The entries are organised alphabetically and cover the literature to the end of 1996; each letter section is headed with a piece of mineralogical artwork by Peter I. Russell, illustrating one of the included species. In species coverage the book parallels the well known *Glossary of Mineral Species* by Fleischer and Mandarino, but provides the additional etymological information and original references. It also updates and expands on R. S. Mitchell's 1979 book *Mineral Names: what do they mean?*

The price of the book, its publication as part of the Mineralogical Association of Canada's programme, and its attractive presentation should add to its direct appeal to systematic mineralogists and ensure its successful marketing. A. M. CLARK

British Geological Survey. *Regional Geochemistry of north-east England.* Keyworth, Nottingham (British Geological Survey), 1996. viii and 100 pp., including colour plates and figures, 44 colour geochemical maps, and a 1:250 000 folded geological map. Price £50.00 ISBN 0 852 72 255 9

This is the fourth of the impressive newer style A3-size colour atlases and the eleventh volume in the series recording the systematic southwards study of the whole of Great Britain by the Minerals and Geochemical Surveys Division of the BGS. Map presentation is based on digital geochemical imagery with the colour-scaled maps being effectively relief maps of element concentration. The digital data are also made available to industry and researchers under a licensing agreement.

The introductory sections emphasise the environmental role of the Geochemical Survey Programme with the declared principal aim being to provide environmental baseline geochemical data of the surface of Britain. The other applications are mineral exploration, resource evaluation, geological mapping and research into crustal evolution and ore formation. The BGS has led the world in the development and application of techniques in regional geochemistry and it is evident that the approach and presentation continues to evolve with each atlas that is produced. This is the first volume to combine stream sediment and soil data and the resolution of the computer images is markedly improved on that of previous atlases.

The geographic area covered in the volume includes the eastern part of the Northern Pennine Orefield, the Durham coalfield and the N. Yorkshire ironstone deposits as well as the industrial urban areas of Tyneside, Sunderland and Teeside. It is therefore several hundred years too late to record a natural environmental baseline of the geochemistry of NE England; this is the first of the areas surveyed to be dominated by "anthropogenic influences".

The Geochemical Atlas is provided, particularly to the reader's advantage, as an independent report with a consistent systematic approach. The introduction contains very full details of the sampling and analytical techniques used as well as an explanation of the data processing procedures. A thorough overview is given of the geology of the entire area which is dominated by Carboniferous to Triassic sedimentary rocks. The Northern Pennine mineralisation is reviewed even though much of it lies outside the area. There is an extensive list of references to all aspects of the geology and all significant mineral deposits are listed as well as located on a simplified geology map. The Atlas is therefore an invaluable key reference for anyone requiring an introduction to, or initiating research on, the area.

The basis of the atlas consists of 31 single element-distribution maps (Sb, As, Ba, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Ga, Fe, La, Pb, Li, Mg, Mn, Mo, Ni, K, Rb, Ag, Sr, Sn, Ti, U, V, Y, Zn and Zr. Following established practice, major rock-forming elements are reported as oxides (CaO, Fe_2O_3, K_2O, MgO and TiO_2) while the others are reported as the elements. The images show element concentration in the <150 μm fraction of stream sediments sampled in a way to reflect the average composition of the source of the sediment. This is ideally the local bedrock but anthropogenic contamination as well as natural enhancement of elements related to mineralisation is extensive in NE England. The lack of drainage over chalk in northern Yorkshire led to the use of soil analyses and the integration of the soil data on to the stream sediment maps. Major geological boundaries are superimposed on each map. For each of the 31 maps an account of the distribution of the element is given and a preliminary attempt at explaining the regional variation as well as local anomalies is made. The reader is thoughtfully provided with a review of the geochemical behaviour of each element. There are also 5 maps related to stream water chemistry (acidity, conductivity, alkalinity, fluoride and uranium) and 8 three-component (red, green, blue) maps in which colour relates to the ratio of three elements (Cu+Mo+V, Cu+As+Sb, K+Be+Li, Mg+Sr+Ca, Mg+Cr+Ni, Co+Ni+Mn, Zn+Ba+Pb and Cu+Zn+Sn).

Of particular interest to mineralogists will perhaps be the discussion of mineralogical controls on the

distribution of each element, especially over the area of the Northern Pennine Orefield, the influence of which appears to extend from the classic area of veined Lower Carboniferous sediments, well to the east into the Permian and Triassic. The genesis of the lead-fluorite mineralisation evidently remains controversial and while much of the stream sediment geochemistry can be explained by the known occurrences of major minerals (baryte, witherite, fluorite, galena, sphalerite) and minor 'exotic' minerals (e.g. cobalt arsenides), there are intriguing pointers to further styles of mineralisation, including gold, in places.

However, it is the environmental geochemist who will gain most by studying this Atlas, in which there is a surprising diversity in element distribution, given that the area is dominated by a sedimentary sequence of fairly limited stratigraphic range. Coal mining waste has made a particularly conspicuous impact on the regional geochemistry, leading to enhanced values for Be, Co, Cu, Pb, V, Zn, Ga, Li, K and Rb as well as local enrichments in As, Sn, Mo, Bi and Sb.

This carefully structured and well produced volume, providing information with exceptional visual impact, is excellent value for the price.

A. J. HALL

Hill, C.A. and Forti, P. *Cave Minerals of the World* (second edition). Huntsville, Alabama (National Speleological Society), 1997. 463pp. Price $70.00 ISBN 1-879961-07-5 (Available from the National Speleological Society, 2813 Cave Avenue, Huntsville, AL 35810-4431).

This is a magnificent book, being a much expanded version of the first author's *Cave Minerals* (1976, 173 pp) and both authors' *Cave Minerals of the World* first edition (1986, 238 pp). This second edition is more than double the length of the first providing a measure of the rapid growth of the subject.

The authors list 255 mineral species found in caves plus 38 varieties of calcite speleothems such as stalactites, stalagmites, helictites and flowstone. Most minerals are illustrated in full colour, though the lack of scale bars made some difficult to appreciate, and a few photos were upside down. Each mineral entry is accompanied by a bibliographic index with the references combined in a single list of nearly 4500 entries. There is a glossary and a comprehensive index. End-papers bear useful diagrams of the variety of cave environments where minerals may be found.

The authors use a definition of a cave as a natural cavity enterable by man. They specifically exclude vugs from their definition of a cave but some mineral-lined cavities large enough to enter are, in fact, just large vugs and minerals from these are included. Mineral veins, too, are excluded from the definition, but then many epithermal veins have cavities large enough to enter. Though some small vugs and veins are excluded, it still means that most of the usual hydrothermal suites of minerals such as galena, baryte and fluorite are listed, as well as their oxidation products.

The authors have also included lava tubes and blisters as caves, with an accompanying suite of silicate minerals. Fumaroles, often lined with sulphur or silica minerals, are included in their survey, though normally they only become accessible after fumarolic activity is extinct.

Two of the largest groups of cave minerals listed are phosphates (52) and sulphates (63). The former group includes several which are really weathering products associated with bone-bearing deposits or with bat or bird guano. The sulphates include many minerals associated with evaporitic conditions in caves of arid areas as well as some found in fumaroles.

Nearly half the book is taken up with contributed articles on special topics and on descriptions of a Top Ten of mineralogical caves. The special topics provide useful concise summaries of some controversial topics. These include the calcite/aragonite problem, crystallography and colour of speleothems, microclimates in caves, trace elements, microbial activity on speleothems, luminescence, dating methods, hydrothermal minerals, relationship with archaeological deposits, the alleged deposition of minerals by aerosols, conservation and display.

The Top Ten caves provide case histories of cave mineral assemblages from various environments, e.g. an Australian lava cave noted for its phosphates derived from bat guano; Lechuguilla Cave in New Mexico, famed for the origin of both the cave and its minerals by sulphuric acid emanations; and Cupp-Coutunn Cave in Turkmenistan which went through a late hydrothermal phase. However, there seems little point in including the French Blue Cave (with blue aragonite helictites) when it seems to be mainly a Roman mine working and is sealed with concrete to preserve it - probably affecting the microclimate and thus mineral deposition within.

The book is well produced and would grace any coffee-table but the English translations of Russian contributions are not always clear in meaning and there is a scatter of mistakes. Figure 27 should be attributed to A. Eavis. However, the book should be on every serious mineralogist's shelf and in every appropriate library.

T. D. FORD