If the volume has a shortcoming it is in that it is dominated by case studies replete with data. These studies tend to address the consequences of extension rather than the causes. What is sadly lacking are a couple of critical review articles. One of these could usefully have dealt with the causes of extension (for instance, why does the over-riding plate decouple from the subducting plate? What causes subduction zones to lock or not?) and could have critically assessed the two dimensional finite modelling that predicts the dominance of extensional stresses in the over-riding plate. The second could have assessed, equally usefully, the likely types and chemistry of volcanic rocks extruded coeval with extension. Although the geochemical data detailed throughout the volume are always interpreted as being consistent with extension, the volcanic rocks do show significant differences in type and geochemistry from case study to case study. Is there a signature characteristic of extension at consuming plate margins? Unfortunately, Hamilton's review article is overly assertive and fails to address either of the areas where I believe that a review would have been most useful.

This is a valuable book which, with the exception of a bizarre typographical error on the back cover, has been excellently produced, as usual, by the Geological Society Publishing House and which does provide a useful synthesis of structural styles and volcanic products of extension of the over-riding plate at subduction zones. I heartily recommend it to anyone working in any arc terrain, modern or ancient, and to anyone with an interest in volcanism and magmatic processes. P. J. TRELOAR

Saha, A.K. *Crustal Evolution of Singhbhum North Orissa Eastern India.* Geological Society of India, Memoir 27, 1994. 341pp. Price US$ 40.

For many readers outside the Indian sub-continent, understanding of the Precambrian evolution of India is dominated by the data from southern India, notably the Dharwar Craton. The nineteen chapters in this Memoir redress this imbalance by providing an up to date summary of the Archaean and Proterozoic crustal evolution of another very important area of Precambrian rocks, those of northeastern India. Unravelling this area has been very much the life-time work of the author, who figures prominently in an extensive reference list. However, summaries of geological debate over the author's work, for example, the geochronology of the Older Metamorphic Group, are included.

Chapters 1 to 3 give an outline of basic concepts of Precambrian crustal evolution, the geology of the Sinhghbum-North Orissa region and the regional structure. Data from remote sensing and geophysical studies are included thus providing an integrated framework for the detailed descriptions of the major units which follow in chapters 4 to 16.

The Archaean (Chapters 4–9) covers the evolution of the old gneiss complex and the overlying supracrustal rocks. Chapters dealing with younger, individual components follow, each broadly organised in a similar way describing field relations and structure, petrography, geochemistry and petrogenesis. To many this information will be readily accessible in one place for the first time.

The geochronology (Chapter 10) is used to link the Archaean and Proterozoic parts of the Memoir. However, it seems a little out of place as data and argument about the Proterozoic rocks (Chapters 11–16) which have not been described, are presented.

Description of each of the Proterozoic components is broadly organized into supracrustal and volcanic rocks with associated intrusive bodies followed by intrusive granitic rocks. Again there is a logical organiztion of information within each of the chapters. The short Chapter 15 describing a group of supracrustal rocks does not follow easily.

Chapter 17 deals with major thrust zones whilst Chapter 18 describes metallogeny which, together with Chapter 5, provides good information on the economic geology of this region. The final chapter provides a personal model for Precambrian crustal evolution.

The use of abbreviations for many of the components causes difficulties because of the number involved. Most of the diagrams and photographs have been well reproduced, though some unfortunate misprints *(e.g.* Nb instead of Nd) occur. There are both author and subject indices.

This book would be a useful addition to a University Library catering for research as it provides a comprehensive guide to a relatively unknown region. I suspect that undergraduates will not be directed towards this Memoir as the region is not generally considered to be a classic area of geology. However, this book is a very useful summary and represents good value. C. R. L. FRIEND

Babu, T. M. *Tin in India* Bangalore (Geological Society of India: Mineral Resources in India, 7), 1994. ISBN 81 85867 10 0. x + 217pp., 15 maps. Price Rs 200 ($25.00).

Although India is a country which is not usually associated with tin mineralization, it does in fact contain numerous scattered deposits of cassiterite. The majority of these deposits are contained in pegmatites hosted by high-grade Proterozoic meta-

morphic terrains, and are associated with enrichments in a characteristic suite of elements (Nb, Ta, Li, B). Alluvial and colluvial concentrations from these primary deposits are also present. Most of the tin occurrences are, however, small in size, and currently it is only the deposits in the Bastar province which are economic.

Although much exploration for tin has been undertaken over the last few decades, the exploration and development programmes have been hampered by both the remoteness of the locations, and the secrecy surrounding any resulting geological data. This book attempts to summarise the occurrences of tin mineralization in India by bringing together and presenting much of this information. It describes many of the tin occurrences in some detail: exact locations, geological setting, nature of mineralization, and history of exploration and development are all presented. The methods used during the tin exploration programmes are outlined (including some discussion on biogeochemical surveys for tin).

This is an interesting and useful summary of the occurrence of tin in India, and the collection of information into one compact text is welcomed. It is packed with data and figures, and includes a good, general introduction to tin and its deposits. It will be of particular use to anyone needing an introduction to the tin mining and exploration industry in India. It will also be useful reading for anyone interested in the mineral deposits of India, tin deposits in general, or the occurrence of mineral deposits in high-grade metamorphic rocks. D. H. M. ALDERTON

Scott, V. D., Love, G and Reed, S. J. B. *Quantitative Electron-Probe Microanalysis* (second edition). London and New York (Ellis Horwood) 1995. xiv + 311 pp., Price £31.50 (paperback) ISBN 0 13 104050 2.

This book comprises 15 chapters covering the theoretical, instrumental and some practical aspects of electron microprobe analysis. Chapter titles are as follows: (1) 'An historical perspective', (2) 'Physical basis of quantitative analysis', (3) 'Wavelength dispersive spectrometry', (4) 'Energy dispersive spectrometry', (5) 'Processing energy dispersive spectra', (6) 'Experimental determination of X-ray intensities', (7) 'Atomic number correction', (8) 'X-ray absorption correction', (9) 'Fluorescence corrections', (10) 'Evaluation of correction procedures', (11) 'Correction procedures in practice' (12) 'The Monte Carlo method', (13) 'Analysis of thin coatings', (14) 'Analysis of thin films' and (15) 'Analysis of particles'. The original edition of this book was published about a decade ago and this second edition has been substantially revised to take into account recent advances. The particular revisions include details of the $\phi(\rho z)$ correction procedures as well as updating the evaluation of correction methods. Details are also included of multi-layer devices for long wavelength WDS gernmanium energy dispersive detectors and applications in the analysis of thin films, coatings and particles (which are now afforded separate chapters).

The book gives an excellent overview of theoretical and instrumental aspects of electron microprobe analysis. A substantial part of the book is devoted to mathematical correction procedures, reflecting, no doubt, a particular area of interest to the authors. However, other instrumental aspects are adequately covered. What the authors have not attempted to do is review applications of the technique, or to demonstrate the important scientific contribution that the electron microprobe has and continues to make. Nor is any attempt made to review the capabilities of the electron microprobe in relation to other modern microprobe techniques.

This said, however, the book is excellent in its role as a 'nuts and bolts' text; it is well laid out and contains numerous line drawings which make a valued contribution in illustrating the text. The bit I enjoyed most? — browsing through the historical perspectives section which gives details and illustrations of pioneer electron microprobe instruments — 'lest we forget'. The bit I most appreciated having to hand'? — the sections on the various correction procedures — 'good for the soul' and one day I'll get round to reading these chapters in detail. The bit I disliked most? — within the scope set by the authors, none, although it would have been nice to appreciate the advances that can be attributed to the electron microprobe in the various branches of science and technology.

Overall — an excellent book and, in paperback format, very good value for money. P. J. POTTS

Hodge, P. *Meteorite Craters and Impact Structures of the Earth.* Cambridge (Cambridge University Press), 1994. Price hardback £25.00. ISBN 0 521 360927. 124 pp.

As the title implies, this book is a compilation of descriptions of meteorite craters and impact structures on the Earth. Each description is accompanied by basic geographical, age and size information, a sketch-map of the surrounding area, and a summary of the geological setting. References to more detailed work on each crater are given, where appropriate. Many entries are illustrated with aerial photographs. Where the author has visited the site, he has provided a description of access details, and suggested itineraries for the best exploration of the feature.