BOOK REVIEWS

SLANSKY, Maurice, *Geology of Sedimentary Phosphates*. 1986. North Oxford Academic Publishers Ltd., Translated by Peter Cooper, 210pp. Hardback £24.50. ISBN 0 946536 55 4.

"Phosphorous was extracted from human urine for the first time in 1669 by the German alchemist Henning Brandt of Hamburg". Thus opens this English edition of Maurice Slansky's well-known state-of-the-art review of sedimentary phosphates, which first appeared in French in 1980. Not, perhaps, the most fitting beginning for an element that is so indespensible and irreplaceable in the living world; nor the preferred source of supply for a giant multinational fertiliser and chemical industry!

This revised and updated edition provides both a detailed and a readable account of sedimentary phosphates. There are eight chapters, together with an extensive updated bibliography and helpful index. Chapter 1 surveys the occurrence of phosphorous in nature, both in living organisms and in the earth's crust. Chapter 2 details the mineralogy of phosphate minerals that occur in sediments, principally apatites of various forms, whereas Chapter 3 synthesises current knowledge of sedimentary petrography and attempts a best concensus classification. Fortunately, the terminology chosen is borrowed liberally from siliciclastic and biogenic classification schemes so it *can* be understood. A pity there seems no room for triangular diagrams, though, and the subtle distinction between phosphorites and phosphatites may not prove too helpful I suspect. Chapter 4 is a useful compilation of many data on the major, trace element and rare earth element chemistry of phosphatites.

Chapter 5 on the mechanisms of phosphate sedimentation and phosphatite accumulation is the longest and potentially most contentious section of the book. In my opinion, Slansky has performed a difficult task admirably, at times even over-emphasising concepts or mechanisms we no longer really accept. Thus we are taken through the possible sources of phosphorous, continental versus oceanic, the environments and processes of formation of phosphate minerals, and then the accumulation and preservation of sufficiently rich deposits to become known as ores. The chapter deals only briefly with diagenesis of phosphatites, a section I felt could have been enlarged, with the association of uranium and phosphatite, and with six separate case sudies of phosphatite accumulation from the Upper Cretaceous—Tertiary of the African Atlantic coast and Tunisia, and from the Permian Basin of the Rocky Mountains.

There are then two shorter chapters on prospecting and mining of deposits (Chapter 6) and on the phosphate industry (Chapter 7) followed by a couple of pages by way of a conclusion (Chapter 8). These last Chapters serve to round off a very useful and succinctly written book.

For a text of this length on a topic that has grown so greatly since the early 1970s, it should not be surprising that individual readers will find some of their own 'favourite' areas incompletely covered or some important examples of phosphatite occurrence not even discussed. But, what the author has dealt with has been thorough and the over 350 references provide a very useful back-up. It is also a well-presented text illustrated with about 40 figures and 50 plates, although I would have appreciated colour rather than black and white plates of the many photomicrographs, even considering the additional costs involved.

In summary, it is a short, readable, authoritative and inexpensive text on a subject of considerable interest to sedimentologists and economic geologists—clearly a must for libraries and for phosphate workers, and a worthwhile purchase for other active sedimentologists.

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MARRE, J., 1986. *The structural analysis of granitic rocks*. North Oxford Academic Publishers Ltd., London, translated from French by John Renouf, xii + 123pp., 140 figs. and 1 folded map. £16.50 hardback, ISBN 0 946536 10 4.

This is not a book for the amateur browser or for the undergraduate with only a general interest in granites. Nevertheless although written by a specialist for specialists, it contains an abundance of small, but lucid, pen and ink drawings of a very wide range of structures and textures which all who visit granite terrain would benefit from studying. Explanations in the text are stimulating and sometimes controversial, certainly they should cause the reader to think about similar structures observed elsewhere.

This, however, was not Jacques Marre's principal intention. He argues with some justification, that the structural aspects of granites have not been researched as much as their composition and that structural analysis techniques "have produced a body of interpretation now indispensable to the understanding of the genesis of these rocks". He, therefore, attempts to set the record straight by demonstrating what can be achieved by studying solely the mineral fabrics and structure of granites. To achieve this he begins oddly, not in the field where he agrees that all research should start but with microscopic fabrics. After a very brief introduction the reader is thus plunged into the intricacies of petrofabric analyses so that as early as page 18 three dimensional strain is introduced followed on p20 by the 'Behaviour of rigid particles in a viscous fluid subject to rigid strain'. Not until part 2 (macroscopic analysis) can the reader begin to relate fabrics, observed and measured using a petrological microscope equipped with an universal stage, to structures observed in the field. His all too brief discussions about the relevance of petrofabric analysis do, however, contain some intriguing concepts and ideas which this reviewer would have liked to have been more fully discussed. Amongst these are criteria for distinguishing between deformation caused by magmatic processes and those resulting from tectonic forces; the construction of isodeformational maps of granite intrusions from fabric intensities and the possibility of studying the evolution of fabrics through time.

However, it is in Part 2 that the author provides most detail of both observed structures and deductions which can be drawn from them. Macroscopic structures resulting from flow; joints; intrusive veins and sheets; contacts and enclaves are accompanied by interesting discussions of their genesis. French geologists have long been noted for their detailed observations on enclaves (i.e. xenoliths) and not the only virtue of this book is that it provides a useful summary, in English, of this research and reference to about fifty continental (mostly French) papers which are not readily available in this country. As the author notes "enclaves would thus seem to be one of the fundamental elements in the structural analysis of magmatic rocks, with an importance that surpasses their role in mere geometrical analysis, i.e. they contribute towards an understanding of the phenomena of crystallisation, of mixing and more particularly, of flow during emplacement". Yet in many papers on granite they receive but the briefest mention.

Detailed as Part 2 is, examples are drawn from comparatively few examples mostly from the Querigut complex in the Pyrenees, which the author has studied in detail, and the main Donegal Granite, the subject of an exhaustive study by Pitcher and Berger. Structures in a few other plutons notably in Brittany, the Vosges, Gallicia and the Massif Central are perfunctorily mentioned. Perhaps rightly Marre does not attempt to review all macroscopic structures in all acid intrusives but inevitably the impression is given that the Querigut complex is *the* example *par excellence* with which all others should be compared. The structures of post-tectonic intrusions and such features as pegmatities are barely mentioned and greisens not at all.

Part 3 (Megascopic analysis) widens the field somewhat by attempting to compare theoretical and experimental work on the morphology of acid intrusives with field observations of their actual structures. Interesting comparisons are made between Ramberg's well known experiments and examples of several plutonic complexes in Donegal, the Sierra Morena of Spain, the Coriscan-Sardinian batholith as well as the Querigut complex. Interpretations are very brief, in stark contrast to the wealth of detail in the preceding part of this book illustrating, to this reviewer at least, how little detail is known for certain about the genesis of granites from the generation of the first granite liquid to their final consolidation even when a comprehensive structural study has been completed.

Although it is refreshing to read accounts of the genesis of granites which lack spidergrams, discussions of incompatible elements, initial Rb-Sr ratios and all the rest of the stock in trade modern geochemistry this writer for one hopes that someone will demonstrate how much more can be deduced from an integrated geochemical and structural approach. Nevertheless, this book is a valuable antidote to the plethora of geochemical papers on granites which have appeared in English language geological journals in recent years. The translation is excellent and for the specialist a worthwhile investment.

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MOSELEY, F. *Geology and scenery in the Lake District* 1986. MacMillan Education Ltd., Basingstoke and London, vii + 88pp., and 72 figs. £6.50 paperback. ISBN 0–333–41781–X.

This is the second of what promises to be a series of books which may be justly dubbed the "geologists' Wainwright". As in the first volume, which was restricted to the volcanic rocks, this book seeks to instruct largely by using numerous illustrations, the text being kept to a minimum.

Through his numerous scientific papers Frank Moseley's geological maps and line drawings of rock exposures have become well known to the geological fraternity being instantly recognisable by his inimitable style. In these books he has not only introduced these maps and text figures to a wider audience but has revealed a further aspect of his artistic ability namely his masterful black and white panoramic views which capture, more often than not, the more sombre modes of Lake District scenery. Anatomy has long been an essential ingredient of an artist's training but geology and geomorphology have not been considered to be an essential pre–requisite for a landscape artist. In this reviewer's experience so rare is it to find drawings of mountain landscapes that are anatomically correct that these volumes should be valued for that alone.

But Dr Moseley goes further – almost every panorama is accompanied on the facing page, by a small line drawing identifying the main rock types and by a geological map. Used in the field this should greatly help inexperienced and aspiring geologists to begin to visualise the geology in three dimensions. Nor does he, like so many authors, over simplify the problem of relating scenery to the underlying geology by choosing only the most easily interpreted examples to illustrate his text. Pike O'Blisco for example, is drawn from three different angles to illustrate how the structure can often only be fully appreciated if studied from different viewpoints and a view of High Stile is included to illustrate how, in some well exposed Borrowdale Volcanic terrain no structures, other than joints, are obvious.

This volume differs from its predecessor in concentrating on scenery rather than rocks, nevertheless rocks are not ignored and there are excellent close–up photographs and drawings of the Skiddaw Slates; amygdaloidal and porphyritic lavas; slump folds in bedded tuff; details of bedded tuff sequences; ignimbrites; flow–banded lavas; the Coniston Limestone; Brathay Flags; structures in the Coniston Grits and Bannisdale Slates and Carboniferous Limestone. Also, instead of solely describing volcanic terrain, Skiddaw Slate, Ordovician, Silurian and Carboniferous Limestone landscapes are depicted. As the author admits, however, the examples are chosen, not because they are representative, but because they are in areas most familiar to the author. Consequently landscapes developed on Borrowdale Volcanic rocks still pre–dominate and although the classic geomorphological features resulting from glaciation of the upland areas are not neglected those in the valley bottoms are ignored. Even where the valley floor is shown the alluvium is not identified. The teacher of physical geography should be warned, therefore, that such features as U–shaped valleys, roche mountonnées, ribbon lakes, and deltas, are missing. This is not a definitive or even a representative text–book on the geomorphology of the Lake District, indeed it is more a personal anthology than a text–book.

The format is similar to the first volume in that a short introduction is followed by a series of itineraries all amply illustrated. The policy of dispensing with a glossary and explaining terms as they arise is, in my opinion, less successful than in volume one partly because the text has been reduced to about a bare minimum of about 25% compared with 33% in the earlier book. Although it is admirable and helpful to explain terms in the text this is the sort of book that the reader reads for a particular itinary and is unlikely to read from cover to cover. A glossary covering all volumes would, therefore, be helpful to those unfamiliar with geological jargon in any future publication. The reader will also note that there are other differences some welcome and some not so welcome. Principal amongst these is that although the page size remains the same (245mm × 187mm i.e. too big for all but the largest anorak pocket) a sideways format is used. This permits panoramas and their explanation to be on facing pages and have the same orientation thus oviating the irksome necessity of the reader having constantly to turn the book through ninety degrees. Concomitant with this improvement is a reduction in the amount of text per illustration, a decrease in the number of pages and an increase in the price, although at £6.50 it is still good value. 'Smiling' sheep looking, dare I say it, more human than the figures which adorn the other pictures, may endear the book to some and irritate others.

Although the text is reduced Frank Moseley does find space to warn of the uangers of fell walking; words all, whether they use his book or not, should take to heart. I can do no better in conclusion than quote from my previous review for in spite of its limitations this like its predecessor is still "an indispensable guide to all with even the slightest interest in geology who visit the Lake District".

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OMISSIONS

The authors and editor apologise for the omission of the following references from papers which were published in Vol. 10, No. 3.

1. From the paper by Mostaghel, M.A. and Ford, T.D. (p.224).

   Worley, N.E. 1978. *Stratigraphical control of mineralisation in the Peak District of Derbyshire.* Ph.D. thesis, University of Leicester, 263pp.

   Worley, N.E. and Ford, T.D. 1977. Mississippi Valley type orefields in Britain. *Bull. Peak Distr. Mines Hist. Soc.* 6, 201–208.

2. From the paper by G.D. Miller (p. 202).

   Walker, R.G. (Ed), 1979. *Facies Models.* Geoscience Canada Reprint Series I, 211pp.