

Prichard, H. M., Potts, P. J., Bowles, J. F. W. and Cribbs, S. J. *Geo-Platinum 87*. London and New York (Elsevier Science), 1988. xiii + 422 pp. Price £70.00.

This interesting volume contains papers presented at the Geo-Platinum 87 Symposium held at the Open University in April 1987. The editors are to be commended for publishing 19 stand-alone abstracts as well as 25 generally concise papers, thus enabling the flavour of current research in platinum group mineral (PGM) distribution, geochemical behaviour and analysis to be fully appreciated by the reader. Most of the contributions deal with individual occurrences, ranging from the Americas to Europe to Africa (North, South and Equatorial) to the Philippines. Although less numerous, the articles on analytical techniques and the behaviour of PGMs in aqueous fluids reveal important and significant advances in the study of PGMs in the crust.

The setting for the current escalation of interest in platinum exploration is lucidly described in the introductory invited papers by C. J. Morrissey and C. R. N. Clark. The former emphasises the importance of accuracy of geochemical assays for PGMs, whilst S. J. Parry, I. W. Sinclair and M. Asif show in their studies that there is considerable scope for the further development of more reliable analytical methods. Two novel methods are presented by I. Shazali, L. van't Dack and R. Gibels (detailing a technique for PGM preconcentration) and P. J. Potts (beta autoradiography for finding PGM grains in polished thin sections).

Papers representing major advances in our understanding of PGM ore genesis and redistribution are contained within the section 'Theoretical and Experimental Studies'. B. W. Mountain and S. A. Wood provide a well-organised theoretical analysis of the solubility and transport of platinum-group elements in hydrothermal solutions. They systematically consider the likely importance or otherwise of a variety of inorganic PGE-complexing ligands. A flaw is the miscalculated overestimate of the stability of Pt- and Pd-hydroxide species. Nevertheless, this paper, together with that of I. R. Plimer and P. A. Williams, provides valuable guidelines for theoreticians and experimentalists interested in the role of aqueous fluids in concentrating or redistribution PGEs. An explanation for the enrichment of Ni, Cu and PGE in chromitite sulphides is elegantly developed by A. J. Naldrett and J. Lehmann. They invoke the loss of Fe from sulphide, on cooling, to non-stoichiometric Fe-deficient spinels, crystallised from a basaltic melt.

The remaining papers in this volume provide an extensive coverage of PGM deposits of different types in various tectonic environments and locations. Detailed petrographic and structural studies include those of A. J. MacDonald (Lac des Iles), K.-P. Burgath (Kalimantan), B. Orberger, G. Friedrich and E. Woermann (Acoje Ophiolite). Considerable emphasis, however, has been placed on chemical assays for PGMs and establishing (or otherwise) the association of Os-Ru-Ir with chromite and Pt-Pd-Ir with sulphides; for example the papers of D. J. M. Burkhard, N. J. Page and G. C. Amstutz (Serpentinites, Eastern Central Alps), W. Fischer, J. Amosse and M. LeBlanc (Bou-Azzer Ophiolite), and R. F. J. Scoates, O. R. Eckstrand and L. J. Cabri (Bird River Sill). S.-J. Barnes and co-authors assess the use of various chemical analytical discriminators in establishing the relative importance of various processes controlling the distribution of PGEs. This paper is suffixed by a substantial reference list of analytical data on rock PGM contents.

A recurring theme throughout this volume of proceedings is the influence of aqueous fluids in redistributing PGEs. J. Bowles presents evidence for groundwater transport of PGEs in Sierra Leone above the Freetown Layered Complex. Evidence for fluid beneath Merensky Reef pot-holes is provided by R. G. Cawthorn and K. L. Poulton. Direct evidence of hydrothermal transport of PGEs is documented by A. J. MacDonald (Lac des Iles), D. H. Watkinson and R. Dahl (Two Duck Lake Intrusion) and J. H. Crocket and A. Kabir (Hawaiian basalt).

There are many other interesting articles in this volume, which succeeds admirably in its stated task of giving 'the reader a taste of contemporary research activities which are now being pursued ... to further ... understanding of concentration processes ... [potentially leading to ore formation]'

D. POLYA

Hodgson, A. A. *Alternatives to Asbestos and Asbestos*. Crowthorne, Berkshire (Anjalena Publications Ltd.), 1987 (2nd Edition). ix + 284 pp. Price (post-free) UK £54.00, Europe £56.00, others £60.00.

The background against which this book has been written can be gleaned from two passages from its early pages. In his Foreword for the first edition (1985). Sir William Simpson paraphrased from the Report of the Advisory Committee which he Chaired in 1978/9 that it recommended that those

involved in the management of asbestos-containing products must consider its substitution by other materials. The author, in his introduction to the present edition makes the general statement: 'In effect, there are many alternatives, substitutes and replacements for asbestos, but none of these can be said to be an equivalent.' Any individual or organisation concerned by those two statements will need to know a great deal about asbestos itself and about the possible substitutes, and the extent to which they do or do not match the desirable properties of asbestos when put to specific uses. To these ends they will find the present publication immensely useful.

The book has two roughly equal parts. The first deals with 'Alternative Raw Materials' and has a chapter on each of the following: glass fibres and mineral wools; synthetic organic fibres; natural organic fibres; carbon fibres; refractory fibres; metallic fibres and composites; minerals. After each chapter there are tabulated data on properties (e.g. physical, chemical and electrical), chemical composition and manufacturers for the material concerned.

The second part is headed 'Alternative Products' and its six chapters are: fibre-reinforced cement; building materials and insulation products; heat-resistant and high-performance textiles; friction materials; reinforced plastics; packings, joints and bearings. Each of these chapters is followed by tabulations of properties and also costs and consumption for the product in question.

With regard to asbestos itself, some useful tables are provided showing world-wide production, consumption by major world areas, consumption for different uses, and prices (1987). Also tabulated are the costs and availabilities of alternative materials and a general listing of their properties under the headings of heat resistance, reinforcing strengths and chemical resistance. Each chapter of the book is annotated by copious references to the literature, reports and patents.

In the author's synopsis he refers to the 'broadly held concept that fibres of any type are hazardous if they are durable and respirable'. He understandably does not pursue this subject except in one Appendix entitled 'Alternative Materials—Suspected Health Hazards'. Understandably, because it is beyond the scope of his technical approach but also because although for some materials it is possible to state simply 'no known biological effect', for others sufficient reliable data are not yet available. Some general references to work on this important subject are provided.

Dr Hodgson is to be congratulated on producing this extremely valuable work of reference bringing together in well-organised fashion so much useful information.

J. ZUSSMANN

Runcorn, S. K., Turner, G. and Woolfson, M. M., eds. *The Solar System: Chemistry as a key to its Origin*. London (The Royal Society), 1988, xviii + 251 pp. Price £50.00.

This book contains the papers given during a two-day Discussion Meeting of the Royal Society on the chemical evidence currently available bearing upon the origin of the solar system. The meeting was divided into five sessions which considered, in turn, the sources of the chemical elements, meteorites, small bodies and terrestrial planets, planetary volatiles and the origin of life. The book follows this format and includes the discussion which followed each of the sessions. The topics range from star formation to the origin of life via meteorites and the possible isotopic signatures of pre-solar-system material. The papers review the information available and discuss possible interpretations. Many diverse sources of information are brought together successfully to cover the wide range of related topics. The book is an informative summary of our current knowledge on these topics. Those with access to libraries will find the proceedings published in the *Phil. Trans. R. Soc. Lond.*, 1987, A 325, 389–641. Though I recommend those interested in planetary science to purchase their own copy of this volume, the price asked may prove too much of a deterrent.

A. L. GRAHAM

Moores, E. M. and Wahl, F. M., Editors. *The Art of Geology*. Boulder, Colorado (Geological Society of America: Special Paper 225), 1988, viii + 140 pp., 250 colour photographs. Price \$37.50, postpaid.

Readers of *Geology* have grown to appreciate the eye-catching cover photographs—the inspiration behind this volume that comprises 140 pages of colour photographs with brief geological explanations. Whilst providing an interesting 'coffee-table' text for the amateur geologist, the quality of the photographs is variable. Moreover the choice of geological topics is of necessity random but they could have been arranged chronologically (i.e. Archaean to present-day) such as to be more instructive.

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