

Management discusses the political dimensions of the problem and here, on internal United States policy matters, we pass beyond the scope of the *Mineralogical Magazine*.

KINGSLEY DUNHAM

Nassau, K. *Gemstone Enhancement*. London and Boston (Butterworths), 1984. xiv + 221 pp., 42 figs., 69 photos (28 in colour). Price £20.00.

This is a work designed primarily for the gemmologist and jeweller, but earth scientists and a wider public will find it fascinating reading. The book is comprehensive over the whole 'gemstone enhancement' field and should quickly become a standard reference work—up-dated editions will, no doubt, follow as new techniques develop.

The author deals first with the history of gemstone treatments and (unlike many other writers) has consulted the original works of C. Plinius Secundus (AD 23–79), translations of the Stockholm Papyrus, P. Holm (c. AD 400) and many other original works. This 20-page chapter is provided with an excellent bibliography. In the chapter devoted to heat treatment, the approach is also historical. The important factors in specifying the conditions of the heat treatment are clearly set out in tabular form, as are the effects of heat upon gemstones. Other topics of current interest include oxidation–reduction in blue sapphire, silk and asterism in blue sapphire, impurity diffusion, heat-induced cracking, and the reconstruction and clarification of amber.

The section on irradiation treatment commences by listing the rays and particles used. The apparatus and methods used for the production of the various irradiating emanations are described in some detail, as are the various changes which are induced. Precautions to be observed in dealing with radioactive gemstones are explained. Enhancement procedures described in Chapter 5 include impregnation by bleaching, by coloured and colourless oils, waxes and plastics; surface modifications including surface colour coating, foil back, mirror back, and star-back; lasering and glossing; composite gemstones produced by overgrowth, surface different colour, or asterism. Doublets, triplets, artefact-included, and gel-filled composites are also explained. The short chapter on gemstone identification is concluded by a discussion on the question of the disclosure of enhancement processes.

The main part of the book is a most informative alphabetical listing of the gem species known to be treated. The historical development of the treatment method is described as are the methods used and the theory behind them. Bibliographies are provided for most species.

There are excellent appendices (A) on heating,

including descriptions of furnaces used, (B) on irradiation, (C) on the fifteen causes of colour, and (D) a list of purveyors of suppliers and services—mostly from the USA.

There is an important source-book, clearly written and arranged for ready reference. Fortunately for European readers the price is related to British production costing; it is very reasonable for this comprehensive work.

E. A. JOBBINS

Borrowdaile, G. J., Bayly, M. B., and Powell, C. McA., *Atlas of Deformational and Metamorphic Rock Fabrics*. Berlin, Heidelberg, and New York (Springer-Verlag), 1982. xiv + 551 pp., 27 figs., 622 photos. Price DM 138.00 (£35.00).

This volume consists primarily of 234 pages of black and white photographs. Most of them are of naturally deformed rock, in outcrop or thin section. A small minority are of experimentally deformed rock or rock analogues. Two plates illustrate meteoritic material. Each page of photographs is accompanied by a descriptive text, allotted the full facing page, but rarely occupying more than half of it. Photographs are grouped under eighteen heads: almost all are good prints. Many of them are both beautiful and full of interest.

The emphasis of the Atlas is on the appearance of cleaved rock in cross-section. Only in relatively few cases is there any expressed interest in the third dimension. No attempt is made to provide a view of the history of investigations into cleavage, nor to provide reference material in its absence. No attempt seems to have been made to encourage the inclusion of material from classic sites. I was glad to see a photograph from Anglesey. The spotted Cambrian slates of North Wales, however, are referred to only with respect to what is called here a disaggregation structure.

Three preliminary chapters offer an analysis of the difficulties of making significant observations on cleavage and useful inferences from them. The distinction of close-set jointing from cleavage is mentioned and an empirical test rejected (p. 2). No reference is made to any genetic grounds for distinction. Varieties of cleavage are distinguished, but cleavage itself is not defined. In contrast, the text accompanying Plate 74 (J. G. Dennis), makes clear its author's view that for fractures to constitute a cleavage, a grain fabric is required, and the rock must have been strained so that the principal axis of shortening is at an obtuse angle to the fractures.

I respect the purpose of the preliminary chapters but wonder at their effectiveness. In my view they represent misplaced effort. The concerns they express should have been made evident through