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Geochemistry

by W. S. Fyfe
Oxford University Press, 107 p., 1974.
$6.75

Reviewed by Denis M. Shaw
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This concise book, written by one of the world's foremost geochemists, will be of most use to other professionals, particularly chemists, wishing to learn something of the scope, achievements and limitations of academic geochemistry (applied aspects are excluded).

Chapters 1 and 2 define the scope of geochemistry and present a succinct and elementary statement of what is known about the physical nature and the solid earth. Modern geochemistry is interpreted as the "integration of chemical and geological approaches to . . . the earth and solar system".

The next two chapters summarise salient aspects of minerals and rocks, including elements of structural mineralogy and petrology. One might quibble that a list of common rock-forming minerals should include (p. 10) carbonates and chlorite, and that to say that the moon has the same minerals as the earth (p. 23) ignores the important absence of water.

Chapter 5 continues the discussion of the nature of the solid earth and also provides a cosmochemical synopsis related to earth evolution. Notable omissions are nebular accretion theory and lunar evolution, the former being of particular interest to chemists.

Chapter 6 is the longest, with 29 pages, and includes examples of probably all the main applications of physical chemistry to mineral formation. The treatment is necessarily qualitative but Fyfe indicates clearly how the quantitative constraints apply and, perhaps more importantly, what practical factors often prevent their application (e.g., inadequate thermochemical data). The aragonite-calcite equilibrium diagram is unfortunately impaired by incomplete labelling of curves (p. 47).

Chapter 7 discusses the nature of ore-forming fluids and the chemistry leading to formation of metallic deposits. Chapter 8 is a good discussion of atmospheric and hydrospheric evolution, with a little on life. Chapter 9 is a brief statement of evolution of the earth: it apparently begins on p. 98 but there is no heading.

At the technical level, Professor Fyfe has not been well-served by his publisher. Spelling mistakes were noted on p. 36, 47 and typographical ambiguities or errors on p. 39, 40, 45, 48, 68, 91. Two of the illustrations (p. 26, 31) are unsatisfactory, the first by a misleading caption and the second by obscurity of detail: Figure 4.3 is repeated on p. 98 for no apparent reason. Has Clarendon Press no copy-editors?

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Meteorites

by John T. Wasson
Springer-Verlag, New York, 316 p. 1974.
$31.10.

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Research on meteorites, which had accelerated greatly during the decade prior to 1969, fell temporarily into a decline in the following five years, as the attentions of meteoriticists were diverted to the study of returned lunar materials. Now that the first flush of enthusiasm for the spoils of the Apollo missions has abated, attention is returning to the more varied and no less interesting bits of extraterrestrial matter which fall, unbidden, to the earth's surface. This little book should provide a strong stimulus to former meteoriticists to return to the fold, as well as serving as an excellent introduction for petrologists, geochemists and others who wish to acquaint themselves with the essentials of the field.

The author describes his work as "an introduction to meteorite science and a handbook on meteorite classification". As he admits, the book is quite brief and many interesting details are left out or dealt with quite succinctly. For example, detailed descriptions of the petrology, mineralogy or metallurgy of meteorites are given short shrift, while theoretical models of meteorite genesis are also dealt with rather curtly, albeit quite penetratingly. Its short summaries of research into stable, radiogenic and cosmogenic isotopic variations, trace elements, and shock features should be excellent guides to the uninitiated through these complex fields. To some extent Wasson makes up for his brevity through the lengthy list of references (filling 35 pages). Indeed, many of the chapters read like annotated bibliographies.

Perhaps as significant a contribution of this text as its review of past research is its up-to-date summary of meteorite classifications, including some novel features proposed here for