

beyond a first-year course. The writer confesses to a feeling of disappointment that the structural work on minerals carried out so strenuously in the last 25 years finds practically no place in this introduction to the subject.

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**Gmelin Handbuch der anorganischen Chemie.**

**Selen B2: Die Verbindungen des Selens.** Pp. xxviii + 195. Clausthal-Zellerfeld: Gmelin-Verlag. 8th ed. 1949. Price DM. 40-60.

This handbook claims to be based on about 1900 journals, and on standard works such as the *International Critical Tables*, *Landolt Börnstein Tabellen*, *Strukturberichte* and the *Tables Annuelles*, up to 1 January 1948.

In addition to a description of the chemical properties of various compounds, a comprehensive account is given of important physico-chemical data. These include properties of the solid state such as data for crystal chemistry, thermal transformations in the solid, vapour pressure, entropy of fusion, molar heat capacity, coefficient of expansion, and solubility in various solvents. Special properties such as the electrical conductivity, photosensitivity and magnetic susceptibility of mixed crystals of Se/S are also included where relevant.

The standard achieved for the section on selenium compounds is high and if it can be maintained the eighth edition of this handbook should be even more valuable than its predecessors for workers in inorganic and physical chemistry, and in various branches of chemical physics.

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**Crystals and X-rays.** By K. LONSDALE. Pp. viii + 99, with 138 figs. and 13 plates. London: G. Bell and Sons, Ltd. 1948. Price 21s.

This little book is divided into seven chapters: I, Historical Introduction. II, Generation and Properties of X-rays. III, The Geometry of Crystals: X-ray Methods of Investigation. IV, Geometrical Structure Determination. V, Determination of Atomic and Electronic Distribution. VI, Extra-structural Studies. VII, The Importance of the Study of Crystals.

In the foreword, the author says that the book 'is not a textbook for advanced students of X-ray crystallography', but, rather, 'is designed to interest those who do not now use X-ray crystallography but who might well do so', and to inspire those who have had the tool of X-ray diffraction put into their hands to use it more intelligently. The book is based on a series of public lectures given by the author at University College, London.

For the scientist not versed in X-ray crystallography, perhaps the most important chapter is the comparatively non-technical 'Historical Introduction'. In this chapter the author not only sketches the history of the development of X-rays and X-ray diffraction, but gives a nicely balanced view of the place of X-rays in modern science. When the evidence is assembled, the debt modern science

owes to X-rays and X-ray diffraction is striking indeed. In the reviewer's opinion, this chapter is beautifully done and should be read by all scientists.

The remainder of the book comprises a selection of topics treated in a manner which the author feels best fulfils her desire to represent X-rays and X-ray crystallography to the scientist not versed in this particular field, and to the industrial administrator. The subject-matter should certainly prove stimulating to the scientist, but may be somewhat abstruse at times to the administrator. But if it is abstruse, it at least well represents the remarkable things which can be done with X-rays for industry in the hands of a skilled investigator.

The veteran X-ray crystallographer will probably find that a good deal of the book is a discussion of material quite familiar to him. Yet almost every reader will find a scattering of this subject matter which appears in novel and stimulating form. The penultimate chapter on 'Extra-structural Studies' should be interesting to nearly everyone. It includes particularly engaging treatments of primary and secondary extinction and vibrations of atoms in crystals.

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**Theory of Groups and its Application to Physical Problems.** By S. BHAGAVANTAM and T. VENKATARAYUDU. Pp. 234. Waltair: Andhra University. 1948. Price ₹ 20.

Despite the great variety of physical subjects to which group-theoretical methods can be applied with advantage, the methods are not widely understood, and even many who use them possess no more than a working knowledge of the technique. Partly, no doubt, this is due to the inadequacy of general literature on the subject, particularly in the English language. Every new book in this field is therefore an important addition. The substance and general plan of the book by Bhagavantam and Venkatarayudu leave very little to be desired. The range of subjects covered is more extensive than to be found in any other single treatise. Besides the application to atomic spectra and the vibrational, rotational and Raman spectra of molecules, there is much material of special interest, such as, for instance, the discussion in Chapter XI of the external and internal oscillations of molecules in crystals, the method given in Chapter XVI of determining the number of permissible (by symmetry) independent constants involved in various covariant physical quantities relating to single crystals (elastic constants, photo-elastic constants, etc.). As to the general plan of the book, the authors have wisely made the mathematical preliminaries short so that the reader's interest is roused by the physical applications, before his patience is overtaxed by purely mathematical developments.

Although intended primarily for readers new to the subject, the text of the book is by no means easy to follow. Though the clarity of the exposition is often admirable, the explanations, particularly as regards the more basic points, are not always sufficient for a clear understanding of the issue. In compressing so much matter in a volume of this moderate size, such difficulties are perhaps not altogether avoidable. However, they are no doubt at