

An advanced text book should present its material in a clear and logical fashion, should provide a reasonably balanced view of the subject and should be up to date. While I like the overall concept of this book, it has to be said that it fails on all these points. The book is very poorly structured, with long sections ranging over diverse material without the benefit of sub-headings; for example the section headed 'corona microstructures' includes a page devoted to the interaction of silver chloride with sodium iodide (neither of which is included in the index). There is little cross-referencing, and a plethora of un-numbered equations. I was particularly disappointed to see that in the areas where Kretz has made important contributions he provides neither a perspective on his own work nor an evaluation of that of others: often a bald list of citations, with no comment or indication of content, is all the reference to major contributions since the mid-80s. The most serious failing of the work is that much of it is hopelessly out of date. It is certainly good to be reminded of the origins of many ideas that remain important, but it is hardly appropriate to entirely ignore new developments. Some random examples: B.M. French certainly pioneered calculations of C-H-O gas equilibria in the earth sciences, but his work is nearly 30 years old, and is no longer the state of the art; the plagioclase ion exchange experiments of Orville are not the main basis today for plagioclase solid solution models, measurement of diffusion in silicate minerals has continued apace since the early 1980s, and modern diffusion studies are no longer best illustrated by the example given of diffusion in zeolites, measured over 30 years ago: modern measurements use techniques such as the ion probe that are not hinted at here.

In summary, this book provides a refreshing approach to metamorphism that is not rigorously bounded by classical considerations of phase equilibrium, facies or rock type. However it attempts to cover a vast amount of ground in a limited space and fails to adequately teach its subject matter or to effectively integrate aspects of physical chemistry into earth sciences. I think that many teachers will find inspiration here to reconsider the structure of their own courses, but the detailed contents are so out of date that they will need to extensively re-research material to find the state of the art today.

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Bucher, K. and Frey, M. *Petrogenesis of Metamorphic Rocks*. Berlin Heidelberg and New York (Springer-Verlag), 1994, xiv + 318 pp. Price (paperback) £19.95 ISBN 3-540-57567-7.

This is the 6th edition of Winkler's textbook, entitled *Petrogenesis of Metamorphic Rocks*, which was a

standard reference book for both undergraduate students and research workers studying metamorphic petrology, during the late 1960s and 1970s. Bucher and Frey have completely revised the book, but have retained the emphasis on quantitative petrology and geochemistry. Consequently, the book has a familiar feel to it, and much of the text is devoted to the detailed description of the metamorphic assemblages formed in common rock types. The book is aimed at the advanced undergraduate and graduate student.

After reading the book, I was left with a feeling that there is more to metamorphism than this! While the book does not claim to be comprehensive, its appeal seems likely to be limited, because its scope is so restricted. Winkler's approach of stressing the chemical and mineralogical aspects of metamorphism undoubtedly was of great value in its time, and still forms a core component of metamorphic teaching. However, modern studies of the formation of metamorphic rocks require a broader approach and student textbooks should reflect this, and include assessments of such things as, micro-textures, deformation, various $P-T$ paths, chemical equilibrium and an appreciation of the full range of tectonic environments in which metamorphism may occur. In this book, the only picture of a metamorphic rock is on the front cover, and there are major omissions from the possible tectonic settings, including obduction and high grade metamorphism linked to extension.

The book is presented in two parts; Part I deals with basic principles of metamorphism, including chapters on definitions, protoliths and graphical techniques of representing mineral assemblages, processes, and various methods of assessing metamorphic grade. In these early chapters, many significant aspects of metamorphism are briefly covered, but are not explored further. Other topics, such as geothermobarometry, are covered in greater depth; however, many of the general principles tend to be lost in the wealth of specific details, details which are potentially of limited value to the targeted readership. The inconsistent use of references (Chapters 1 and 4 include references in the text, Chapters 2 and 3 do not) adds to an impression of a book written, in a series of distinct segments by different authors, and the general lack of direct reference to other work detracts from its value as a reference book. Part II (chapters 5-10) documents the metamorphic assemblages developed in a succession of common lithologies. Advances in understanding metamorphic processes in recent years have been on many fronts, and the principal area where this textbook reflects these advances is in the use of thermodynamic databases to assess $P-T$ conditions and construct phase diagrams to depict assemblage changes. The immensely detailed infor-

mation that the databases offer is far in excess of the needs of most undergraduate students. Equally much of this is potentially of little use to research students, who may have access to the databases on which the book draws and so will be in a position to assess particular subtleties which are beyond the capabilities of a single book.

Overall the book suffers from a general lack of integration of both style and content. Consequently, it does not read well, many of the topics in early chapters appear brief and disjointed, while other subjects are too detailed to allow the broader picture to emerge. The book includes a few typographic errors and spelling mistakes, particularly of rock names. Some of the *P-T* diagrams and tables are rather poorly produced and explained. Bucher and Frey have produced a textbook which covers some aspects of the petrogenesis of metamorphic rocks in great detail, certain sections will undoubtedly be very useful to certain readers, and hence it will be a valuable addition to geological libraries. However, the book is aimed at students and although the price puts it within their reach, the drawbacks suggest to me that students may prefer to purchase a more balanced metamorphic textbook. T. J. DEMPSTER

Wilson, W. E. *The History of Mineral Collecting 1530–1799: with notes on twelve hundred early mineral collectors*. Mineralogical Record, **25**(6), 1994, 243 pp. Price \$24.00.

This Special Issue commemorates the 500th anniversary of the birth of Georgius Agricola (Georg Bauer: 1494–1555), the Father of Mineralogy and the Father of Mineral Collecting. The book is divided into two major sections: the narrative text, arranged by century and (for the XVIIIth century) by country, and the reference section consisting of an annotated census of all known collectors active before 1799, a bibliography of their published collection catalogues, and a general bibliography.

The earliest known surviving mineral specimens are two native silvers from Schneeberg, Saxony; in 1477 miners encountered the convergence of 12 silver-bearing veins in the St Georg mine, and at this junction a mass of solid silver $4 \times 1 \times 2$ m weighing ~ 20 metric tons was uncovered. Turning to the XVIIIth century, after a description of the French scene (including colour photographs of some of the specimens from the collection of René Just Haüy), there is a 27-page documentation of collecting in Great Britain (including Scotland and Ireland). Here details are given of the collections of Sir Hans Sloane, John Woodward, William Borlase, Philip Rashleigh, A.J. Forster, Charles Greville, James Sowerby, Alexander Crichton, James Smithson and William Phillips, amongst others. Similarly, accounts are given of collectors in Germany (Goethe, Werner) and Austria (von Born, Zois), Hungary, Bohemia, the Low Countries, Switzerland, Italy, Russia, the Scandinavian countries, Spain (and Mexico), Portugal (and Brazil) and America. A fascinating reproduction of the 25 guidelines for visitors to mineralogical museums to follow (C. F. Nickelio, 1727) includes a plea for 'cleanly scrubbed hands' (rule 1) followed later by (rule 18) 'everyone should be wary of having sticky hands and light fingers'.

As is usual with *Mineral Record* publications, the work is well illustrated, with drawings, coloured sketches of minerals (e.g. from the works of Rashleigh and Sowerby) and colour photographs. In his concluding chapter, the author points out that the beginning of mineral collecting in the XVIth century was a necessary prerequisite to the development of the first systematic classification schemes for minerals, and also led to the developing interest in the chemical analysis of minerals and to the study of their structure and physical properties.

This book gives a truly fascinating description of the birth of our science and at \$24.00 should be snapped up by all mineralogists while it is available.

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