

BOOK REVIEWS

STRUCTURE REPORTS FOR 1940-1941. Vol. 8. General Editor, A. J. C. Wilson; Section Editors: N. C. Baenziger (Metals), J. M. Bijvoet (Inorganic Compounds), J. Monteath Robertson (Organic Compounds). Published for the International Union of Crystallography by N. V. A. Oosthoek's Uitgevers Mij., Utrecht, Holland, viii+384 pp. (1956). Price 80 Dutch florins; alternatively may be purchased from Polycrystal Book Service, 84 Livingston St., Brooklyn 1, N. Y., \$21.50.

With the publication of Volume 8, the gap between the last volume of *Strukturbericht* (Vol. 7, 1939) and the new *Structure Reports* is filled. Beyond an expression of appreciation to the editors for their great contribution to crystallography, this latest volume requires no special comment. Crystallographers the world over are already familiar with these indispensable reports.

R. M. DENNING

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AN INTRODUCTION TO CRYSTALLOGRAPHY. By F. C. PHILLIPS, pp. viii plus 324, 515 illustrations, Longmans, Green and Company, New York, Second Edition, 1956. Price \$6.00.

The second edition of this book was called for because of the enthusiastic reception of its predecessor. A review of the first edition was published in Volume 35 (p. 352, 1950) of this *Journal*. This edition is essentially the same as the first edition except for the following minor changes:

Page 4: Fig. 5 is new.

Page 16: Old Fig. 26 is deleted, old Fig. 27 is now Fig. 26.

Page 17: A new figure of a two-circle goniometer has been added as Fig. 27.

Page 92: A short paragraph has been added on the fundamental circle (ground circle) in the gnomonic projection and figure 166 has been modified by the addition of this circle.

Page 258: The following has been added to the last line on the page ". . . and these symbols are to be preferred (see page 273)."

Page 268: Added to the end of line 13, "(see p. 273)."

Page 271: The last four lines at the bottom, p. 272, and the top 10 lines on page 273 are all new.

The major change in this book is the addition of a 21 page chapter entitled "Diffraction of X-Rays by Crystals" which is a brief but well presented and well illustrated treatment of this subject. It will serve as a real help to the student in making the transition from crystallography to x-ray crystallography.

This edition should prove equally as popular with students as did the first edition.

GEORGE T. FAUST

THE EVOLUTION OF THE IGNEOUS ROCKS. By NORMAN L. BOWEN, pp. 334 plus 8, 82 illustrations, "Dover Edition," Dover Publications, Inc., New York, 1956. Price \$3.75, cloth bound; \$1.85, paper covers.

The "Dover Edition" of this treatise contains the entire text and illustrations of the first edition published by the Princeton University Press. The introduction to this new edition is written by Bowen's colleague, Dr. J. F. Schairer. He has added a bibliography (8 pages) of the papers by N. L. Bowen complete to 1954.

This is a classic work, available at a reasonable price. It should be in the library of every student of earth sciences who is interested in the origin and diversity of igneous rocks and of their tectonic significance.

GEORGE T. FAUST

BAU UND BILDUNG DER KRISTALLE. DIE ARCHITEKTONIK DER STOFFLICHEN WELT. By FRANZ RAAZ AND ALEXANDER KÖHLER, pp. 185, 166 illustrations. Springer-Verlag, Molkerbastei 5, Vienna 1, Austria, 1953. Price bound \$4.30.

Professors Raaz and Köhler prepared this volume of topical essays on the results of modern mineralogical research because they believe this information is of general interest to scientists and engineers.

Chapters I through XII are discussions of crystallography which present the laws of crystallography, symbolism, symmetry, crystal structure, x-ray studies, and chemical crystallography. Emphasis is placed on the vectorial character of the physical properties.

The second half of the book consists of fourteen chapters, averaging about seven pages each. The subjects discussed are the formation of minerals in nature, mineral synthesis, growth and habit of crystals, twin formation, gems and gem materials, play of colors in minerals (iridescent and aventurine minerals), luminescent minerals as guides to discovery of trace elements, the various concepts of the earth's interior, occurrence of gold and platinum, occurrence of iron, meteorites, methods of determining minerals, the laboratory of the mineralogist and petrographer, and finally, symmetry as a basic element of scientific knowledge.

The illustrations are generally of excellent quality. An atmosphere of informality is created by the inclusion of poetic selections and a reproduction of Albrecht Dürer's famous picture, "Melancholia."

GEORGE T. FAUST

CRYSTALLOGRAPHIC DATA FOR THE CALCIUM SILICATES. By L. HELLER AND H. F. W. TAYLOR. vi+79 pages, published for Building Research Station, Department of Scientific and Industrial Research, by Her Majesty's Stationery Office, London, 1956. Price (bound) 10s. 6d.

Uncertainty has long prevailed as to the identity and stability of many of the minerals and artificial crystalline phases reported in the system $\text{CaO-SiO}_2\text{-H}_2\text{O}$. Recently some progress has been made in clearing up the confusion. This progress has been largely due to work by the authors of this book, begun nearly ten years ago as part of a project under the direction of Professor J. D. Bernal at Birkbeck College, London. Dr. Heller is now at the Standards Institution of Israel, Tel Aviv and Dr. Taylor is in the Department of Chemistry, University of Aberdeen. Their report covers not only their own work but summarizes all modern work in the field.

The book contains descriptions of 10 anhydrous phases, 7 known as minerals, and 19 hydrous phases, 12 known as minerals, plus reference to several uncertain phases and mixed materials. Each description includes information on composition, natural occurrence, technical occurrence, synthesis, appearance, optical properties, density, unit-cell and a number of other items such as synonyms and relations to other phases, gathered under the heading "additional notes." All of the information is documented, there being a separate list of references with each description. In the section on anhydrous compounds 8 powder diffraction patterns are tabulated, 6 of them indexed, and in the section on hydrated compounds 22 powder diffraction patterns are tabulated, 12 of them indexed. Two appendices deal with "thermal dehydration" and "classification and structures" of the hydrated calcium silicates. A third appendix lists the 3 strongest lines in the powder x-ray diagrams of 29 phases in "A.S.T.M. arrangement."

It is pleasure to see a summary of a complex group of minerals well presented by those best qualified to deal with the subject by virtue of their own important contributions to it. The book is heartily recommended to mineralogists and to all who have to deal with calcium silicates.

A. PABST

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THEOPHRASTUS ON STONES by EARLE R. CALEY AND JOHN F. C. RICHARDS; ix+238 pages; The Ohio State University, Columbus, 1956, \$6.00. (Contributions in Physical Sciences, No. 1, Graduate School Monographs.)

This volume consists essentially of the Greek text, the authors' translation, and detailed comments on the treatise "On Stones" by Theophrastus (372-287 B.C.). Also included are helpful prefatory materials, many references throughout the commentary, and both Greek and English indexes. It was prepared from three Vatican manuscripts and several other translations by a chemist (E.R.C.) at Ohio State University and a classicist (J.F.C.R.) at Columbia University. This work represents the only English translation since the second edition (1774) by John Hill, the original edition of which appeared in 1746.

In order to obtain such a translation many conjectural devices must be employed, and these are necessarily based on incomplete data on physical and chemical characteristics, designated localities and modes of occurrence, and described uses. Obviously differences of opinion are certain to arise, and many of them may never be fully reconciled. The authors conclude, for example, that a variety of Samian earth is probably kaolinite despite Theophrastus' statement that it is used mainly or solely for clothes. Inasmuch as the detergent properties of other clay minerals are much greater than those of kaolinite, this reviewer believes that this particular type of Samian earth probably contained appreciable quantities of montmorillonite or a hydromica.

"Many of Theophrastus' conclusions are surprisingly accurate. . . . Pliny obtained many facts and some myths from Theophrastus. . . ." according to Ball (1950). Although we may accept this general statement without reservation, it cannot be assumed that Pliny always correctly interpreted Theophrastus. For example, straightforward correlation between their Greek and Latin names is not possible. *Adamas* of Theophrastus is usually corundum (including emery) according to the authors, because "it is very doubtful whether diamonds were ever known to the peoples of the Mediterranean region in ancient times." Ball concludes that Pliny's six sorts of *adamas* included diamond, quartz (rock crystal) and magnetite, but probably not emery (p. 242).

This work by Caley and Richards represents the latest attempt to interpret the writings of the earliest mineralogist and petrologist. It is a creditable contribution of linguistic and scientific value, and most reasonably priced.

DUNCAN MCCONNELL

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BALL, SYDNEY H. (1950), A Roman Book on Precious Stones, *Gemological Institute of America, Los Angeles, Calif.*

VORRATSBERECHNUNG MINERALISCHER ROHSTOFFE by A. P. PROKOFJEV. German translation (from the Russian) by Oscar Oelsner and Ehrhart Peukert. 163 pp. 44 illustrations. VEB Verlag Technik, Berlin, 1956 (price not known).

This little volume could no doubt be of service to German readers in providing explicit directions for computing the tonnage and average content of metalliferous and nonmetalliferous deposits that had been developed by drill holes and/or underground

workings. For geologists familiar with the standard texts in English it offers little that is new in principle. From the list of references one might gather that all of the familiar methods of estimation were devised by Russian authorities mainly since 1930; if the author is acquainted with any of the voluminous British and American literature of the past 60 years, he has chosen to ignore it.

Perhaps the most enlightening topic is the manner of fixing the cut-off grade, i.e. the dividing line between minable ore and non-economic mineralization, an ever-perplexing problem that can be solved under conditions of a free economy only by an educated guess as to future metal prices and operating costs. In Russia, the engineer is apparently relieved of the duty of crystal-gazing by the Ministries concerned, which accommodatingly specify the minimum minable grade for ore of any metal. Unfortunately, however, this specification is not final since it is subject to modification for "technisch-ökonomischen" factors. How to adjust for them is not explained. Ores containing two or more recoverable metals are left hanging in mid-air, for in the absence of open-market metal quotations the combined grade must be determined by the use of conversion factors which are not specified.

In favor of the book it may be said that it provides a thorough and detailed explanation of all of the common methods of ore estimation, expressing the author's preference for two methods: estimation block-by-block, particularly applicable to vein deposits, and estimation from cross sections (or horizontal sections), rather than by prisms, particularly in the case of deposits developed by drilling. Special attention is given to sources of error and factors for adjusting them. Commendable emphasis is placed on an understanding of geological conditions in attempting any rational estimate.

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AURARIA: THE STORY OF A GEORGIA GOLD-MINING TOWN, by E. MERTON COULTER. x+149 pages, 7 black and white illustrations. The University of Georgia Press, Athens, 1956. Price, \$3.00.

Gold was discovered in Georgia in 1828, and the mining town of Auraria was founded in 1832 on a ridge between the Etowah and Chestatee Rivers. Auraria grew within a year into a settlement of 1,000 people, with perhaps 10,000 others living in the surrounding country. But its boom was short-lived, as the nearby town of Dahlonega, becoming the county seat of Lumpkin County and the site of a United States mint, soon outstripped Auraria in size and importance.

A newspaper, *The Western Herald*, was published in Auraria for nine months; and the discovery of a complete file of this paper made possible the present narrative. This little book has considerable historical value, as it outlines the problems connected with the translocation of the Cherokee Indians from Georgia, and describes the social life of an early and apparently law-abiding mining community. Further interest accrues from the presentation of current ideas regarding personal liberty, states' rights, and the encroaching powers of the Supreme Court.

This book has little information for geologists or mineralogists. The average commercial value of the alluvial gold, given as 90 cents per pennyweight, indicates that its fineness was in excess of 900. The Philadelphia mint receipts of \$1,763,900 from Georgia, representing about 85,000 ounces during the period 1828-1837, shows the magnitude of the early production of gold; and the Dahlonega mint receipts of \$6,115,569 for the period 1838-1861, is a measure of the later production of this region.

JOHN B. MERTIE, JR.

NOTES ON PUBLICATIONS RECENTLY RECEIVED

TSUBOI COMMEMORATIVE VOLUME. A collection of petrological, mineralogical, and geological papers published in 1955 in Tokyo, Japan, in celebration of Prof. Seitarō Tsuboi's 60th birthday (1953) by his pupils and colleagues. The commemorative volume consists of the following parts: foreword; review of Professor Tsuboi's career; a collection of 13 papers which have been published in *Journal of the Faculty of Science*, University of Tokyo, Sec. 2, Vol. 9, Part 2; together with 21 other papers published in other Japanese scientific journals. Most of these papers deal with mineralogical and petrological problems, although there are a few on paleontology, tectonics, stratigraphy, and volcanology. A memorable tribute and a very significant group of scientific contributions. Price and availability not indicated.

PROGRESS IN ECONOMIC GEOLOGY. Commemorative volume for Professor Takeo Katō. This is a volume of 581 pages+22+6, consisting of 83 papers on economic geology and mining geology; unfortunately, for the American geologist, entirely in Japanese. Only a table of contents in the rear is in English. The main subject headings for groups of papers include genetic relations of ore deposition to magmatic activity, pegmatite deposits, contact metasomatic deposits, hydrothermal deposits, sedimentary deposits, metamorphic deposits, relations of ore deposits to geologic structure, wall rock alteration, metallogenetic provinces and epochs, geologic thermometry, laboratory investigation of ores, descriptions of Japanese ore deposits, and mining geology. The volume concludes with a tribute to Professor Kato. No price or availability is indicated. Chairman for the committee is Professor Takeo Watanabe, whose address is Geological Survey of Japan, Hisamoto-cho 135, Kawasaki-shi, Kanagawa-ken, Japan.

CHEMICAL ANALYSES OF IGNEOUS ROCKS, METAMORPHIC ROCKS, AND MINERALS, 1931-1954, by EILEEN M. GUPPEY, with petrological descriptions by P. A. SABINE. Compiled from the records of the Geological Survey. Memoirs of the Geological Survey of Great Britain, 1956. Available through Her Majesty's Stationery Office, London, 10s.6d. net.

ADMINISTRATION REPORT OF THE GOVERNMENT MINERALOGIST FOR 1955, by L. J. D. FERNANDO. Ceylon Administrative Reports, 1955, Part 4, June 1956. Although primarily concerned with administrative matters, the report contains summaries of the geology of several areas in Ceylon. Price, 50 cents; postage, 20 cents. Purchasable at the Government Publications Bureau, Colombo, Ceylon.

CLAY MINERALS BULLETIN, Vol. 3, No. 15, Oct. 1956. 13 papers dealing primarily with the preparation and investigatory techniques of clay minerals. Price to non-members, 6/-, through Dr. R. M. S. Perrin, School of Agriculture, Univ. of Cambridge, Cambridge, England.

THE GEOLOGY OF NEW HAMPSHIRE, Part 2: Bed Rock Geology, by MARLAND P. BILLINGS. New Hampshire State Planning and Development Commission, 1956. An excellent summary of the bed rock geology of New Hampshire based to a large extent upon the work of Billings and his students. Includes an excellent map in color. Available through the New Hampshire State Planning and Development Commission, Concord, New Hampshire, at a cost of \$3.50. The map by itself is \$2.00 if sold separately.

E. WM. HEINRICH