

with direct methods being covered by J. Karle, isomorphous replacement and anomalous dispersion techniques by G. Bricogne and the novel technique of information theory by Varghese & Wilkins.

*Refinement techniques* are introduced by two chapters on least-squares and related methods by J. S. Rollett and R. Diamond. The rest of the section is devoted to large molecules: N. Isaacs discusses the use of the fast-Fourier transform as applied to least squares and J. L. Sussman shows how stereochemical information can be used in the form of constraints and restraints to facilitate the refinement of macromolecules. Refinement also includes phase extension techniques, which are covered by G. Bricogne, and the section concludes with examples of the refinement of myoglobin and cytochrome c by T. Takano, and 2Zn insulin by Sakabe, Sasaki & Sakabe.

*Accurate electron density analysis* shows how much information can be obtained when the X-ray diffraction experiment is pushed to the limits of its accuracy. N. Kato gives a brief overview of diffraction theory and practice after which some examples are given. The measurement of electrostatic properties is discussed by M. A. Spackman & R. F. Stewart, and F. Marumo looks at the X-ray determination of *d*-electron distributions in transition-metal compounds. The section ends with some words of caution by E. N. Maslen who covers the problems in high-precision electron density studies.

*Computer software and hardware* is possibly the most disappointing section comprising only two papers. One entitled *Adaptive scientific software packages: application flexibility with hardware efficiency* is by S. R. Hall who restricts himself to the XTAL package. The other, by W. Furey Jr, is an introduction to array processors and their programming.

*Computer database techniques* is a short section with I. D. Brown covering the basics of database design and P. Murray-Rust showing how numeric databases can be used for far more complex tasks than simple bibliographic searching.

The final three sections cover *Computer graphics*, *Powder diffraction* and *Electron diffraction and microscopy*. R. Diamond gives a short overview of the hardware and software required for interactive vector graphics, which is followed by a detailed example of a molecular modeling system on an Evans and Sutherland graphics system by Pflugrath, Saper & Quijoco. The measurement and analysis of powder data is covered in some detail by R. Shirley. The last section contains three papers: *Gas electron diffraction* by K. Kuchitsu, *Electron microscopy at the atomic level* by N. Uyeda and finally *Lattice imaging techniques and applications* by S. Iijima.

The book is completed by some 18 brief contributions by participants, covering the gamut from proteins to the use of robots in the X-ray laboratory.

This volume is produced directly from typewritten manuscripts provided by the authors all of which are of good quality, but a number of those by contributors whose native tongue is not English contain typographical errors that would presumably have been corrected at the proof-reading stage had the book been typeset. There is a wealth of information between the covers of this book that should be of use to all involved in the field. But I would caution the prospective buyer that if they already own one or more

of the previous Summer School proceedings they will find much duplication of contents.

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*Acta Cryst.* (1985). **A41**, 622

**The structure and properties of crystal defects.** Edited by V. PAIDAR and L. LEJČEK. Pp. xii + 463. Elsevier, Amsterdam, or (for Eastern Europe) SNTL Publishers, Spalena 51, 113 02 Praha 1, Czechoslovakia, 1984. Price US \$ 113.50, Dfl 295.00.

This book records the proceedings of the symposium of this title, held in Liblice, Czechoslovakia, in June 1983.

The book contains 38 articles altogether, covering the following subjects: the structure and properties of dislocations in metals and alloys with close-packed and b.c.c. lattices, the structure and properties of grain boundaries and the collective behaviour and interaction of defects.

In particular, the book deals with defect structure at the atomic level, and the mechanical properties of crystals with defects. However, point defects and external surfaces, and also the electrical properties of defects and defects of semiconductors, are excluded. Furthermore, the book contains a few articles on important crystal defects and cracks, as well as the equilibrium configuration of dislocations around a crack tip, and a dislocation model of fracture.

The book gives a good survey of the latest ideas and the progress that has been made in theoretical and experimental work on dislocation theory. The level of the book is particularly suitable for postgraduate students and research workers.

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*Acta Cryst.* (1985). **A41**, 622-623

**Dislocations in solids. Vol. 6. Applications and recent advances.** Edited by F. R. N. NABARRO. Pp. 557. Amsterdam: North-Holland, 1983. Price US \$ 104.25, Dfl 245.00.

In contrast to the previous five volumes in this series, this volume consists of some applications of dislocation concepts to practical problems in metallurgy and materials sciences. It contains eight up-to-date reviews in one volume and is thus very convenient for readers who are interested in the behaviour of dislocations.