

BOOK REVIEWS

MINERALS OF NEW MEXICO by STUART A. NORTHROP, revised Edition, IX-XVI, 665 pages, map in pocket, University of New Mexico Press, Albuquerque, New Mexico, 1960—price \$10.00.

In a preface of eight pages the scope and plan of the book are presented. The volume is divided into two parts. Section I (80 pages) includes a summary of history of New Mexico's mineralogy and mining from 1535 to 1956, a summary list of early records of minerals and changes in name or status of minerals, and a listing of minerals from New Mexico since 1925. Other headings comprise lists of minerals and localities, recent mineral additions, minerals for which quantitative analyses are available, mineral specimen list and districts, fluorescent minerals and those occurring in New Mexico, radioactive minerals, and a tabulation of outstanding minerals concludes this section.

A second major division of part I contains economic aspects of New Mexico's mineral industry which includes production figures.

The second division of the book, section II (470 pages), gives descriptions of New Mexico minerals alphabetically arranged and their localities. First the name is given with a brief description of its properties. This information as stated by the author is extracted chiefly from the Dana System. Next, localities are given by counties with brief notes as to occurrence of the minerals. A subheading in 25 pages lists districts, subdistricts, and camps with notes concerning location. A map in pocket shows the location of various mining districts.

The reviewer believes the book will have great value as a reference volume to geologists and mineralogists who are interested in minerals of New Mexico. Its bibliography of 1302 titles including 838 authors indicates a thorough investigation of the literature by the author. Mineral collectors and prospectors interested in certain mineral deposits will also find the volume excellent for their purpose.

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DANA'S MANUAL OF MINERALOGY, 17th Ed., by CORNELIUS S. HURLBUT, JR. 609 pages. John Wiley and Sons, Inc., New York. \$11.50.

Very little need be said concerning this well known and excellent textbook for mineralogy save to mention a few of the outstanding improvements over earlier editions. The 145 pages on crystallography represent a thorough treatment of basic principles of the subject and include amongst other points improved considerations on: crystal notation; rules for crystal orientation; calculation of axial ratios; and *x*-ray crystallography.

Much of the section on crystal chemistry has been revised, 35 pages being devoted to geochemical principles. These 35 pages are packed with the latest knowledge and attitudes concerning atoms and their forms of combination in minerals. The included periodic table gives atomic and ionic radii, and the structure of the atom is adequately explored. The effects of bonding on crystal properties is treated very well.

There is little doubt that most textbooks are written more for teachers than for students. Probably no student and very few teachers could be expected to know all that is in this textbook at the conclusion of a course in mineralogy. The basic information included on crystallography and crystal chemistry, though more than a first year student of mineralogy could be expected to make an immediately available part of his mental equipment, does give the nonspecialist teacher the type of background to make his mineralogical

presentation completely modern in every respect. The modernization of the treatment of mineralogy by Professor Hurlbut is the outstanding accomplishment of this revision.

This reviewer would like to suggest a few minor points which he feels might add to this almost superlative textbook. The reciprocal lattice concept, particularly in respect to Miller Indices, projections, and x-ray pictures, is not only singularly useful but also imperatively needed in a modern approach to these subjects. This is missing in the revision. As was mentioned in this author's review of the 16th edition, the definition of a mineral should be broadened to include *definite physical and chemical properties* thus clearly making crystallography as well as composition a distinguishing factor in defining a mineral and also suggesting the possibility of isomorphous variations in composition. Very few minerals are precise chemical elements or compounds. This would eliminate such incomplete statements as "consequently, the final proof of the identity of a mineral has been chemical composition." Although the revision is remarkably rigorous in most sections, the reviewer finds the treatment of crystal systems, particularly in respect to the hexagonal-rhombohedral systems, to be slightly less than precise. It is doubtful that systems as such can be defined by symmetry alone, just as they cannot be defined by geometry alone. There are 5 classes of the rhombohedral system which possess the same symmetry as 5 classes of the hexagonal system; but the basic building blocks or geometries are entirely different.

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GEOLOGIE, MINERALOGIE UND LAGERSTÄTTENLEHRE, Third Enlarged Edition, by PAUL KUKUK. 354+xvi pages. Springer-Verlag, Berlin, 1960. DM 28.50.

The first edition of this book was reviewed in *The American Mineralogist*, Vol. 37, pp. 350-351, 1952, and the second edition received notice in *The American Mineralogist*, Vol. 40, p. 935, 1955. The book still retains its general identity as an elementary, comprehensive work on geology, mineralogy, and ore deposits, intended chiefly for nonspecialists in these fields. It has had wide favorable reception particularly for generalized courses in geology in mining and technical schools.

Although the number of pages has remained about the same, the third edition book has been somewhat reorganized. It is divided into three main sections: Geology, Mineralogy, and Ore Deposits. Part I of the section on geology deals with general or dynamic geology, whereas Part II of this section is an elementary discussion of historical geology. Similarly, the section on mineralogy has two parts; the first is general, and the second contains descriptions of individual species. Again, the third part starts with a general section followed by descriptions of various types of ore deposits, with particular emphasis on those occurring in Germany. Major groups of deposits described in this last part include coal, metallic deposits, evaporites, petroleum, miscellaneous minerals, rocks and earths, natural gas, and gemstones. The book concludes with a five-page bibliography.

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ROCK TO RICHES, The Story of Arizona Mines and Mining, Past, Present and Future.

By CHARLES H. DUNNING with EDWARD H. PELOW, JR. viii+406 pages, Southwest Publishing Company, Inc., Phoenix, Arizona, 1959.

In many ways this is a peculiar book. It is written by the combined team of Dunning, who is a mining engineer, and Peplow, an ex-newspaper correspondent, author and member

of the faculty of Arizona State University. The introductory section, called "Let's Talk About Mining," gives a "short course" in economic geology and mining geology in 33 pages. This is followed by the main section, which is a history of mining in Arizona, starting with the explorations of the Spanish expeditions in the early part of the 16th Century and continuing up to 1957. Part 3 includes a chapter entitled "Mining Today and Tomorrow" which discusses the effect of economic and political factors upon the mining industry, touching upon such subjects as free trade, foreign competition, nationalization, protective tariffs, import quotas, and subsidies, as well as arguments for the proposal by Senator Allott of Colorado to establish a U. S. Department of Mineral Resources which would be represented at the Cabinet level by a Secretary. Also in this final part another chapter presents production statistics for the important non-ferrous metals, for minor metals and non-metals, and a compendium of the important mines of Arizona. The volume concludes with a four-page glossary and an index.

Doubtless for the layman, particularly those who have concerned themselves in an avocational or semi-professional manner with mining interests in the Southwest, this book will be generally interesting. It contains, however, little information for the advanced professional man or scientist other than it brings together under one cover a detailed summary of the history of Arizona mining. To adequately present this, the significant feature of the book could have been greatly reduced in size. The outline maps showing mining development during the various periods are excellent, and many of the drawings used as chapter headings are striking.

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