

Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the General Secretary of the International Union of Crystallography (D. W. Smits, Mathematisch Instituut, University of Groningen, Reitsdiepskade 4, Groningen, The Netherlands).

Crystallographic Book List

The Commission on Crystallographic Teaching of the International Union of Crystallography has prepared a crystallographic book list for circulation to members and correspondents of the Commission. Anyone else wishing for a copy should write to Dr H. D. Megaw, Cavendish Laboratory, Cambridge, England, *enclosing a self-addressed gummed label* and either international postage reply coupons or british stamps to cover postage, as follow:

Second-class sea mail, 1 coupon or 6*d*; first-class sea-

mail, 4 coupons or 2/-; second-class air mail (elsewhere than Europe), 11 coupons or 5/6*d*.

The book list contains about 700 titles, arranged alphabetically under order of authors.

IBM 1620 Crystallographic Users' Group

During the Munich conference in July it was decided to form a group for the exchange of IBM 1620 programs and other information. Interested persons are asked to write to G. S. D. King, Union Carbide European Research Associates, 95, rue Gatti de Gamond, Brussels 18, Belgium.

Book Reviews

Works intended for notice in this column should be sent direct to the Editor (A. J. C. Wilson, Department of Physics, University College, Cathays Park, Cardiff, Great Britain). As far as practicable books will be reviewed in a country different from that of publication.

Proceedings of the European Regional Conference on Electron Microscopy Delft 1960; 1961. 2 Vols. xxviii + 1075 pp. Delft: Nederlandse Vereniging voor Electronenmicroscopie. Price *fl.*135.

These volumes may be as interesting for the mode of their production as for their contents. To reduce the delay in publishing, and also to promote discussion at the meeting, a new procedure was tried out. Nearly two-thirds of the papers offered were allotted to 'symposium sessions', in preparation for which they were pre-printed and distributed to participants in advance of the meeting. A rapporteur had the task of summarizing the substance of eight or ten papers at the appropriate session, each author was allowed a few minutes to amplify particular points, and the rest of the time was devoted to general discussion. Although other meetings, such as those of the Faraday Society and the Institute of Metals, have long been conducted on these lines, this was the first experiment for electron microscopists. The results were more or less successful, depending on the extent to which a group of papers were in fact related in subject matter and on the amount of homework done by the rapporteur. The organizing committee of the next international meeting, at Philadelphia in August 1962, are going a stage further and arranging to have all the papers pre-printed in the form of extended abstracts, each author being limited to two pages.

For the Delft Proceedings, the pre-prints served as page proofs, to which were added the texts of the remaining one-third of the communications. The Netherlands Electron Microscope Society decided to act as its own publisher, having obtained reasonably ample financial backing in the way of grants and guarantees from the State and private firms. As a result, the Proceedings have appeared in roughly half the time and at half the cost of

those of the Berlin Conference of 1958, which were in the hands of a publishing house. The quality of text, reproduction and binding, is not noticeably inferior. On the other hand, the load of work on the scientific editors (Dr A. L. Houwink and Dr B. J. Spit) must have been incomparably greater; at a guess it cannot have been less than one man-year of concentrated effort.

The result is a broad survey of the state of electron microscopy in 1960, in all its many aspects. Although it was planned as a European conference, it attracted many of the leading workers from America and Japan. Volume 1 contains the contributions on physical and metallurgical topics, including electron optics and electron diffraction, and Volume 2 those on biological applications, 138 and 107 papers respectively. The papers are grouped according to theme and not in the order in which they were presented at the meeting. The largest individual sections are those on Crystal Growth (23) and Lattice Defects (24), closely followed by Transformations in Metal Lattices and Metallurgical Applications (18, altogether), thus reflecting the rapid expansion of electron microscopy in these directions in the past 4 or 5 years. Electron Diffraction attracted only 7 contributions (although it cropped up in several other places), probably because most new work went to the International Union of Crystallography's meeting at Cambridge, which immediately preceded Delft. The chief topics centred on the application of the dynamical theory to electron diffraction in metals.

The Netherlands Electron Microscope Society is to be congratulated both on its enterprise (which has been rewarded by a profit) and on the speed of production and quality of these volumes. If a suggestion is in order to future editors of such proceedings, it is that authors allowed a limited space be encouraged to state where they anticipate publishing an extended account of their

work. In an average of four pages per paper (as here) it is possible to cover only the main points and to give few references, which rarely seem to include the author himself. Less modesty and more pointers to further information would be helpful.

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Transmission Electron Microscopy of Metals.

By G. THOMAS. Pp. xiv + 299. New York; London: Wiley, 1962. Price 87s.

In the early days of electron microscopy it was possible to examine metals only by taking plastic replicas of their surfaces. In the past five or six years, however, controlled etching techniques have been developed which allow films of almost any metal or alloy to be prepared thin enough for electron microscopy at 100 kV., i.e. less than about 0.3μ in thickness. Coming as it did soon after the establishment of the dislocation theory of metals, this sparked off an almost explosive outburst of activity in applying the electron microscope to problems in metal physics and metallurgy. Although there have been one or two reviews of the results so obtained, the present text is the first to describe in detail the subject as a whole. The author is well qualified to do so, having been in the middle of developments first in Cambridge and now in the University of California.

He sets out to provide a working handbook for those new to the electron microscopy of metals, giving principles as well as recipes. The first chapter is an introduction to the interaction of electrons with matter, with particular attention to the theory of diffraction, and Chapter 2 applies this knowledge in explaining the mechanism of image formation and contrast from crystal-line specimens. For those with a knowledge of crystallography and X-ray diffraction, prerequisites for the course at Berkeley on which the book is based, all this will no doubt be plain sailing. But anyone new to the subject will probably need to make full use of the references given to more detailed treatments of these topics. Similarly, a treatment of the principles, construction and operation of the electron microscope in 50 pages can be no more than an outline introduction, to be supplemented by further reading. The remaining half of the book, Chapters 4 and 5, describes methods of

specimen preparation and reviews the results obtained with them. This part is very well done, and it will probably be a revelation to many metallographers. The detailed evidence of dislocations and other defects in metals is fully set out, with many micrographs. The recent work on dynamic phenomena, such as phase transformations in alloys, is probably even less known and, being the author's special area of interest, is clearly and concisely treated.

For the newcomer to the electron microscopy of metals, the Appendices may well prove as valuable as the body of the text. Appendix A describes in detail the steps in analysing an electron micrograph of a thin aluminium foil and the selected-area diffraction pattern obtained from it: determination of foil orientation, slip planes and foil thickness. Appendix C is a short review of the main bibliographical sources for electron microscopy in general, and Appendix D outlines the requirements of an electron-microscopical laboratory. Appendix E lists the latest values of atomic scattering factors for the elements.

The text is clearly written and illustrated with a wealth of line diagrams and micrographs, 159 in all. The details in most of the latter would have shown up better if reproduced on art paper instead of in the text, but doubtless to do so would have added appreciably to the cost. This is a minor criticism, and the book can be recommended to all who wish to learn of the great advances which the electron microscope has brought in our knowledge of the interior structure of metals. To those who are setting out to use the new methods, it must be an indispensable guide and mentor. The chief omission, to one of a cautious turn of mind, is of any critical discussion (apart from a few lines on p. 188) of the relevance of the observations made on thin films to our understanding of the properties of metals in bulk. Now that the electron microscope is being increasingly used as a metallurgical laboratory in miniature, with heating, cooling, straining and even reaction of the specimen during observation, the limitations as well as advantages of the method need to be kept fully in mind. However, the author may feel that the occupational scepticism of the trained metallographer will provide a natural counterbalance to his own evident enthusiasm for his subject.

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