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Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (R. O. Gould, Department of Chemistry, University of Edinburgh, West Mains Road, Edinburgh EH9 3JJ, Scotland). As far as practicable books will be reviewed in a country different from that of publication.

Acta Cryst. (1987). **A43**, 839-840

Symmetry: unifying human understanding. (Vol. 10 of **Modern applied mathematics and computer science**, Series editor E. Y. RODIN.) Edited by I. HARGITTAI. Pp. xvi + 1045. Oxford: Pergamon Press, 1986. Price US \$115.00.

This is a coffee-table book, not a textbook at all - for it gives no single, coherent, developed account of its subject.

But *what* a coffee-table book! A serious and a massive one. The coffee table itself will have to be strongly made, and many hundreds of cups of coffee will be poured before the contents of this book are fully absorbed, such is the size and such the volume, detail and variety of the contents of this production.

It is a collection of 65 mostly quite disparate essays, each on some symmetry-related topic, contributed by a galaxy of distinguished authors from 18 different countries. Each of these essays is a small gem in its own right; they average about 16 pages in length (about 10 000 words, since the print is small); they are in excellent English and are usually

complete with a business-like list of references. There are very many fascinating illustrations all through the book, some ten or so in colour. It is a book that is hard to put down once one has lifted it up. Only in one case (Zvilna, on trihedrons) are there some infelicities.

The sheer range of subject areas is striking. Predictably, quite a number of the essays are on symmetry in the graphic arts (about nine); but there are also articles on symmetry in ornaments, dance, music, mathematics, fractals, even literature, as well as biology, physics and chemistry. Symmetry in various aspects of chemistry scores ten essays (of course, the editor is a chemist himself) which include symmetry considerations in reactions, bonding, isomerism and the Periodic Table. Readers of *Acta Cryst.* will want to know how crystallography fares in this compilation. Indeed, some six or seven essays are explicitly related to crystallography. Of these, the one I find most interesting and readable (although the English here is occasionally less than perfect) is Vainshtein's, on biological molecules; Senechal's essay is also both interesting and thoughtful, ending by posing the unsolved problem of the origin of twinned crystals, after a fine survey of crystal morphology;

and Alan Mackay's wide-ranging analysis of 'Generalised crystallography' is, to me, stimulating to the point of provocation. There are also essays on imperfect solids, non-space-group symmetry, and two-dimensional systems; Mamedov's essay, for example, on periodic decorative patterns, is a pleasure to browse over. Curiously, there is no presentation of diatoms, no essay on snowflakes, none on flowers, none specifically on poetry, architecture, clothing, or ceremonial or liturgical symmetries. However, even with these omissions, the range is very remarkable.

What is disappointing about this book is its flagrant failure to match up to its subtitle. Symmetry of one sort or another does indeed feature in every one of these essays but the essays do not succeed in 'unifying human understanding' merely by being published together. Interest erupts everywhere but unity or coherence are missing completely. The book is divided into Parts 1 and 2, at about page 500, but there is no trace of an indication as to why. Essays on related subject matter are strewn randomly amongst unrelated ones. Unification appears almost to have been studiously avoided. Thus, although the editor writes a Preface, as well as the first of the essays, he attempts no umbrella introduction to what follows. There is no summary at the close. There are no cross-references: no essay makes any reference to, let alone any analysis of, any of the others (even when two essays having an identical title, 'Moirés', are in juxtaposition). There is not even any index at the end. Incredibly - but perhaps appropriately - the topic of the final essay is chaos.

Regrettably, these authors do not 'talk to each other', as claimed in the Foreword of the book, but simply talk, seriously but independently, each on their own topic, to the reader. The result is a book replete with information and stimulus, even delight, but achieving little furtherance of understanding. However, crystallographers should certainly look into this book, and will find that they learn from it, if ever they find it on a coffee-table within reach. Symmetry is a fascinating topic.

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Dynamics of molecular crystals. Edited by J. LASCOMBE. Pp. xxvii + 727. Amsterdam: Elsevier, 1987. Price US \$169.00, Dfl 380.00. Available in USA/Canada from Elsevier Science Publishers, PO Box 1663, Grand Central Station, New York, NY 10163, USA.

This stout volume contains the proceedings of the 41st international meeting of the Société Française de Chimie, Division de Chimie Physique, at Grenoble in July 1986. It comprises some 95 papers by some 200 authors, covering intermolecular forces, relaxation phenomena, phase transitions, properties of materials, glasses, surfaces, phonons, and the diffusion or rocking motions of molecules in crystal-line solids.

Although the book is prepared by offset lithography from typescripts of various styles, the production is good, and the diagrams are always clear. While crystallographers rightly give first consideration to the atomic positions that create crystal structures, it is useful to be reminded of the many sorts of disturbances that can perturb these positions in real crystals. There is a mass of information in these collected papers; it is just a pity that conference proceedings are, of necessity, so incoherent.

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Defect crystal chemistry and its applications. By R. J. D. TILLEY. Pp. viii + 236. Glasgow and London: Blackie; USA: Chapman & Hall, 1987. Price £35.00.

This is an excellently written introduction to the problem of the real structure of stoichiometric and non-stoichiometric compounds, mainly of oxide crystals. The various types of structural defect are presented, as well as the various theories - largely thermodynamic in nature - which permit quantitative characterization of the defect chemistry. Serious attention is paid to the practical applications of defect chemistry, including the photographic process, photochromic glasses and fluorites, galvanic cells and sensors, free energy and oxygen meters.

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Books 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.

An adventure in multi-dimensional space: the art and geometry of polygons, polyhedra and polytypes. By J. MIYAZAKI. Pp. vii + 112. Chichester: Wiley, 1986. Price £48.00. This is a translation from the original Japanese, of 1983, and is a miscellany of puzzling, entertaining and intriguing explorations of shapes and colours, spaces and dimensions, golden means and so on, with scores of eye-catching colour pictures of patterns and models. It is not addressed to crystallographers.

Tunable solid-state lasers II. Edited by A. B. BUDGOR, L. ESTEROWITZ and L. G. DE SHAZER. Pp. xi + 368. Berlin: Springer Verlag, 1986. Price DM 80.00. A review of this book, by J. Kvapil, has been published in the October 1987 issue of *J. Appl. Cryst.* page 449.