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Crystallography in North America. Edited by DAN McLACHLAN JR and JENNY P. GLUSKER. Pp. xii + 479. New York: American Crystallographic Association, 1983. Price US\$50.00.

This book has been gestating since 1976, inspired by the upsurge in the interest in history generated by the bicentennial celebrations in the US. Finally, after much discussion, in mid-1979 Dan McLachlan agreed to edit a history book for American crystallographers, the book to be divided into two parts: historical discourses by 'expert authors', and reports by past-presidents of the ACA on the important events occurring during their terms of office. With the aid of an editorial committee and somewhat later the addition of Jenny Glusker as joint editor, the task was almost accomplished at the time of Dan McLachlan's death on 3 December 1982; the book begins sombrely with two memorials to him, by Jenny Glusker and his son Dan H. McLachlan. With a foreword by Linus Pauling and nearly one hundred individual contributions it is a difficult book to review. In particular, if a contribution is not mentioned it does not indicate that it is of inferior quality, but that the reviewer's interests lie elsewhere – and that space in *Acta* is not unlimited. A notable feature is the glossy section of photographs, compiled by S. C. Abrahams, of the great and the not-so-great in poses both formal and informal.

The outcome is not the neat dichotomy planned. Instead, there are seven parts. The first is simple: a straightforward *Overview of crystallography in North America* by Clifford Frondel, beginning with the purchase of a contact goniometer by Harvard University in 1797 and ending with the gradual supersession of classical crystallography by X-ray crystallography in the twenties and thirties. The second part contains twenty-odd *Accounts of some crystallographic laboratories*, each interesting in itself, but lacking any connecting thread. The longest are those from industry; powder diffractionists may agree with this space allocation, but do structural crystallographers? (The lack of connectivity, here and in other parts, can be remedied by the reader; there are extensive indexes, amounting to sixty-three pages.) Dead, but not living, past-presidents come into their own in the third part, with nine appreciations.

The fourth part, *Organizations of crystallographers*, is in many ways the most interesting. The tortuous deliberations that led from the National Research Council Committee on X-ray and Electron Diffraction, the American Society for X-ray and Electron Diffraction, and the Crystallographic Society of America to the American Crystallographic Association (official birthday 1 January 1950) are described in some detail; UK crystallographers, recently exposed to the formation of the British Crystallographic Association, will read of them with a wry but sympathetic smile. The birth of the International Union of Crystallography is also described. This came into existence at the First International Congress of Crystallography (held in Cambridge, Massachusetts) in August 1948, but was conceived in London two years earlier, at the time of the first post-war international meeting of crystallographers, organized by the X-ray Analysis Group of The Institute of Physics. The account of this meeting is one of several contributions by Dan McLachlan. Five living ACA presidents have their accounts in this part. As I am reviewing a collection of

recollections, perhaps I may add two of my own. German crystallographers were represented, and von Laue was fêted. There was a strong undercurrent of resentment at their presence, particularly from participants from countries that had suffered from occupation, and at the dinner at which von Laue spoke I found myself surrounded by murmurs of disapproval – I trust inaudible at the VIP table. However, they were there, and crystallographers can take some credit for beginning the process of reconciliation within months of the cessation of hostilities; Germans and their allies were excluded from international scientific meetings for a decade or more after 1918. The other memory is frivolous: I was greatly impressed by Dan's festoon of equipment that enabled him to photograph the proceedings at the Royal Institution under normal lighting conditions.

The fifth part is *Apparatus and methods*, and again the longest contributions deal with powder techniques, though direct methods of structure determination and electron microscopy are not overlooked. The sixth part, *Internal properties of matter*, is a miscellany. I looked forward with particular interest to *Some statistical aspects of crystal symmetry* (S. B. Hendricks), thinking that I should be introduced to a branch of crystallographic statistics not treated in recent microsymbiosia, but was temporarily disappointed to find that the topic was in fact the various types of disorder within crystals. The final part, *Applications to various sciences*, contains twenty-two papers, on subjects ranging from glass through the usual classes of compounds to biological materials like teeth, calculi and virus.

Those who ordered the book at the pre-publication price of \$25.00 may congratulate themselves. The production is good (with a little reservation about the muddy appearance of some of the figures and photographs), but not up to the standard of Ewald's *Fifty years of X-ray diffraction*. Misprints are few ('Bijvoit' is regrettable). In spite of the size and length of the book, one feels vaguely dissatisfied with many of the papers. With relatively few exceptions, the contributors have not been allowed, or have not allowed themselves, sufficient space to do justice to their topics.

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Materials science of the earth's interior. Edited by ICHIRO SUNAGAWA. Pp. xv + 653. Tokyo: Terra Scientific Publishing Co.; Dordrecht: D. Reidel Publishing Co., 1983. Price Dfl 340.00, US \$120.00.

This collection of 33 research articles ensued from a cooperative research project of the Ministry of Education, Japan, 1978–1980. It is the first of a new series on *Materials Science of Minerals and Rocks*, and is based on a special issue in Japanese of the *Journal of the Japanese Association of Mineralogists, Petrologists and Economic Geologists*. Topics of particular interest to crystallographers are: *silicates and glasses* (computer simulation; radial distribution functions for molten $\text{CaAl}_2\text{Si}_2\text{O}_8$ and $\text{NaAlSi}_3\text{O}_8$; Raman spectra);

crystal growth (general summary of growth processes, morphology and growth spirals; synthesis of large crystals of silicates and titanates; synthesis of Ni_2SiO_4 spinel and black phosphorus up to 4 GPa; defects in natural and synthetic olivines); *electron theory of transition-metal compounds at high pressure*; *crystallography at high temperature* (olivines, spinels) and *high pressure* (coesite, stishovite, KCl, PbO_2); *electron microscopy of microtextures in minerals* (pyroxene, plagioclase feldspar, kelyphitic breakdown rims around garnet); *properties of olivine* (oxygen self-diffusion and creep); *properties of diamond* (morphology; surface topography; nucleation of single crystals); *shock-induced phase transitions* (feldspar, olivine, ilmenite); *techniques* (multi-anvil presses above 10 GPa; compression guns; high-temperature X-ray diffractometry up to 2800 K, and application to cristobalite). This book, based largely on material published in scientific journals and books, demonstrates the increasing drive and variety of the research programs in crystallography (*sensu lato*) in Japan. The substantial price will essentially establish which libraries will buy the book. In general, the book is nicely printed. Some articles are in excellent English, but others were not fully translated from Japanese.

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Structural inorganic chemistry. By A. F. WELLS. Pp. xxxi + 1382. Oxford: Clarendon Press, 1984. Price £75.00.

The fifth edition of this well known book by A. F. Wells will be welcomed by all those teaching inorganic chemistry.

In fact, it is unquestioned that an adequate understanding of molecular and crystal structures is fundamental in chemistry, and particularly in inorganic chemistry. On the other hand, it is from the study of the solid state that we acquire those basic geometrical and topological concepts that allow us to understand and describe in a simple way the structures of compounds, even of those with quite complicated chemical formulae. Therefore, from a didactic point of view, it is very convenient, for students as well as for teachers, to find in the same volume, besides a systematic description of the structural chemistry of elements and their compounds, a clear exposition of general topics concerning the structures of solids.

The goal of this text is to offer a reasonable balance of material between introductory concepts and detailed structural information.

The book is divided into two parts. Part I (Chapters 1-7, 325 pp.) deals with some basic aspects of solid-state structures, such as lattices, symmetry, coordination polyhedra, plane and three-dimensional nets with related structures, sphere packings and close-packed structures. Chapter 5 shows examples of the description of structures as assemblies of tetrahedral and octahedral coordination polyhedra. Chapter 6 gives a thorough discussion of simple AX_n structures. All the crystallographic concepts are described in

terms directly intelligible by chemists, which constitutes another merit of this book. Each chapter contains tables with many examples of structures based on the particular type of net or polyhedron under discussion. The last chapter gives a brief description of the structural aspects of bonds in molecules and crystals.

Part II (Chapters 8-29, 983 pp.), the major one, provides a survey of structural data for elements, arranged according to the groups of the Periodic Table.

The detailed description of the structural chemistry of elements, from hydrogen to actinides, makes this second half of the book uniquely useful, not only to teachers or students but also to research workers. In fact, numerous citations of relevant literature, generally referring to the latest work, are given in an abbreviated form and may constitute a good starting point for further information.

The last chapter deals with the structure of metals and alloys.

Relevant structural data, such as bond lengths and angles, coordination geometry, *etc.*, are collected in tables, useful for reference work. There are a formula index and a subject index that, together with the detailed list of contents, allow a ready location of each topic or compound.

As appropriate in a book of this sort there are a great many figures, sketches and diagrams, always presented in a pleasant and clear form.

For the clear and concise exposition of such a wide variety of material this is a book to be highly recommended. The only defect is its daunting price.

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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.

Densities of aqueous solutions of inorganic substances. By O. SÖHNEL and P. NOVOTNÝ. Pp. 335. New York, Amsterdam: Elsevier, 1985. Price Dfl 175.00, US \$67.25.

Современная кристаллография. (Contemporary crystallography.) Vol. 4. Physical properties of crystals. (In Russian.) By L. A. SCHUVALOV, A. A. URUSOVSKAJA, I. S. ZEŁUDJEV, A. V. ZALESKIJ, S. A. SEMILJETOV, B. N. GRECZUSZNIKOV, I. G. CZISTI AKOV and C. A. PIKIN. Pp. 484. Moscow: Nauka, 1981. Price 4r 80k. A review of this book, by J. Auleytner, has been published in the January 1985 issue of *Acta Crystallographica*, Section A, pages 111-112.

Structure of crystalline polymers. Edited by I. H. HALL. Pp. 313. London: Elsevier Applied Science Publishers, 1984. Price £35.00. A review of this book, by Eric Siu-Wai Kong, has been published in the February 1985 issue of *Journal of Applied Crystallography*, pages 53-54.