graphic fraternity who already have some familiarity with Fourier series and Fourier transforms but would like to broaden their knowledge and understanding.

Chapter four, a short one, illustrates a point which, while familiar to most crystallographers, is not often so clearly demonstrated and that is the dominance of phases over intensities in determining crystal structures. Fourier syntheses are illustrated with correct phases and random structure amplitudes (or even structure amplitudes belonging to another crystal structure) and these show correct structures quite well. The reviewer is reminded of a remark made (in jest) at an international conference concerning this point – that it seems to offer the possibility of solving crystal structures without data!

The following four chapters (about 25 per cent of the book) deal with the solution of crystal structures of which some part is already known and here the three basic types of synthesis (α, β and γ) with some variants are described, analysed and compared. Of particular value is the way in which the authors relate their own work to that of others. There are numerous illustrations of the applications of the syntheses and a nice balance is preserved between the theoretical and practical aspects of these methods.

Two chapters deal with the isomorphous replacement method, the first, a short one, describing the basic principles of the method and the second a comprehensive account of Fourier methods of dealing with data from isomorphous crystals. The final two chapters deal similarly with Fourier methods applied to anomalous dispersion.

The book is well illustrated and very readable. Few errors were detected by the reviewer and even those were fairly minor ones relating to the index. Large numbers of references are given and these are assembled at the end of each chapter. This work can be recommended without reservation to all crystallographers who can afford the rather high price.

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Elementary science of metals. Wykeham Science Series No. 1. By J. W. MARTIN. Pp. 135. London: Wykeham Publications, 1969. Price £1.

The aim of the Wykeham Science Series is 'to broaden the outlook of the senior grammar school pupil and to introduce the undergraduate to the present state of science as a university study'. The subject of this volume is the structural and mechanical aspects of physical metallurgy; this is an appropriate topic for treatment at this level, and a good choice as number one of the series. Sixth formers and undergraduates studying physics or chemistry will find that the book opens their minds to a whole area of science of great practical importance, but which is often barely touched on by such students. The book is most welcome, and one hopes that it will be widely read by the audience for whom it is written.

The first half of the book deals with bonding, crystal structure, polycrystalline structures, alloys and phase diagrams. An indication of the level is that Bragg's law is derived and the Laue, rotation and powder techniques of X-ray diffraction are outlined, but the book does not actually show how such techniques can distinguish between, for example, a body-centred cubic and a face-centred cubic metal.

The second half of the book surveys a wide range of elastic, plastic and fracture phenomena in metals, and gives simple and readable explanations of how they occur. The treatment of the geometrical features of dislocations is exceedingly brief and only edge dislocations are described. Although dislocations are said to form loops, the screw character of portions of these loops is ignored. The subsequent treatment of plastic deformation therefore rests on shaky foundations, but this treatment may well be appropriate in a book of this kind; it shows the enormous importance of dislocations and may encourage readers to find out more about them later.

An attractive feature of the book is the series of simple 'do-it-yourself' experiments given at the end of each chapter. Yet in some ways my main disappointment was that the experimental angle had not been stressed further by indicating more explicitly in the later parts of the book how the techniques introduced earlier have been used to establish the processes described. There is for example no explicit reference to any technique for revealing dislocations experimentally until an electron micrograph of a dislocation tangle is almost casually introduced into a section on work hardening.

Only experience of students reading the book will show whether it has succeeded in its aims; it deserves to do so and I hope it will.

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Crystals and X-rays. By H. S. LIPSON. Pp.xiv+198. London: Wykeham Publications (Science Series), 1970. Price £1·75.

This little volume should appeal to the general reader interested in science and, in particular, in the origins and methods of X-ray crystal structure analysis. The writing is bright and lively. The reader is presented, quickly and painlessly, with brief and informative descriptions of the beginnings of X-ray crystallography, its experimental methods, its early successes in solving simple crystal structures, and the application of Fourier and related methods to more complex structure problems. Professor Lipson's use of the analogies between the optics of visible light and X-rays enables him to present many aspects of crystal structure from relatively novel and stimulating points of view.

This reviewer cannot resist the temptation to draw attention to one of Professor Lipson's rare crystallographic lapses: on p. 68 he notes that lines of reciprocal-lattice points are arranged along curves in Weissenberg photographs and that 'certain lines are straight; these represent ... the axes of the reciprocal lattice'. A glance at the photograph on the same page reveals, of course, that all central lines of reciprocal lattice points lie along straight