Chapter 4 gives detailed studies of intermolecular distances in some structures containing molecules of various symmetries. Cubic symmetry is first dealt with, the examples being adamantane and hexamethylenetetramine, and some cases of freely rotating molecules are also considered. Following on tetragonal and hexagonal symmetries the study is made of axial molecules: in the case of the I_2 molecule, for example, a detailed and somewhat curious 'shape' is worked out. Some consideration is then given to the conditions for axial rotation of molecules, and then molecules of lower symmetries are discussed. A lengthy study is made of long chain compounds, a number of possible structures being deduced and compared with observed arrangements where possible. The clathrate compounds are next described, and here the author suggests strong disapproval of the structure of the 'empty' hydroquinone, as its packing coefficient is too small. Finally the chapter concludes with a discussion of isomorphism and solubility in the solid state, again insisting on the importance of structure and packing in these phenomena.

Chapter 5 is the concluding chapter of the book and consists of more than 280 pages of description of the detailed structures of 209 compounds or types of compound. These are quite full and critical accounts. In the case of ascorbic acid, for instance, the author says: 'Determination by trial; hence of low accuracy ($\pm 0{\cdot}07$ Å), also because there is no centre of symmetry': he goes on to complain that the ring is flat and contradicts the results from other structures. However there is some doubt about the validity of this criticism since the ascorbic acid ring contains a double bond, and is thus not strictly comparable with the other ring structures quoted.

It is refreshing to find a book like this which although something of a compendium, yet has a definite thesis, and the thesis strongly declaimed is that shape is of prime importance in organic structures and should be more thoroughly studied. Some readers would probably prefer a little less geometry and a little more chemistry, and indeed the author in his foreword is aware of this likely line of attack. However it is undoubtedly the crystallographer's work to promote the application of geometrical ideas as far as possible, and this book is a notable contribution in this direction.

The translation is extremely well done, although the use of the word 'spacing' for 'distance' is unfortunately common. There are very few errors. The diagrams (more than 500 of them) are excellent and the author has also used many space-filling models to illustrate his material. The book will be welcomed as a vigorous contribution to the literature of X-ray crystallography.

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The Rare Earths. Edited by F. H. Spedding and A. H. Daane. Pp. xi + 641. London: Wiley. 1961. Price £5·18·0.

This collective work has twenty-four chapters and involves about thirty authors. It is divided into four sections: Occurrence and extraction of rare earths (71 pages), Preparation of rare-earth metals (98 pages), Properties of rare-earth metals and alloys (276 pages), and Applications of rare-earth metals and compounds (159 pages). There is a good subject index (27 pages), but no author index.

The third section is crystallographically the most interesting. Chapter 13 contains a summary table of the structures of the metals, and chapter 14, by K. A. Gschneider Jr., discusses the structures and their allotropic relationships in some detail (25 pages). Cerium leads, with four allotropes, lanthanum has three, and about half the rest have two, some being high- or low-temperature forms. Neutron-diffraction studies and magnetic structures are treated only briefly. Chapter 16, Rare-earth metal phase diagrams, by C. E. Lundin, is the longest in the book (162 pages). This gives, after an introduction, 95 binary phase diagrams and brief particulars of what is known about another 300 or so binary systems. The unit cell, and sometimes other structural information, is given when known, and there are many references. 'Alloys' is interpreted liberally, to include borides, hydrides, nitrides, oxides, phosphides, sulphides, selenides, and tellurides. It is probable that it is for this chapter that the book will be consulted most frequently, though some of the technical applications make fascinating reading ('burnable poisons are actually long-term shim controls').

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Chemical Crystallography. An Introduction to Optical and X-ray Methods. By C. W. Bunn. Pp. XIII + 509. Second Edition 1961. Oxford: Clarendon Press. Price 60*s*.

The scope and plan of this book are unchanged from the first edition (1945), but the later chapters are now brought up to date by the inclusion of material on intensity statistics, optical-transform methods, the determination of absolute configuration, and a few other recently developed topics.

The first part of the book deals with the identification of materials by means of the study of crystal shape and symmetry, by optical examination (refractive-index determination), and by X-ray powder photography. Excellent accounts are given of all these subjects, written in a clear and logical yet 'down to earth' fashion which could only be done by someone really familiar with the practical aspects of the subject. At the same time the underlying theory is very well displayed and with the advantage of appropriate illustration from actual crystals.

The second part of the book deals with single crystal methods, starting with the determination of cell dimensions by means of rotation photographs (including the 'tilted-crystal' procedure) and the uses that can be made of such measurements. Then follows a chapter on the measurement of X-ray reflexion intensities and the underlying theory, and on the determination of space groups. Trial-and-error methods are fully illustrated and structure-factor charts and graphs discussed, along with optical-transform methods. The effect of structure on physical properties is outlined, so that these properties can be made use of in structural work. A number of