The principles of internal symmetry and the concept of the space lattice are next presented, followed, logically, by the chemistry of crystals, the derivation of space groups, and a review of crystal structures. The author defends his preference for 'island silicate' in preference to 'orthosilicate' and the reference to Zoltai's classification of tetrahedral structures introduces an additional view of structure that should both stimulate discussion and help understanding.

One of the most welcome parts of the book is the treatment of the physical properties of minerals. Instead of a paragraph or two on hardness, lustre, streak and so on, Professor Bloss gives a clear account of physical properties following logically from preceding chapters on structure, chemistry, and structural defects of crystals. The use of tensors in the description of physical properties is explained and is valuable as part of a book that is likely to be used by geologists and mineralogists. There is a useful appendix, explaining the matrix algebra necessary to make the chapter understandable without extensive reference to mathematical texts.

The chapter on optical properties of crystals is short because the field is covered in many other books, including the author's own [M.A. **16**–14]. The brief account given includes a section on crystal field theory.

The book concludes with a section on X-ray crystallography sufficient to give a good working knowledge of the powder method and an understanding of the basis of single-crystal work.

Each chapter ends with a list of references, and questions and answers. The excessive use of abbreviations and acronyms calls for comment. The reader may quickly come to terms with 'equipoints' and 'identipoints', but the use of 'AB' and 'OB' for acute and obtuse bisectrices seems rather unnecessary when Bx_a and Bx_o have long been in common use. Although 'relp' is used among X-ray crystallographers, a general reader may, in these days of change to SI units, wonder whether a relp is one such unit he has overlooked. If an abbreviation is needed for reciprocal lattice point it seems a pity that r.l.p. could not have been used in place of relp, because it has the advantage of drawing the reader's attention to the fact that it is an abbreviation.

The book has been carefully checked for errors and is well illustrated, though in places I feel there has been an over-enthusiastic use of shading tints. The illustrations are enhanced by the use of accompanying captions that are written in sufficient detail for the diagrams to be understood without undue reference to the text.

The book should commend itself to students and teachers as giving an up-to-date grounding in crystallography for mineralogists, chemists, metallurgists, and indeed all who have to do with the crystalline state. A. C. BISHOP

CHAYES (F.). *Ratio Correlation. A manual for students of petrology and geochemistry.* Chicago and London (University of Chicago Press), 1971. viii+99 pp., 1 fig. Price £2·70, $6·00 (cloth); £1·00, $2·25 (paper).

This book deals with the vexed subject of how to distinguish between substantive relations between variables and spurious correlations resulting from the inherent negative correlations that must exist between any set of variables that sum to a constant

sum (e.g. percentages). This is a perennial problem, which particularly faces petrographers concerned with modal proportions of minerals in rocks and geochemists preoccupied with chemical analyses of minerals and rocks, and both when they try to relate mineral compositions and proportions to rock compositions.

Although this is a book based on lectures given to students in two university geology departments and claimed to be written for students, the mathematics will certainly confound most students of geology—and their teachers also. It is most abstrusely written from the very first paragraph where r and ρ are introduced without any definition or explanation (also λ on p. 8, δ on p. 9, and C on p. 11). Clearly a sound knowledge of elementary statistics is assumed. If the author had made explicit reference to more actual petrological or chemical situations in deriving his general equations, the significance of the conclusions—which are not very many or positive—would have been more readily apparent. As it is, the reader is generally left to imagine a geological problem to which the discussion could be applied. The whole text only cites eight examples of petrochemical problems and although some of the suggested exercises are some help, as a teaching manual it fails dismally. A final chapter summarizing the conclusions and suggesting where petrologists now stand could have been particularly helpful.

Most surprisingly, no reference is made to the work of Vistelius or even Miesch (particularly A. T. Miesch 'The constant sum problem in geochemistry' *in* Computer Applications in the Earth Sciences, Plenum Press, 1969) and although Chayes has tried to answer Miesch's criticisms of the Chayes–Kruskal test elsewhere, the main criticism by Miesch appears to be valid.

This book may help us to rationalize our delusions and realise the assumptions and uncertainties inherent in many commonly accepted procedures but it gives us little to use in the place of these procedures. I acknowledge helpful comments from Drs. Atkinson and Howarth.

BERNARD E. LEAKE

KORZHINSKIĬ (D. S.). *Theory of metasomatic zoning*. Transl. from the Russian by Jean Agrell. London (Clarendon Press: Oxford University Press), 1970. vii+162 pp., 45 figs. Price £2·50.

Those of us who live in the world of petrology always welcome a translation of the works of a leading Russian colleague and even more when a good translation rapidly follows the first Russian edition. Certainly we are most interested in another work from D. S. Korzhinskiĭ, for in the past he has many times stimulated consideration of important problems.

To those of us familiar with the works of Korzhinskiĭ the title of the book is no surprise. Korzhinskiĭ has been fascinated for a long time with this subject: 'Metasomatic rocks commonly show a more or less regular zoning, each succeeding zone being of different mineral composition. The boundaries between these zones are usually sharp' (page 1).

For some time I have been just a little critical of Korzhinskiĭ's former treatments of metasomatic events (surely the result of diffusion processes) in terms of classical