microscopy), A. V. Crewe (high-intensity electron guns and scanning microscopy), U. Valdré and M. J. Goringe (special stages) and K.-H. Hermann *et al.* (image recording). Septier's contribution is particularly clear and informative, containing a number of worked examples, and that of A. V. Crewe is timely in view of the great interest in field-emission electron guns.

The middle section of the book is introduced by accounts of the interaction of the beam with crystalline material by A. Howie and R. Gevers. This is followed by contributions from L. M. Brown (metallurgical information) and M. J. Makin (radiation damage studies) which demonstrate their fields of application. M. J. Goringe discusses computing methods. The final contribution to this section by Goringe and C. R. Hall contains 22 problems which range over the preceding material and enhance the value of the whole section.

In the final part of the book are lectures by F. A. Lenz (transfer of image information), F. Thorn (phase contrast) A. C. van Doorsten (amorphous and macromolecular objects), C. R. Hall (small clusters), R. H. Wade (Lorentz microscopy) and D. Wohlleben (magnetic phase contrast).

Thus the book presents a comprehensive survey of the power of the electron microscope as a tool in Materials Science. The Organizers of the School and the lecturers are to be congratulated on presenting the material in a way that will stimulate use of the power rather than reverence of it. The book is handsomely produced and strongly bound, which is well, for it will surely get the use it deserves.

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Book Received

The following book has 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.

Handbook of Geochemistry. Vol. II/3. Editorial board: C. W. CORRENS, D. M. SHAW, K. K. TUREKIAN, J. ZEMANN. Executive editor: K. H. WEDEPOHL. New York: Pp. 600 approx. Springer-Verlag, 1972. Price (Looseleaf binder) DM 258, U.S. $ 81.80 (Subscription, price DM 206,40, U.S. $65.50).

This work is in loose-leaf form and is issued in instalments. Each section of Volume II deals with either a single element, or sometimes a group of related elements. The sections are written by different authors and are issued as they are received by the publishers so that they must be rearranged in correct sequence by the reader. For each element there is a chemical and physical description, an account of the natural occurrence in minerals and a reference section.

Meeting Report

Conference on Phase Analysis: Identification and Quantitative Determination. Hull, 5-7 April 1972.

The Crystallography Group of the Institute of Physics devoted its 1972 Spring Conference to Phase Analysis: Identification and Quantitative Determination. The meeting, held in the Physics Department of the University of Hull from 5–7 April, covered in four sessions the following topics: phase identification and characterization, quantitative determination and data processing, instrumentation and indexing. There were 125 participants – several from abroad – drawn from industry, research laboratories and Universities.

The first session opened with an invited paper by Professor H. P. Rooksby (University of Leeds) and Dr E. A. Kellett (The General Electric Company Limited). Professor Rooksby described the unique role played by X-ray diffraction as part of an analytical partnership. The importance of the photographic method, in particular the Debye–Scherrer technique, was stressed, since in an industrial environment many specimens are not amenable to powder diffractometry. The non-destructive aspect of the Debye–Scherrer method was emphasized together with the possibilities of examination *in situ* and the importance of the additional information which may be recorded on a film.

The power of the X-ray technique when used in conjunction with other analytical methods such as microprobe analysis, emission spectroscopy, infrared absorption and even Curie-temperature measurements was illustrated by a variety of applications ranging from the non-destructive identification of small inclusions to more complex problems involving thin-film composition and semiconducting devices. It was shown that although X-ray powder methods can identify the presence of various phases, other techniques such as X-ray spectrochemical or microprobe analysis are required to obtain the atomic composition of each phase. The importance of oorrect characterization was stressed by Dr G. F. Claringbull (British Museum) in his introductory address and illustrated by Dr J. H. C. Hogg and Dr H. H. Sutherland (University of Hull) in their paper on the indium–sulphur/selenium/tellurium systems, in which they showed by X-ray single-crystal studies that four reported phases previously identified by X-ray powder methods had been assigned incorrect formulae.

An investigation of the cadmium–copper–zinc ternary system, undertaken by Mr R. D. Nicholson, Dr P. H. Spriggs and Mr K. A. Stubbs (University of Manchester) showed that the previously reported Laves phase quoted for the equi-atomic alloy Cu–Cd–Zn was an f.c.c. phase obtained during investigation of the pseudo-binary system γ-CuCd and γ-CuZn. The attempted preparation of the equi-atomic alloy resulted in two cubic phases one of which was related to δ-$CuZn_3$ by the ordered substitution of cadmium.

At a time when the uncertainty in lattice parameters is one part in 10^5 or 10^6, Mr L. Zwell (Joint Committee on Powder Diffraction Studies, Swarthmore) pointed out that often the chemical characterization and homogeneity of the materials are not known to one part in 10^4. Inaccurate data, from poorly prepared or inadequately characterized specimens, inevitably cause failure in efforts to relate various properties of materials to either the presence and quantitative distribution of phases, or the electronic structure and relative sizes of the atoms in solid solutions. He described the change in the lattice parameter of α-iron by the addition of titanium and manganese, showing how this is related to density. This work was further coordinated with Curie temperature measurements and results from shear-stress experiments. Mr Zwell made the plea for more accurate density determinations as an aid to specimen characterization – a point which was frequently made by other speakers including Dr Shirley and Professor Lipson.