BOOK REVIEWS

Thompson, M., and Walsh, J. N. *A Handbook of Inductively Coupled Plasma Spectrometry*. Glasgow and London (Blackie), 1983. xii + 268 pp., 65 figs. Price £35.

Much of the classical data of trace element geochemistry was obtained by the use of the d.c. arc emission spectrograph. From the early 1960s rapid advances were made in the development of X-ray spectrometers and atomic absorption spectrophotometers. These instruments soon replaced the traditional emission spectrograph in many geological laboratories as a means of analysing rocks and minerals for a wide range of trace elements, and proved equally reliable for routine major element analysis. During this same period the potential of the inductively coupled plasma (ICP) as an alternative to the d.c. arc spectroscopic source was realized by analysts in the UK and the USA. Developments in ICP technology and related spectrometers over the last twenty years have reinstated atomic emission spectrometry as a versatile alternative analytical technique and, for many applications, a highly competitive one.

This book by Thompson and Walsh introduces inductively coupled plasma atomic emission spectrometry (ICPS) to geoscientists, environmental researchers and, the authors hope, to workers in other fields of application. The book aims to provide an introduction to ICP spectrometry for analysts using the technique routinely; background information for workers wishing to familiarize themselves with the potential of the technique; information on the background and operation of the ICP; and detailed methods for those involved in routine analysis. The authors state specifically that they have 'consciously avoided any detailed discussion of the theoretical aspects of the ICP' while at the same time 'not advocating a black-box approach to analysis'. They have preferred to explore the applications and potential of ICPS to the analysis of natural materials but, while recognizing its importance in manufacturing industries, have not extended their discussions to manufactured materials.

The book contains ten chapters and two short appendices. Chapter 1 ('Introduction', 15 pp.) briefly outlines the purpose and scope of the book and provides a summary history of the development of ICPS and a background to ICP analysis. Chapter 2 ('Analytical characteristics', 21 pp.) identifies the analytical characteristics of ICPS and includes discussion of such matters as interferences, detection limits, precision and accuracy, and the 'dynamic range' of ICPS. Chapter 3 ('Instrumentation for ICP atomic emission spectrometry', 46 pp.) reviews the component parts which make up an ICPS system (both multielement and sequential), comments briefly on the relative merits and performance of alternative devices (nebulizers, torches, generators) and offers useful advice to prospective purchasers of commercial ICPS systems. Chapters 4 ('Silicate rock analysis', 33 pp.), 5 ('Multielement applications in applied geochemistry', 33 pp.), 6 ('Gas phase sample injection', 22 pp.), 7 ('Discrete sample injection methods for solid samples', 26 pp.), 8 ('Water analysis by ICPS', 14 pp.), and 9 ('The analysis of environmental materials by ICPS', 17 pp.) comprise essentially the 'handbook' aspect of the book's title. Chapters 4, 5, and 6, in particular, convey clearly through numerous hints and comments that both authors are active 'bench men' and in close touch with the day-to-day performance of ICPS analysis. Chapter 10 ('ICPS—now and in the future', 24 pp.) reviews the present capabilities of ICPS for the analysis of geological and environmental materials and suggests possible future trends in instrument design. Other aspects covered, but not evident from the title of the chapter, include the use of the ICP as a source for other analytical techniques, discussion of alternative plasmas for atomic emission spectrometry and a comparison of ICPS with other analytical methods widely used in geological and environmental research. Appendix 1 ('Safety', 4 pp.) provides a short summary of safety matters which one would have hoped was superfluous for readers contemplating purchase of a sophisticated ICPS system! Appendix 2 lists names and addresses of a selection of manufacturers and UK agents supplying ICPS systems and accessories.

The authors have succeeded in achieving the brief they set themselves and overall have presented a fair, but not exhaustive, assessment of the practical capabilities of ICPS in geological and environmental research, particularly with reference to multielement polychromator systems. There will be readers who would have wished for an increase in the 'cookbook' aspects of the text and others seeking a more detailed discussion of ICP theory. The former will have to scan the ever-increasing flow of papers in analytical journals, especially if they require information on methodology relating to scanning monochromator systems for sequential analysis. Specialist practising ICPS analysts may look for more detailed discussion of their own field but this book was not written with them in mind.

The book is well written and well produced with clearly drawn and annotated text figures. Typographical errors are few and references are given in full rather than in the cryptic format adopted by many publishers.

This book will undoubtedly be consulted by many 'geoanalysts' and environmental scientists but, regrettably, its price may limit its purchase to those workers actively engaged in ICPS analysis or those who are about to do so. Bearing in mind the ever-expanding applications of ICPS in geological and environmental research the authors will no doubt already be looking forward to a second edition.

J. E. THOMAS

Boyd, F. R., Jr., ed. *Explosive Volcanism: Inception, Evolution and Hazards.* Washington, DC (National Academy Press), 1984. xii + 176 pp., 72 figs., 20 photos, 40 maps. Price $24.50.

Although explosive volcanism has been a major concern of volcanologists for decades, it took the events at Mount St Helens in 1980 and subsequently to convince the wider US scientific community—let alone the American public—that this is a topic in urgent need of further research. The obvious first stage of such work is to summarize what is already known about the subject. This inexpensive but well-produced volume is an admirable attempt to do so by a committee established by the American National Academy of Sciences. The result of their labours is a paper on a relevant aspect of the topic from each panel member and an introductory overview and lists of recommendations edited by their chairman, F. R. Boyd, Jr. This opening chapter is an excellent summary of what we do and do not know about explosive volcanism, leading to crisp recommendations as to what we should do to improve the situation. Its target is 'to aid policymakers in decisions on societal problems that involve geophysics'. What is not specified but becomes clear within minutes of opening the book is that both the policymakers and problems in question are strictly American. Indeed, nearly all the discussion focuses on the conterminous United States; Alaska is hardly mentioned. The value of this report for the rest of the world is therefore indirect, but it is nevertheless substantial, because all the articles are well prepared and carefully written.

The first two papers are concerned with alkaline magmatism in general (A. L. Boettcher) and the tholeiitic flood basalts of the north-western USA in particular (R. W. Carlson). These illustrate another unusual aspect of a book of this nature. Rather than giving balanced (or even unbalanced!) reviews of the present overall state of opinion on their topics, the chapters are simply vehicles for the authors' own opinions on the matters. Clearly the committee must have thought carefully before taking this rather unusual course. It limits the potential use of the volume for such purposes as teaching but gives it a 'bite' which makes it a good read. The next three articles cover subduction (I. S. Sacks), magma formation and ascent (B. D. Marsh), and volcanism in the geologically recent past and probable near-future in the western USA (R. L. Smith and R. G. Luedke). Three wall-chart maps accompany the last paper, and depict western USA volcanism at 5 Ma intervals for the last 15 Ma. To date, I have found these to be some of the most useful items in the book. The two following papers give a very detailed summary of present knowledge about Yellowstone (R. L. Christiansen, R. B. Smith, and L. W. Braile). The next three look at explosive eruptions in general (T. Simkin and L. Siebert), followed by detailed studies of the phreatic explosions of Kilauea (R. W. Decker and R. L. Christiansen) and the Mount St Helens eruption on 18 May 1980 (J. G. Moore and C. J. Rice). Next S. W. Kieffer gives an invaluable account of the physics of various types of volcanic jet. K. H. Wohletz and R. G. McQueen follow this theoretical approach with an illustrated account of spectacular DIY analogues to phreatomagmatic eruptions, conducted in a disused quarry with mixtures of thermite and water. The final chapter (R. S. Fiske) compares two examples of another sort of potentially explosive interaction—between volcanologists, governments, and the public—during two recent volcanic crises in the Eastern Caribbean. This is a thoughtful analysis of a very serious topic. It should be read carefully by all of us who have to give 'expert' advice on any geological matter potentially involving public safety.

R. N. THOMPSON

Fry, N. *The Field Description of Metamorphic Rocks* (Geological Society of London Handbook). Milton Keynes (Open University Press) and New York (Halsted Press: John Wiley and Sons), 1984. x + 110 pp., 12 figs., 58 photos. Price £5·95.

The Field Description of Metamorphic Rocks by Norman Fry is a long overdue and very necessary addition to the present range of texts dealing with metamorphic geology. The text is aimed at final year undergraduates, although it will interest a much wider group than this, and concentrates entirely on the description of metamorphic rocks in the field rather than their study by laboratory