minimize intramolecular strain. This 126 page chapter has 222 references and covers approximately that number of structure determinations, including those published in 1978.

There are two chapters primarily on type 3 compounds. *Thermodynamics and Kinetics* by the Brigham Young University group provides a most valuable survey of known results on various cations, not only metals, but also RNH_3^+ ions; type 1 compounds occupy only about 5% of the space. For the complexes of alkali and alkaline-earth metal cations crystal structure results up to 1976 are presented by A. I. Popov and J.-M. Lehn as among the physicochemical studies of crown ethers and cryptates; this aspect occupies 12 pages compared with 40 pages on solution studies.

Finally, V. C. Goedken covers types 1 and 3 under the heading *Natural Product Model Systems*. He deals explicitly with the biological relevance implicit in other chapters. He includes a thoughtful discussion on the validity of model systems as well as accounts of the work reported. One section, *Importance of X-ray Structural Analyses*, deals with the need for accurate analysis of model compounds to complement the, necessarily inaccurate, investigation of natural macromolecules such as proteins. Particularly important examples of this are Fe–N distances in, and coplanarity with, porphyrin rings. It is in this chapter that the biological implications of the macrocyclic compounds of type 3 are considered. A good test of the reader's understanding is provided by the interchange of (*a*) and (*b*) on the formulae of the two antibiotics in Fig. 1 on p. 610.

Chemical crystallographers should read at least part of this book as an opportunity to see ourselves as others see us, *i.e.* to see what part of the findings are seen as of importance by coordination chemists. I recommend the exercise not only to authors, but to referees of papers and editors of journals.

The book is well produced, with clear diagrams and print. I found few errors. There is a good subject index. Although it is large, 664 pp., it weighs a manageable 1 kg, good quality paper having been used.

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Handbook on the physics and chemistry of rare earths. Vol. 2. Alloys and intermetallics. Edited by K. A. GSCHNEIDNER and L. EYRING. Pp. xiv + 620. Amsterdam: North-Holland, 1979. Price US $97.50, Dfl 200.00.

The *Handbook on the Physics and Chemistry of Rare Earths* is a timely, four-volume work which attempts 'to cover the entire rare-earth field in an integrated manner'. With the second volume, *Alloys and Intermetallics*, this laudable attempt has succeeded admirably, producing a book which will be an invaluable guide, albeit a heavy one, to all workers involved in this particular part of the field.

The first chapter is concerned with the fascinating problems of the crystal chemistry of intermetallic compounds, notably the range of structure types and compositions. The scale of the problem may be appreciated by the fact that over 1800 crystal structures have been determined for the binary intermetallic compounds alone. The article concentrates discussion on the most frequently occurring compositions, namely the R_5X_3, RX, RX_2 and RX_3 compounds.

The major chapter, some 176 pages long, is concerned with the magnetic properties of the intermetallic compounds. Faced with a perhaps overwhelming amount of information, a necessarily subjective review is given which concentrates on the magnetically ordered systems, and results in an eminently informative, self-consistent account of this often complex field.

The Laves-phase RFe_2 compounds, which exhibit uniquely large magnetostrictive properties, are considered, rightly, to be worthy of a dedicated chapter. The same applies to the much studied europium chalcogenides and the technologically important amorphous alloys.

The book also contains an extremely clear and concise exposition of the important crystal-field interaction, the basis of many of the observable macroscopic properties of rare-earth systems. The inclusion of this chapter in a volume devoted to alloys and compounds may be questionable, but it is a valuable contribution nonetheless.

The applications of nuclear resonance and electron paramagnetic resonance methods are admirably discussed with respect to metal, alloy, compound and insulator compound systems in both the ordered and disordered magnetic states. The final chapter is concerned with valence changes in compounds and presents a clear description of the subject and illustrates the fundamental problems still to be solved in this area.

The volume contains approximately 600 pages of text, 27 pages of references and just over 7 pages of subject index. It is to this last statistic that the criticism of inadequacy may be levelled. There are a number of significant omissions in the index, one example being that there is no listing of $SmCo_5$, an important permanent magnet compound dealt with at some length in the text. A further criticism, though minor, is that although the rare-earth element is identified throughout the book by the symbol R, other alloy constituent elements are variously described by the symbols X, B and M.

In spite of these faults, throughout the excellent text the areas of deficiency in both experiment and theory are emphasized and the flavour of the variety and the appeal of rare-earth systems is communicated to the reader.

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