gives little attention to linear operators until his last chapter, which concerns summability theory in sequence spaces. Epstein devotes a good deal of space to operators, especially in Hilbert space.

Maddox's first three chapters provide a leisurely account of the set theory, topology and linear algebra required for the rest of the book, with examples drawn from analysis. Serious functional analysis starts in the fourth chapter (on normed linear spaces), and we find here *inter alia* the Hahn–Banach theorem and the standard deductions from Baire's category theorem. Next comes a chapter on Banach algebras that culminates in a version of the Gelfand representation theorem. The relevance of this theorem to other parts of analysis is unfortunately not explained. The maximal ideal spaces of the author's examples of commutative Banach algebras are not constructed, and, for instance, Wiener's theorem is not even mentioned. A short chapter on Hilbert space follows, and treats orthogonality and the Riesz representation theorem. There is virtually no operator theory here, and hence no spectral theorem. Turning in another direction, the author concludes with a chapter, unusually full for an elementary text, on matrix transformations and summability in sequence spaces, which provides a lot of scope for applications of the Banach–Steinhaus theorem.

The book is clearly written, but would have been a great deal more satisfying if the Gelfand theory had been properly illustrated and if some form of the spectral theorem had been included.

Epstein, after a topological introduction, takes Lebesgue theory as far as the dominated convergence theorem and the construction of the Lebesgue spaces. Then follows a treatment of normed linear spaces and linear functionals broadly similar to that in Maddox, but with the better supply of illustrations made possible by the availability of the Lebesgue integral. The last two and a half chapters provide a simple introduction to spectral theory in Hilbert space. The spectral theorem for compact self-adjoint operators is proved, and there is a survey of the Fredholm theory of integral equations. There is also some interesting material on the estimation of eigenvalues.

Epstein chooses to omit certain proofs (of certain more advanced theorems of Lebesgue theory, and in his section on Fredholm theory). Although it might have been better to include these, the book as it stands provides a well illustrated and terse introduction to the topics treated.

D. A. Edwards

CRYSTAL STRUCTURES

Introduction to Crystallography

By Donald E. Sands. (Physical Chemistry Monograph Series.) Pp. xii + 165. (W. A. Benjamin: New York and Amsterdam, 1969.) n.p.

The author's stated aims are to acquaint the non-specialist with the vocabulary of crystallography and to provide an introductory text for those who wish to study the subject in depth. That these aims cannot be achieved within the compass of a mere 165 pages is abundantly demonstrated and one is left wondering who will find the book useful. The extreme variability in the standard of the exercises dispersed through the book deserves comment; that some of the exercises involve concepts introduced in subsequent chapters is regrettable.

Chapters one to four are very properly devoted to the formal geometrical crystallography which is essential to a thorough understanding of diffraction crystallography. Elementary group theory is introduced in the initial discussion of point-group symmetry which uses the Schoenflies notation. The introduction of the Hermann–Mauguin notation, used exclusively in the chapter on space groups and universally preferred by crystallographers, is postponed to a later chapter. In chapter four, the illustration of space-groups from actual crystal structures is admirable but would be improved by the use of conventional space-group diagrams instead of mere lists of coordinates of equivalent positions. It is surely unnecessary for a text that overtly assumes the availability to its readers of the *International Tables for X-ray Crystallography* to list the 230 space-groups in an appendix.

The chapters on X-ray diffraction fail to maintain the high standard set by their predecessors. The brief description in chapter five of the methods of recording single crystal diffraction patterns is accompanied by a condensed mathematical treatment of diffraction which is practically devoid of physical interpretation. The diagrams are also disappointing, especially Figs. 5–3 and 5–4 where the lack of correlation must be misleading to the beginner. Brief descriptions of the reciprocal lattice and of the powder method are consigned to appendices. Chapter six is concerned with the determination of atomic positions; here as in chapter five it is unlikely that the mode of presentation would be easily intelligible to a beginner. The aridity of both these chapters would be lessened by the inclusion of more figures. Chapter seven, too, is disappointing, in that it merely presents crystallographic data for a few simple structures and makes no attempt to discuss the chemical significance of accurate crystal structure determination.

In conclusion it can be said that although this book falls short of its aims, which I regard as incompatible anyway, it is well produced and generally interesting. C. H. McKie

CHEMICAL ENCYCLOPAEDIA

Analytical Chemistry of Beryllium

By A. V. Novoselova and L. R. Batsanova. Translated by J. Schmorak. Pp. vii + 225. 130*s*.

Analytical Chemistry of Zirconium and Hafnium

By S. V. Elinson and K. I. Petrov. Translated by N. Kaner. Pp. viii + 243. 130*s*.

Analytical Chemistry of Ruthenium

By T. D. Avtokratova. Pp. ix + 250. 150*s*.

Analytical Chemistry of Thallium

By I. M. Korenman. Translated by Zvi Lerman. Pp. ix + 166. 120*s*.

Analytical Chemistry of Cobalt

By I. V. Pyatnitskii. Translated by N. Kaner. Pp. ix + 253. 140*s*.

(Analytical Chemistry of the Elements. Edited by A. P. Vinogradov.) (Ann Arbor-Humphrey: Ann Arbor and London, March 1970.)

In recent years there have been many encyclopaedic accounts of analytical chemistry. The present series is of special interest in that it comes from the Soviet Union and is published in English by an American firm following transliteration by the Israel Programme for Scientific Translations. The original series of books comes from the world famous Vernadskii Institute in Moscow under the general editorship of academician A. P. Vinogrado vwith a distinguished board of advisers also drawn from the USSR Academy of Sciences. According to the publishers the series will consist of fifty volumes, seventeen of which are under active translation and should be published in 1970. The first five volumes show ample evidence of being very well planned and executed and, as far as one can judge, the translations are of a high quality. Each individual volume is complete in itself and is written by an expert or group of experts in close consultation with the appropriate members of the editorial board. One of the most interesting features of these volumes is the account which is given of the trend of thought of our Russian colleagues in this area of elemental analysis.

Analsytical Chemistry of Beryllium. Being one of the lightest, most heat resistant and hardest of metals, beryllium has achieved widespread industrial usage.