoted price of \$52.50 in Canadian dollars.

The authors set out to put in context the many concerns associated with inorganic fibrous materials in our environment. Beginning with a discussion of what constitutes a fiber, they then describe mineral fibers in the order followed in Dana's System of Mineralogy. Choosing from more than 350 minerals known to occur in fibrous form and listed in Appendix 1, they focus on the crystal chemistry of the silicate compounds. Minerals frequently found in fibrous form are used as examples. A balanced overview of fibrous minerals, with clear and elaborate illustrations of crystal structures, results. The temptation to burden the reader unnecessarily with too much detail is avoided at all times. Ample reference is made to standard modern literature sources for further study. As a geologist, I personally appreciate the frequent use of the term *polymerization*, almost synonymous with crystallization in the context of the very complex silicate structures.

Whereas 60 pages in this book are devoted to the discussion of fibrous minerals, a mere 10 pages dwell on synthetic inorganic fibers and whiskers. Nevertheless, this section is a worthwhile and very readable introduction to the physics and chemistry of these materials. In a second Appendix, close to 300 varieties are listed, as completely as possible with literature references or patent numbers.

The third chapter of this book, titled: Health Effects of Inorganic Fibers, dedicates 49 pages to an overview of the various diseases known to be associated with fibrous materials. Again, in this section, the authors have given a responsible and factual presentation of elementary information. A well-

illustrated discussion of the body's defence mechanisms gives perspective to the possibilities for damage incurred by inhalation or ingestion of fibrous matter. A reading of these paragraphs allows a layman to acquire understanding of the time factor in development of the relevant diseases and to visualize the degree of severity and chances of recovery for each. Examples mentioned in the text are asbestosis, and the cancerous mesothelioma found in the Kurdish town of Karain, Turkey and thought to be linked to the occurrence of erionite (zeolite) needles in the soil. One of the many reasons which prompted the authors to write this book is a misunderstanding concerning the character of tremolite occurring in talcum powder in the deposit at Gouverneur, New York. Tremolite here occurs in large crystals rather than in the fibrous form.

Although long overdue, the publication of this book is timely in view of a recent decision by the U.S. Environmental Protection Agency to ban the use of asbestos in most products. This book is compiled and edited with meticulous care. Complete with Glossary and Index, and a wealth of additional references to recent literature, it will serve equally well both as a course text at graduate and undergraduate levels and as a general text for geologists, lawyers and doctors concerned with damage claims in a court of law. The authors are to be complimented for the courage to undertake an interdisciplinary study of this nature, and for completing this task, in my opinion, so successfully.

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Chemical Fundamentals of Geology. By Robin Gill. Unwin Hyman, London, 1989, 291 pages, U.S. \$24.95 (softbound), \$60.00 (cloth).

This book sets out to introduce the concepts of geochemistry to students with little chemical knowledge. In the preface the author states that the book is based on a lecture course previously given by him. As such the layout of the book has been well thought out, being divided essentially into 3 sections. Section 1 deals with the physical chemistry of geological processes; chapters cover energy, equilibrium, kinetics and aqueous solutions. Section 2 deals with atoms and chemical bonding, with chapters on electrons in atoms, the periodic table, chemical bonding and the properties of minerals, and silicate crystals and melts. The final section deals with the elements, the two

chapters covering the geologically important elements and the elements in the universe. In addition, three appendices are included; the first consists of a comprehensive glossary of relevant chemical terms, the second gives some simple mathematics, and the third, some simple notions of solution chemistry.

Whereas the book has been designed as an introductory text, some more advanced material has been included for the more chemically knowledgeable reader. This material is separated from the main body of the text, in boxes on adjacent pages, with instructions for the 'beginners' to ignore this boxed information on the first reading.

The work is well produced, and the separation of the advanced material from the main text results in an easily understandable book. Illustrations are plentiful and well drawn, the book is generally very readable. One slight criticism is that Chapter 9 on 'Some geologically important elements' is somewhat "bitty". In an attempt to cover several elements, the author has been too brief on several of them.

In general, however, the author is to be congratulated on producing a very good text book that is ideal for introductory geochemistry courses. In addition, the book is useful for the general geology student who wishes to acquire basic background information for such courses as mineralogy and petrology. The book is also sensibly priced for the undergraduate market.

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The Geology of Iztaccihuatl Volcano and adjacent areas of the Sierra Nevada and Valley of Mexico. By G.T. Nixon. Geological Society America, Special Paper 219, 1989, 58 pages, U.S. \$20.00.

This Special Paper describes the geology of Iztaccihuatl Volcano as well as the geology surrounding this prominent volcanic edifice in the central part of the Trans-Mexican Volcanic Belt. Iztaccihuatl volcano is Quaternary-aged and dominates the map-area. Consequently, the Special Paper is largely devoted to the stratigraphy, petrography and geochemistry of the abundant volcanic rocks. In addition to detailing the geology and petrology of Iztaccihuatl Volcano, Nixon also has given adequate coverage to other smaller volcanic centers, as well as aspects of the local glacial geomorphology. The Special Paper covers the geology thoroughly and treats the volca-

nic rocks comprehensively. The paper represents a modern piece of work that should be useful to geologists working in areas adjacent to Iztaccihuatl Volcano and petrologists who are generally interested in the petrology of the calc-alkaline lavas.

The Special Paper concerns Iztaccihuatl Volcano; consequently, approximately 40% of the book is used to introduce the stratigraphy, petrology, geochronology and petrology of the volcanic rocks. The subject is treated thoroughly, and I would argue that the depth of coverage rivals that in many scientific papers. Another 35% of the paper comprises photographic plates of field exposures and photomicrographs. These add greatly to the Special Paper and are referred to throughout the text. In particular, many of the photomicrographs illustrate textures that form the basis of arguments concerning the origins of the volcanic rocks. The document comes with a high-quality, colored, 1:50,000 geological map of the area, which increases the use of the publication. The remainder of the Special Paper includes short sections concerning: i) previous work, ii) analytical considerations, and iii) glacial geology of the map-area.

The Special Paper is based on Nixon's Ph.D. research and represents a definitive document on the geology of Iztaccihuatl Volcano and the environs. The publication presents a comprehensive suite of data, which is used by Nixon to constrain the petrogenesis of the lavas. In addition to the high-quality geological map, the publication presents: i) detailed petrographic observations supported by clear tables of mineralogical occurrences, estimated modal abundances and a plethora of excellent photomicrographs, ii) comprehensive chemical data on the key lavas including, major-, minor- and trace-element data, and iii) K-Ar age dates for lithological units of the Iztaccihuatl Volcano.

These data are essential to the reconstruction of volcanic edifices and have been presented clearly. Not only is the Special Paper well-written and carefully edited, but of particular note are the tables, charts, maps, figures and plates, all of which are well reproduced. The Special Paper covers a specific area and will appeal mainly to geologists working in the Trans-Mexican volcanic belt. However, the comprehensive data-set for the lavas of this important calc-alkaline volcano should make the Special Paper of interest to petrologists in general. It will be used by subsequent researchers and will probably be useful for years to come.

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