temperature of the cold junction that should be added to the measured e.m.f. to give the temperature of the hot junction.

Page 78: α should be the temperature resistance coefficient and not thermal expansion.

Page 142: Increasing pressure will, for most heating-element alloys, reduce the resistance and not increase it as stated by Edgar. The change in resistance of the heating element has nothing to do with the power requirements; the power needed to maintain a given temperature merely reflects the heat lost. Thus the increased power needed at higher pressures indicates that more heat is lost, probably due to the denser gas acting more efficiently in transferring heat to the walls of the pressure vessel.

Page 165: Edgar states that temperature gradients are much smaller in solid-media than in internally heated gas equipment. This is nonsense, the very fact that the furnace length in an internally heated vessel is commonly 9 inches or greater compared to about $\frac{3}{4}$ inch in the piston-cylinder must mean that, with a properly constructed furnace that minimizes convection, the gas apparatus will have a longer, more uniform hot zone.

Taken all round, however, Alan Edgar can only be congratulated on this book. It obviously represents a great deal of work, many of the diagrams are really outstanding and the bibliography is quite extensive. Above all it brings together a lot of material that is useful to the experimental petrologist and has previously been scattered over a wide range of literature.

D. L. HAMILTON

SAXENA (S. K.). *Thermodynamics of rock-forming crystalline solutions* (Minerals, Rocks and Inorganic Materials: Monograph Series of Theoretical and Experimental Studies, vol. 8). Berlin, Heidelberg, and New York (Springer-Verlag), 1973. xii+188 pp., 67 figs. Price DM 48.00 ($21.70).

It is an auspicious time for the publication of this book for at present there is much active research aimed at quantifying the chemistry of mineral equilibria in order to obtain parameters such as temperature and pressure of formation. It is essentially a review volume dealing with the systematics of thermodynamics as applied to crystalline solutions, but in places new developments in the thermodynamical application are made, such as in the treatment of order–disorder in pyroxenes.

The first three chapters deal with the basic thermodynamics, regular solutions, and immiscibility in solid solution. The treatment of regular solutions is abrupt and the reader who wishes an understanding would do better to go straight to the texts of Guggenheim. Likewise, the treatment of mixing and immiscibility is in the nature of a reference source for the thermodynamic equations involved in these processes, although a few pages at the end of this chapter contain a discussion of immiscibility in mineral systems. Chapter IV is a condensed but useful review of the distribution of components between coexisting phases of both ideal and non-ideal solid solution. Chapters V and VI cover the formalities in the determination of activities; Chapters VII to X deal with order–disorder in the pyroxenes, olivines, and feldspars, with a particularly thorough treatment for orthopyroxene. The final chapter on the thermodynamic properties of coexisting phases as a function of temperature and pressure also gives pointers to future research in this field. The book ends with an appendix of computer programmes for calculation of some of the thermodynamic functions discussed in the body of the text.

Each chapter is divided into a number of sections and subsections that are often entities in their own right. Within these, thermodynamic equations are stated, or sometimes derived, and manipulated to deal with the theoretical problem in hand. This approach may be appreciated by the researcher involved with the thermodynamic details of solid solutions but the student requiring an introduction will probably find the style too curt. Where the discussion is developed more freely (as in Chapter VIII, sect. 2, and Chapter XI) the result is good and relevant to a wide range of researchers in geochemistry and mineralogy.

This is a well-produced and advanced text, which should stimulate the application of thermodynamics to problems in mineralogy and geochemistry. It will undoubtedly have a restricted readership of those who are already involved in this subject—for them it will be a valuable text. PAUL HENDERSON

AUGUSTITHIS (S. S.). *Atlas of the textural patterns of granites, gneisses and associated rock types*. Amsterdam (Elsevier Publ. Co.), 1973. xii+378 pp., 687 figs., 24 tables. Price Dfl. 160.00 ($59.30).

Studies of the textures of granitic rocks are clearly essential to the understanding of the granite problem and this *Atlas* sets out to document the anatomy of such textures with a thoroughness only matched before by the works of Dresder Kaden: in it some 650 microphotographs illustrate nearly 100 pages of text. However, the origin of granitic rocks is not to be finally determined on the basis of just one kind of evidence so that Professor Augustithis invites criticism when he presents the case for granitization largely on the basis of these textural studies—especially when the examples are selected so much at random and largely without detailed reference to the geological environment.

The introductory chapters of this *Atlas* are so general and uninformative that the knowledgeable reader is no further forward. The text becomes more interesting when the author enters into his own research field of crystalloblastic mineral growth in granites. Rightly, such textures are compared with those in metamorphic environments. The central problem is stated in terms of a general preference: that such blastic textures are not simply due to 'deuteric' adjustments during the long cooling history of a magma but represent the process of replacements by which the rock was transformed into granite.

Then follows a rather elementary discussion of the nature of crystalloblastic growth, full of generalities, little related to environment, and almost entirely lacking in the case histories that must surely accompany discussions of the chronology of blastic growth. A chapter on xenoliths, inserted at this point because they are regarded as