Three of the four papers grouped under 'Regional Considerations' are broad reviews of the large-scale features and units within geologically complex and diverse high-grade areas which definitely deserve more coverage in the western literature: the Pamirs and Tien Shan (Budanov *et al.*), Baikal and areas west (Sizykh) and Kazakhstan (Shlygin *et al.*). Although some of the maps and diagrams are cryptic and the age data not reliable, these articles may provide some useful background for future work. A paper by Budanov and Volkova on bimetasomatism in magnesian skarns in the SW Pamirs, in contrast, is a highly focused and purely petrological contribution of considerable worth but not particularly relevant to the regional considerations theme.

Despite the apparent organisation, the book has no real definitive or unifying approach binding the diverse papers together. It is not a text which will be referred to for state of the art or up to date evaluations of the principal issues facing those of us working on high grade terrains, such as the roles of fluids and melts, tectonic settings, implications of $P-T$ paths, reliability of $P-T$ estimates, constraints imposed by mineral assemblages and grids, and temporal and spatial scales of high grade events. The main use of this book will be as an avenue into some of the literature relevant to the terrains considered and perhaps a data source for geochemical compilations, but it is not a book which I can recommend either to specialists or petrologists in general.

S. L. HARLEY

Brocardo, O. *Minerals and Gemstones of the World.* Newton Abbot, Devon (David and Charles), 1994. Price £10.99 (paperback) [ISBN 0 7153 0197 7]. 215 pp., 156 colour photographs.

This handy identification guide (translated from Italian) comprises an excellent text in the first 43 pages, followed by 156 pages with colour plates of mineral specimens, together with a pictographic table below each using easily identified symbols to allow rapid selection from a mass of detailed information on the characteristics and properties which can be used to classify and identify the mineral. The order of presentation of the minerals is by their overall colour.

The colour photographs are generally excellent, but the specimens to be shown were all selected from the Turin Museum of which the author is Director; there is thus a tendency to select rather rare species, e.g. buergerite, creedite and greenockite. Admittedly we are told that these are rare or extremely rare, but with only some four percent of known mineral species on display the inclusion of such rare species must be questioned. Also, we are shown some unusually coloured varieties, e.g. violet-pink cobaltian calcite [though, no doubt by a slip, the formula is given beneath the plate as $CaCo_3$]; similarly we have a rather bilious yellow quartz, labelled prase. Another problem users may find is with the colour descriptions in the pictograms: it turns out that the colour indicated there is that of the mineral powder rather than the hand-specimen appearance — thus we have a representative picture of kyanite, we are told the name is for the blue colour, but the pictogram indicates merely white or pale. Under epidote, piemontite is mis-spelt and the selected sample of epidote is yellow-brown rather than the typical pistachio green.

Despite these reservations (colour giving a collector such an important clue), I would happily recommend this useful little book to a beginner.

R. A. HOWIE

Veasey, T. J., Wilson, R. J. and Squires, D. M. *The Physical Separation and Recovery of Metals from Wastes*, (Gordon and Breech), 1993. vi + 201 pp. Price £45.00.

This book, arranged in five chapters, is a review of the physical processes involved in the recycling and reprocessing of secondary metals. Resource conservation, in the form of reclamation and recycling, has increased in the past two decades and is expected to continue increasing. The technologies involved are complex and have developed considerably in response to the increase in recycling. Hence, this review of the latest tcchnologies available for secondary metal processing deals with an important topic in engineering.

The first chapter introduces the relevant terminology and considers the economic, political/social and technological practicalities of metal and material recycling. It highlights the environmental and energy cost benefits to be gained from secondary metal processing. The second chapter, 'Unit operations in secondary metals processing', describes the methods available for the comminution of waste and physical separation of metal fragments from the bulk in detail. For each separation technique described (size, density, magnetism and electrical conductivity) the suitability of various types of machinery to different waste sources is assessed. The third chapter reviews the different processes employed to recover scrap metal from large objects such as automobiles whilst the fourth describes the processing of metal wastes from smaller sources e.g. television sets. The final chapter is an interesting description of the recent attempts to separate out municipal solid waste into its major components.

The book is well organised, with the unit operations described first, followed by a comparison of the various processing practices employed both in the UK and USA. However, the authors often digress into the processing of waste glass, plastics and rubber tyres which is rather out of place in this book. I found the poor quality type and diagrams frustrating and felt a list of abbreviations would have been helpful. Nevertheless, this book is a timely publication and the technical content admirable. The introduction is sufficiently general for novices and I am sure it will prove a useful technical manual for engineers in the chemical, metals and mineral industries wishing to know the latest technologies involved in the reprocessing of metals. J. COTTER-HOWELLS

Stoiber, R. E. and Morse, S. A. *Crystal Identification with the Polarizing Microscope*. London and New York (Chapman & Hall), 1994. Price hardback (0-412-04821-3) £65.00; paperback (01-412-04831-0) £24.95. 385 pp., 156 figs.

Of the topics with which a student of geology must become familiar in his initial training, crystal optics is probably the one which causes the most difficulty. Despite the fact that the techniques have not changed much in the last fifty years nor have the instruments used, new text-books in English on this subject are published every few years. Can this be due to dissatisfaction with the existing books and do the new authors feel that a different approach to teaching optics is required?

Stoiber and Morse in their Preface say "We offer this new book in the firm belief that crystal identification with the polarizing microscope is not only still a fundamental skill in the earth sciences but is also a tool of growing power and simplicity". The most noticeable difference between this book and others is the emphasis on refractive index determination as a means of identification of minerals. These authors inform us that 'At some institutions, immersion methods are alternated with thin section study in dual two-hour lab sessions each week". In most geology departments in the U.K. the time allocated to methods of determining refractive indices is probably not more than one or two hours in the whole course, mainly because of the necessity to teach other topics. There is probably another, more important, reason however in that, of the optical properties which students are taught, refractive indices are the most difficult to measure accurately. Most geologists. even those specializing in mineralogy and petrology, do not have a set of refractive index liquids in their offices and they are unlikely to know which of their colleagues has an Abbe-type refractometer available. Even those who may occasionally use immersion oils to study mineral grains would hesitate before attempting to measure a refractive index of even a cubic mineral and certainly not with the accuracy that Stoiber and Morse would like to achieve. To be fair, these authors tell us that an accuracy of ± 0.002 often suffices for identification purposes.

Of the immersion methods, Stoiber and Morse favour the oblique illumination method (they do not mention the name of van der Kolk) over the Becke method. One chapter is devoted entirely to the immersion method, and in the chapters on uniaxial and biaxial minerals, worksheets have been constructed for mineral identification including R. I. measurements.

The treatment of uniaxial and biaxial interference figures begins fairly conventionally and, after a discussion of estimation of the size of optic axial angle, embarks on a description of one- and two-symmetry plane figures. The one-symmetry plane figures fall into two categories of counter-rotating (C R) and same-rotating (S R) one isogyre figures. Eight pages are devoted to the appearance of the interference figure. In contrast the Universal Stage is allotted only four pages and of these only seven lines are devoted to conoscopic observation.

Forty years ago, in one Department of Geology and Mineralogy in the U.K., the Professor decreed that each first year student of geology should have access to a Universal Stage and so twelve were constructed in the departmental workshop (to purchase U-stages was prohibitively expensive). This represents another approach to teaching the student to understand the appearance of the interference figure in different orientations of the crystal. Few undergraduates, at least in the U.K., will be taught much about the rise of the U-stage nowadays but it is to be hoped that they would learn that, with the correct objective and sub-stage condenser, the conoscopic method is ideal for measurement of optic axial angle in most cases.

In the last ten or twenty years the availability of electron probe microanalysers and electron microscopes incorporating analytical facilities has resulted in a dramatic reduction in the use of quantitative optical methods of determining the nature and composition of minerals, to such an extent that few students will use more than the simplest optical techniques routinely before transferring their thin sections to a microprobe for analysis.

James Thurber, the American humorist, once defined a critic (a reviewer) as a person who "looks into a microscope and sees his own eye". I hope that this reviewer will not be accused of this offence in being critical of some aspects of this book. The following statement in the Preface came as a complete surprise "An elegant treatment of alkali