*American Mineralogist, Volume 64, pages 660–662, 1979*

# BOOK REVIEWS

MINERALS OF GEORGIA (Their Properties and Occurrences), Georgia Bulletin 92. By Robert B. Cook, 1978. Order from: Department of Natural Resources, Geologic and Water Resources Division, 19 Dr. Martin Luther King, Jr. Drive, Room 400, Atlanta, Georgia 30334. vi + 189 pages. $5.00.

This book is the latest in a growing number of very good state mineral-occurrence guides, modestly priced at $5.00 for a large-format (8-1/2 × 11 inches) paperback of 189 pages. Georgian occurrences of 198 minerals or undivided mineral groups are described in detail, and a list of 21 meteorites found in the state is provided. A classical systematic arrangement of minerals is followed, beginning with the elements and ending with the silicates. The latter are subdivided on the basis of their structural subgroups. The localities for each species are arranged by counties. At the end of the book is a six-page bibliography, an index of species by counties, and an alphabetical index by mineral names.

There are no illustrations or maps save for colored photographs of a gold nugget (front cover) and rutile, magnetite, and goethite (back cover). The binding is probably durable, being stapled and glued, but has the disadvantage of not lying flat when the book is open.

Unfortunately, Dr. Cook's credentials are not given. He is highly qualified as he has been teaching economic geology and optical mineralogy at Auburn University for seven years and has been a dedicated collector of minerals, with an emphasis on those of the southeastern US, for 26 years. He has personally collected most, if not all, the localities cited in the book. For these reasons the data he has presented are precise and accurate, and the book is an excellent state mineral guide.

Special features are few but include a tabulation of the most important gold nuggets discovered in Georgia, and all units of measure are given in U.S. and metric form.

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MANUAL OF THE MINERALOGY OF GREAT BRITAIN AND IRELAND. By Robert Philips Greg and William G. Lettsom. A facsimile reprint with added material before (pages I–XXII) and after (pages XXIII–LXVII) the reproduction. Lapidary Publications, 84 High Street, Broadstairs, Kent, 1977. xvi + 483 pages, illustrated. £10.00 (postage and packing 50p).

This is a facsimile reprinting of the comprehensive mineralogy of the British Isles by Greg and Lettsom first published by John van Voort, London, 1858. The facsimile reproduction is preceded by a foreword, pages VII–XVII, and biographical notes, pages XIX–XXII, by Peter G. Embrey.

L. J. Spencer published three supplementary lists of British minerals, intended as continuation of the work of Greg and Lettsom, in 1898, 1931, and 1958. The first and second of these lists, which gave only the name of the mineral together with the name of the describer of the occurrence and the date of description, appeared in the Reports of the British Association for the Advancement of Science. In the present work these two lists have been combined into a single alphabetical list which, preceded by the prefaces to the two lists, appears on pages XXIII to XXVII. Spencer's *"Third supplementary list of British Minerals"* is reproduced in full on pages XXVIII to XLVII, just as it appeared in the *Mineralogical Magazine*, vol. 31, pp. 787–806, 1958, one hundred years after the appearance of the Greg and Lettsom work. To these lists Peter Embrey has added a *"Fourth supplementary list of British Minerals"* with a brief introduction on pages XLVIII to LXVII. This list has 131 entries in the same form as Spencer's 1958 list. However, several of these entries are for "unidentified" or "unnamed" minerals or marked with "(?)". Embrey estimates that the total number of mineral species now known to occur in the British Isles is "about 600."

For a somewhat more extended review see *Mineral. Magazine, vol. 42*, p. 414, September, 1978.

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EARLY MINERALOGY IN GREAT BRITAIN AND IRELAND. By W. Campbell Smith. Bulletin of the British Museum (Natural History), Historical Series, vol. 6, no. 3, 1978. 26 pages. Price not given.

In this short pamphlet, Dr. Campbell Smith, who has been associated with the Department of Mineralogy of the British Museum for many years (since 1910), provides a succinct account of the development of mineralogy in his native land. The account starts with a 1661 publication and continues through the establishment of the Mineralogical Society of Great Britain and Ireland in 1876, and comprises the following sections: early natural histories and catalogues; eighteenth-century and nineteenth-century mineral collections; other important collections made in the nineteenth century; early mineral analysts; the influence of Werner in the classification of minerals; systems of mineralogy and textbooks; the teaching of mineralogy in the nineteenth century; the development of crystallography; and an extensive set of references. This is an interesting and informative history, and can be highly recommended.

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CLAYS AND CLAY MINERALS OF JAPAN. Edited by T. Sudo and S. Shimoda. (Developments in Sedimentology 26). Elsevier Scientific Publishing Company, New York, and Kodanska, Ltd., Tokyo, 1978. 326 + viii pages. $60.75, 7000 yen.

This well-written and beautifully-produced volume in almost faultless English brings up-to-date earlier books by Sudo, notably his "Mineralogical Study on Clays of Japan" (1959) and his "Nendo Kobutsu-gaku" (Clay Mineralogy) (1974). Clays and clay

0003-004X/79/0506-0660$00.50

minerals have been extensively studied in Japan, particularly by Sudo and his associates, and many notable contributions to the subject have come from that country. We can expect, therefore, to find fresh points of view on many topics. As compared with many other texts on clays and clay minerals, the book places considerable emphasis on geological aspects and for this reason is particularly welcome. A long introductory chapter by Sudo, almost one-third of the book, is followed by seven shorter, more specialized chapters on particular topics by K. Nagasawa, S. Shimoda (who also is co-editor), H. Shirozu, H. Takeshi, and K. Wada, all well-known names to workers in the field of clay minerals. I was especially pleased to find in Chapter 1 careful explanations of terms widely used by Japanese workers which have often puzzled me, notably Roseki, Kuroko, Toseki, Gaerome clay, and Kibushi clay. It was an excellent idea to provide on the inside cover of the book a map of Japan giving the names of places and mines mentioned in the text, and to each name is attached the page number where the mine or deposit is discussed. So many of these names are like old friends, and now I can see exactly where they are located. Regretfully, visiting the 'old friends' is less easy! Sudo's chapter covers concisely and adequately the principal experimental techniques and then goes on to describe the physical, chemical, and geological characteristics of the principal mineral groups. The treatment is oriented towards Japanese clays and the contributions of Japanese investigators, often treated in a historical manner and integrated with researches in other countries. This historical approach is often very interesting because much of the earlier Japanese work was published in Japanese.

Chapters 2 and 3, namely "Weathering of Volcanic Ash and Other Pyroclastic Materials" by K. Nagasawa and "Wall Rock Alteration in Kuroko Deposits" by H. Shirozu emphasize geological aspects of clay-mineral formation. Subsequent chapters deal with particular mineral groups. The chapter by Shimoda, "Interstratified Minerals," is exceptionally interesting. These minerals represent transitional stages in transformation processes and are related to the temperature, pressure, and chemical factors in the environment. Japanese workers have played an important part in the study of these minerals, and we recall that two of them, sudoite and tosudite, are named after Dr. Sudo. The chapter on "Allophane and Imogolite" by Wada is a notable contribution. The discovery of imogolite, with its fine hair-like structure only a few atoms in thickness, by Aomine and Yoshinaga added a new dimension to clay mineralogy. The nature of allophane also has been greatly clarified by Japanese workers. In the chapter on chlorites by Shirozu we find a very useful discussion of the dioctahedral chlorites. In the chapter on smectites, Takeshi discusses particularly the so-called acid clays and transitional forms between montmorillonite and halloysite.

I believe that all clay mineralogists will find this book a very useful addition to the literature. The price in yen is not excessive, but unfortunately in 1979 U.S. dollars it becomes expensive. Nevertheless it should be on the shelves of all libraries and individuals concerned with research on clays and clay minerals.

G. W. BRINDLEY
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ATLAS OF INFRARED SPECTROSCOPY OF CLAY MINERALS AND THEIR ADMIXTURES. By H. W. van der Marel and H. Beutelspacher. Elsevier, Amsterdam, 1976. 396 pages. $63.50.

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The book is a catalog of spectra of clays, other silicates, associated minerals, and mixtures of all of these. Hundreds of spectra are given for some 200 minerals. The quality of most spectra is very good. The authors are to be complimented for their decision to reproduce the full spectra with band wavenumbers drafted directly on the spectral curves. There are also spectra of heated clays to show the effects of dehydration on water and OH bands—a particularly useful feature. The examples are drawn from a very large collection of clays and often many spectra are shown for the same mineral, thus illustrating source-to-source variations. The mixtures are an incredible collection of natural materials. Spectra are shown of clays admixed with calcite, quartz, and other accessory minerals whose IR bands are clearly identified. A comprehensive bibliography is provided.

The chapter plan is to first introduce and describe the minerals (*e.g.* kaolin and serpentine minerals) with a few pages of text. Then follow some dozens of pages of spectra. The spectra are usually arranged in three segments: the $OH/H_2O$ region, the Si–O stretching region, and the long-wave 700–400 $cm^{-1}$ region. Far IR spectra, 400–50 $cm^{-1}$, are not provided. The IR spectra of clays are notoriously variable, and the authors cope with this situation by providing many spectra of the same mineral. Spectra are given for dickite from 10 different localities, for example. Mineral families and other collections for which comprehensive data are given include the kaolin minerals, the serpentine minerals (14 minerals), the smectites, the micas, the chlorites, a large collection of interstratified minerals, iron, aluminum, and silicon oxides and hydrates, and finally the carbonate, sulfate, oxide, and feldspar minerals that appear as admixtures with the clays.

On the whole, the book is an outstanding compilation, and I would offer only two serious criticisms. First, the use of vacuum cold-pressed KBr pellets as a sample medium, although it can hardly be avoided, leads to serious consequences when applied to highly ionic materials. It has been known for at least ten years that the method produces distorted spectra for silicates and completely invalid spectra for oxides. The authors seem to be unaware of this and speak vaguely of "anharmonic effects" and "disorder" as an explanation for the broad IR bands observed in many minerals. In fact, much of the band width, not to mention substantial errors in peak frequency, comes from the use of powder samples. Surface reflectance effects and surface mode effects combine to give totally erroneous spectra of such minerals as rutile and anatase. Although the authors seem to be aware of the reflectance effects, they take little account of them in comparing minerals with greatly different polar character such as oxides and silicates.

Second, the introductory and background information on infrared spectroscopy is rather sparse and very old-fashioned. Most of the theoretical discussion concerns the vibrations of small molecules, which are not relevant to the crystalline phases that are the subject of the book. The instrumentation description is out-of-date. For example, fast Fourier transform spectrometers which are replacing spectrometers in many laboratories are not even mentioned. Many of the instruments described are now obsolete. There is extensive citation of literature going back into the 1800's, which might be of historical interest, but few papers are cited from the 1960's and citations of 1970's literature are almost nonexistent.

These shortcomings should not be allowed to detract from the value of the book. If one wants a reference catalog of clays and related families of minerals, this book is by far the best reference available.

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THE WOLFSON GEOCHEMICAL ATLAS OF ENGLAND AND WALES. Compiled by the Applied Geochemistry Research Group, Imperial College of Science and Technology, London. Oxford University Press, 1978. 69 pages. $86.

The core of this work is a series of computer-plotted colored maps showing the concentrations of the following elements in 49,464 stream-sediment samples: Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, Ga, K, Li, Mn, Mo, Ni, Pb, Sc, Sn, Sr, V, Zn. The maps are on a uniform 1:2 million scale, with a 15″ × 12″ size. The mean sampling density (illustrated by a map) was approximately 1 sample per 3 km², the program being based on sampling road-stream intersections wherever the upstream catchment area did not exceed 25 km² (in practice, rarely in excess of 5–10 km²). Sampling was completed in a 10-week period in 1969 by 28 two-person teams of geology students supervised regionally by four geologists and coordinated by AGRG staff. The elements were analyzed spectrographically, except for As, Mo, Cd, and Zn, which were determined by atomic absorption or calorimetric methods. A 14-page introductory text describes the procedures followed, and includes a discussion of technological applications to mineral exploration, agriculture, pollution, and medicine and public health.

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The International Association of Geochemistry and Cosmochemistry and the Alberta Research Council will be sponsoring the 3rd International Symposium on Water–Rock Interaction in Edmonton, Alberta, Canada, July 14 to 24, 1980. Both pre-session and post-session field trips are planned. To receive the first circular, enquiries should be directed to:

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