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Obituary

Allan Línek
1925–1984

Allan Línek passed away on 30 September 1984, after a long, painful and hopeless illness. His death will be felt as a permanent loss by Czechoslovak crystallographers because of the major role he played in the development of X-ray crystallography in his country.

Son of a physician, Allan Línek was born in Kolín on 22 December 1925. He studied at the Faculty of Mathematics and Physics of the Charles University in Prague in the years 1945–1949. After PhD graduation he began to work in the Physical Research Department of the Czechoslovak concern for machine industry. Later, after the foundation of the Czechoslovak Academy of Sciences in 1952, this department became one of its institutes, which after a series of reorganizations is at present the Institute of Physics.

The beginnings of the scientific career of Allan Línek coincide with the time at which, after the World War II, the trends of development of the research in physics in Czechoslovakia were formed. He took part in these efforts. Encouraged by the director of the institute, Academician J. M. Bačkovský, to specialize in X-ray single-crystal structure analysis, he began to work in this field as a genuine pioneer, who had no predecessors nor teachers in his own country. Depending only on his personal talent and assiduity, he learnt from books the theoretical and experimental knowledge necessary to solve the structure of ethylenediamine tartrate, a compound without a heavy atom. Its model was exhibited in the Palace of Science at the World Fair in Brussells in 1958.

From his first steps in crystallography Allan Línek realized the significant role of the automation of computing in X-ray work (he actually made his first calculation by means of a calculating frame and strips). Subsequently, he initiated and took part in the construction of some special relay machines, among them a machine for computing the trigonometric part of structure factors and a machine for the summation of Fourier series, including a printer. This equipment made possible in the mid-1950's the solution of medium-size structures, and the interest of Allan Línek at that time was directed towards structural studies of terpenes. It also was the period when he assisted in the education of several young scientists who began to work in X-ray crystallography (they are now well known crystallographers) and to whom he offered the use of all the facilities of his laboratory. By doing so, he influenced the formation of crystallographic groups in other institutes and universities in Czechoslovakia.

In the early 1960's one of the first electronic digital general-purpose computers in the Czechoslovak Academy was installed in Línek's laboratory and he and his coworkers developed programs for the determination and refinement of structures.

During the last fifteen years Allan Línek concentrated his interest, with great success, on the studies of heteroboranes.

From the late 1950's Allan Línek was very active in many national and international scientific organizations. He organized regular meetings of the Czechoslovak crystallographic community, and from 1959 served as the secretary of the National Committee for Crystallography. He was involved in the IUCr for many years; he was member of the Commission on Crystallographic Computing 1963–1966, member of the Executive Committee 1966–1972, Chairman of the Sub-Committee on the Union Calendar 1969–1972, the Union's representative on the Conference Committee of the EPS from 1970 and the Union's representative on the IUPAP Commission on the Structure and Dynamics of Condensed Matter from 1978.

For his scientific achievements, his extensive activity, as well as for his personal qualities – friendliness, helpfulness and dry humour – his memory will always be kept in high esteem by his friends, his coworkers and all who knew him.

JÁN GARAJ

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.

Acta Cryst. (1985). A41, 207–208

Physics of amorphous materials. By S. R. ELLIOTT. Pp. x+386. London: Longman, 1984. Price £25.00.

Though glassy materials have been manufactured for thousands of years, many new materials recently produced in amorphous form having considerable technological promise have produced an explosion of interest in these materials in the last ten years and many properties peculiar to the amorphous phase are now well understood. Nevertheless, the scientific study of non-crystalline materials is one of the newest branches of solid-state physics and Dr Elliott's book is one of the first works entirely devoted to the expanding field of the amorphous state. In this book, S. R. Elliott provides an introduction to the science of amorphous materials with two aims: to introduce students of different disciplines to this new science and to provide a reference source for researchers interested in the field of the amorphous state.

One may note that his objective is fulfilled perfectly. This book is a good pedagogical approach to the subject with a lucid style, definitions of the usual terms used in this new domain, subject index, glossaries of symbols and abbreviations, copious instructive figures and a collection of exercises at the end of each chapter. But, it is an easy introduc-

tion for the newcomer only if the reader already has some background in crystalline solid-state physics. The good survey of the present knowledge of many aspects of properties of amorphous materials, with a detailed list of references to the original literature and the inclusion of several tables of physical parameters, make this book very useful for all those professionally involved in the amorphous domain.

The contents of the book are divided into seven chapters, which deal in turn, and in excellent detail, with: the preparation of amorphous materials; thermodynamic, kinetic and other factors (including glass transition phenomena) that influence ease of glass formation; the structure of amorphous materials, including methods for finding structure (diffraction of X-rays, electrons, neutrons) and the techniques (such as NMR and spectroscopy) that supply indirect information; the dynamic behaviour of atoms in the glassy state, including such details as the thermal anomalies that can appear at low temperature; electronic excitations, manifested as transport, or optical properties in amorphous semiconductors, including discussion of those particular glasses having ionic properties that offer the promise of technological applications such as superionic conduction; defects and defect control of the properties of amorphous materials; and, finally, a chapter on amorphous metal (metallic glasses).

It is remarkable how much theory, practical application and detailed example have been incorporated in 380 pages of this excellent work. The author has given the reader a good idea of the vitality of this rapidly expanding branch of solid-state science.

I enjoyed the book. It is carefully produced, fully illustrated with clear diagrams and well arranged tables. With its extensive bibliography, which is substantially complete through to the end of 1982, this book provides very up to date information in fundamental and experimental amorphous materials physics.

In conclusion, it can be said that this book must be strongly recommended as a sound practical guide for the novice in amorphous-material study and as a handy compendium of new theoretical concepts and practical hints for all those already concerned and familiar with the amorphous state.

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Theory of structural transformations in solids. By A. G. KHACHATURYAN. Pp. xiv + 574. Chichester: Wiley, 1983. Price £53.25.

Writing a book on all important aspects of structural transformations in solids, based on unifying mathematical concepts, is a formidable task, even if the view is 'restricted' to metallic systems. The author presents a quantitative treatment of problems related to the formation of the morphology (microstructure) of metals and alloys, summarizing and extending primarily his own and his associates' work (much of which was published previously in Russian), which skilfully combines theoretical methods of elasticity, matrix algebra, Fourier transforms, thermodynamics and the concentration wave approach to ordering and decomposition in order to arrive at meaningful conclusions about the transformation product in diffusion-controlled and diffusionless (martensitic) transformations.

After five introductory chapters on the basic ideas, the six following chapters concentrate on the role of elastic strains in heterogeneous materials. The calculation of strain energy for arbitrary distributions of coherent inclusions allows one to anticipate and rationalize the formation of certain types of precipitate, habitus planes and spatial arrangements. Unfortunately, the experimental literature referred to for comparison is rich, but not very recent (*e.g.* Ni alloys 1969 or earlier, Al-Cu 1963!). A whole chapter is devoted to the results of computer simulations where the continuum approach to strain energy is worked out in detail for several cases. The final two chapters deal with the microscopic elastic theory of defects, *i.e.* discrete atomic displacements around point defects and their mutual interaction. In these chapters, very detailed information can be found, for example, on the interaction of interstitial solutes in b.c.c. metals, and the aspects of ordering and spinodal decomposition in Fe-C martensites are extensively covered from a microscopic point of view.

This book is not for beginners. It will be most attractive to those who are experienced and interested in a mathematical description of crystallographic and strain-energy features of phase transformations. Though the book is intended to be self-contained, the reader should have a good knowledge of concepts in physics (terms like Ising model, mean-field approximation, percolation theory, *etc.* are never properly explained) and a working knowledge of the mathematical tools in order to appreciate the full significance of the work and the lucid cross references to other fields of solid-state physics.

In view of the immense number of equations, the number of printing errors seems very small. The index contains some misleading entries. At least in the reviewer's copy, the reproduction of most of the transmission electron micrographs does not meet current standards.

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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.

Elastic wave propagation in transversely isotropic media. By R. G. PAYTON. Pp xii + 192. Martinus Nijhoff Publishers BV, 1983. Price Dfl 110, US $42.50.

Electronic properties of doped semiconductors. By B. I. SHKLOVSKII and A. L. EFROS. Pp xii + 388. Springer-Verlag, 1984. Price DM 128.00, US $50.20.