**Elements of X-ray Diffraction.** By B. D. CULLITY. Pp. xiv + 514 with many figs. and tables. Reading, Massachusetts: Addison-Wesley. 1956. Price $10·00.

The book is addressed to a reader with no previous knowledge of the theory of X-ray diffraction, the experimental methods used and their applications. The treatment is based on the Bragg's law and no knowledge of the reciprocal lattice is required, that subject being referred to only in an appendix of some 15 pp. Within these self-imposed limitations the author has given a very good introductory account of the subject which should be of interest to students of metallurgy, chemistry and mineralogy requiring a simple description of the methods of X-ray analysis.

The subject matter falls into three sections: Fundamentals, Experimental Methods, and Applications. The first of these (136 pp.) consists of four chapters dealing with the properties of X-rays, the geometry of crystals, and the direction and intensity of the diffracted X-ray beams. The rotating-crystal method is mentioned only briefly on the grounds that 'the complete determination of complex crystal structures is a subject beyond the scope of this book and outside the province of the average metallurgist who uses X-ray diffraction as a laboratory tool'.

The section on experimental methods (76 pp.) has three chapters devoted to the Laue method, the powder method and diffractometer measurements, the last including a readable account of the use of proportional, Geiger and scintillation counters.

The remainder of the text contains an account of some applications of X-ray analysis and amounts to rather more than half the book (238 pp.). The applications referred to are nearly all of metallurgical interest, such as the determination of simple structures, precise parameter measurements and their application to phase-diagram work. Chemical analysis, quantitative and qualitative, is covered in three chapters, in which the use of diffraction methods, fluorescent radiation and absorption measurements are described.

The book concludes with a chapter giving a list of text books, reference books and periodicals recommended for further study of the subject, and fifteen appendices. Each chapter concludes with a number of problems, the answers to some of which are given.

G. D. PRESTON

*University College*
*Dundee, Scotland*

**Modern Instruments in Chemical Analysis.** By FRANK M. BIFFEN and WILLIAM SEAMAN. Pp. ix+333 with many figs. New York, Toronto, London: McGraw Hill. 1956. Price $7·50; 56*s*.6*d*.

This is a book which describes a number of physical methods used for, or applied to, chemical analysis. Examples of the subjects covered are emission spectroscopy, flame photometry, mass spectrometry, polarography, potentiometric analysis, and radioactivity. Only one of the fourteen chapters deals with X-ray diffraction and this review is confined to a discussion of that chapter (pp. 31 with 18 figs.). The authors stress that their accounts are not designed for the expert, but for the general practitioner who might wish to learn what kind of help a particular instrument could afford him; so it would hardly be fair to expect the chapter on X-ray diffraction to contain much to intrigue the skilled crystallographer.

As the title of the book implies, there is special emphasis on the tools of the trade. The properties of X-rays, the crystalline state, and the basic methods of recording diffraction patterns are dealt with in a matter of some eight pages. There follows a short description, with illustrations, of examples of commercial diffraction apparatus, including the diffractometer (which is referred to as a Geiger-counter spectrometer). A quite noteworthy amount of experimental detail about powder methods is packed into the space of a few pages, and the chapter finishes with a very brief pointer to the scope of X-ray fluorescence spectroscopy.

It is a little unfortunate that the table of wavelengths on p. 126 was taken without correction from the 1933 edition of *The Crystalline State*. The values are thus in kX. units, and not in Å units as stated, and this leads to a discrepancy between the Cu $K\alpha$ radiation figures given in the text on p. 146 and in the corresponding table. It may perhaps be considered another error of judgment that in giving advice about sources of crystallographic information there is mention of *Strukturbericht* but not of *Structure Reports*, and of Wyckoff's *Structure of Crystals* but not of his more recent *Crystal Structures*.

H. P. ROOKSBY

*Research Laboratories*
*The General Electric Company*
*Wembley, England*

**Order–Disorder Phenomena.** By E. W. ELCOCK. Pp. ix + 166 with many figs. London: Methuen; New York: Wiley. 1956. Price 11*s*.

This book, one of Methuen's *Monographs on Physical Subjects*, gives an excellent introduction to the difficult topic of order–disorder problems. It consists of five chapters. The first gives a general introduction and the second deals with the several kinds of order parameters and their experimental determinations. The principal subject of this volume, however, is to be found in the next two chapters, which treat the statistical theory of ordering of binary alloys. The third chapter follows closely the presentation, given in Fowler & Guggenheim's, *Statistical Thermodynamics*, of two interpenetrating lattices, each of them being entirely or partially occupied by one of the constituents. In the fourth chapter alloys, described by four interpenetrating lattices, are discussed. The title of this chapter is somewhat misleading, as it suggests that Chapter 3 is concerned only with stoichiometric alloys. The last chapter gives a clear exposition of the problems of ferromagnetism, antiferromagnetism and ferrimagnetism. Most chapters conclude with a summary.

The theoretical investigations in each chapter are followed by the experimental evidence, and the discrepancies between these two are discussed, and, as far as possible, explained.

The booklet is also intended for the reader with less specialized interests, and it may stimulate him to make