

## BOOK REVIEWS

PETROLOGY OF THE IGNEOUS ROCKS: Rewritten twelfth edition. F. H. HATCH, A. K. WELLS AND M. K. WELLS. George Allen & Unwin Ltd., proprietors of Thomas Murby & Co., Woking & London 1961. 515 pp. \$7.25.

The text of the twelfth edition of this well known book has been considerably reorganized. Outdated material has been discarded and a notable quantity of new data added. The book is carefully edited, the style is crisp and lucid, and petrologists would be hard put to find much to question in the definitions and descriptions as presented. Most would also agree that material is presented in a manner to make it useful and readily available, especially for students. Rock definitions and descriptions still make up a large part of the text (perhaps "Petrography and Petrology of Igneous Rocks" would be a better title) which is in keeping with the authors' feeling that, for the student in the beginning course in igneous petrology, a knowledge of the rocks themselves form, "the only firm foundation upon which theories of origin may be built".

Those familiar with the former issues of this work will find certain features missing in the new edition, *e.g.*, the section on crystal optics in Part I because "... books more appropriate to the subject are now readily available"; and the chapter on petrogenesis (now discussed, in connection with individual rock groups, in more appropriate places throughout the book). On the other hand in the section on mineralogy, many data on the paragenesis of the rock forming minerals have been added. The section on felsic minerals has been reorganized and updated, and the portions dealing with accessory and secondary minerals have been grouped together under one chapter because of the difficulty "... to draw a hard and fast line between these two categories". The section on batholiths has also been updated and expanded and, in a modest enlargement of the section dealing with consolidation of magmas, a series of phase diagrams have been added depicting the quartz-alkali feldspars-feldspathoids crystallization relationship and recent data on the pyroxene two-component system.

In Part III, "The Petrography of the Igneous Rocks"; a discussion of recent concepts on the origin of andesite has been added to the section on intermediate rocks; the origin and differentiation of basaltic magma is now treated as a separate chapter; and basaltic rocks are classified as, (1) oversaturated, (2) undersaturated, (3) saturated (very rare), with respect to silica. Spilitic rocks are treated as a separate chapter, and the sections on feldspathoidal, carbonatitic, and pyroclastic rocks have been enlarged slightly. The statement that, "Some ignimbrites are lavas"—page 232—is, however, not entirely consistent with the original definition of the term (Marshall 1932, 1935). Such usage is regrettable; it tends to invalidate a useful term. Despite the fact that use of the word "acid" to signify rocks of high SiO<sub>2</sub>, has bothered many petrologists, the authors have felt it necessary to retain this word, justifying their action by the statement, page 186, "That such a precise and wholly erroneous meaning is no longer attached to the term". This reviewer prefers discarding "acid" in favor of a more suitable term; perhaps silicic, or even sialic.

Finally, Part IV, "Igneous Activity in the British Isles" has been brought up to date with the inclusion of data of recent research on the areas described. It is regrettable that this interesting section could not be expanded to include occurrences from other lands as well, but the scope of the work prohibits this.

Many of the illustrations in the book have been touched up, thereby enhancing their usefulness. The book is a must reading for petrology students, and the price is not unreasonable, although a paperback edition might make the work accessible to many more students.

CHARLES J. VITALIANO  
*Indiana University*

AN INTRODUCTION TO THE THEORY OF FLOTATION. V. I. KLASSEN AND V. A. MOKROVSOV. Butterworths, London. 493 pp., 1963.

This book, a translation by Dr. J. Leja and Mr. J. W. Poling of the Department of Metallurgy, University of Alberta, seems to accurately reflect the original text in Russian. This reviewer has met the Russian senior author, Dr. Klassen, whom he regards as particularly competent to write on "The Theory of Flotation."

The book is divided into 9 sections which deal, respectively, with the following subjects: the characteristics of flotation pulp, bubble mineralization, flotation reagents in respect to mineral surfaces, collectors, regulating agents, frothers, the effect of particle size on flotation, methods of determining interaction of reagents with minerals, and pulp aeration in flotation machines. Each of these topics is adequately treated. I have been particularly interested in the discussion of the attachment of mineral particles to bubbles, this being an area in which much work has been done in Russia. Another section that is well documented is the section on the adsorption of reagents in the electrical double layer (pages 175-186), which reviews the work done by Professors Plaksin and Klassen.

The authors are well acquainted with studies made in the United States, Canada, Australia and other parts of the western world. However, most of the references are to Russian documents. This in itself is one of the principal values of this book for the western reader, in that it provides him with an introduction to the Russian approach. It is, of course, regrettable that many western books are cited through their Russian unauthorized translations. Possibly the translators of this very useful text could have cited in their references the original books, often in English, which are dealt with in this way by Klassen and Mokrovsov.

The illustrations are particularly pleasing and the general appearance of the book is excellent, and, in fact, much better than that of the Russian text. It certainly speaks well of Butterworths as publishers.

As the title indicates, the book is for the specialist. It is particularly designed for one who is interested in the theory of flotation and its relationship to such topics as crystal structure, composition of water, etc. It is not the kind of book to recommend to someone who does not know anything about flotation and wishes to begin. There are books in English that would fill that need better than this book and are about half the cost, to boot. For the specialist, on the other hand, this book is invaluable in that it presents in a very able translation the point of view of a master of the subject who not only is familiar with western work, but has at his fingertips all of the significant Russian developments.

A. M. GAUDIN  
*Massachusetts Inst. Tech.*

ALLGEMEINE MINERALOGIE. R. BRAUNS AND K. F. CHUDOBA, eleventh revised and expanded edition. 152 pages, 1 plate, 143 figures, and 3 tables, pocket size. Sammlung Göschen, Vol. 29/29a, Walter de Gruyter & Co., Berlin, 1963. Paper cover, 5.80 DM.

The first edition of MINERALOGIE by R. Brauns was issued in the Göschen series in 1893, which was followed by numerous revisions, the seventh in 1936 (reviewed, *Am. Mineral.* 21, 815, 1936). Since the death of Brauns in 1937, Chudoba has been the author of subsequent editions. In 1955 the ninth edition was published in two parts—as (a) Allgemeine Mineralogie, and (b) Spezielle Mineralogie—and in 1963 the eleventh and tenth editions, respectively, were issued.

Seventy years ago when the first appeared, mineralogy could be discussed concisely in a small volume, which was very useful as an introduction to the subject or for review purposes. In subsequent editions, Brauns always attempted to keep the material up to date. However, the many significant advances made in mineralogy and related sciences in the

last fifty years have greatly increased the scope of the subject. Hence, because of the limitations of space characteristic of the Göschen series, this edition of ALLGEMEINE MINERALOGIE does not include the description, occurrence, and uses of minerals. Following a brief introduction, 50 pages are devoted to morphological crystallography, 20 pages to crystal structure and x-ray analysis, 35 to physical properties, 11 to chemical properties, and 12 to the formation, transformation, and methods of occurrence of minerals.

The text of this handy little volume is authoritatively written and well illustrated.

EDWARD H. KRAUS

*The University of Michigan*

NORSK GEOLOGISK TIDSSKRIFT 42 (2) FELDSPAR VOLUME. Ed. by OLAV H. J. CHRISTIE. 606 pp. Norsk Geologisk Forening, Oslo, Norway, 1962.

This volume includes the various lectures presented at the Advanced Study Institute of Feldspar in Oslo, June 20-30, 1962, during which period investigators expert on the different fields of feldspar study offered their most recent results. The 40 papers are grouped under four major topics: 1. Structures and sub-solidus relations (11 papers); 2. Morphology, optical relations, twinning and thermal expansion (6 papers); 3. Leaching and ion exchange experiments (3 papers) and 4. Application to natural rocks (20 papers). The hope expressed in the Foreword, "that the present volume will serve to convey the latest ideas in feldspar research" is entirely realized. No mineralogist can afford to be unfamiliar with the results conveyed in this collection.

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NORWAY NORTH OF 65. Edited by ÖRNULO VORREN. 271 pp., 57 figs., 1 fold-in map mounted on inside back cover. Oslo University Press, Oslo, Norway. 1960, \$4.60.

This modest volume is a highly informative synthesis of the "natural features, occupations and cultural life" in northern Norway. Containing 16 chapters by 15 different authors, the work is a successful attempt to bring under a single cover detailed knowledge of this area, not just for tourists, but for students, journalists, broadcasters and research workers. The chapters, each of which was prepared by a specialist in the subject, cover the topics: geology, climate, flora, fauna, history, Laplanders, settlement, economics, agriculture, reindeer, fisheries, whaling, industry and mining, communications, education, science and art. The Tromsø Museum, which initiated the studies and sponsored the book, is the largest northern Norway research institution.

Of particular interest to earth scientists will be the chapters entitled "Rocks and Land Forms" by Kåre Landmark and "Industry and Mining" by Leif Anne. The first, after a general statement, describes the Precambrian and Eocambrian formations, the rocks of the Caledonian fold zone, Jurassic and Cretaceous sediments, Quaternary units, glacial features, coastline features and mineral deposits.

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HANDBOOK OF SUBSURFACE GEOLOGY. CARL A. MOORE. Harper & Row, 235 pp., \$8.50.

This book was written as a text reference on subsurface geologic techniques, primarily for the student intending to go into subsurface petroleum geology. Consistent with this purpose, the text covers subsurface structural and thickness maps, various mechanical logging techniques and their interpretation, and interpretations of drill-stem tests. Of somewhat wider application are the chapters on criteria for subsurface faulting, and sedimentary basins.

LOUIS I. BRIGGS

*The University of Michigan*