

haustive review article, which will appeal to readers at all levels of involvement in nuclear techniques. Chapter 5 (32 pages), despite the specialized title, succeeds admirably in establishing the proper perspective by constantly evaluating the technique in terms of some of its competitors. Chapter 1 is perhaps the least successful of the three; although it is well written and concise, I doubt that its 20 pages will succeed in imparting more than a superficial taste of this complex subject to readers not already conversant with the pertinent concepts and terminology.

Chapter 3 (66 pages) represents an interesting and authoritative discussion of the various problems connected with in-line analytical instrumentation and some of their solutions. Although the choice of some of the topics may seem arbitrary, this is probably unavoidable; on the whole, the authors cannot be commended too highly for their perseverance in extracting some of this important information from its scattered sources, not always easy of access, and assembling it in this fashion. Continued effort along these lines may go far in minimizing costly duplication in the development of analytical instrument systems for industry. The two parts of Chap. 4 (66 pages) consist of a variety of tables for converting microprobe instrument readings to concentration, along with a detailed explanation of their derivations and uses.

While conceding the high quality of the individual contributions, I am somewhat disappointed by what impresses me as the lack of a unified viewpoint. It has been demonstrated in many instances in recent years (including Series IX!) that effective editorial planning can produce a review volume which evokes in the qualified reader a sense of "unity in diversity," despite a wide range of topics. By contrast, this book impresses me as merely an arbitrary collection of chapters, with the combination of Chaps. 1, 2, and 5 establishing one viewpoint and Chap. 3 a rather different one; as for Chap. 4, it is difficult to see how anyone but a practicing microprobe analyst will profit from it.

It is to be hoped that future volumes in Series IX will show a degree of editorial direction to match the superior quality of the individual

contributions, as some of the predecessors of this volume have done.

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PRICE A PITY

<i>Title</i>	Single Crystal Diffractometry
<i>Authors</i>	U. W. Arndt and B. T. M. Willis
<i>Publisher</i>	Cambridge University Press, 1966
<i>Pages</i>	xv + 331, 125 illustrations
<i>Price</i>	\$15.00
<i>Reviewer</i>	Walter C. Hamilton

In the past decade, the science of crystallography has experienced an unprecedented growth in its ability to provide rapidly the answers to many difficult questions in biology, chemistry, and physics. One of the factors which has been of great importance in this growth is the increasing displacement of photographic film, as the data collection medium, by particle counters used in connection with a mechanical device—the diffractometer—for orienting the crystal and moving the counters. These diffractometers are being operated increasingly with the aid of black boxes chock full of automation of the most sophisticated design.

Arndt and Willis have been for several years in the forefront of that small army of crystallographer-engineers whose efforts in developing this equipment have had such an enormous impact on the work of their colleagues. They are thus eminently qualified to write an introductory book on the subject of single crystal diffractometry. They have done a creditable job.

The authors do not describe their intended audience in the preface, but one may judge from the content of the book that its greatest readership will be found among those scientists of some crystallographic experience who are on the verge of changing from photographic to counter methods. These readers should know their trade well, for much of the material is presented with far too much brevity to be useful to the rank beginner. The text is relatively free from what the authors describe as "reprehensible jargon;" the phrase "staticized in the store" is attributed to a computer engineer. Nevertheless, the reader is assumed to have some familiarity with the modern instruments of physics.

For the reader experienced in diffractometry, the felicitous style leads to an enjoyable reading experience. Except for a few small instances, it does not extend the bounds of his own knowledge.

Chapter 1 is an "Introduction" which provides some background and motivation, plus a rather interesting analysis of the economics of data collection. American readers will look enviously at the quoted technician's salary of £800 (\$2240).

Chapter 2 is a rather lengthy discourse on "Diffraction Geometry" which presents standard material in a standard way, but which is superior to most texts in the adequacy of its drawings. This section stops disappointingly short of a proper conclusion by not presenting the trigonometric formalism necessary for setting a crystal in an arbitrary orientation on a four-circle diffractometer. This is information without which such an instrument cannot be satisfactorily used, and its omission is curious. The lack of matrix notation throughout this section makes the simple mathematics somewhat cumbersome.

Chapter 3, "The Design of Diffractometers," includes excellent descriptions of the two machines with which the authors have been most intimately involved and gives some interesting insight into the factors which influenced their designs.

Chapter 4 contains one of the best treatments of "Detectors" to be found in any crystallographic text. It includes a tantalizing introduction to coordinate detectors which may represent the next big development in x-ray and neutron-data collection.

Chapter 5 is a brief discussion of "Electronic Circuits" which fulfills its aim of telling the crystallographer "what black boxes are required in a diffractometer installation."

Chapters 6 and 7 describe "The Production of the Primary Beam" for x rays and neutrons and include some interesting and useful material on monochromators.

Chapters 8, 9, 10, and 11 describe the actual process of data collection. An excellent contribution is made by the discussion of systematic errors which are always present. These result in an uncertainty of at least one percent in even the best intensity data.

Chapter 12 is a very brief description of "Computer Programs and On-Line Control," an area which was developing rapidly as the book went to press.

An Appendix presents an informative comparison of x-ray and neutron-diffraction experiments.

Taken as a whole, the book deserves to be read by every newcomer to diffractometry before he digs into the necessary detail to be found in various sections of the "International Tables for X-Ray Crystallography," the Furnas-General Electric *Single Crystal Orienter Instruction Manual* and, unfortunately, fair quantities of folklore, which even in this fine book have not found their way to the printed page.

It seems a pity that the forbidding price tag is likely to keep this volume off the bookshelves of that group

of readers which it would most benefit.

Walter C. Hamilton received his PhD in 1954 from the California Institute of Technology. In 1955, he came to Brookhaven National Laboratory, where he presently holds the position of Senior Chemist. A specialist in molecular and crystal structure, he served as Visiting Professor of Chemistry at the State University of New York in Stony Brook during the academic year 1966-67.

BOOK ANNOUNCEMENTS

Although the following books will not be reviewed, they may be of interest to some of our readers:

Radiation Effects on Electronic Systems, Henning Lind Olesen, Plenum Press, 1966, xv + 234, \$16.50

Elementary Reactor Physics, P. J. Grant, Pergamon Press, 1966, viii + 196 pp, \$5.00

A Decade of Progress in Refractory Metals, G. Mervin Ault, American Society for Testing and Materials, 1966, 54 pp, \$2.00

American Men of Science, 11th ed., L-0, 1966, viii + 1063, \$25.00

All of the remaining books were published by the International Atomic Energy Agency (1966):

Radioisotopes in the Detection of Pesticide Residues, 118 pp, \$2.50

Radioisotopes and Radiation in Dairy Science and Technology, 258 pp, \$6.00

Food Irradiation, 956 pp, \$20.00

Disposal of Radioactive Wastes into Seas, Oceans and Surface Waters, 898 pp, \$18.50

Neutron Thermalization in Reactor Lattice Cells: an NPY-Project Report, R. J. J. Stamm'ler, S. M. Takac, Z. J. Weiss, 131 pp, \$3.00

Isotopes and Radiation in Plant Pathology, 94 pp, \$2.50

Reactor Physics Studies of H₂O/D₂O-Moderated UO₂ Cores: A NORA Project Report, compiled and edited by E. Anderson, J. O. Berg, and J. M. Doderlein, 76 pp, \$2.00

Costing Methods for Nuclear Desalination, 42 pp, \$1.00

Effects of Low Doses of Radiation on Crop Plants, 58 pp, \$1.50

Atlas of Radiation Dose Distributions, Vol. II (Multiple-Field Isodose Charts), M. Cohen and Susan J. Martin, 132 pp + 158 charts, \$15.00