

which covers much of the same ground. Nonetheless, it represents an interesting approach to the problems of teaching thermodynamics to petrologists, and it deserves serious consideration by those involved in such teaching.

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Mason (R.). *Petrology of the Metamorphic Rocks*. London (George Allen and Unwin), 1978. xvi + 254 pp., 122 figs. Price £10.95 (boards), £5.95 (paperback).

This is the metamorphic counterpart of the well-known text *Petrology of the Igneous Rocks* by Hatch, Wells, and Wells; it aims to be comprehensible to geology students who are not necessarily petrology specialists. General principles are illustrated by selected suites of metamorphic rocks, the underlying theme being the recognition of equilibrium assemblages in metamorphism. The three parts of the book deal with metamorphic rocks in the field, under the microscope, and in the laboratory—the latter including useful chapters on the study of metamorphic reactions, isotope geology, and electron-probe microanalysis.

The part on metamorphic rocks under the microscope takes up more than half of the book and will be the section of most general use. It is illustrated by thin-section drawings keyed to the text and generally of rocks from Britain or Europe. This section deals with considerably more than petrography, ranging as it does from consideration of the phase rule and AFM and ACF diagrams to the conditions of formation of blueschists. Contact rocks, however, are dealt with rather summarily (Skiddaw, Comrie, Skye) and with virtually no descriptions of skarns or of the problems of metasomatism. For dynamic metamorphism we are taken to Turkey and to the Lochseiten mylonite, Switzerland, but also included are descriptions of progressive shock metamorphism at the Ries crater, Germany, and of metamorphism in Moon rocks.

Regional metamorphism is split into a consideration of metamorphic rocks of Precambrian shield areas, Palaeozoic orogenic belts, Cainozoic orogenic belts, the ocean floor, and the upper mantle. After consideration of the pyroxene gneisses of the Scourie area and Lewisian migmatites, progressive Barrovian regional metamorphism of pelitic and basic igneous rocks in orogenic belts is exemplified not by the Scottish Dalradian area but by the Furulund schist and Sulitjelma amphibolites of Norway. For this interesting departure the author is to be congratulated: in this area the two respective stratigraphical units can be traced continuously from low- to high-grade assemblages; the progressive changes are sketched in AFM diagrams

and the textural developments are integrated. A different type of regional metamorphic sequence is described from the Dalradian schists of Connemara, the later phases of which represent a Buchan-type assemblage, thus leading to consideration of variations in the conditions of metamorphism in space and time. A description of the Alpine orogenic belt includes descriptions of the progressive regional metamorphism of pelitic rocks above the Aar massif and of basic igneous rocks in the Pennine nappes, going on to a consideration of retrograde metamorphism. The Troodos basic-ultrabasic complex of Cyprus illustrates metamorphic rocks of the ocean floor, and the upper mantle is represented by the xenoliths of eclogite in the South African kimberlites. Throughout this section some of the pitfalls of nomenclature are carefully avoided; pelite and psammite are eschewed though their adjectival forms are used.

The chapter on metamorphic reactions comes in part III, though its contents need to be studied in conjunction with the rock descriptions of part II. The introduction of the concept of metamorphic facies at this stage is, however, well justified: as the author states, the assignment of a suite of metamorphic rocks should come at the end of an extensive programme of field and microscopic rocks not at the beginning. The uses of both unstable (radioactive) and stable isotopes are described, including the application of oxygen isotope geothermometry to progressive regional metamorphic sequences. The final chapter deals with metamorphic rocks and the evolution of the earth, with mention of paired metamorphic belts and introducing a model of the crust and upper mantle beneath an island arc.

Terms in the eight-page glossary are indicated in bold type when first introduced in the text. The printing and diagrams are clear and such oddities as Beinn an Duhaich being shorn of its final 'h' throughout the book will no doubt be rectified in succeeding editions which will assuredly be necessary. A book to be digested thoroughly by students before entering their final Honours petrology course.

R. A. HOWIE

Rösslin (Eucharius) d. 1526. *Eucharius Rösslin The Younger on Minerals and Mineral Products. Chapters on Minerals from his 'Kreuterebuch'* (Critical text, English translation, and commentary by J. S. Belkin and E. R. Caley). Berlin and New York (Walter de Gruyter & Co.), 1978. xxxviii + 415 pp., 3 figs. Price DM 240.

The mineralogist interested in the curious lore of the late Middle Ages that surrounded minerals, especially in connection with the use of such

substances in medicine, will find the core of this book on pp. 51–205. Here are reproduced the archaic German text of the 1535 edition of Rösslin's *Kreutterbüch* or herbal, and the parallel English translation. Aside from the first chapter, which gives instructions in the art of polishing stones, the remaining ninety-two chapters treat the substances themselves in alphabetical order commencing with the 'Adamas' or diamond and ending with 'Zignites', a stone merely identified by Rösslin as 'a glass-colored stone'. In between are a bewildering number of mineral substances: gemstones, ornamental stones, earths, inorganic materials as pearl, amber, coral and jet, stones of peculiar shape, several metals, inorganic compounds as alums and salts, bezoars and other calculi, the lodestone, petroleum, etc., all of which were believed to possess properties that made them of value in the pharmacy of the time.

According to Belkin and Caley, this work 'marks the end of the medieval viewpoint in writing about nature', noting that unlike Agricola's *De Natura Fossilium* of 1546, it is essentially a synthesis of earlier writings in similar vein by such as Silvaticus, Vincent of Beauvais, Albertus Magnus and others. While the bare bones of Rösslin's text, written in the curt style typical of herbals, is easy enough to follow and appreciate, it is the vast quantity of complex ancillary material provided by Belkin and Caley that doubles the size of the book. There is a bibliography of several hundred items of great value for anyone interested in further research of medieval lapidaries but marred by visual confusion caused by failure to use bold face type to clearly distinguish entries, a biography of Rösslin, bibliographical notes on other editions of his work, a comparison of his work with other herbals of the period, and an analysis of Rösslin's editorial procedures in the preparation of his book. A very large and complete commentary follows the original text and its translation, and in turn is followed by various appendixes, an *index verborum* of the German text, and name and subject index. In short, this work fulfills its aim to paint a picture of the contemporary state of German medical knowledge in so far as it concerns the use of mineral substances in medicine. Its value as a permanent reference work is unquestioned.

J. SINKANKAS

Deer (W. A.), Howie (R. A.), and Zussman (J.). *Rock-forming minerals. Vol. 2A. Second edition. Single-chain silicates*. London (Longman), 1978. x + 668 pp., numerous figs. and tables. Price £25.

In the 15 years since its first appearance, 'D. H., and Z.' has established itself as by far the most significant work of reference ever to be put into the hands

of the petrologist. For once it can be said without appearing trite that a work has become a classic in its own time, certain volumes at least having been reprinted as many as six times since their original publication. And now the indefatigable authors are well under way with the task of bringing their work up-to-date: with this first volume of the new series to appear, one is again left amazed at the sheer industry of these three leading scientists who have been able somehow to find the energy and the time to undertake, not merely a revision but a complete re-write, in the midst of three unusually busy lives.

The familiar five-volume first edition of D. H., and Z. is so often referred to as 'encyclopaedic' or 'monumental'. What about the first instalment, then, of the second? Encyclopaedic it certainly is, in even greater measure, but how can a work that has evolved and grown so radically in the 15-year interval between the two editions be likened to so static an object as a monument? Quite apart from the personal achievement of the authors in producing it, this second edition of part of Volume 2 bears most impressive testimony to the unprecedented growth and vigour of petrology and mineralogy during the past one-and-a-half decades.

In 1963 Volume 2 of D. H., and Z. dealt with all the chain silicates in a volume of 379 pages, costing £4.75 (95s. in old money). In 1978 Volume 2A of the second edition treats only the single-chain silicates in a volume of 668 pages, costing £25. It is still extremely good value. The volume covers pyroxenes (544 pp. as against 161 pp. in the earlier edition), wollastonite (17 pp.), pectolite (11 pp.), bustamite (11 pp.), rhodonite (14 pp.), pyroxmangite (14 pp.), sapphirine (26 pp.), aenigmatite (15 pp.), rhönite (4 pp.), and serendibite (3 pp.). The amphiboles will presumably form the substance of Volume 2B, as the pyroxenes of Volume 2A.

The amount of information given on the single-chain silicates has roughly trebled and comparisons between the two editions show how not only the volume, but also the depth of knowledge has increased, especially of course in the important and much-researched pyroxene group. There is very much more crystal structural and chemical detail; many more phase diagrams of relationships in systems of petrogenetic importance carried out under wider ranges of temperature and pressure; much more concern with thermodynamic considerations—all this information digested, set in context, and commented upon lucidly and concisely without becoming dull or obscure. Indeed, despite the greatly increased length, the reviewer has if anything found the new edition a more readable book to browse in than was its predecessor.

The organization and layout of the extensive