

## BOOK REVIEWS

HANDBOOK OF MINERAL DRESSING, ORES AND INDUSTRIAL MINERALS by ARTHUR F. TAGGART. John Wiley and Sons, Inc., New York (1945) \$15.00. Price to students \$12.00.

This publication represents a completely revised and greatly expanded edition of the *Handbook of Ore Dressing* which was issued in 1927. It is stated in the preface that this is Volume I. Volume II which will follow will treat of the preparation of fuels and the methods by which metalliferous and nonmetallic concentrates are rendered into primary-consumer products. In other words, ore dressing is being expanded to include the entire field of primary mineral technology. This will prove to be an outstanding milestone in the historical development of mineral technology. The willingness of the metallurgist to abandon the treatment of ores and confine his attention entirely to metals and their alloys has been increasing steadily during the past decade. The metallurgist is rapidly becoming exactly what the term denotes—a worker in metals. The field of primary ore treatment tends to become more and more isolated and may soon be recognized as a definite division of mineral technology in which ore dressing, furnace operation, coal preparation, and petroleum refining become component parts of equal importance. This trend has been in evidence for years but Professor Taggart appears to be the first to appreciate its ultimate effects.

The book represents a major advance in size and content paralleling the growth in the importance of the arts of mineral preparation since 1927. The format has been changed and in place of continuous pagination the volume is divided into 22 sections, each one of which is paged separately. Pages total over 1900 and the size has been increased. Flexible binding, excellent paper and typography make the volume an outstanding example of bookmaking, particularly for these times. Thirteen contributors, recognized leaders in their fields, have prepared certain sections, specially those dealing with processes. This adds much to the authenticity and value of the volume.

The mineralogist who so frequently uses the physical properties of minerals as means of identification will be surprised at the extraordinary skill and elaborate equipment with which the engineer uses these same properties to separate the valuable mineral from its worthless associates. Specific gravity is by far the most important, but electrical conductivity, magnetic attractability, and the complex physical-chemical relationships involved in surface wetting and amalgamation are also utilized.

The text contains a complete description of practically all those processes and types of equipment employed in the diverse operations of mineral preparation. Processes range from hand sorting to the most recent developments in flotation. The value of practical data is constantly reinforced by a sound discussion of theory. Performance data and the reproduction of flow sheets from many operations add to the practical utility of the volume. It is difficult to isolate outstanding contributions in the wealth of data presented but to the reviewer the discussion of the principles of flotation appears to be a model of concise and accurate technical writing. As long as the production of minerals is motivated by profit, economic factors will control technical operations. The emphasis which is placed on the economics of production and processing accents this important consideration. Comparatively little data are supplied concerning the properties of minerals and part of that available is not entirely free from error. To the mineralogist this will appear to be a deficiency which is particularly striking in view of the detailed and complete review which is supplied for the principles of mathematics.

The decline in the reserves of first class ore is constantly forcing industry to turn to lower grade materials, which can be used only after concentration. This trend is of growing

importance in every mineral raw material and will be increased in the post-war years due to the depletion of high grade stocks which the conflict has caused. Therefore the value of the service which this handbook can render will constantly increase. The engineer, whether located in the city or in those distant and remote areas where minerals have a way of occurring, will find this encyclopedic volume an invaluable source of data concerning the construction and operation of equipment. The research worker will find it to be a mine of information upon which future progress may be dependent.

W. M. MYERS

DICTIONARY OF GEMS AND GEMOLOGY by ROBERT M. SHIPLEY, assisted by ANNA M. BECKELEY, EDWARD WIGGLESWORTH, AND ROBERT M. SHIPLEY, JR. Octavo, XII+254 pages. Gemological Institute of America, Los Angeles and Boston (1945). Price \$5.50.

During the last two decades dealers in gems and gem materials, as well as the general public, have endeavored to become better informed concerning this important and very fascinating branch of mineralogy. Through the activities of the Gemological Institute of America and the Gemological Society many dealers have been able to secure systematic and authoritative instruction by correspondence, through regional discussion groups, and by actual laboratory experience. That the general public is also eager to become better informed is evidenced by the organization of many local mineralogical clubs, by the development of amateur lapidaries, and by the increased demand for authoritative texts and articles dealing with gem stones. In these activities and in the discussion of the properties, occurrence, and uses of gem stones many terms, synonyms, and varietal names must of necessity be used which are unfamiliar to members of these groups. To make this information available in compact and convenient form this dictionary has been compiled.

As a forerunner to the dictionary a gemological glossary was published serially, 1934 to 1940, in *Gems and Gemology* which included approximately 1,700 terms. In the present volume many items have been added so that about 4,000 titles are given, which include definitions, abbreviations, synonyms and varietal names, translations of foreign terms, and short biographical sketches. The book should prove very helpful not only to dealers in and lovers of gem stones but also to professional mineralogists.

EDWARD H. KRAUS

THE OPTICAL PROPERTIES OF ORGANIC COMPOUNDS by A. N. WINCHELL. Photoprinted. pp. 342+X, figs. 157, 17×25 cm., cloth. Published by University of Wisconsin Press, 811 State Street, Madison, Wisconsin (1943), Price \$5.00.

Professor Winchell has been gathering optical data on crystalline substances for many years and has published books containing such information for minerals and for inorganic chemical compounds. The book now under review completes the series and furnishes the available data for organic substances and for some naturally occurring organic materials.

Twenty-five years have elapsed since the last volume (V) of Paul von Groth's monumental work "Chemische Kristallographie" was published. This standard reference contained both morphological and optical data on minerals, both natural and artificial, and on inorganic and organic chemical compounds. As W. L. Bragg<sup>1</sup> has so aptly written:

"This record of the form, preparation, and physical properties of crystals has been the familiar book of reference to all workers on crystal structure, and its influence in the development of the new methods (*in crystallography*) has been immense."

<sup>1</sup> Bragg, Sir W. H., and Bragg, W. L., *The Crystalline State*, Vol. I, p. 271 (1934). The MacMillan Co., New York.

Since 1919 there has been a great increase in the use of the so-called "immersion methods" for the measurements of the indices of refraction of crystalline compounds. As a result of this practice, the recent chemical literature contains very many widely scattered data on organic compounds. It has been necessary for research workers on organic compounds to spend much time in searching for optical data in the abstracts of the American, and the various foreign chemical publications. The present work by Winchell will greatly reduce this effort and will fill a long existing need. The compiler has wisely adopted the system of Beilstein's "Handbuch der organischen Chemie" (4th edition) for arranging the organic compounds. This arrangement should help to introduce optical data and optical-crystallographic methods to a wider audience among the organic chemists. The main divisions used by Winchell are: I—Acyclic Compounds, II—Isocyclic Compounds, III—Heterocyclic Compounds, IV—Natural Products, not assigned places in the three preceding groups. There are certain minor deviations from Beilstein which are explained by the author in the introduction.

The French notation for the principal indices of refraction, used by Winchell, may detract somewhat from the convenience of the book; a notation not commonly employed in English-speaking countries. The method of reproduction and the quality of the paper used serve greatly to increase the difficulty in identifying the subscripts. In treating the data of Bolland and others, the compiler might have made some use of the scheme of Buttgenbach, and others, in presenting the optical data for cleavage flakes.

The rest of the book contains a collection of references to the original literature, and a set of determinative tables. These tables (71 pages), are based on the indices of refraction. They should prove very useful. Following this compilation, there is a chart for the determination of compounds in which the individual substances are arranged according to their index of refraction and birefringence. The text accompanying this chart is rather brief and contains generalizations to which numerous exceptions could be cited and hence are not rigorously correct.

Thus on page 341 he writes: "Then select another grain or fragment that shows the highest interference color (for the given thickness); it will have two indices of refraction,  $N_o$  and  $N_p$ ." Particularly for organic materials which commonly have a high to very high birefringence this is not a very reliable method for selecting a section which will give  $N_o$  and  $N_p$ . Only by securing a grain of known orientation may reliable results be obtained.

The reviewer recommends this book to all those investigators engaged in the study of organic compounds. It will certainly prove a time saver. The author should be complimented for his energy and interest in assembling and organizing the widely scattered data. It is to be hoped that this book will stimulate a wider interest amongst chemists in the useful methods of microscopic-petrographic research so that in the future a book may be written containing many more critical data on organic compounds.

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