

From the response which the lectures, the poster sessions and the exhibitions on the European Synchrotron Radiation Facilities received, it can be concluded that this symposium was most useful to all attendants.

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Teaching Crystallography for Today's Sciences, Summer School, Erice, Sicily, Italy, 6–16 September 1977

The first Summer School on the Teaching of Crystallography was held in Erice (Sicily, Italy) in September 1977. It was organized by the IUCr Commission on Crystallographic Teaching and sponsored by IUCr, Unesco and various official and private organizations. It was attended by 90 participants of 36 different nationalities, a number of them from developing countries. The aim of the School was not to teach sophisticated methods to professional crystallographers, but to give simple and precise ideas on how to teach basic crystallography to non-crystallographers, and on how to convey to them the great power of crystallography, keeping in mind the need to teach crystallography at many levels through school and university and to students of many different sciences.

The School did not attempt to be comprehensive. The main topics covered were: point group symmetry, space group symmetry, experimental techniques of X-ray diffraction, bases of the dynamical theory, structural types, principles of structure determination and real crystals. For each topic the main difficulties encountered in teaching were developed in full lectures followed by tutorial classes and discussions. Various teaching aids were presented and discussed in special sessions: films, programmed texts, optical analogues and models. Laboratory experiments were also discussed and participants were encouraged to present posters and exhibits on teaching material.

Finally, applications of crystallography to metallurgy, earth sciences, industry and engineering, chemistry and biology were presented. Informal discussions took place on many subjects, such as comparisons of curriculae in various countries. These discussions and contacts between participants from different countries and different specialities were found by all present to be extremely profitable.

The School was the occasion for testing the first pamphlets prepared for the IUCr Commission on Crystallographic Teaching. They are short texts by different authors, on different topics pertaining to the teaching of crystallography at various levels and are the early steps of a major project by the Commission. Information concerning this project can be obtained from Professor C. A. Taylor, University College, PO Box 78, Cardiff CF1 1XL, England and from Professor A. Authier at the address below.

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Crystallographers

This section is intended to be a series of short paragraphs dealing with the activities of crystallographers, such as their changes of position, promotions, assumption of significant new duties, honours, etc. Items for inclusion, subject to the approval of the Editorial Board, should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England).

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Professor **W. Cochran**, Professor of Natural Philosophy at the University of Edinburgh, has been awarded the Hughes Medal of the Royal Society for his work on electron density distributions and lattice dynamics.

International Union of Crystallography

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Union Office, Change of Address

The Union Office, incorporating the Union secretariat and the technical editing office, has now moved to 5 Abbey Square,

Chester CH1 2HU, England. All correspondence for the Executive Secretary and the Technical Editor should be sent to this address. The telephone number (Chester 42878), the cable address (Unicrystal) and the telex address (667325 COMCAB G, attention Unicrystal) remain unchanged.

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Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.

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Кристаллография. *By M. P. Ша-
скольская (Crystallography. By
M. P. Shaskol'skaya).* Pp. 391.
Vysshaya Shkola Publishing
House, Moscow, 1976. Price
1 r. 52 k.

The book under review is a textbook of engineering crystallography and crystal physics appropriate, in the first place, for students of university-level technical schools; but it will be very useful too for university students specializing in crystallography. The book comprises the elements of classical crystallography and selected topics of crystal physics and technical crystallography. It also gives engineering methods of calculation of crystal properties and it points to their applications in modern technology.

As is well known, in the last thirty years great changes have occurred in crystallography. New branches of this science have come into existence and developed. We see the formation of a new line of crystallography: studies of biological subjects; and we are eye-witnesses of the development of new techniques based on the use of specific properties of crystals. Therefore the increase in demand for specialists efficient in mathematical crystallography and crystal physics is a matter of course. This is a textbook de-

signed for the education of such specialists. The author mentions that the preparation of this textbook is based on her experience in lecturing at the Department of Crystallography at the Moscow Institute for Steel and Alloys, which is a Technical University for the education of specialists in the field of semiconductor and dielectric materials and the methods of their investigation.

The author pays special attention to the technical application of crystals using the experience of industrial plants and research laboratories working in this field. She presents many examples taken from industrial practice and gives engineering methods of the calculation of crystal properties with special regard to the basic needs of technical crystallography. X-ray structural analysis and some parts of crystal chemistry are not included in the book because, according to the teaching pattern assumed, these subjects would be in the course of general and physical chemistry.

The book has six chapters. The first is devoted entirely to the symmetry of the external forms of crystals. In a concise and perspicuous manner the author presents the elements of classical crystallography. The topics of this chapter are anisotropy and external symmetry of crystal forms as well as physical properties and structure. Full interpretations of the fundamental crystallographic laws, the principles of projection (spherical, stereographic and gnomonic) and the symmetry elements of crystal polyhedra are given. The crystallographic systems and classes, symbols for symmetry elements, classes, axes and planes are described in a clear way. At the end of the chapter the author shows different physical forms of crystals and gives reasons for their formation. After the presentation of a topic, exercises are given; they are solved and provided with comments.

In chapter II the symmetry of crystal structure is discussed: Bravais lattices, symmetry elements of crystal structures, space groups, symbols and the basic facts of the experimental determination of crystal structures.

In chapter III the author presents some basic problems of crystal chemistry with special emphasis on changes in crystal structures as a function of their physico-chemical properties. This chapter contains extensive material concerning atomic and ionic radii, coordination numbers and schemes, methods of determination of stoichiometric formulae of substances, polarization of ions, types of bonds, stability of structures, close packing of atoms and molecules, construction of

structures by means of coordination polyhedra, basic types of structures, polytypism, isomorphism and polymorphism.

In chapter IV a comprehensive description of the physical properties of crystals is given. On this basis, the author considers the symmetry principle in crystal physics and presents symmetry operation by means of matrices. She describes tensor physical properties in crystal-physical coordinate systems. Then she discusses antisymmetry and scalar and vector physical properties such as piezoelectric, dielectric and magnetic properties, thermal expansion, stresses and deformations in crystals, elasticity, birefringence, polarization of light and crystal-optical effects. A substantial part of this chapter is devoted to the optical properties of crystals and their investigation in polarized light. A lot of attention is paid to the application of optical properties. At the end of the chapter the correlation between physical properties and different phenomena occurring in crystals is discussed.

A careful description of mechanical properties and plastic deformations of crystals is given in chapter V. This chapter deals with such topics as cohesion, hardness, and changes in crystal structures. A rough classification of structural defects is presented (point defects or dislocations, supplemented by a table of Burgers vectors for dislocations in some structures). Also discussed are: energy and migration of dislocations, dislocation reactions, dislocations in some real structures, stress field of dislocations, interaction between dislocations themselves and with point defects, and methods of investigation of dislocations. This chapter is particularly well supplied with tables, figures and photographs.

In the last chapter the author presents the problem of crystal growth, which is of fundamental importance to crystallographers. She discusses conditions and possibilities for crystal growth from vapours, solutions and alloys as well as the conditions for and the possibilities of recrystallization from different crystal phases. Moreover, this chapter gives the basic facts of crystal growth, equivalent and real forms of crystal growth, macroscopic defects, normal and twin growth of crystals, epitaxy and, at the end, a summary of methods of crystal growth from vapours, solutions and alloys.

As a whole, this book is written in an intelligible, clear and logical way and is well provided with tables illustrating changes in physical properties, graphs and colour photographs. The author possesses a special gift for acquainting the reader with the world of modern crystallography