

## BOOK REVIEWS

Pitcher, W. S., Atherton, M. P., Cobbing, E. J., and Beckinsale, R. D., eds. *Magmatism at a Plate Edge: the Peruvian Andes*. Glasgow (Blackie) and New York (Halsted Press), 1985. x + 328 pp., 246 figs., 2 coloured geological maps. Price £65.

This book celebrates one of the outstanding achievements in geological sciences accomplished over the past twenty years. Before the early sixties, most modern interest and research effort in igneous petrology had been directed towards understanding the processes and significance of basic magmatism, both volcanic and plutonic. In 1965 Wallace Pitcher, who had previously carried out in Donegal some of the most interesting of the little work done on granite bodies, initiated what became an exceedingly ambitious and enterprising field and laboratory research programme—the study of the Coastal Batholith of Peru. Using the resources of his department at the University of Liverpool and working in close collaboration with a team from the (then) Institute of Geological Sciences, as well as with geologists from the Geological Service of Peru, an assault was carried out on the great complexity of this ‘granitic’ terrain with its marvellous three-dimensional exposure but daunting logistic problems. Numerous geologists, including research students and professional specialists, became involved as mapping was collated and followed up by detailed petrographic, geochemical, and isotope studies. Concepts were developed and refined into a comprehensive model for the evolution of the batholith in relation to its destructive plate margin environment. Although many aspects of this work have appeared in print since the programme got under way, the twenty-five chapters in this book represent the only complete and comprehensive review of the results and their significance.

Each chapter is in essence a review-type summary co-authored by those who have collaborated on each topic. There are some thirty contributors in all. The first five chapters are concerned with the general geological setting and pre-Mesozoic history of the Peruvian Andes, including the Arequipa massif and the Eastern Cordillera, with notable contributions from French and Canadian teams who were not part of the main programme. This places the subsequent chapters in a more complete context and adds considerably to the value of the book to the non-specialist. Three further chapters establish the early environment into which the granites were emplaced—the volcanic/sedimentary fill of an ensialic marginal basin, its burial and metamorphism, and the early basic intrusions

which are related to aborted rifting rather than to the calc-alkaline magmas. The core of the book—chapters 9–21—deals with the batholith itself; its classification (especially the concept of units and superunits which can be recognized in the field and provide a key to the magmatic history), its mineralogy, mechanics, structure and form. Of special importance are the chapters on geochronology and the geochemical characteristics of individual superunits, as well as the use of both these aspects to identify the source of the magmas as a uniform sub-crustal region, possibly basaltic underplating. The remarkable linear regularity of the batholith is used to argue for long-lived lithospheric fractures controlling the ponding and rise of evolving magmas. The final chapters deal with the metallogenic history associated with the batholith, including both early Cu-Fe and late porphyry-Cu mineralization events, and the overlying plateau-type volcanic rocks.

Considerable care has gone into the production of this book. Its readability and comprehensiveness is much enhanced by the chapters in which the main editors are also authors, providing general comments, links between various aspects and synthesis of conclusions. It is lavishly laid out and illustrated and includes two coloured maps covering the area from Chimbote southwards to the Chilean border (at scales of 1:500 000 and 1:700 000). There are unfortunately some signs of last minute haste in its preparation, the most obvious being the reference list for the entire volume which has an addendum but is still incomplete. However, this is a small flaw in an exceptionally important work. As pointed out by Sir Malcolm Brown in his Preface, publication happily celebrates the 150th anniversary of the British Geological Survey, whose mapping contract with the Peruvians was a lynchpin of this programme (MA 81–4515). However, to a large part of the geological community, this volume will chiefly represent a fitting monument to breadth of vision and resourcefulness of Wallace Pitcher.

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Wright, J. B. with contributions from Hastings, D. A., Jones, W. B., and Williams, H. R. *Geology and Mineral Resources of West Africa*. London (George Allen and Unwin), 1985. xiii + 187 pp., 49 figs. Price £30.

This book provides a broad summary of West African geology and mineral resources for undergraduates who have already been introduced to the