a peralkaline rock as one with $(Na_2O+K_2O) > H_2O$ (p. 218). The only general criticism of the book might be that there is an over-emphasis on North American examples, especially of igneous bodies, and the absence of several classic metamorphic examples from the Alps, Scandinavia, Scotland, and central Europe is regrettable. Inevitably, the very strength of this text—its emphasis on current ideas and state of the art review—will lead it to becoming dated much more rapidly than its more descriptive predecessors, but we have no hesitation in recommending this extremely good modern text to all serious students of petrology.

D. A. CARSWELL
F. G. F. GIBB

Picot, P. and Johan, Z. *Atlas of Ore Minerals.* Orleans (BRGM) and Amsterdam (Elsevier Sci. Publ. Co.), 1982. 458 pp., 335 pls. (227 in colour). Price 920.00 FF (US $170).

This is a translation of the original French text (1977). Like the original, it is remarkable for the many high-quality colour photographs taken in reflected light under crossed nicols and reproduced here with startling clarity. The bibliography is brief (nine items), the authors' intention being to group together homogeneous data based solely on personal observations and measurements, avoiding compilation of inconsistent information. Thus the reflectivity measurements which accompany the descriptions of most species have all been obtained under identical operating conditions and the identities of all the minerals have been checked by X-ray or by electron microprobe.

The first part of the book is devoted to the importance of a metallographic study, the preparation of polished sections and the techniques of observations in reflected light. Some common parageneses are listed and there are numerous tables of reflectances, colour, polarization colour, internal reflections, twinning, minerals tending to euhedral shape, etc., and a determinative table for the main Pb, Bi, Cu, Ag(Sn) sulphides and sulphosalts. This is followed by a useful summary of procedures to be followed in reflected light observations, and with fifty-four black-and-white photomicrographs showing various textures.

The second part mainly consists of mineral descriptions, 369 species being listed in alphabetical order (except some twenty minerals new since the French edition, which are grouped at the end of this section). Here the emphasis is placed on the importance of chromatic phenomena under crossed nicols in determining opaque minerals; 225 colour photographs are included and represent the first serious use of this medium. Under each mineral, one of the longest entries is the paragraph 'criteria of determination' in which distinguishing features and comparisons with other species are given. X-ray cell parameters and XRD powder reflections are also listed but at the end of the book the five strongest lines of all the minerals described are listed and conveniently divided into fifty-eight groups by strongest line, the minerals being listed in decreasing order of the second strongest line.

The text of the first part refers to plane-polarized light and polarization colours under crossed nicols, but there is some incipient confusion in that the captions to the photographs describe conditions of observation as OL or PL. However, this is not a book destined for library shelves; it is a laboratory manual for use at the bench, and as such any minor uncertainties will soon be clarified. In their preface the authors state that their hope is that the book will 'seem easy enough for beginners, sufficiently elaborate for experts and finally, clear and appealing enough to be used by all': they have surely succeeded brilliantly in these aims. It is unfortunate that the five years between publication of the French and English editions has led to a price increase of more than 265 per cent.

However, the three main strengths of this magnificent work—reflected light colour photographs, data from personal observations, and use of carefully checked specimens—make it an essential tool for all concerned with studying, or teaching, reflected light microscopy of ore minerals.

R. A. HOWIE

Howarth, R. J. *Handbook of Exploration Geochemistry, Vol. 2: Statistics and Data Analysis in Geochemical Prospecting.* Amsterdam and New York (Elsevier Sci. Publ. Co.), 1982. xiv+438 pp. Price Dfl. 235.00 (US $100.00).

One of the natural consequences of improved geochemical analytical facilities has been the voluminous generation of analytical data. Because geochemists (particularly those engaged in mineral exploration) have traditionally avoided using elaborate interpretative techniques and have relied on the more empirical approaches, the full potential of these data has not always been fully realized. This text aims to correct this tendency by introducing the various techniques of data analysis that can be used to extract as much information as possible from a geochemical exploration programme. As the series editor states in the foreword, 'The processing and interpretation of geochemical data is one of the most difficult—and one of the most important—stages in the successful application of exploration geochemistry.'

The text has been divided into two parts. The first

part introduces the techniques and includes chapters on data storage and retrieval, control procedures in geochemical analysis, univariate analysis, sampling methodology, mapping, and multivariate analysis (certainly not the most logical order). These chapters are easy to understand and contain a large number of worked examples and useful figures. Of particular use are the graphical aids for some statistical tests for up to 1000 samples. Portrayal of results is extremely important in mineral exploration and so the large section on geochemical mapping techniques is a most welcome addition.

The second part attempts to survey the statistical and cartographic techniques which are used in geochemical exploration in various parts of the world. This is of undoubted value for illustrating the actual usage of these techniques but unfortunately does, in places, appear more as a catalogue of references. Considering the cost of the book some of these sections are an inefficient usage of space.

This book is highly recommended for any geochemist who needs an introduction to the interpretation and portrayal of analytical data. One can only wait and see if geochemists increasingly adopt such statistical techniques in the interpretation of their results. Certainly the exorbitant price will deter most individual purchasers and will not help in disseminating the wealth of useful information contained within the book.

D. H. M. ALDERTON

Pies, W. and Weiss, A. *Crystal Structure Data of Inorganic Compounds. Part b3: Key Elements S, Se, Te.* (Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology. New Series. *Group III. Crystal and Solid State Physics. Vol. 7*) Springer-Verlag. Berlin, Heidelberg, and New York, 1980. xxvii+435 pp., 5 figs. Price DM 740.00 (US $296.00).

The latest volume in this extensive series of crystal-structure data compilations includes sulphides, sulphates, other oxo-compounds of sulphur, selenides, tellurides, and oxo-compounds of selenium and tellurium. The ore microscopist, expecting to find data applying to mineral sulphides, tellurides and selenides, should take note of the contents footnote—compounds are included in so far as they contain F, Cl, Br, I, O, N, and/or P. This leaves only a handful of minerals in the sulphide section (kermesite, sarabauite, tochilinite, and valleriite). Other sulphides are classed in this work as inter-metallic compounds and were included in Volume 6, published in 1971. In this present volume it is probably the sulphate section which will be of most use to the mineralogist as it does contain a very comprehensive compilation of structural and allied reference data. Again, the series can be recommended to crystallographic laboratories, although the capital involved in subscribing to the series is formidable.

A. M. CLARK