A $\bar{\mu}$ of 0·080 Å and a Θ_M of 232 °K. were obtained for UN from the above expression.

The writers wish to thank Ralph Kraft, formerly with the Ceramics group, for the UN samples, Dr Stanley Flikkema for the use of his sample spinner and Dr LeRoy Heaton for helpful suggestions. This work was performed under the auspices of the U.S. Atomic Energy Commission.

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Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. Copy should be sent direct to the Editor (P. P. Ewald, Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn 1, N.Y., U.S.A.) or to the Technical Editor (R. W. Asmussen, Chemical Laboratory B of the Technical University of Denmark, Sølvgade 83, Copenhagen K, Denmark)

Pittsburgh Diffraction Conference

The annual Pittsburgh Diffraction Conference will meet at Mellon Institute, Pittsburgh, Pennsylvania on November 5 through 7, 1958. Submitted papers will be presented in the fields of X-ray, neutron, and electron diffraction. In addition invited speakers will include

J. Bardeen (Recent Developments in the Theory of Superconductivity),
R. D. Heidenreich (Electron Micro Probe Analysis),
A. N. J. Heyn (X-ray Studies of Fibrous Polymers), and
W. B. Pearson (Intermetallic Compounds).

For programs or further information write J. R. Townsend, Physics Department, University of Pittsburgh, Pittsburgh 13, Pennsylvania, U.S.A.

Preliminary Single-Crystal X-ray and Optical Study of Nor-Harman, $C_{11}H_8N_2$

Errors occur in the above article by Lilabati Ray (*Acta Cryst.* (1957), **10**, 707). The refractive indices published are: $\alpha = 1{\cdot}758$, $\beta = 1{\cdot}759$ and $\gamma = 1{\cdot}806$. These values should be replaced by: $\alpha = 1{\cdot}753$, $\beta = 1{\cdot}764$ and $\gamma = 1{\cdot}783$.

The Interpretation of Difference Maps

Errors occur in the above paper by Yuen C. Leung, Richard E. Marsh and Verner Schomaker (*Acta Cryst.* (1957), **10**, 650). Equations (2·7) and (2·8) should be written as approximate equalities, and a minus sign should precede the $4\pi^2$ in both. The signs of the left-hand members of (2·9), (2·10), (2·11), and (3·7), as well as the expressions for Δx, Δy and Δz just before the beginning of section 3, should be changed to minus, and likewise for the argument $\frac{1}{4}(\Delta B_1 h_1^2 + \Delta B_2 h_2^2 + \Delta B_3 h_3^2)$ in (3·1), (3·2), (3·4), and (3·8). The sign of the second term of the right-hand side of (3·9) should be plus. The derivatives expressed by $\frac{\delta \varrho_c(0)}{\delta B_i}$ in (3·5) and (3·7), should be written $\frac{\delta \varrho_c(0)}{\delta \Delta B_i}$ instead. The respective symbols f and T should be replaced throughout by f_0 and T_0.

Book Reviews

Works intended for notice in this column should be sent direct to the Editor (P. P. Ewald, Polytechnic Institute of Brooklyn, 333, Jay Street, Brooklyn 1, N.Y., U.S.A.). As far as practicable books will be reviewed in a country different from that of publication.

X-ray Crystal Structure. By D. MCLACHLAN, Jr. Pp. xiii+416 with many figs. New York; Toronto; London: McGraw-Hill. 1957. Price $15·00; £5.16.6.

In the preface to this book which is largely based on lecture notes used at the University of Utah, the author writes 'Although the lone investigator is borne in mind throughout the book, it has been hoped that the book may also be use as a university text in a two-quarter course in structure analysis'. The author, who has a long and varied experience in his subject, declares that the book is intended to bridge the gap which exists between books on X-ray crystallography written in a *popular* style and those written with *rigor*. It is the reviewer's opinion that the book fails to achieve its purpose; few lecturers would be prepared to recommend it in its present form and the lone investigator would quickly run into difficulties.

The reviewer makes two major criticisms. The first is concerned with the presentation. Too much of the material, including some of the fundamental ideas in crystallography, is treated sketchily or is badly organized and presents unnecessary problems to newcomers to the subject. One wishes that basic concepts had been ex-

panded at the expense of other matters which clearly interest the author and receive greater attention than is necessary. Lists of references to original papers and text books, given at the end of each chapter, help to repair some of the deficiencies and should prove useful to anyone wishing to delve more deeply into particular subjects. Altogether there are about 300 references; not all of these are the most appropriate and one or two important books are omitted.

The second ciricism concerns the appalling number of errors; these are too varied and too extensive for detailed discussion. Most serious are the errors in fact and in logic; one of the latter (page 225) is quite absurd but, like many of these errors, may seriously trouble the novice. Two examples will be quoted from the first chapter; they are chosen because they are easily recognized out of context. (i) page 2. 'There are 230 space groups among crystals, all identifiable by the occurrence of absences or extinctions'; (ii) page 5. 'The discovery that cells have centres other than those at the unit-cell corners was made by Bravais. This discovery resulted in 14 lattices instead of the original six. These 14 lattices are often called Bravais lattices because of his discovery of them by *optical* means' (the italics are the reviewer's). Here there are two mistakes, one of which arises out of the author's attempt to regard the rhombohedral system as a subdivision of the hexagonal system.

After these criticisms it is only fair to add that many sections of the book *are* presented clearly and that several examples are worked out in great detail. Certain features will appeal to the experienced crystallographer. In particular one finds well known topics treated in new and interesting ways and there are many original diagrams.

The first two chapters, introducing the fundamentals of classical crystallography, are particularly prone to the faults already noted; but one unusual feature is worthy of mention—a thorough, though space consuming, discussion of point group operators and the derivation of the point groups. The nomenclature is sometimes unorthodox and not always consistent; the terms point group and space group seem to be regarded as interchangeable. X-rays, diffraction, X-ray cameras and the interpretation of photographs are discussed in chapter 3. The following chapter, on the determination of space groups, is confined to the interpretation of systematic absences; to clarify the general procedure the space groups and unit-cell contents of two materials are worked out starting from the X-ray and physical data. The equation for the integrated intensities of diffraction from crystals of known structure is developed in chapter 5; most of the correction factors are discussed although absorption is mentioned only in passing and primary and secondary extinction not at all. The next chapter, on the nature and properties of Fourier series, introduces convolutions and the main types of Fourier series used in X-ray analysis; an important omission is the difference synthesis. The phase problem is considered in chapter 7; particular attention—almost 40 pages—is devoted to the various Patterson and statistical methods. There follows an interesting, but rather unbalanced, chapter on computing aids. The final chapter illustrates the principles discussed in preceding chapters by describing, in considerable detail, the methods used to determine six particular structures. To conclude there is an appendix on special recording techniques.

The book is profusely illustrated by line diagrams which are neatly drawn and well reproduced. A few are inadequately described and mistakes in drawing or lettering occur far too frequently. The printing, paper and binding are excellent.

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The Powder Method in X-ray Crystallography.

By LEONID V. AZAROFF and MARTIN J. BUERGER. Pp. xv+342 with 127 figs. New York: McGraw-Hill Book Co. Inc. 1958. Price $8·75; £3.8.0.

Two books have been published in recent years which deal comprehensively with X-ray diffraction by powders. H. P. Klug and A. E. Alexander's X-ray Diffraction Procedures for Polycrystalline and Amorphous Materials came out in 1954, whilst X-ray Diffraction by Polycrystalline Materials containing contributions from many different authors, and edited by H. S. Peiser, A. J. C. Wilson, and the present reviewer, was issued in 1955. Leonid Azaroff and Martin Buerger's book is deliberately much more limited in scope than these. Its avowed purpose is simply to provide an authoritative guide to the taking and the interpreting of a powder photograph. The word photograph must be stressed because the diffractometer method is dismissed as outside the scope of the book in two or three sentences on page 3. The authors further confine their attention for the most part to practice with the precision type of American cylindrical camera of either 5·73 or 11·46 cm. diameter; there is a brief reference to flat cassettes on pages 42 to 44, and the existence of back-reflexion focusing cameras is recognized on page 220.

It was thus possible to concentrate attention on basic principles and to discuss in detail how, as the authors put it, to 'ferret out' from the Debye–Scherrer pattern as much structure information as possible. One would expect a book in the preparation of which Martin Buerger had had a hand to be authoritative, accurate, and clearly written, and in this expectation the reader will not be disappointed, provided the limitations of aim to which reference has just been made is accepted. The authors have, moreover, succeeded in writing a text which will appeal to the chemist, physicist, or metallurgist who may be called upon to take powder photographs and interpret them.

The first forty-five pages can be said to deal with the practice of powder photography. Such matters as camera design and alignment, film arrangement, specimen making, choice of radiation, and so on are briefly described. There follows a chapter on interpretation, which includes guidance to the use of Hull-Davey, Bunn, Bond, Bjurström, and Harrington charts in indexing the powder lines. Analytical methods of indexing are described in chapter 8.

In chapter 9 the reciprocal lattice is simply explained and from there on the concept is used freely. Indexing with the aid of the reciprocal lattice is discussed in chapter 10 and the method illustrated by showing how to handle step by step a spacing list for $MgWO_4$. The