The first changes in the cordierite section which struck me were that 'nH_2O' is now part of the molecular formula, and that the optic axial plane is now parallel to (010) whereas in 1966 it was parallel to (100). No explanation for this mysterious transposition is offered: demonstrators pinned to the wall by puzzled students will find that there is an explanation, of sorts, in Vol 1B of the multi-volume DHZ. Although cordierite is placed in the book with ring silicates, the authors point out that it is really a framework silicate, as its optical properties, imply. The new structure drawing (from Cohen *et al.*, 1977) is much easier to understand than the one given in the first edition. As for many mineral species new analyses are given, with one carried forward from the earlier edition, and the drawings of complex twinning are much clearer. The section on chemistry is considerably expanded, with a *P–T* diagram for KMASH and several more reactions involving cordierite discussed. Like most other sections there are more references, and these have in some cases a review character.

The book has three appendices. The first two are from the first edition: examples of how chemical formulae can be calculated from mineral analyses, and a table of molecular weights. A new appendix explains how molecular percentages of end member components in solid solutions can be calculated from chemcial analyses. A final addition, inside the back cover, is a coloured Michel-Levy birefringence chart.

The new edition represents an almost complete rewrite of its predecessor. Connections with the first edition are little more than a ghost stratigraphy and the authors have done a magnificent job of revising and updating all the important minerals. While it is possible to quibble about details there is no doubt at all that the new edition maintains the 'student' DHZ as the most authoritative compact mineralogy reference work for undergraduate and postgraduate use. The substantial changes are all improvements, and perhaps the only aspect of modern mineralogy conspicuously absent is any treatment of mineral thermodynamics. The price is realistic and (for once) not so great that students will find it out of reach. For knowledge content and applications this is probably one of the best value Earth Science books around. The authors deserve our heartfelt thanks for the immense amount of work that has gone into producing it and its multi-volume parents. It is certain to be a familiar sight on laboratory benches for many years to come, and deservedly so.

I. PARSONS

Clarke, D. B. *Granitoid rocks.* London (Chapman and Hall), 1992. 283 pp. Price £24.95.

The literature on granitic rocks is now so vast, and the techniques used to study them so varied, that it is difficult even for a specialist to see the wood for the trees. The author of this book has succeeded remarkably well in covering the present state of granitology in such a concise review, or, to use his own analogy, in distilling a batholithic amount of information into a book of aplitic proportions.

His approach has been to take each type or method of investigation—field, mineralogical, geochemical, isotopic—and describe what information it has provided or could provide on the origin of granitic rocks. Every chapter is full of interest, and is supported by a lengthy and up to date bibliography. The first chapter sets out the many ways of classifying granitic rocks and discussed the merits and limitations of the alphabetic (S and I) classification. This is followed by a chapter on field relations which is somewhat less statisfactory than the rest of the book; it does not say enough about the composite nature of granitic intrusions and the difference between plutons and batholiths. There are excellent chapters on mineralogy, geochemistry and experimental petrology which are a mine of information and ideas. There is a welcome discussion on economic geology, which is a useful reminder to igneous petrologists that hydrothermal processes are an integral part of the granite story. Finally there are case studies of some contrasting granitic suites, and a very valuable bibliography.

A great virtue of this book is its consistency of purpose. It is written from beginning to end as a guide to the new researcher, setting out what is known already and what can be achieved. It is not written primarily for undergraduate students, nor is it bogged down in the sort of detail that might be found in a research monograph. It is consistently well written, its brevity and lucidity making a real contribution to the understanding of a complex subject. It comes as close as is possible to providing a complete state-of-the-art review of granite studies. For both new research students and experienced specialists alike this book is excellent value for money.

A. HALL

Mason, B. *Victor Moritz Goldschmidt: Father of Modern Geochemistry.* Geochemical Society Special Publication no. 4, 184 pp 1992.

A fascinating biography of the most influential scientist in the sphere of geochemistry. It chron-

icles his scientific achievements, over 200 papers, from his first paper in 1906 at 18 years of age, on the pyroluminescence of quartz to his receipt of the highest accolade from the Geological Society of London—the Wollaston Medal.

One realises what a major language barrier existed in science this century when the works of Goldschmidt, written mainly in German were unavailable to most English-speaking scientists until the 1930s or when his book appeared in 1954 after his death. Up until the year he received his doctorate he had published some 16 papers and made a major contribution to our understanding of contact metamorphism. Interestingly, during his doctoral work the participants on a field excursion to the Oslofjord islands included Einstein. In 1922 VMG (and Bowen) published similar ideas on reaction series in igneous rocks and VMG made a major contribution on Earth differentiation and the distribution of the elements. His search for element 72(Hf) in minerals containing some 16% HfO_2 was beaten into publication by 29 days. His pioneering study of ionic radii published at this time was later confirmed by the wave mechanics work of Pauling. Suggestions that glacial clays may be a good candidate for average crustal composition (81 analyses) closely matched the work of Clarke and Washington on 5159 crustal rock samples. In the 1930s VMG made significant contributions to our understanding of the geochemical cycle and expressed a profound concern at the amount of man-made CO_2!! The Hugo Müller lecture to the Chemical Society in the 1930s on 'The Principles of distribution of Chemical Elements in Minerals and Rocks' preceeded his book by 17 years and provided an invaluable insight, to the English-speaking community, of the pioneering works of VMG. His concern for the determination and reporting of precise data was apparent when he placed a financial wager with Harwood & Holmes that a published value of 0.0001% Sc for pyroxenites was incorrect and misleading.

This Special Publication provides valuable information on the scientific output of VMG and his influence on generations of geologists. His dedication to the science in the first half of the twentieth century led to a surge of interest and major advances in geochemistry in the second half. Interwoven with details of his career in Oslo and Gottingen are details of the suffering of scientists in Europe during two World Wars. Conveniently a letter signed by Goebbels and Hitler releasing VMG from his post at Gottingen later freed him from a concentration camp. His research on apatites associated with the Fen carbonatite kept him from being deported.

A Goldschmidt story to be remembered by all examiners. VMG asked a student during an oral exam 'Tell me . . . why is amazonstone green?' The student attempting to bluff his way through replied 'Well sir I did know but I have forgotten.' Goldschmidt replied 'That really is too bad . . . nobody else knows and you have forgotten!'

An excellent read and any department that boasts interest in geochemistry must obtain a copy for the interest of academic staff and students alike.

M. A. MENZIES

Pagel, M. and Leroy, J. L., eds. *Source, Transport and Deposition of Metals.* Proceedings of the 25 years SGA Anniversary Meeting, Nancy, 30 August–3 September 1991, Rotterdam (A. A. Balkema), 1991. 841 pp. Price £61.00.

I usually regard conference proceedings with as much interest as a hamburger grabbed from an all-night petrol station. The contents seem often to be an unsorted mixture, with little to stimulate literary or intelectual interest. The scientific content is bland, being written in anticipation of results, rather than acutal known data. Choicer scientific works are virtually certain to be dressed and published elsewhere in reputable journals. Other articles are disposable, or of merit solely to the authors' publication record at the risk of being a source of embarrassment later. I suspect I am not alone in these opinions, having seen conference hall, railway station and airport waste bins filled with conference proceedings, baggage limits being assigned to less dense and more enjoyable contents.

These opinions, however, do not apply to the proceedings of the 25th anniversary meeting of the Society for Geology Applied to Mineral Deposits (SGA). The meeting itself was stimulating to an exceptional degree, and well organised. These attributes permeate the volume. Instead of purposely forgetting it in the Hotel de Guise (courtesy of an unknown organiser with a sense of humour), I still have the compact volume, and refer to it frequently. The all-encompassing title (Source, Transport and Deposition of Metals) is justified, as the 841 page volume contains 202 extended abstracts, varying from 2–4 pages each. The abstracts have been organised into the following sections: fluid-rock interaction and ore deposition, P–T–x–time determination in ore deposits, sources of metals, dating of deposits, structural environment, metals and organic matter, oceanic crust metallogeny, transport and