to avoid substantial lengthening and complication of the text, the author provides the reader with a list of supporting references.

Examples of the subjects developed are: crystal growing, molecular interactions, the effect of impurities and defects on crystal properties, molecular motion in crystals, optical properties, electric properties, and chemical reactions in the crystal phase. All these subjects are given a good introduction at about undergraduate level; the book is based on more than ten years of teaching a course to final-year undergraduates. This level is particularly suitable for non-specialists, and provides a relatively simple and rapid method of 'getting into' the field.

Probably just because of this method of approach, crystallographers may find some voids when 'familiar' arguments such as interatomic potentials, molecular motion, *etc.* are dealt with, particularly in view of the most recent developments in these fields. On the whole, however, the book cannot but be recommended to any scientist who is interested in crystallography from a wider point of view than strict crystal structure determination.

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Kristallographie, eine Einführung für Naturwissenschaftler (second edition, in German). BY W. BORCHARDT-OTT. Pp. xi+255. Berlin: Springer-Verlag, 1987. Price DM 34.

'The guiding principle of this book, which places geometrical crystallography in the centre of the stage, remains unchanged.' Thus, happily, begins the preface to the second edition of this useful book, written in a terse yet elegant German style. It is a book designed originally for chemists, and also other science students, deriving mainly from the author's lectures in Münster. What rouses greatest envy in a British chemical crystallographer is the fact that someone, somewhere, actually has the time to cover this fascinating subject so thoroughly for chemical undergraduates!

The book is an introduction to the geometry of crystals, and diffraction of X-rays is only mentioned at the end. It is copiously illustrated with good and useful diagrams, and contains numerous worked examples. Solutions were not provided in the first edition, but Dr Borchardt-Ott has, against his own inclination, kindly provided them this time, because 'I have received numerous letters from students *and lecturers* at other Universities, requesting these solutions.' The book is designed to be used as a workbook, with places to fill in examples, a cutout model of a crystal of galena, and a pull-out Wulff net at the back.

The first chapters are concerned with the basic concept of a lattice and its relationship to morphology. A particularly clear illustration of crystal growth and the maintenance of the constant interfacial angle is included. Only then is the concept of symmetry operations introduced, and the two- and three-dimensional space lattices are derived. Space groups are introduced first by means of the space groups of the lattices themselves, before the formal description of point groups. This logical development is somewhat hindered by the insertion of symmetry diagrams for all of the crystallographic point groups in the earlier chapter on space lattices.

With the coverage of point groups and crystal forms, the often troublesome distinction among 123, (123), {123}, [123] and ⟨123⟩ is made clear. The Schönflies nomenclature is introduced, and molecular examples are given to illustrate point group theory. The choice of these is usually good, but some could have been better. No example is given for point group 222 (a substituted spiran could have been given), or 622 (hexaphenylbenzene comes to mind). Also, too much use is made of particular unstable conformations in the examples. Thus a skew conformation of ethane is given for point group 32 instead of the well known complex $[Co(NH_2CH_2CH_2NH_2)_3]^{3+}$. Non-crystallographic point groups are mentioned, and several good examples for working out molecular symmetry are given. General space-group theory is then developed in both two and three dimensions, and the structure of rutile is used to illustrate $P4_2/mnm$. Unfortunately, the introduction to *International Tables* is to the 1952 edition rather than to the new Volume A.

The final chapters of the book are devoted to an introduction to crystal chemistry and to X-ray (powder) diffraction. Not surprisingly, this section is somewhat more superficial than the rest of the book. The section on crystal chemistry builds up the closest-packed structures well, but ionic structures are less well treated. One is left, for example, with the feeding that it is reasonable to describe sulfur(VI) in SO_4^{2-} as an S^{6+} ion. A standard ball-and-stick diagram of zinc blende, illustrating 4:4 coordination, is juxtaposed with a rather confusing diagram of high-quartz in which the 'sticks' connect the oxygen atoms into tetrahedra, when, in any case, high-cristabolite would have made 4:2 coordination clearer.

These are small criticisms of a valuable book, which can well be recommended to those who have come to work in crystallography without the benefit of Dr Borchardt-Ott's lectures. It is above all the work of a man who can attractively present a subject of whose interest and importance he has no doubts.

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