

monitoring, and demonstrates how practical and logistic criteria can be prioritized as eruptions are predicted, with successful examples from Unzen and Pinatubo, and sadly unsuccessful hindsight explanations of, for example, Nevado del Ruiz. The final short chapter (15) places volcanoes back in a global and humanitarian perspective. There follows a summary Appendix of safety measures for volcanologists and a useful 7 page index. The book is well illustrated, and the editors have produced a cohesive text from the 28 contributors. Anyone with an active interest in volcanoes will almost certainly already be aware of the vast and growing array of electronic information available on the internet, and some of those links are mentioned by these authors (e.g. Chapter 7). This book is very readable, most chapters are excellent, and it is strongly recommended. However, the essential base of geological mapping, including geochemical and petrological volcano-stratigraphy, (from which may be deduced power of eruptions and geological-scale periodicity) is not covered, which perhaps underplays the vital role of national geological surveys. Nonetheless, for those directly involved with research in the subject it is essential, but it also forms a valuable teaching resource for earth science courses which include active volcanoes.

A. P. JONES

Khomyakov, A.P. *Mineralogy of Hyperagpaitic Alkaline Rocks*. Oxford and New York (Clarendon Press, Oxford), 1995. x + 223 pp. Price £60.00 (Hardback). ISBN 0-19-854836-2.

Agpaitic rocks form part of the peralkaline rock series which comprise a minor proportion of igneous rock types. In this book, Khomyakov further divides the agpaitic rocks into four groups based on chemical and mineralogical criteria, and it is a description of the most extreme category, i.e. the hyperagpaitic rocks, that this book addresses. These rocks are also arguably the most mineralogically interesting because of the exceptionally large number of different mineral species present, a significant proportion of which are water-soluble, and the spectacular pegmatites that they form. Classical localities of agpaitic rocks include Mont Saint-Hilaire (Canada), Ilfmaussaq (Greenland) and Langesundfjord (Norway). However, the subject of this book is a detailed mineralogical description of the largest intrusions of these rocks at the Khibina and Lovozero massifs, Kola Peninsula, Russia. The author, Professor Khomyakov, has devoted his life to collecting and studying minerals from these massifs. With his publication record, which numbers well in excess of 100 papers, including descriptions of more

than 60 new mineral species he has discovered, he is ideally placed to bring to the attention of western scientists the mineral paradise that comprises these two massifs.

Although more than 223 pages in length, the book is divided into only four chapters. The first chapter provides an introduction to the classification of agpaitic rocks, their characteristic minerals and their mode of formation, followed by a brief geological description of the Khibina and Lovozero massifs. The second chapter describes the water-soluble and unstable minerals occurring in the magmatic rocks, together with some of their phase relationships. A unique feature of these rocks is the large number of such minerals, in excess of 40, and their description merits this separate chapter.

By far the bulk of the book and its central theme, is contained in the third chapter. This is a systematic description of the minerals found in the Khibina and Lovozero massifs. Remarkably, some 500 mineral species have been identified from these massifs, although only about a third are described in detail in this book, of which more than 109 are listed as having been established as new minerals. The author stresses the high probability that many more new minerals will continue to be found within these massifs. The descriptive mineralogy is a mixture of classical typomorphic descriptions based on parameters such as crystal morphology, colour, density, lustre and traditional wet chemical analyses, coupled with some modern microprobe data. Scattered throughout these descriptions are many crystal line drawings and stereograms of selected minerals. This chapter will prove to be an invaluable source of reference to those who work in the field of alkaline rocks.

The final chapter outlines those minerals associated with hyperagpaitic rocks which have an economic potential. In addition to current exploitation of niobium, rare earths, nepheline and phosphate from these rocks, Khomyakov points to potential new prospects such as natural sodium carbonate deposits and zeolites becoming economically viable. The references relating to the geology and mineralogy of the Kola Peninsula are extensive, and although some may not be readily available to many Western scientists, they are accessible and should be consulted.

This book inevitably will have only a limited market, and individual purchasers are likely to be confined to researchers into alkaline rocks. But because of the wide range of rare and unusual minerals these rock types cover, and the proposed new rock classification, this book should also be available for reference purposes in institutional libraries.

C. T. WILLIAMS