problems. Some of the ideas presented in it will undoubtedly wither and pass from sight in future years but the volume will remain an historical record of the state of our knowledge on matters granitic. As such it has a place in any good geological library.

J.D. CLEMENS

Cawthorn, R.G. (ed.) *Layered Intrusions*. Amsterdam (Elsevier Science BV). 1996, x + 531 pp + 1 map. Price $93.75 (softback), $200.00 (hardback). ISBN 0-444-81768-9 (hardback) 0-444-82518-5.

Layered plutonic igneous rocks remain one of the most contentious and fascinating aspects of igneous geology. Layering phenomena are an important clue to processes occurring during the crystallization of igneous bodies. This book represents a valuable attempt to bring together a variety of experts on different layered igneous intrusions into a single monograph, and will undoubtedly be embraced as an important reference for studies on layered rocks. It is now ten years since the publication of *Origins of Igneous Layering*, edited by I. Parsons, which many will consider an important contribution to research into layered igneous rocks. *Layered Intrusions* updates much of that work, but the style is more of a review, and will appeal to a wider audience.

The format of the book is as a series of 14 chapters, each tackling a different aspect, with a foreword by G.M. Brown. The first four chapters consider the origins and development of layered igneous rocks, whilst the remaining seven are descriptive reviews of some key intrusions or provinces (including Skaergaard) which have provided some of the most important clues to our understanding of layered processes. A colour pull-out map is provided with the Skaergaard review. The chapters' titles and authors are: 1. H.R. Naslund and A.R. McBirney, Mechanisms of Formation of Igneous Layering; 2. I.H. Campbell, Fluid Dynamic Processes in Basaltic Magma Chambers; 3. R.H. Hunter, Texture Development in Cumulate Rocks; 4. C.A. Lee, A Review of Mineralization in the Bushveld Complex and some other Layered Mafic Intrusions; 5. A.R. McBirney, The Skaergaard Intrusion; 6. H.V. Eales and R.G. Cawthorn, The Bushveld Complex; 7. J.R. Wilson, B. Robins, F.M. Nielsen,, J.C. Duchesne and J. van der Auwera, The Bjerkreim-Sokndal Layered Intrusion, SW Norway; 8. J.D. Miller Jr and E.M. Ripley, Layered Intrusions of the Duluth Complex, Minnesota, USA; 9. J.R. Wilson and H.S. Sørensen, The Fongen-Hyllingen Layered Intrusive Complex, Norway; 10. B.G.J. Upton, I. Parson, C.H. Emeleus and M.E. Hodson, Layered Alkaline Igneous Rocks of the Gardar Province, South Greenland; 11. A.H. Wilson, The Great Dyke of Zimbabwe; 12. C.H. Emeleus, M.J. Cheadle, R.H. Hunter, B.G.J. Upton and W.J. Wadsworth, The Rum Layered Suite; 13. I.S. McCallum, The Stillwater Complex; 14. C.I. Mathison and A.L. Ahmat, The Windimurra Complex, Western Australia.

The foreword stresses the importance of the book to researchers, but the book will have another role as a one-stop reference for final-year undergraduate students of igneous petrology. Naslund and McBirney's condensed but readable review of magma chamber processes and the reviews of key intrusions such as Skaegaard, will be an invaluable teaching aid. My only criticism of the book lies not with the content but with the cost. With a price tag of US$200 for a hardback, there are few individuals who will be able to purchase this book. In times of increasing financial restraint in higher education, it will also be outside the price range of many institutions and university libraries. It is a pity that such an important contribution will not reach a wider audience.

A.A. FINCH

Hoefs, J. *Stable Isotope Geochemistry: (fourth completely revised, updated and enlarged edition)*, 4th Edition, Berlin, Heidelberg and New York (Springer-Verlag), 1996, xi + 201 pp. Price DM78.00. ISBN 3-540-61126-6.

This book of 168 pages provides a synopsis of some stable isotopic concepts and data relevant to the Earth Sciences. The book comprises three main parts *viz.* Chapter 1: Theoretical and Experimental Principles (26 pages); Chapter 2: Isotope Fractionation Mechanisms of Selected Elements (34 pages); Chapter 3: Variations of Stable Isotope Ratios in Nature (103 pages), with this last chapter being divided into 12 sections, each dealing with isotopic variations in particular geospheres. Chapter 3 devotes 51 pages to stable isotopes in low-temperature systems (e.g. 15 on Section 3.11: Sedimentary Rocks) and 38 pages to stable isotopes in high-temperature systems (e.g. 5 pages to Section 3.3: Magmatic Rocks).

The book is useful as a source of information, but it is not for the non-specialist, despite the claim made in the preface that "The book is written.....more for the non-specialist and graduate student, who needs practical knowledge of how to interpret stable isotope ratios." This is a book for reference into which those with some acquaintance with isotopic techniques can delve to widen their understanding of isotope systematics and pick up hints and information that might be useful or lead them down new paths. There are several books (e.g. E. Mazor, *Applied Chemical and Isotopic Groundwater Hydrology* and G. Faure,

Principles of Isotope Geology), that provide a more accessible introduction to a variety of aspects of stable isotope geochemistry.

The preface to this book states that the previous (third) edition "has been totally re-written on the basis of the literature which has appeared since 1987". It is therefore a little disappointing that fewer than 39% of the citations refer to post-1986 papers (Fig. 1). Nevertheless, this 39 or so percent represents the incorporation of significant new work whilst the style and layout have remained effectively unchanged.

A book of 168 pages that encompasses such a wide range of isotopic studies cannot provide a comprehensive survey of isotope geoscience (nor does Hoefs claim to do so). The book therefore has a distinct bias toward the traditional fields of isotopic study. There is nothing on the use of stable isotopes as pollution tracers in the surficial environment (e.g. coupling C and Cl isotopes to trace pollution plumes in groundwater), nor is there anything relevant to archaeological studies (e.g. sourcing artefacts with isotopes). Surprisingly, there is nothing on the rapidly developing field of strontium isotope stratigraphy.

Sometimes, credit is not given where it is due; for example, by citing the "interesting observation made by Shemesh *et al.* (1983) .... that the $\delta^{18}O$-values of phosphorites decrease with increasing geological age", the author overlooks the fact that this observation was put forth as clearly as could be by Longinelli and Nutti in 1968. Some figures are outdated; for example, "Fig. 65. Composite of $\delta^{18}O$-fluctuations in the foraminiferal species *G. sacculifer* from Caribbean cores (Emiliani, 1978)" might more usefully have been a reproduction of the (slightly) more modern SPECMAP $\delta^{18}O$ record.

Despite these caveats, the book clearly remains a useful source of information on stable isotope geoscience, and should be on the shelf of any science library. The third edition of this book was cited 158 times, so clearly it was useful to many.

J.M. MCARTHUR

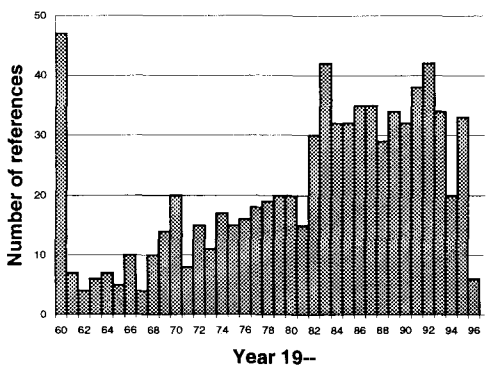

FIG. 1. References by year.

Cornell, R.M. and Schwertmann, U. *The Iron Oxides: Structure, Properties Reactions Occurrence and Uses*. Weinheim and New York (VCH Verlagsgeseiischaft mbH). 1996, xxxi + 573 pp. Price DM 328.00. ISBN 3-527-28576-8.

This book provides an authoritative and detailed account of the structure, properties, reactions, occurrence and uses of the fine-grained iron oxides such as are produced by synthetic and industrial processes. Chapters describe the crystal structure, cation substitution, crystal morphology and size of the common iron oxides and hydroxides. Here crystal size is usually in the micron or sub-micron range and this is particularly relevant to the chapter on surface area and porosity. The chapters on the electronic, electrical and magnetic properties include applications for magnetic tapes and describe the semiconductor properties. Methods of characterization are listed from IR, Raman, UV and Mössbauer spectroscopy to magnetic methods and diffraction techniques including XRD. Microscopy appears low in this list followed by thermal methods such as TG and DTA. Subsequent chapters deal with the thermodynamics, solubility, surface chemistry and adsorption characteristics. The chapter on dissolution covers a range of dissolution reactions and mechanisms and their effects on particular iron oxides and hydroxides. The dissolution effects of biological and other reduction reactions in natural environments are covered in nearly two pages and relate to the effects in soils. The formation of the iron oxides is discussed with reference to synthetic systems and hydrolysis reactions and the flavour of this can be judged from the section on mechanisms of formation which opens "In unhydrolysed or slightly hydrolysed solutions in which only monomeric and dimeric Fe^{111} species are present....". The chapter on transformations is detailed and informative but lacks any application of this knowledge to natural systems. A chapter on rocks and ores appears rather suddenly and magmatic and metamorphic rocks and ores are described briefly. Apparently magnetite is "ubiquitous in rocks" and "intrusive rocks, which cool down at a lower rate, contain crystals (of titanomagnetite and ilmenite) up to 100 μm." We also learn that "An enormous amount of literature about titanomagnetites and other magnetic minerals exists because these minerals are the main carriers of rockmagnetism (sic) and therefore form the basis of the field of palaeomagnetism." Sedimentary and