The authors have clearly gone to a great deal of trouble to present their material in a systematic way, as befits a work of reference. Unfortunately, however, this has involved the adoption of conventions the full understanding of which demands the mastery of many pages of 'small print'. The regular user will understand and remember these conventions but the occasional reader will be perplexed (and even irritated) by, for example, the liberal use of square brackets the significance of which will escape him unless his eye happens to fall on p. 8. In a work so systematically planned the reader would have been helped if every opening displayed not only the chapter number but also the symbol for the part, section, and subsection of the chapter, e.g. on p. 185 (IV.B.2c) instead of just (c), which appears in four different places in the same chapter. It would also help if all the pages carried a folio; as it is, many can be identified only by counting from the nearest numbered page. The formula index is admirable but the subject index meagre: the mineralogist who has momentarily forgotten the composition of rooseveltite will quest in vain but a search under $BiAsO_4$ will be immediately rewarded. R. C. EVANS

McKIE (D.) and McKIE (C.). *Crystalline Solids.* London (Nelson), 1974. x+628 pp., 382 figs. Price £6·50.

The authors of this new work are Lecturers in the Department of Mineralogy and Petrology at Cambridge University and are therefore in a rather special teaching situation. The Department has a long tradition of teaching 'Crystallography' (now termed 'Crystalline State') to large classes of students with strong backgrounds in and leanings towards physics, chemistry, and mathematics. It is no accident that well-established texts on crystallography, crystal chemistry, crystal optics, crystal physics, and X-ray diffraction have emanated from this source, and I am sure that the present publication deserves similar success. It is very different in that it encompasses all of the above together with some other subjects under one cover.

The Cambridge undergraduates, for whom the book is primarily intended, will no doubt find it extremely useful to have this single basic text, and, moreover, considering its size and coverage, and present-day costs, they should also welcome the very reasonable price. Students elsewhere, who more usually are designated from the start as chemists, physicists, metallurgists, or geologists, will also find the book useful, although it contains more than many of them will really need (not a bad feature for a good student!). One reason for the authors achieving surprisingly complete coverage in limited space lies in their frequent use of mathematical treatments, which, though not very complex, may not suit some students. This by no means implies that physical descriptions and explanations are lacking.

The first five chapters (150 pages) deal with basic crystallographic concepts, treating morphological and lattice geometry more or less in parallel. The next four chapters (130 pages) are on the principles and uses of diffraction methods, and these are followed by chapters on crystal chemistry (87 pages), crystal physics (28 pages), and crystal optics (75 pages). The former chapters constitute Part I of the book, and are

concerned primarily with crystal structure. Part II is non-structural and it is aimed more specifically at mineralogists and other solid-state scientists with similar interests. It deals in four chapters (125 pages) with thermodynamic principles, the interpretation of phase equilibrium diagrams, physical and chemical methods of compositional analysis, and experimental methods for mineral synthesis and equilibrium studies.

In addition to covering such a wide scope in one book, the authors have somehow managed also to incorporate more recent developments in the subject, and in some aspects to give more detail than do the more specialized texts. In crystal symmetry, for example, they show the derivation of the 32 point groups, and also explain the Weber symbols for zone axes in the hexagonal and trigonal systems. The diffraction section includes considerable detail on the Weissenberg, precession, and Laue methods, and also gives something on neutron diffraction and electron microscopy. Crystal chemistry includes a good account of crystal field theory and of non-stoichiometry. Crystal physics treats the subject of diffusion which should perhaps be given more attention by mineralogical researchers.

In Part II, it is good to have a treatment of thermodynamics, not as an abstract exercise, but with its relevance to mineralogy emphasized and illustrated by examples for many of the concepts involved. Only recently have textbooks begun to appear dealing with experimental petrology and phase equilibrium diagrams. The chapter on this subject in the present volume considers most if not all of the kinds of binary and ternary systems that are commonly encountered in mineralogy and petrology, and should fill a noticeable gap in the spectrum of texts, not only for undergraduates but also, because of its previous neglect, for many postgraduate earth and materials scientists.

The chapter on compositional analysis is something of a bonus since the combination of scope and depth achieved in this book is remarkable enough without it. All the important methods (including atomic absorption, electron probe analysis, radioactivation analysis, and Mössbauer spectroscopy) are treated in a more than adequate manner for a book that is clearly not meant to be a laboratory manual.

Finally, the authors have found room for seven appendices on varied topics (including stereographic constructions, spherical trigonometry, and crystal setting by X-ray diffraction), and a reference list for each chapter.

I have drawn attention to a number of ways in which this book provides what others do not. Even where the subject-matter corresponds more closely with that presented in other texts, there is nevertheless a refreshing difference of emphasis and style Having complimented the authors on managing to include so much, it is perhaps churlish to note the absence of two topics that deserve some mention. There is no description of the use of X-ray powder patterns for determining accurate cell parameters other than cubic, and surprisingly, although point defects, random defects, order–disorder, and shear defects are mentioned, screw and edge dislocations are not.

I would recommend this book strongly. Although as a whole it will be of great value mainly to those students for whom it was primarily designed, many others at different levels and in different disciplines will find substantial parts of it useful.

J. ZUSSMAN