Book Review

Works intended for notice in this column should be sent direct to the Book-Review Editor (M. M. Woolfson, Physics Department, University of York, Heslington, York YO1 5DD, England). As far as practicable books will be reviewed in a country different from that of publication.

Diffraction methods. By JOHN WORMALD. Pp. xii + 100, Figs. 58. Oxford Chemistry Series. Oxford: Clarendon Press, 1973. Price (cloth) £3·00, (paper) £1·75.

This small book is part of a comprehensive series of short texts on chemistry published by the Oxford University Press. The purpose of this book is to give an introduction to diffraction methods, emphasizing their importance in solving chemical problems. The treatment is deliberately elementary and non-mathematical throughout.

The book is divided into eight chapters and there are two appendices, one giving units of length and the other formulae for structure factors and electron densities. The first two chapters deal with the diffraction phenomenon and give the fundamental concepts of X-ray crystallography. The third chapter illustrates some technical aspects of single-crystal structural analysis, while the importance of these analyses for chemistry is stressed in the fourth chapter. Powders and polymers, with some hints about glasses and the paracrystalline state, are treated in chapter five. Chapter six is devoted to neutron diffraction, in particular to location of hydrogen atoms and to magnetic scattering. In chapter seven the high-energy electron diffraction (HEED) of gases and vapours, and low-energy electron diffraction (LEED) from solids are considered. Conclusions with reference to the future development of diffraction methods in chemistry are discussed in the last chapter.

The book is certainly useful for developing a qualitative idea of the application of diffraction methods in chemistry. The various examples, particularly those taken from modern inorganic chemistry, are interesting and well chosen. Nevertheless the reviewer is not completely satisfied with it. Perhaps with a few pages more and fewer topics (*e.g.* the application of the Born–Haber cycle to sodium chloride which can be found in any general chemistry textbook, or the discussion of fluxional organometallic molecules which is a typical problem to which diffraction methods do not apply) a more exhaustive and coherent development of the subject matter would have been achieved. The author is too worried about avoiding the use of mathematics and this, instead of making things clearer, makes them more obscure. For example the formula for the structure factor is given in an implicit form in the text and it is doubtful that a reader trained in chemistry would find it clearer than the explicit equation given in Appendix II. This preoccupation leads to descriptions which can be understood only by those who already know the subject (*e.g.* the concept of the reciprocal lattice). Also the chemical examples are treated too superficially. Perhaps it would be better if they were fewer, but treated in more detail, particularly in connexion with the specific contributions the crystal structure analyses give for solving chemical problems. Some figures are incorrect. For example in Fig. 1.1 the radii of the circles do not increase linearly as they should, Figs. 3.3 and 5.4 are misleading drawings which bear no resemblance to the real photographs; indeed the reviewer has never seen a Debye–Scherrer photograph with the back region equal to the direct one.

The bibliography given at the end of the book is valuable for those who want to obtain a deeper knowledge of the subject.

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