(p. 272). A comment which may be made is upon the notation used for Fourier syntheses and structure factors: there appears no good reason for the introduction of such unfamiliar and inelegant expressions as that given on p. 261 (eq. (15)) when the standard and accepted symbols are available.

The final section of the book is composed of nine appendices. The first, by Pepinsky, describes the preparation of problems for the X-RAC and reproduces standard forms for use by those fortunate enough to have access to the machine. The second appendix, also by Pepinsky, deals with the extension of the range of indices available on the X-RAC. The use of a non-standard notation leads (p. 295, eq. (2)) to the remarkable result:

$$\bar{F}(\bar{R}) = \exp\left[-2\pi i \bar{R}.\bar{t}\right].\bar{F}(\bar{R}) .$$

The third appendix, by MacGillavry & Pepinsky, considers the application of conditions on $\varrho(x, y, z)$ (e.g. non-negativity) to the X-RAC and the possibility of sign determination. Appendix 4, by MacGillavry & Pepinsky, analyses the calculation of F values by sampling the continuous density distribution at points on a lattice. This technique, originally due to Beevers, is shown to be capable of accurate results so long as the lattice chosen has at least four times as many points as there are (H, K) values. A valuable point is made on p. 312, which can be condensed to 'In = Out', and should be noted by all protein crystallographers.

Appendix 5, by Pepinsky, discusses the use of positive kernels in terminating a Fourier series at a small number of terms without producing diffraction effects, and gives particular attention to the form $\{(1+\cos x)/2\}^m$.

Appendix 6, by Calderon & Pepinsky, extends the non-negativity criterion of Herglotz, which is the basis of polynomial and inequality theory, and leads naturally to Appendix 7, by the same authors. In the latter, the bounded-polynomial method is discussed, and the possibility of using the X-RAC in a steepest-descent process is suggested.

Appendix 8, again by Calderon and Pepinsky, considers the uniqueness of solutions and concludes that non-negativity and finite total mass are sufficient to define a unique solution in the centrosymmetric case of a *non-periodic* structure, but not otherwise, a result which has been tacitly assumed by Bragg and Perutz in their work on haemoglobin.

Appendix 9, by Sayre, concludes the book; it forms an excellent summary of Fourier transform theory, as applied to structure analysis, and contains some account of sampling methods for structure-factor calculation. A minor blemish is the use of a non-standard notation.

Although many of the papers contained in the book have now appeared elsewhere, and despite the numerous misprints, the work can be thoroughly recommended to all research workers in X-ray structure analysis. No other complete account of Pepinsky's X-RAC is readily available, and this alone makes the book worth reading. Moreover, most of the other papers in the collection are ones which crystallographers will like to have gathered together for easy reference. Considering the style of binding (limp card) the cost of the book is high.

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Data for X-ray Analysis. Volume I. Charts for Solution of Bragg's Equation.

By W. PARRISH and B. W. IRWIN. Pp. 108. Eindhoven: Philips. 1953. Price $2.

Data for X-ray Analysis. Volume II. Tables for Computing the Lattice Constant of Cubic Crystals.

By W. PARRISH, M. G. EKSTEIN and B. W. IRWIN. Pp. 90. Eindhoven: Philips. 1953. Price $2.

These volumes are the first of a series which is intended to supplement the *International Tables* by describing methods for facilitating certain routine calculations of rather specialized interest. If the standard of these first two volumes is maintained, it seems that the complete series will be very useful indeed to those who deal chiefly with the applied side of X-ray diffraction.

The first volume is of interest to those who are concerned with identification of materials by means of their powder patterns. It consists entirely of a large number of graphs of spacing against angle (θ and 2θ) for the $K\alpha$ lines of Mo, Cu, Co, Fe and Cr radiations; where necessary, separate curves are drawn for $K\alpha_1$, $K\alpha_2$ and their weighted means. The graphs are drawn on extremely open scales, and so are not subject to the usual criticism that graphical methods are not very accurate. On the other hand, the large scales necessitate several pages for each radiation, and one would have thought that the information could have been presented more compactly in tabular form.

The second volume is more diversified, and presumably owes its existence to the difficulties sometimes met with in identifying cubic substances from the A.S.T.M. index; if a powder photograph can be recognized as that of a cubic compound, identification is often more certain if its lattice constant, a, can be accurately measured.

The tables make use of the equation $a = \sqrt{N}.\frac{1}{2}\lambda/\sin\theta$, where $N = h^2+k^2+l^2$. Values of $\sqrt{N}.\frac{1}{2}\lambda$ to six decimal places are given for the wavelengths of the α_1, α_2, and β_1 lines of the K radiations of Cu, Ni, Co, Fe and Cr, for values of N up to 378. Division of this quantity by the observed value of $\sin\theta$ for a given line gives the apparent value of a derived from that line. The results may then be plotted against $\sin^2\theta$, or $\frac{1}{2}(\cos^2\theta/\sin\theta+\cos^2\theta/\theta)$, extrapolation to $\theta = 90°$ giving the true value of a; both these functions are presented.

An extensive list of lattice constants of cubic substances is included, together with representations of typical powder patterns, in the form of lines of varying heights, drawn at appropriate positions on $\log d$ scales.

It is perhaps unfortunate that the values of wavelengths used in the computations (*J. Sci. Instrum.* (1947), **24**, 27) are not those more recently recommended (*Acta Cryst.* (1950), **3**, 400), but since the difference are only of the order of 0·001 %, and the uncertainty of the wavelengths is about 0·003 %, the difference is negligible for most work.

For books intended for considerable use, the bindings, of thin flexible card, seem rather inadequate and will probably not stand up well to the use they will receive. On the other hand, the price is low, and laboratories which make considerable use of the books should have no compunction in replacing them when they become outworn.

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