BOOK REVIEWS

THE SYSTEM OF MINERALOGY OF JAMES DWIGHT DANA AND EDWARD SALISBURY DANA, Yale University 1837–1892, seventh edition, entirely rewritten and greatly enlarged, by CLIFFORD FRONDEL; Volume III, Silica Minerals. New York and London (John Wiley and Sons, Inc.) 1962, xii+334 pages, 114 figures, $6\frac{1}{4}\times9\frac{1}{4}$ inches. $7.95.

The first volume (1944) of the seventh edition of *Dana's System of Mineralogy* was reviewed in *The American Mineralogist* (**29,** 453–454, 1944) by M. A. Peacock and the second volume (1951) was reviewed here (**38,** 419–421, 1953) by Earl Ingerson. Peacock closed his review by "expressing the hope that the succeeding volumes on the mineral salts and silicates will follow in the not too distant future," and Ingerson closed with the statement that "Volume III, the silicates, which will complete the monumental Seventh Edition, is eagerly awaited."

Over the years many rumors have been heard as to the future of the Seventh Edition. Volume III is not devoted to the silicates as once planned. Its preface begins with these statements: "This book describes the mineralogy of the polymorphs of silica. Two other volumes, still in preparation, will deal with the mineralogy of the silicates, to which the silica minerals stand in a broad structural sense as prototypes. The importance of the silica minerals both in scientific and in technological respects, and the historical interest that attaches to certain of them, it is hoped, justify the detail of the treatment here attempted."

The substances treated in volume III are: quartz, high-quartz, tridymite, cristobalite, opal, keatite, coesite, stishovite and natural highly siliceous glasses. Just three quarters of the book are devoted to the first of these. The natural occurrence of stishovite was discovered just in time to be noted on the single page devoted to this mineral. All of the types of information included in the first two volumes of the Seventh Edition are accorded an expanded treatment in this volume. Two full pages are devoted to the density of quartz, whereas there were only three lines on the density of calcite in volume II (p. 150).

Some space is devoted to the description of the crystal structures of the crystalline phases, where known, but the drawings of structures (none are given for coesite and stishovite) are far below the standards one might have expected. The introduction includes a brief discussion of structurally related substances, but the truly structural data for the silica phases are treated rather briefly with little reference to bond lengths, bond angles and related matters. The table of contents suggests that the section on structural crystallography of quartz covers 18 pages. Four of these are devoted to unit cell dimensions and eleven to x-ray powder diffraction data.

It appears that some of the recommendations made by Ingerson in his review have been adopted. For instance, indices of refraction are now designated by Greek letters. An innovation in DANA, there are about twenty half-tones, all in the chapter on quartz. Though no special paper has been used for these, the reproduction is satisfactory.

An indication of the increased detail is given in the following tabulation:

	Sulfides & sulfosalts	Calcite group	Silica minerals
6th Edition	118 pages	18 pages	14 pages
7th Edition	333 pages	40 pages	334 pages
Increase factor (not corrected for change in format)	2.82	2.22	23.85

If the detailed treatment which the silica minerals have received were to be accorded the silicates, nine or ten volumes of a thousand pages each would be required. No doubt a

more condensed treatment will again be used in the remaining volumes. Even so, it seems unlikely that this reviewer or mineralogists of his generation will see any of the volumes yet to come. We will have to content ourselves with Deer, Howie and Zussman's *Rock Making Minerals* (1962–1963) which is skimming the cream in the treatment of the mineral silicates.

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CLAY AND CLAY MINERALS—PROCEEDINGS OF THE NINTH NATIONAL CONFERENCE edited by ADA SWINEFORD, Pergamon Press, Ltd., 1962, xi+614 pages.

This volume contains forty-two separate papers presented at the Ninth National Conference on Clays and Clay Minerals, sponsored by the Committee on Clay Minerals of the National Academy of Sciences—National Research Council and held at Purdue University, Lafayette, Indiana, October 5–8, 1960. The volume also gives the itinerary and essential information for the field trip held preceding the conference to examine characteristic soils of the Lafayette area and sections of Pennsylvanian formations unconformably overlying Mississippian beds, and to consider the Pleistocene history of the region.

Nine of the papers are devoted to a symposium on the Engineering Aspects of the Physico-Chemical Properties of Clays. A major topic considered was the nature of the water adsorbed directly on the surface of clay mineral particles. There are excellent statements of the divergent ideas as to whether or not such water is essentially in a liquid condition or made up of water molecules with a definite structural arrangement and consequently with properties somewhat different from those of a liquid; together with pertinent data which seem to be evidence for one or the other of these concepts. This matter is, of course, of very great importance in considering the physical properties of clay-water systems because it follows from one concept that water has merely a passive role and from the other concept that the water plays a vital factor in determining properties.

Thirteen papers are devoted to a symposium on Clay-Organic Complexes. Much new information is presented on the type of organic compounds adsorbed by the clay minerals, the mechanism of their adsorption, the orientation of the organic molecules on the clay minerals surfaces, and the stability of these compounds following adsorption.

The remaining twenty-one papers cover a wide variety of topics concerned with the occurrence of clay minerals in soils and sediments, the physical characteristics and properties of the clay mineral, and methods and problems for their analysis.

The volume is an extremely important contribution to the literature on clay mineralogy. Every student of clays and soils, regardless of whether his interest derives from geology, ceramics, engineering, or some other discipline, will find the contribution essential if he is to keep abreast of advances in this field. The editing and production of the volume are excellent. The editor and her associates are to be congratulated on the elimination of wordiness from the papers—they are remarkably clear and concise.

RALPH E. GRIM
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DIE MINERALISCHEN ROHSTOFFE by J. E. HILLER, E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, Germany, vi+359 pp., 1962, DM 56.

This text was planned as a survey of our important economic mineral resources. It will serve as a useful supplement to existing books on general mineralogy and mineral deposits.

Thirty pages are devoted to a concise discussion of the composition of the earth and the formation of minerals and mineral deposits by (a) magmatic action, (b) sedimentation and (c) metamorphism. The main portion of the book consists of two parts. In part one 160

pages are devoted to a detailed description of 27 metallic minerals. In part two, under the heading "Rocks and Earths," the important non-metallic minerals are treated, 102 pages being used for this purpose. The treatment of each metal and mineral follows a uniform pattern; that is, there is, first, a brief historical statement followed by, second, the listing of the minerals which are the sources of the metal being described, and, third, by a discussion of the geochemical aspects of, and the methods of formation of, the important deposits; fourth, by a description of important occurrences and their regional distribution; and fifth, by a discussion of their practical and economic uses, and statistical data.

There is a selected bibliography (2 pages) which is followed by statistical tables (16 pages), rather detailed mineral tables (27 pages), and subject and regional indexes (20 pages).

The book is a storehouse of up-to-date (1960) information. It is well written and should prove to be very useful for reference purposes.

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EDELSTEINE UND PERLEN, third edition, by K. SCHLOSSMACHER. xvii+343 pp., 115 illustrations in the text, numerous tables, one map, and 5 tables (2 colored), 16×24.5 cm. E. Schweizerbart'sche Verlagsbuchhandlung (Nagele und Obermiller), Stuttgart-W, Germany, 1962. DM 32.

The first edition of this excellent authoritative text was published in 1954 (reviewed, *The American Mineralogist*, **39**, 846–847, 1954). It immediately found favor with the German lovers of and dealers in gems and pearls, so that it became necessary to issue a second, expanded edition in 1959. Since then important developments have been made with regard to synthetic and imitation gems and the methods for their identification which prompted the author to issue this third revised edition. It is an excellent contribution to gemmological literature.

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METEORITES by BRIAN MASON. 274+xii pp., 67 figures, 2 appendixes. John Wiley & Sons, Inc., New York. $7.95, 1963.

It's high time that *somebody* wrote a modern comprehensive book on meteorites, and it's providential that Brian Mason has done it. With the recent eruption of intense interest in all aspects of extra terrestrial "geology" (impact craters, high-pressure phases, lunar terrain analysis, etc.), detailed mineralogical and chemical studies of meteorites have again advanced to the forefront of research, particularly in such aspects as trace elements, age determinations, non-radioactive isotopes, tektites and organic material. If one compares the scarcity of material available for study with the number of scientific articles appearing in the whole field of meteorites resulting from such study, one might conclude that there are more doctors than patients.

Mason has carefully organized both the older and more modern data on meteorites into a sequentially logical and highly useful synthesis of the entire field of meteoritics. It is a complete and concise "Handbook" on meteorites, their compositions (both chemical and mineralogical), their forms and textures, their arrival histories, their ages, their classification and the theories of their origin. Fortunately the book does not qualify as a "Handbuch" in the Germanic sense. It is too small—a happy testimonial.

The first chapter (Introduction) deals with definition of meteorites, their naming, falls and finds, recognition, fossil meteorites, reasons for their study, the history of meteorite research (lamentably brief, with no mention, for example, of the lapse of belief, until the

late 1700's, in their extraterrestrial origin, as exemplified in the classic denial of Stütz in 1751 regarding the Agram, Austria fall), and the literature. Recovery methods could receive mention here.

Chapter 2, Phenomena of Fall, describes orbits; light, sound, velocity, and impact effects; craters; and distribution, frequency and time of falls, as well as data to be recorded during fall observations.

Meteorite classification is dealt with in Chapter 4; meteorite mineralogy in 5. Next follow chapters on the composition, mineralogy and petrography of each of the major groups: chondrites, achondrites, stony-irons and irons. Composition by elements is the subject of Chapter 10. The final three chapters are on meteorite ages, their origin and tektites. Appendix I is entitled "Chemical analyses of meteorites and their interpretation." Appendix II is a catalog of the meteorites of the United States. A third useful appendix might well have been "Techniques for etching of metallic meteoritic material."

In all, this is a timely, useful and admirable book, one that can do much to promote the science of meteoritics, particularly for geology students who often receive little or no systematic instruction in the subject. Dr. Mason is to be thanked for an important contribution to (as the Russians call it) cosmic mineralogy.

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SEDIMENTOLOGY, Journal of the International Association of Sedimentology, Vol. 1, No. 1. 1962.

The appearance of Sedimentology, the official journal of the International Association of Sedimentology, marks a major step in bringing the contributions in this important field into the proper international perspective. The Association has been in existence for several years, with its locale in the Netherlands, owing to its early promotion by the Dutch school of sedimentology and especially Professor D. J. Doeglas, its nominal head. The Council of the Association and the Editors of the Journal are truly international in that they represent some 20 countries.

The first issue of the Journal (Vol. 1, No. 1, March 1962) contains the following articles:

"Preface" by F. P. Shepard

"Past and present in sedimentology" by A. Brouwer

"Petrology and paleogeography of the Warrensburg channel sandstone, western Missouri" by R. W. Doty and J. F. Hubert

"Etude du comportement hydraulique du mica" by L. Berthois

"Untersuchungen zur Kalkfällung und Kalklösung am Westrand der Great Bahama Bank" by E. Seibold

"Note on pH of brines" by H. H. Rieke III and G. V. Chilingar

and an announcement of the 6th International Sedimentological Congress in the Netherlands and Belgium.

Subscription to the Journal is $10.00 per annum for non-members, and $6.50 for members.

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