volcanism in the island-arc environment, as exemplified by the Solomon Islands Younger Volcanic Suite (SIYVS). Thus, althougn the bulk of the book (Chapters 5–23) is concerned with describing ore element distributions and petrogenesis in the SIYVS, the context of this study is established (Chapters 1–4) within the framework of an important and outstanding problem in the genesis of massive sulphides.

After a brief introduction (Chapter 1) and a briefer outline of the general nature of exhalative ores and their volcanic associations (Chapter 2), the historical development of ideas of the origins of exhalative ores and theories for their origin are created in Chapters 3 and 4 respectively. Chapter 3, in particular, is an incisive piece of writing that gives a selective overview of the progress of ideas in this area — although it may not have been a specific aim of the book, this chapter alone provides a wonderfully clear picture of the scientific process and the (development of theories in a particular field. The author concludes in Chapter 4 that the currently predominantly held view, that sea-water leaching of preexisting volcanic rocks is the major processs by which ore-forming elements are sourced, is not a satisfactory explanation and proceeds to focus on the major alternative hypothesis involving derivation from magmatic solutions.

In order to make some predictions as to the bulk chemical composition of exhalative ores from the ore element distributions in associated magmatic rocks, the author, using the SIYVS as an example, proceeds to provide a detailed description of their petrology (Chapter 5) and of the distribution of Cu, Zn, Pb, Ba, Sr, P, Ca, Ti, V, Cr, Nn, Fe, Co, Ni (Chapters 6–19) and sundry other elements (Chapter 20) within various rock units and the minerals comprising them. This represents a very substantial piece of work incorporating nearly 1000 XRF, ICP-MS and neutron activitation analyses of whole rock and mineral separates as well as over 10 000 electron probe microanalyses. From the factual base provided, abundance patterns in crystallizing melts are treated in Chapter 21. For copper, in particular, it appears that fractional crystallization alone cannot explain the patterns observed, and elemental loss through magmatic solutions is invoked as a second important process. Chapter 22 considers evidence for the magnitude of ore element losses from magmas via volcanic exhalations. The implications for petrogenesis of the lavas and associated exhalative ores are discussed in Chapters 23 and 24 respectively, with the SIYVS exemplar being used as the basis for modelling ore element behaviour in other arc environments.

This is a well written and carefully crafted volume. It is easy (indeed, a pleasure) to read and the essence of the work is clearly encapsulated in the succinct concluding statements at the end of each chapter. The minimum of treatment of hydrothermal fluid chemistry and the lack of detailed discussion on the possibility of ore element fractionation through non-magmatic processes is, however, in my opinion, a major and unfortunate drawback of the volume in as far as an attempt is being made to explain the metal sources for exhalative ore deposits. Nevertheless, the monograph makes an important contribution to an important problem, and the detailed chemical and mineralogical analysis of the Solomon Islands Younger Volcanic Suite stands on its own as a remarkably substantial piece of work. Although at £85.00, this book might not be purchased by individuals other than those with a deep interest in arc lavas or exhalative ore genesis, I would highly recommend it for purchase by institutional libraries.

D. A. POLYA

Trounson, J. H. (Burt, R. and Waite, P., Eds.). *Cornwall's future mines*. Exeter (University of Exeter Press), 1993. xvi + 164 pp. Price £14.95. ISBN 085 9894096.

J. H. Trounson's knowledge of Cornwall's mineral potential was extensive, arising from more than 50 years' association with the mining industry. It was thus not surprising when, during the 1960s, he was asked by the Department of Trade and Industry to produce a series of reports on areas of Cornwall considered worthy of future mineral exploration. Unfortunately, by the time these reports were finished he was told that they were no longer needed (and he didn't even receive any remuneration for his efforts!). The unique information he compiled was thus in danger of remaining unpublished and being lost forever. It is thus fortunate that The University of Exeter has been able to publish these manuscripts, not least as a tribute to an individual who did so much to assist the mining industry during his life.

This work contains descriptions of about 50 selected mining sites of promise in Cornwall; some are large and well-known, whilst others are small and obscure. It outlines their development history and the reasons why exploration or exploitation of promising deposits was either not successful or was terminated. It then summarizes the reasons why the author considers them to be worthy of further exploration. It is notable that the factors which curtailed mining operations were varied and often not geological. These include mine ownership problems, the intervention of war, lack of finance, flooding, depression of the tin price at the end of the last century, and the sudden deaths of key personnel.

Although the book is fairly detailed it makes interesting reading, particularly in giving an insight into why projects may have failed in the past. It certainly whetted my appetite for exploration and I wished that I had some spare capital to invest in an exploration programme! The editors have done little to the original manuscripts so there is often some repetition. However, as they say: "What we have here is essentially a guide to buried treasure and no treasure hunter wants a second-hand interpretation of someone else's map — they want the original."

It is debatable whether the mining industry in this region will ever return to prosperity after the disastrous tin price 'crash' of 1985, but this book underlines the fact that promising prospects still exist in the region. It is recommended for anyone with interests in the mining industry and mineral exploration in southwest England.

D. H. M. ALDERTON

Burt, R., Waite, P. and Burnley, R., Eds. *The mines of Flintshire and Denbighshire*. Exeter (University of Exeter Press), 1992. xxxii + 168 pp. Price £12.95. ISBN 085989 3715.

This is the tenth volume in the series presenting statistical details of mining operations in various parts of the United Kingdom. It covers the mines of Flintshire and Denbighshire in northeast Wales, an area which has had a long history of mining but one that is poorly documented. During the latter half of the last century the mines were producing between one third and one quarter of the total British output of Pb and Zn, together with important amounts of Ag. The area was particularly unusual because at this time the production levels were increasing, unlike the terminal decline witnessed in other British metal mining fields. The book lists the mines in operation between 1845 and 1914, their location, owners, production statistics, and numbers employed. The information is all presented in tables, so it is essentially a reference work. It will be of specific relevance to those with interests in the former metal mining industry of northeast Wales.

D. H. M. ALDERTON

Vincent, E. A. *Geology and Mineralogy at Oxford 1860–1986: History and Reminiscence*. Oxford (Dept. of Earth Sciences), 1994. viii + 245 pp, 17 pls. Price £8.50 (£10.50 inclusive of postage and packing).

This book can be considered to have four distinct parts. It opens with an interesting historical description of the Departments of Geology and Mineralogy as they existed from their establishment in the University Museum in the latter part of the XIXth century up to their incorporation as a single Department after the Second World War. Here the black-and-white portraits of such worthies as Wm. Buckland, John Phillips, M.H.N. Story-Maskelyne, H.A. Miers, W.J. Sollas, T.V. Barker and R.C. Spiller help to bring to life the expertise and eccentricities of these gentlemen.

A new era was ushered in from 1950, with the appointment of L.R. Wager to the Chair of Geology, and for the years from 1951 onwards, when the author was appointed to the staff, we get a fascinating personal account of the development and growth of the Department, including the appointment of Louis Ahrens to the Readership in Mineralogy, the continuing research activities on layered intrusions, and the development and growing pains of the geochronological laboratory. I found these particular chapters of far more than mere parochial interest, describing as they do the burgeoning of geochemistry, integrated with mineralogy and petrology and the growth of isotope geology — mirroring many of the developments elsewhere. Ahrens was succeeded by the author as Reader in Mineralogy, and later by Jack Zussman and Eric Whittaker. Meanwhile on the geological side, the lecturing staff included such people as Malcolm Brown, Keith Cox, Stephen Moorbath, Keith O'Nions and Ron Oxburgh.

David Vincent succeeded Lawrence Wager to the Chair of Geology in 1967, and the third part of this account is devoted to the subsequent period of consolidation and change until his own retirement in 1986. Here we are given an insight into the strains and stresses in a department which had grown very considerably in size and perhaps had allowed the pendulum to swing too far to the 'hard rock' side. However, the last two decades with which this book is concerned saw the balance shift somewhat, with the emergence of strong research teams in palaeontology and sedimentology and the broadening of the research base of the Department. We also hear of the trials and tribulations brought about by the imposition of new fire regulations on old buildings and of the impact of the changing policy on grant allocations.

The last, but by no means least, part of this well written account is concerned with the technical and support staff — right back to the days of the typical indomitable laboratory assistants, who became experts in their subjects. They had to be Jacks-of-all-Trades, everyone having to help with setting out laboratory practical classes and clearing away afterwards. Later they became known as technicians, but were poorly paid, particularly in comparison with those employed elsewhere in the area at Morris Motors. Nevertheless, men and women