Molecular Structures and Dimensions

The Executive Committee of the International Union of Crystallography has pleasure in announcing the publication of a new series of standard reference books entitled *Molecular Structures and Dimensions*. The aim of the series is to make the results of structural investigations by diffraction and related methods readily available to all scientists interested in molecular structures. It is designed to be easily usable by specialist crystallographers and by academic and industrial research workers in the related fields of chemistry, biochemistry, molecular biology and pharmacology. The new series is a continuation and extension of the *Tables of Interatomic Distances in Molecules and Ions* (Chemical Society Special Publication), which covered the literature until the end of 1959.

The first two volumes of the series are now available. They are edited by Olga Kennard and David G. Watson at the Crystallographic Data Centre, Cambridge, England and contain classified bibliographic information for over 4000 structures. Literature coverage is comprehensive from 1935 to 1 January 1969 and there are 500 additional references to 1969 publications. Volume 1 deals with general organic crystal structures and Volume 2 with complexes, organo-metals and metalloids. Entries are arranged in chemical classes with extensive cross-references. Individual compounds can be located through the formula or metal index and there is also an author index. The bibliography is the first attempt at bringing together all publications on related structures and provides a survey to the various areas of organic and organometallic chemistry which have been investigated by X-ray and neutron diffraction methods.

The series is published for the Union, in conjunction with the Crystallographic Data Centre, by A. Oosthoek's Uitgevers Mij N.V., Doomstraat 5–13, Utrecht, The Netherlands, from whom the first two volumes may now be obtained. Volume 1 costs 45 Netherlands Guilders (U.S. $12.50 or £5·25 at the present rates of exchange) and Volume 2 costs 35 Netherlands Guilders (U.S. $10.00 or £4·20). Copies or the personal use of scientists may be obtained at the reduced prices of 32 Netherlands Guilders (U.S. $9.00 or £3·75) for Volume 1 and 27 Netherlands Guilders (U.S. $7.50 or £3·15) for Volume 2. All prices include postal charges. Copies may also be obtained from Polycrystal Book Service, P.O. Box 11567, Pittsburgh, Pa. 15238, U.S.A., or through any bookseller. Standing orders can be placed for future volumes.

Book Reviews

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.

Introduction to crystallography. By DONALD E. SANDS Pp.xii+165. New York: Benjamin, 1969. Price not known.

The book is part of the Physical Chemistry Monograph Series edited by Walter Kauzmann of Princeton University, and the aim of the series is that each volume will cover one topic important in physical chemistry at an introductory level in 150 to 200 pages. *Introduction to Crystallography* by Donald E. Sands does just that. In his words, 'The proliferation and the importance of the results of crystal structure analysis confront the chemist with the need to learn the language of crystallography. This book is the outgrowth of the opinion that the training of the undergraduate chemistry major can include more of this language than the memorization of a list of lattice types. At the same time, it would be unreasonable and impractical to expect all chemists to become experts in this specialized field. The purpose, therefore, is to treat the subject in a manner that will quickly and painlessly enable the non-specialist to read and comprehend the crystallographic literature. It is hoped that this introduction may serve as a useful starting point for those students who wish to pursue the subject further.' (p. vii).

The first four chapters introduce lattices, point groups and space groups. Chapter 5 introduces both the theory and experimental methods of X-ray diffraction, chapter 6 covers briefly crystal structure determination methods, and the last chapter summarizes some simple structures. The book is written in an easy style and has a large number of exercises scattered throughout the text and at the ends of chapters, with answers and hints collected together at the back. Having mentioned the excellent framework of the book, the reviewer must now make some adverse points. Because of the introductory level and the large number of topics covered in a short space, each topic tends to have only a brief outline. It is therefore essential that each one be clearly and correctly presented. If there are errors then there is no extra material in which the student can overcome a mistaken impression, and this sometimes happens. Thus when lattice points are being introduced (before any symmetry has been discussed) a footnote adds (p. 6) ' We will frequently use the terms lattice point, identical point, and equivalent point interchangeably. Lattice points may be considered a special case of identical (or equivalent) points in that they are related to each other by lattice translations. All lattice points are equivalent to each other, but equivalent points are not necessarily lattice points.' The N_4S_4 molecule (p. 40) is introduced as having no axis higher than 2, thus ignoring the $\bar{4}$ axis and the fourfold nature of the molecule. The monoclinic lattice is given an obscure justification (pp. 48, 56). Miller indices are introduced for single arbitrary planes in a lattice rather than for sets of lattice planes. Fourier series are introduced for functions with a repeat of 2 instead of 1, hindering the transition to structure-factor and electron-density formulae. Point group symmetry is introduced mainly with the Schoenflies notation used by spectroscopists, and a transition has to be made for space

groups to the Hermann–Mauguin or international notation prefered by crystallographers. Simple group theory ideas are used but no mention of sub-groups is made.

Most of the diagrams are simple and good, but some are obscure. Thus cubic close packing is well illustrated but hexagonal close packing is shown with the unit-cell origin wrongly placed on an atom. The early diagrams showing mirror planes in molecules are not clear. The least satisfactory diagrams occur in the table of Bravais lattices, where almost identical cells are drawn for triclinic and trigonal and the same cell is used for orthohombic, tetragonal and hexagonal. By no stretch of perspective imagination can the hexagonal cell be made to look hexagonal. Similarly, the monoclinic unit cell looks like an Escher trick, with back lines longer than front lines.

Most of the criticisms would not have mattered in a more comprehensive text, and in spite of them the book has many good features. It can be recommended to chemistry students as planned, provided the mistakes are also pointed out.

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Inorganic crystal chemistry. By I. NÁRAY-SZABÓ. Pp. 480. Budapest: Akadémiai Kiadó, 1969. Distributors: Collet's, London. Price £ 8·40.

There are not too many monographs devoted to crystal chemistry and the appearance of a new text in this field should be met with considerable interest. The present book is an enlarged English version of the Hungarian original. As pointed out in the preface it is not intended as a textbook. It is purely descriptive and includes very few theoretical aspects such as discussions of chemical bonds or the physical chemistry of the crystalline state.

Following a short introduction, the crystal chemistry of the elements, alloys and compounds between non-metals is treated. The compounds between metals and non-metals are discussed systematically according to the anions in the largest section of the book and the structural chemistry of the cations is briefly reviewed in the concluding chapter.

The limited space devoted to each compound, mostly highlighting the symmetry, some coordination feature and one or two interatomic distances, with little discussion of the structure, makes the account somewhat monotonous. Despite the artistic efforts put into the drawing of spheres, most of the Figures are not very enlightening; this, in combination with the very brief descriptions in the text, often leaves the reader without much idea of what the atomic arrangement actually is.

The large number of references and the valuable information collected in the tables make the book useful as a reference. However, it requires critical reading since it contains numerous errors and is not always up to date.

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Contemporary crystallography. By MARTIN J. BUERGER. Pp. xi.+364. New York: McGraw-Hill, 1970. Price £6·00.

It is impossible not to be impressed by the writings of Professor Buerger on the geometries of real and reciprocal spaces and much of this book is concerned with the introductory theoretical and experimental aspects of these geometries. Here clarity is the keynote and careful study will reward the reader although he may find himself frustrated by the lack of examples for him to test his knowledge. A book such as this should teach as well as test. However it is more with the title of the book that many will take issue. For example a book on contemporary crystallography cannot dismiss the implications of the dynamic theory in a few scattered sentences and yet claim to act as a background for study of the bonding of atoms in crystals. Indeed an unwillingness to argue the physics of diffraction prevents this book from discussing the contemporary scene in crystallography. The structural crystallographer will no doubt look for more detail on direct methods of structure determination and will be surprised to find little on the accuracy of results. But one must come back to the beauty of the writing on the geometrical aspects and for this alone the book will be found on many shelves.

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