generalizations, badly executed diagrams, errors of fact. For example, Fig. 4.6, the electron density section through the (100) plane of sodium chloride, looks as if it has been drawn free-hand. Not one of the ions has anything like fourfold symmetry and the inner density of the sodium ions is elliptical. This is inexcusable when good examples are available, such as in McKie and McKie's *Crystalline Solids*. On the facing page the diagram for sodium chloride would strike the unbiased observer as monoclinic, as would that of copper, Fig. 4.8.

A complete list of such blemishes would be too long for this review but here are a few of the more blatant examples: p. 3, '... practically the whole of solid matter is crystalline', and the angle between crystal faces is called a 'solid angle'; Fig. 3.8 does not contain the points *A*,*B*,*C*,*D* referred to in the text; p. 78, graphite is said to be obtained 'by burning some organic material chemical'; p. 98, ClO_4^- is referred to as the chlorate ion; p. 110, a solid containing 1 p.p.m. impurity is said to contain '10^{23} impurities per cubic meter'; the *Glossary*, p. 134, on *Unit Cell*: 'Generally the smallest is chosen'. (The student reader may wonder why this 'generalization' seems largely inapplicable to the examples given in the book itself, most of whose cells are non-primitive.)

The chapter on disorder contains 'neutron diffraction patterns' of vitreous silica and of crystalline $NH_4H_2PO_4$. This comparison is made obscure by the fact that no explanation is offered as to the difference in diffraction effects between single crystals on the one hand and crystal powders or amorphous materials on the other. Moreover, why compare such disparate samples? Surely a comparison of the diffraction (neutron or X-ray) from, say, amorphous silica and powdered quartz would have been far more telling?

Although this little book has some good material in it, it is a disappointment. With clearer exposition and better production it could have been very good.

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Cordination chemistry reivews: Vol. 34. Main group chemistry review, 1979, edited by D. B. SOWERBY, pp. viii + 467; **Vol. 35. Transition-metal chemistry review, 1979, Part A,** pp. 268 and **Vol. 37. Transition-metal chemistry review, 1979, Part B,** pp. 339, edited by C. D. GARNER & K. R. SEDDON. Elsevier, 1981. Price: Dfl 210 for Vol. 34, and Dfl 210 for Vols 35 and 37 together.

These three volumes are aimed to provide a reasonably comprehensive coverage of literature on the coordination chemistry of the main-group elements that appeared in 1979 and of *d* transition elements that appeared during late 1978 and 1979.

Vol. 34 is the second of the annual reviews of the chemistry of the main-group elements, published in *Coordination Chemistry Reviews*. In comparison with the 1978 volume, the current volume shows greater activity during 1979 in the chemistry of the elements of Groups III and V. Topics described in detail are preparative techniques, spectroscopic and structural properties, and reaction chemistry.

Vols 35 and 37 aim to provide a complete review of the coordination chemistry of all the *d* transition elements. Of these, Vol. 35 treats the coordination chemistry of Fe, Ru, Os, Co, Rh, Ir, Pd, Pt, Cu, Ag and Au, while Vol. 37 covers Sc, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Tc, Re, Ni, Zn, Cd and Hg. Developments in the coordination chemistry of these transition elements and current topics, inclusive of metal carbonyls, metal-to-metal bonds, metal-atom clusters, transition-metal compounds with bonds to hydrogen and carbon, and biological systems, are described in detail.

There are some inconsistencies of presentation in the three volumes, and abbreviation of the ligands is not necessarily consistent with IUPAC rules. However, these reviews will be of great value: for example, on the coordination chemistry of Mo, which has been extensively studied in recent years, the reports appear in many different journals; if researchers wish to know about the coordination chemistry of Mo, they must read a vast number of research papers appearing in many journals – a tremendously time-consuming task; fortunately, as these review volumes have been organized element by element, and a wide range of the information that appeared in the period is summarized compactly, researchers can fulfil such requirements without much labour. Consequently, these three volumes serve as an extensively useful bibliography for researchers in the fields of chemistry and materials science.

At the present time it is well known that X-ray and neutron diffraction methods have been widely utilized in the study of inorganic chemistry. Without the popularization of X-ray crystallography, inorganic chemistry would never have seen such a dramatic development in recent years. X-ray crystallography is now indispensable for the characterization of compounds and has provided a sound basis for the studies of model systems for oxygen carriers, Jahn–Teller systems for Cu^{II} complexes, metal chelates of macrocyclic compounds, crown ethers, and cryptates, *etc.*, described in these volumes.

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Structure and bonding. Vol. 44. Metal complexes. Edited by M. J. CLARKE *et al.* Pp. 202. Berlin, Heidelberg, New York: Springer-Verlag, 1981. Price DM 96.00, US $50.40.

This volume of the irregularly published series *Structure and Bonding* comprises two articles on structural aspects of metal complexes. The first is a summary of *Crystallographic Studies of Transition Metal Hydride Complexes* by Ray-

mond G. Teller and Robert Bau. The authors list all of the more than three hundred molecular transition-metal hydride complexes with structures known to them up to the end of 1979 and provide a description of the general structural types. There is a brief introduction to the methods used to locate hydrogen atoms from both X-ray data and neutron diffraction. Then follows a well illustrated description of various classes of metal hydride complexes, from those containing terminal M—H bonds to metal clusters and molecular species containing interstitial hydrogen. The discussion of the structures is not particularly critical, with only a limited amount of speculation. Based largely on the approximately fifty neutron studies available, some generalizations are offered about metal–hydrogen distances. The result is a definitive survey of the literature, well organized and well illustrated. It represents very good value when one considers that an initial on-line literature search would probably cost about as much as this volume. My only criticism is that by listing only one or two authors in multiple-author references it is not possible to know which structures were determined in which laboratories.

The second, slightly longer review on *Spin Crossover in Iron*(II) *Complexes* by Phillip Gütlich is a comprehensive survey of the variety of studies made on this class of compounds which exhibit a change in magnetic moment with temperature. Results are described from measurements of magnetism, vibrational and electronic spectra, the Mössbauer effect, heat capacity, and magnetic resonance, as well as from X-ray diffraction. This review is of less immediate interest to crystallographers. Because the change in spin state invariably involves some change in structure, however, the phenomenon provides a probe into lattice effects. In a series of elegant experiments using Mössbauer spectroscopy, Gütlich and co-workers have examined the effect of diluting a spin-crossover iron(II) complex into the analogous zinc(II) lattice and found evidence for a cooperative domain model of the structural transition. Hence solid-state scientists may find these relatively obscure complexes a useful probe into lattice effects.

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La structure de la matière – du ciel bleu à la matière plastique. By A. GUINIER. Pp. 288. Paris: Hachette, 1980. Price 140.18 FF.

This is the first of a series intended for science teachers in secondary schools in order to keep them informed of current developments in science. After a short discussion of atomic structure and chemical bonds, the author classifies matter in two states: the disordered (the perfect gas) and the ordered (the perfect crystal). A major part of the book is concerned with the field between these two extremes from liquids *via* colloids, liquid crystals, polymers, crystalline aggregates with their preferred orientations, to real crystals with their defects.

While the work covers the whole field of crystallography, there is little use of mathematics. The author's aim is not to give rigorous proofs of physical laws but to demonstrate the consequences of these laws in everyday life.

Many university teachers would do well to incorporate in their courses some of the examples given by Guinier. He reminds us in a very elegant manner that the study of physics is not confined to the laboratory but extends to the universe. It can provide explanations both for the blue colour of the sky and for the physical properties of plastics.

The author's style is so clear that it is a pleasure to recommend this book not only to science teachers (the effort for English-speakers will be repaid) but also to teachers of French in English-speaking schools. At a single blow it would improve the standard of French and increase the quality of the science intake in universities.

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Book Received

The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.

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История кристаллографии. I: С древнейших времен до начала XIX столетия, II: XIX век. И. И. Шафрановский. **(A history of crystallography. I: From earliest times to the beginning of the nineteenth century; II: In the nineteenth century.** By I. I. SHAFRANOVSKII.) Pp. 296 (Vol. I), pp. 324 (Vol. II). Leningrad: Nauka, 1978 (Vol. I), 1980 (Vol. II). Price 2r 50k (Vol. I), 2r 40 k (Vol. II). A review of this book, by A. L. Mackay, has been published in the March 1982 issue of *Acta Crystallographica*, Section A, p. 288.

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The rare earths in modern science and technology. Vol. 2. Edited by G. J. MCCARTHY, J. J. RHYNE and H. B. SILBER. Pp. xxiii + 647. New York: Plenum, 1980. Price US $59.50.

This book is the second in a series which aims to publish the proceedings of the Rare Earth Research conferences, held in North America every 18 months or so. This conference was held two years ago in North Dakota, and it is the 14th, the first having been staged in 1960. Some of the proceedings of previous conferences were published as hard-cover books but the process was interrupted; it was a pity that so much