SCIENTIFIC BOOKS

X-RAY CRYSTALLOGRAPHY

X-Ray Crystallography. An Introduction to the Investigation of Crystals by their Diffraction of Monochromatic X-Radiation. By M. J. BUERGER, associate professor of mineralogy and crystallography, Massachusetts Institute of Technology. xxii + 531 pp. New York: John Wiley and Sons, 1942. $6.50.

THIS useful book deals with that part of x-ray structural analysis employed to determine for a crystalline substance "the crystal symmetry in the larger sense: the crystal class, the space lattice (its type and dimensions), and the space-group." The material covered is further limited to those techniques which utilize single crystals and monochromatic radiation, thus excluding consideration of the powder and Laue procedures; in point of fact the discussion of the rotating and oscillating crystal techniques, while quite adequate, is incidental to the treatment of the various moving film methods. Although requiring somewhat more complicated equipment, the moving film methods offer the great advantage of registering three film coordinates for each diffraction spot. The author shows how to exploit this and other advantages fully and with great simplicity, particularly for the most important "equi-inclination" Weissenberg method.

Essential theory, design and operation of apparatus, simple indexing procedures, connections with group theory, precision determination of lattice constants—these and related topics are treated in great detail. A discussion of the systematic application of plane-group theory to the interpretation of the observed diffraction symmetries of equi-inclination Weissenberg photographs resulting in a very direct determination of the probable space-group(s) rounds out a definitive treatment of the Weissenberg method. The limitations of any x-ray method for determining the space group of a crystal are properly emphasized, and detailed tables makes clear the specific ambiguities wherever they arise. The inclusion of a brief discussion of auxiliary methods, *e.g.*, observation of face development, tests for piezo and pyro electricity, etc., which frequently aid in the selection of the probable space-group, would have provided additional guidance in this connection.

The book is addressed primarily to those more or less actively engaged in some phase of crystal structure analysis and should be particularly useful to the beginner in the field. Only a quite modest background in physics and mathematics is required, the development is extremely detailed, and the text is replete with excellent diagrams and illustrations. In the opinion of this reviewer and of two of his students who have used the book extensively, the treatment would have gained ultimately in clarity while permitting of some condensation through the more consistent use of elementary vector analysis. A separate section or appendix, giving in one place a complete explanation of the systematic notation now used for space-groups also would have been desirable.

The comprehensive account given of the Weissenberg equi-inclination method should encourage the wider use of this powerful technique. An equally detailed companion volume to continue with the more interesting and more difficult problem of determining atomic positions within the unit of structure would be welcomed, especially by the student beginning the study of structural analysis.

J. L. HOARD

CORNELL UNIVERSITY

EXPLOSIVE CHEMISTRY

Laboratory Manual of Explosive Chemistry. By ALLEN L. OLSEN and JOHN W. GREENE. vi + 106 pages. 13.8 × 21.1 cms. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Limited. 1943. Price $1.75.

THE material in this manual has been used by the authors in presenting short courses in explosives under the Engineering Science and Management War Training Program. The book is primarily a compilation of the usual chemical analyses and specifications of the common military explosives. As the authors have stated, the details of testing and the included specifications are those which have been outlined by the War Department in their most recent printing of "Military Explosives, Technical Manual, TM 9–2900." Olsen and Greene have, however, included more detail and have emphasized precautions in manipulations.

The contents have been divided into five chapters: I. Safety. II. Propellants, Raw Materials. III. Propellants, Nitrocellulose and Smokeless Powder. IV. High Explosives. V. Primers, Igniters and Initiators. Following the last chapter is an appendix on "Sampling."

The chapter on "Safety" is valuable but does not place sufficient emphasis on the individual characteristics of explosives and the frequent unpredictability of their behavior. It should be demonstrated to the student that there are three types or classes of explosives and that there is a wide range of behavior in each class. These facts can be made clear by a few simple experiments with such explosives as black powder, smokeless powder, lead azide, nitroglycerin and guncotton.

The text is very limited, for it has nothing to offer the chemist or physicist who is engaged in research on explosives or to any one who is interested in testing the explosive properties of these substances. Although the authors obviously did not have such read-