

contribution offered for general discussion and assessment by practising crystallographers, partly because it bypasses the usual safeguards of impartial refereeing, but chiefly because such format requires a review.

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**X-ray Diffraction Procedures for Polycrystalline and Amorphous Materials.** By H. P. KLUG and L. E. ALEXANDER. Pp. xiii+716 with 325 figs., 94 tables and 9 appendices. New York: Wiley; London: Chapman and Hall. 1954. Price \$15.00; £6.

In step with the spectacular growth of X-ray crystallography, a number of valuable books have recently been written. It remains, however, a rare event for a book to appear which is new in scope and which can be recommended to numerous readers with diverse interests. Both these attributes apply to this volume. The reviewer indeed supports the authors' contention that the book should appeal to those who must acquire crystallographic knowledge and skills through their own efforts. It should interest industrial plant technologists (the reviewer's interpretation of 'plant workers'), science graduate students, research scientists, as well as group leaders and research directors in industry.

Let us examine how individual chapters will appeal to this wide range of readers. The first 160 pages consist of three introductory chapters: 1 'Elementary Crystallography', 2 'The Production and Properties of X-rays', and 3 'Fundamental Principles of X-ray Diffraction'. For plant technologists they are rather formidable, and science graduates and research workers should turn first to other text-books such as those referred to by the authors. Perhaps these chapters are best suited to group leaders and research directors for whom they would probably supply revision of university curricula.

Chapter 4 on 'Photographic Powder Techniques' is written for the experimental research worker, who might in places welcome even more detail, such as on high-temperature and micro-cameras. Summaries of this and other chapters would have added to the usefulness of the book.

Chapter 5 'Spectrometric Powder Technique' (the internationally agreed word 'diffractometric' would be preferable) is one of the most valuable of the book. Again it is addressed primarily to the practising research scientist for whom fuller discussion of some topics, notably proportional counters, seems desirable.

Chapter 6 'The Interpretation of Powder Diffraction Data' will appeal to all readers. Plant technologists and research directors may wish to omit some details such as on indexing methods. This very subject, however, could have been more fully treated for the research worker. It would be instructive to set some representative problems

on indexing to two teams working competitively and using respectively methods described in the book and those only referred to. If the latter team were to win, as the reviewer suspects, a change of emphasis would be indicated.

Chapters 7 'Qualitative and Quantitative Analysis of Crystalline Powders', 8 'The Precision Determination of Lattice Constants from Powder Photographs' and 9 'Crystallite-Size Determination from Line Broadening' strictly speaking still fall under the title of Chapter 6. They, too, are admirable accounts of these most important topics and will be appreciated by all readers.

Chapter 10 'Further Applications of Polycrystalline Diffraction' really deals with stress determinations (not 'measurement') and preferred orientation. The applications to the industrially important high-polymer field would have deserved fuller description.

Chapters 11 'Diffraction Studies of Non-Crystalline Materials' and 12 'Small-Angle X-ray Scattering' are self-contained summaries of these fields, which very properly fit into this volume because they refer to the X-ray crystallographic study of materials that at first sight do not lend themselves to the experimental procedures discussed elsewhere in the book.

The appendices are helpful though not intended to replace the use of the *International Tables for X-ray Crystallography*. The subject index is adequate when used in conjunction with the table of contents. Printing and paper are superb, but they necessarily make the volume rather heavy. Considering that this is a first edition of a novel and large text-book, it is great credit to the authors that errors and misprints are revealed only on close study. The reviewer singled out the author index for fairly close scrutiny and noticed that the initials of Arndt, Prins and Rinn are wrong, that the spellings of Matthews, Müller, Schäfer, Waite and Zernike are incorrect, and that Cox appears in the wrong alphabetic order.

The achievements of the authors overshadow all criticism. They have written the first comprehensive and up-to-date text-book dealing with those crystallographic subjects on which the great majority of technological applications depend. It is no secret that another group of crystallographers—of whom the reviewer is one—has been independently engaged in writing a similar text-book. The present authors must be congratulated on their priority of publication and the conviction might here be expressed that the two volumes will find complementary rather than competitive use.

The price of the present volume might be excessive to individuals but not to libraries in industrial and academic establishments; for, just as chemical analytical methods have established themselves during the past fifty years as indispensable to virtually all research investigations, so it will soon be unthinkable for major research projects to be embarked on without the aid of the crystallographic methods described in this book.

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