BOOK REVIEWS

SOIL CLAY MINERALOGY—A SYMPOSIUM, ed. by C. I. RICH AND G. W. KUNZE. The University of North Carolina Press, Chapel Hill, 1964, 330+xvi pp., $8.00.

The outcome of a seminar held at Virginia Polytechnic Institute in 1962, this book consists of ten chapters by ten experts concerning clay mineralogy and soil clay mineral analysis. Uneven in subject matter and amount of detail, it serves less as a textbook or manual than as a sourcebook for various techniques of clay mineral analysis but including one or two extraneous chapters. The descriptions and bibliographies should be very useful to any clay analyst who wishes to use techniques with which he is only slightly familiar.

The first chapter, by W. D. Keller (University of Missouri), describes and summarizes processes of origin and alteration of clay minerals; thus it differs from the other chapters, most of which are on techniques of analysis. Chapter 2 (by Roy Brewer of the Commonwealth Scientific and Industrial Research Organization, Canberra) is concerned with structure and mineral analysis of soils; it seeks to put pedography into an orderly framework. Many terms are new to petrographers and they suggest a potentially great void between at least one school of soil clay mineralogical analysis and classical mineralogy.

The chapter by W. F. Bradley (University of Texas) consists of abstracts of lectures, written in Bradley's usual telegraphic style, with a list of five basic references for additional reading. His subject is *x*-ray diffraction analysis of soil clays and structures of clay minerals, and it may be difficult reading for those who are not already well versed in *x*-ray diffraction theory.

Each of the remaining seven chapters concerns itself with a specific analytical technique. Thomas F. Bates (The Pennsylvania State University) writes on the application of electron microscopy in soil clay mineralogy. He describes and illustrates the morphology of the major clay minerals, but, although the electron micrographs are generally excellent, one cannot always see in the halftones the features described. The following chapter (by John L. Brown, Georgia Institute of Technology) gives useful detail on laboratory techniques in the electron microscopy of clay minerals.

R. J. P. Lyon (Stanford Research Institute, Menlo Park), writes a chapter on infrared analysis of soil minerals. Of particular interest is his discussion of quantitative infrared analysis and its pitfalls. The chapter by R. C. Mackenzie (The Macaulay Institute for Soil Research, Aberdeen) is an informative discussion of heating curves, differential thermal curves, thermogravimetric curves, and differential thermogravimetric curves. He discusses theory, differential thermal apparatus, standardization of technique, and interpretation of results.

In Chapter 8, M. L. Jackson (University of Wisconsin) gives a practical exposition of soil clay mineralogical analysis, with emphasis on *x*-ray diffractogram interpretation, specific surface measurement, and determination of various mineral constituents by selective dissolution analysis.

X-ray spectrographic analysis of soils is described briefly by A. H. Beavers and Robert L. Jones (University of Illinois). The technique is found to be especially useful in estimation of illite in clays by K_2O determination, and in analyzing cation exchange capacity by measuring adsorbed strontium. CaO-ZrO_2 molar ratios are also of value as a sensitive measure of weathering. The final chapter (by Jackson and Mackenzie) concerns chemical analysis in the quantitative mineralogical examination of clays. These authors show that proper allocation of constituents to specific minerals is possible after fractionation and preliminary identification by various techniques.

This book should be of use to anyone who is involved with identification of fine-grained sedimentary materials.

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METEORITES by FRITZ HEIDE, University of Chicago Press, 1964. 144 pages, $5\frac{1}{2}\times8\frac{1}{2}$ inches. Priced in the hardback edition $6.50, paperback $1.90.

An English translation of Heide's second edition of "Kleine Meteoritenkunde" published in 1957, was revised and upgraded by Drs. Edward Anders and Eugene R. DuFresne with Heide's permission.

This makes the third book in English titled "Meteorites." Although there is much to be said for simple yet meaningful titles, it seems odd that the translators were unable to either translate Heide's title into meaningful English. Perhaps "Kleine" made it difficult. The last statement is a reviewer's comment, not a criticism.

With three "Meteorites" available, and all different, it seems fitting to review Heide's book and also comment on the others, although it is an unusual practice.

The first "Meteorite" appeared in 1915, 50 years ago, and the two more recent ones seem to show that O. C. Farrington did a remarkably good job when he published his "Meteorites." That book set a very high standard, and it has been difficult to prepare a better popular text. Farrington's big mistake was to publish it privately, hence, today it unfortunately exists only in libraries and among collectors. B. H. Mason published the second "Meteorites" in 1962.

The last two books, "Meteorites," follow the style Farrington established in 1915 to a considerable degree, but each author has in most cases used different illustrations. This is a tribute to one of the America's greatest in the study of meteorites. Heide uses 6 plates which Farrington published 50 years earlier.

Although it is unusual to devote so much space to other books, in presenting a book review, I was curious, and the facts obtained are being offered for consideration.

Title	*Author*	*Year Published*	*Number of Plates*	*Number of Pages*	*Index*
Meteorites	Farrington	1915	65	225	subj., mets. bibliography
Meteorites	Mason	1962	67	245	subj., mets. bibliography
Meteorites	Heide *et al.*	1964	109	138	subj., mets. bibliography

Any book written by a knowledgeable investigator and revised a decade later is improved, but when one is translated and upgraded by other specialists in the same field, it cannot help but be a useful book for those wanting basic data on meteorites.

The subject matter is treated under three headings, (1) Fall Phenomena; (2) Meteoritic Matter, (3) Origin and Formation of Meteorites.

Then follows a brief appendix in which meteorite collections and tektites are discussed. Next is a useful table "Element concentrations in ordinary chondrites" and a list of meteorite minerals.

In general, the illustrations are good except Fig. 89. Its legend says it is enlarged 70 times, thus the area shown is less than 1 square millimeter. To type a meteorite, one should use macro pictures.

Heide's book contains good data, presented in a well-written style; however, one can purchase a hardback copy of Mason's larger book for considerable less cash outlay.

It is satisfying to find that the three "Meteorites" treat the subject from slightly different points of view and often use different meteorites for examples. Hence, these books

supplement rather than duplicate each other. You are invited to buy, read and enjoy all three "Meteorites."

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PRINCIPLES OF PHYSICAL GEOGRAPHY, F. J. MONKHOUSE, Philosophical Library, New York, xxv+511 pp., $10.00.

This is a revision of an introductory text in British-style physical geography, a field quite akin to the secondary school physical geography taught at the turn of the century in America. It encompasses much of our classical elementary geology, some climatology, and a good deal of general earth science and physiography.

The coverage of the subject is quite thorough, albeit descriptive and "classical." There is relatively little attempt made to explain the cause of the features described—to discuss the why's rather than simply to describe. In many respects the book is woefully out of date; to cite only two examples: the author recognized only four glacial advances in Europe during the Pleistocene, making no mention of recent work which indicates that there were one or more advances earlier than the Günz; and in the section of the book on the loess of the Upper Mississippi Valley he makes the simple statement that it was deposited during "a dry interglacial period," an idea proven wrong over twenty years ago. Despite these criticisms the book contains a tremendous amount of information of interest to the geologist.

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HYDROGEOLOGY, J. B. LAMARCK. Translated from the French (Paris, 1802) by A. V. Carozzi. Univ. of Illinois Press, Urbana, 1964, viii+152 pp. Illus., $4.75.

This recent translation of Lamarck's curious little book with a highly misleading title is mainly of interest to the historian of the geological sciences. While it gives some insight into the man now remembered primarily as one of Darwin's important predecessors, its treatment of the wide range of geological topics covered is of little real value. For example, Lamarck, who had little use for the chemist of his day, was unable to approach many of the mineralogical problems with any real objectivity, and in his theory of mountain building he placed far too much emphasis on the importance of vertical movement.

The topics covered range from a discussion of the significance of fossils to some observations on the origin of the earth's crust. Among the relatively modern geological ideas held by Lamarck over a century and a half ago are the concept of uniformitarianism, and a relatively clear idea of the immensity of geologic time.

The translation is well done and the translator's footnotes are, in general, helpful.

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PRECIOUS STONES AND OTHER CRYSTALS by RUDOLPH METZ (text) and Arnold E. Fanck (photographs). A Studio Book, The Viking Press, Inc., 625 Madison Ave., New York, N. Y. 10022. 191 pp. 89 color plates. Quarto. 1965, $25.00.

As an "art book" this volume is a spectacular success; as an introduction to mineralogy for the uninitiate it is elementary but relatively complete, and, of course, generally out of range because of its cost. Translated from the German by W. Mykura, the *raison d'etre* of the work is its collection of magnificent color plates of minerals, a few rocks, a meterorite, and art objects of precious stones and metals (5), most from European collections, photographed with Linhof-Kardau Color, a 13×18 camera with lenses by Schneider-Kreuznach

and Zeiss-Winkel on Ektachrome pan film, type B. The text is simply a vehicle for conveyance (albeit a modest and generally correct one) of the plates. Most of the plates are excellent to superb, both in terms of color and mineralogical characteristics, but a few were obviously chosen strictly because of the art form illustrated by their texture. Perusal of the book is an interesting experience, and it would be a fine gift for that hypothetical mineralogist who "has everything."

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LES ROCHES ALCALINES ET LES CARBONATITES KAISERSTUHL by L. VAN WAMBEKE, J. W. BRINCK, W. DEUTZMANN, R. GONFIANTINI, A. HUBAUX, D. MÉTAIS, P. OMENETTO, E. TONGIORGI, G. VERFAILLIE, K. WEBER and W. WIMMENAUER, Euratom 1827 d, f, e. Brussels, 1964. 232 pp.

This report is a contribution to the study of alkaline rocks and carbonatites in general and to those of the Kaiserstuhl in particular. Apart from geological, mineralogical and petrographical descriptions, the concentration processes during magmatic differentiation of the four main families of rocks at the Kaiserstuhl have been studied for some thirty elements. Four main families distinguished are: olivine-nephelinites, essexites, phonolites and carbonatites. The alkaline rocks are characterized by an abnormal content of Nb, Ba, Sr, Pb and RE elements. These elements are genetically related to the carbonatitization. Other elements of which appreciable enrichment has been observed are U, Th and V.

The carbonatites have been studied in detail. Three consecutive stages are distinguished as follows: sövite brown carbonatite and Ba-rich dolomite. Structural study on the sövite of Schelingen indicates these rocks to be emplaced as diapires. The presence of manganophlogopite, olivine, mossite, columbite, bastnaesite, monazite and several sulfides has been established. A geochemical mineral study demonstrates the common occurrence of Ba, Sr and RE, elements in a great number of minerals, especially in calcite and dolomite.

The genesis of the alkaline rocks and carbonatites also is discussed. Isotopic measurements of the abundance of O^{18} and C^{13} are in agreement with a magmatic origin for the sövite type of carbonatite, for the alvikites and for the brown carbonatites. On the other hand, the dolomitic phase is more likely hydrothermal.

A geochemical soil survey shows a heterogeneous distribution of the Nb mineralization. A magnetic survey has indicated several anomalies of which one, the Badberg, has been studied in detail.

Finally this study shows the general importance of alkaline rocks and their differentiated products as a source for many raw materials of which Th and the paranuclear materials Nb and Zr. It is not impossible that in certain cases, these rocks may also be an appreciable source of U.

This is an excellent study. With its numerous authors it may also set a new record for the number of persons lumped in references under "*et al.*".

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BOOKS RECEIVED

DATA OF GEOCHEMISTRY 6th ed. MICHAEL FLEISCHER, ed. Chapter L. Phase-equilibrium relations of the common rock-forming oxides except water by George W. Morey. U.S. Geol. Survey, Prof. Paper 440-L 1964. $1.25, 158 pp. An absolute necessity for all students (and teachers!) of petrology; 120 figures, 32 tables. An introduction; a discussion of the component oxides; binary systems (25); ternary systems (30); quaternary systems (18); quinary systems (5); petrogeny's residua system. A bargain.

INTERPRÉTATION GÉOCHIMIQUE DES ÉLÉMENTS EN TRACES DANS LES ROCHES CRISTALLINES by D. M. SHAW. Masson & Cie, Paris 237 pp. 1964. In

three parts: 1) Significance of the numerical value of the content of trace elements; 2) Interpretation of the content of trace elements; 3) Role of trace elements in the interpretation of geological problems.

DISTRIBUTION OF THE ELEMENTS IN OUR PLANET by L. H. AHRENS. McGraw-Hill Book Co. 330 West 42nd St., New York 10036. 110 pp. 1965 $3.95. Part of the Earth and Planetary Science Series edited by Pat Hurley. Discusses earth beginnings, elemental abundances, composition of earth layers, geochemical classification of element and their distribution in igneous rocks and minerals. Concise and complete.

AN ILLUSTRATED ELEMENTARY CLASSIFICATION OF MINERALS, ROCKS AND FOSSILS by H. C. CURWEN. Pergamon Press, 60 Fifth Ave., N.Y. 11, N.Y., 1965. 183 pp. $6.50. A collection of tables and photographs illustrating and classifying minerals, rocks, fossils and miscellaneous geological features. A rear pocket contains an evolutionary-stratigraphic chart. Elementary and of uneven quality.

THE HABITABLE EARTH by RONALD FRASER. Basic Books, 404 Park Ave. South, New York 16, N.Y. 1965. 155 pp. $4.50. The story of the earth's evolution from its earliest beginnings into an environment that produced and sustained living organisms.

DICTIONARY OF MINING by A. NELSON. Philosophical Library Inc. 15 E. 40th St., N.Y. 16, N.Y. 1965. 523 pp. $15.00. For "mining men"—student, official, miner and engineer. Useful; broad coverage, but expensive.

THE PHOTOCHEMICAL ORIGIN OF LIFE by A. DAUVILLIER. Academic Press, 1965. 193 pp. $7.50. A theory of the origin of life as an interdisciplinary problem of cosmic physics. Cosmic paleovulcanism synthesized heterocyclic compounds pyrogenetically; after the oceans condensed, photochemical reactions created the optical rotation characteristic of living matter.

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