Short-course handbooks are invariably written in a hurry, and printed from typescript. This results in a high concentration of errors (nearly four pages of errata), and a certain lack of co-ordination (I read the chapters in the order 1 to 4, 9, 7, 5, 8, 6, and 10 to 15). These disadvantages are offset by a freshness of approach unusual in conventional books, by the low price, and by the opportunity to see how leading workers in the field were thinking as recently as April 1977.

Within the limitations of the form of publication, this is a good book. It is readable (which cannot be said of many books on thermodynamics), and it should provoke the interest of many of those who have been indifferent to thermodynamics and the enthusiasm of some who profess an interest in that subject. It ought to play a useful part in raising the general standard of work towards that which exists in the best laboratories. It should be bought by all libraries serving mineralogists and petrologists, and by many individuals.

R. G. J. STRENS

King (E. A.). *Space geology: an introduction.* New York and London (John Wiley and Sons), 1976. xiv + 349 pp., 180 figs. Price £10·75.

Few will find the title of this book misleading though it is somewhat biased towards petrology and terrestrial rocks are scarcely mentioned even in making comparisons. The book is lavishly illustrated, with more than 200 line diagrams and monochrome photographs making a large part of the 270 pages of text. There are also about 50 pages of notes and references and the glossary and index make about 20 pages. Many of the diagrams are taken from the literature and all are well produced. The photographs are well selected and are mostly of good quality. The text is plainly written and is well edited and presented; it is a pleasure to read but the beginner may have difficulty in understanding a few sections such as those dealing with generalized Hugoniot curves or europium anomalies. The text reports selectively what has been done and written, but the information is not analysed or discussed in depth and there is little attempt at synthesis of generalities. The last chapter, for example, is on comparative planetology and amounts to only four sides of text.

Nearly half the book is occupied by chapters on meteorites and the Moon. The remainder consists of long chapters on terrestrial impact craters, impact metamorphism, and Mars, and of short chapters on tektites, craters, asteroids, comets, and other planets and moons. At the end of each chapter there is a very useful set of notes giving extra detail and a list of references. The main themes of the book are to do with rocks and surface forms and phenomena. Geophysical aspects of the planetary bodies are mentioned, but neither they nor geodetic or astronomical topics are treated thematically and experimental petrology is not treated in the depth it may deserve.

The book requires some prior knowledge of geochemistry and petrology but would be appropriate to second and third year undergraduates. Its greatest value may be in giving an introduction to an already vast literature and a short, readable, coherent, and authoritative account of the rocks of the Solar System.

W. J. FRENCH

Schneer (C. J.), editor. *Crystal Form and Structure* (Benchmark Papers in Geology, 34). Stroudsburg, Pennsylvania (Dowden, Hutchinson, and Ross Inc.), 1977. xiv + 369 pp., 139 figs. Price £24·00.

This book provides a conducted tour through some three and a half centuries (Kepler, 1611, to McLachlan, 1974) of developing thought on the relationship between crystal morphology and structure. The courier (editor Cecil J. Schneer) provides a stimulating and knowledgeable, but never obtrusive, commentary between numerous visits to monuments (the original papers of the time) marking former positions of the frontiers of the discipline – frontiers echoing with evocative phrases like 'Bravais' law', 'Donnay-Harker principle', 'Brillouin zones', 'PBC vectors', and 'Congestion factor'.

The wide variety of type faces (English language texts are photocopied from the original while others are in English translation) adds savour and, in some cases, considerable nostalgia to the tour. It is, however, irritating to find neighbouring papers from the same journal reproduced, quite needlessly, to two different scales.

The well-chosen hard core of key papers, the wealth of references, and the modest price make this a highly desirable book.

F. E. TOCHER

Dent Glasser (L. S.). *Crystallography and its applications.* London (Van Nostrand Reinhold Co., Ltd.), 1977. viii + 224 pp., 117 figs. Price £12·00 (cloth), £5·95 (paper).

This book provides an introduction to the subject for those interested in its practical applications. The initial chapters cover the elements of crystal symmetry, optical crystallography, and diffraction theory. The various photographic techniques of data collection are then dealt with, and their uses

and limitations are explained. Counter methods are next discussed, and reference is made to the procedures for correcting intensity data for use in subsequent structure determination. The essential steps in solving a crystal structure are then set out, and the methods of refinement described. The aim throughout is to explain the procedure to be adopted by the practical crystallographer who does not want to be distracted by digressions into full background theory or the more specialized aspects of crystal structure determination. The style is clear and very readable, and one is conscious of being given the experimental 'know how' that can only come from an experienced crystallographer who has herself met all the practical difficulties and overcome them. The usefulness of the book as a crystallographers' 'workshop manual' is reinforced by a final chapter summarizing and assessing the advantages of the various techniques against the effort likely to be expended in applying them and the cost of the necessary equipment. An extension of the very brief one-page section on direct methods would have been an advantage in view of the prominence of these techniques in current research, but this is a minor criticism of what is on the whole a very well-balanced account.

The book can be warmly recommended to undergraduates or graduates who wish to learn quickly the elements of the subject in order to apply them in the course of a project or research. It is well produced, and the diagrams are clear. Comprehensive references are provided for those who wish to read further; and at £5·95 the paperback edition should be within the reach of most students even at the current depressed level of grants.

S. G. FLEET

Kerr (P. F.), *Optical Mineralogy* (fourth edition). New York (McGraw Hill Book Company), 1977. xvi + 492 pp., 427 figs. Price £16·90.

This is the latest edition of a textbook that has always been popular with students because it sets out in a well-arranged way the properties needed to identify minerals in thin section. It is in two parts, the first giving the principles of mineral optics and the second describing each mineral systematically. There are relatively few changes from the preceding edition, but instructors who may be tempted to prescribe the book for class use should be aware that it has many serious deficiencies.

The most obvious shortcomings arise from the failure to revise the new edition to take account of developments in the subject. For example the differences between high- and low-temperature feldspars seem to be only grudgingly recognized, and low-temperature plagioclases continue to be described as 'normal plagioclase'. The determinative curves for plagioclase based on 2V and the angle of the rhombic section are taken from publications of 1931 and 1919 respectively and completely ignore subsequent discoveries on the effects of variation in structural state. Albite is listed as optically positive with a 2V of 77° to 82°, which is only true of the low-temperature variety. Non-metric measurements continue to be used, such as miles per second on p. 55 and pounds per square inch on p. 430, and for monoclinic minerals β is usually quoted as an acute angle. A really bizarre entry is that of iddingsite, which although in reality a poorly characterized mixture is given a most detailed description that includes crystal system, refractive indices, 2V, cleavage directions, and pleochroic scheme. There is no explanation of the real nature of such materials as opal or limonite, even though they are much better understood than when the first edition of the book appeared. Some of the updating that has been done is of dubious value. The electron micrographs and phase diagrams do not contribute much to a handbook on optics, especially when liquidus temperatures are referred to as 'temperatures of formation' (p. 286).

Errors abound. Wrong chemical formulae are given for augite, biotite, chabazite, dumortierite, glauconite, heulandite, illite, phlogopite, staurolite, stilbite, and trona, Chabazite is wrongly described as monoclinic and erionite as orthorhombic, while the refractive indices quoted for the latter are much too high ($\sim$ 1·54 instead of $\sim$ 1·47). There is a general disregard of the principles of crystal chemistry. Formulae of minerals are sometimes quoted as though they were made up of separate molecules, e.g. kaolinite $Al_2O_3.2SiO_2.2H_2O$, while others are presented in a more modern form. The treatment of hydroxyl ions is capricious, and they are shown as (OH) in talc and chlorite, as H in prehnite, serpentines, axinite, chloritoid, stilpnomelane and lawsonite, and as H_2O in kaolinite, chamosite, and several others. In heulandite and stilbite, molecular water is written simply as H. Melilite is grouped with the tectosilicates, but glauconite is not classed either as a mica or a clay mineral. It is suggested that feldspathoids may be considered as 'silica-deficient feldspars'. In places, isomorphous substituents are written without a comma, e.g. $(KNa)AlSi_3O_8$ for microcline on p. 285.

There is a great deal of carelessness in the systematic descriptions, with students being led into pitfalls that should be guarded against. The interference colour of albite is described as 'pale yellow of the first order, about the same as quartz in the same section', with no reminder that this would be the *maximum* interference colour of a number of grains (and then only in a rather thick