BOOK REVIEWS

VOGEL, J.C., (Ed.) *Late Cainozoic palaeoclimates of the Southern Hemisphere* 1984. A.A. Balkema, Rotterdam. 536pp., £27.50, Hardcover. ISBN 90 6191 554 6.

Never having had the opportunity to visit the Southern Hemisphere, the reviewer was initially a little doubtful over the intrinsic interest to be generated by this volume amongst those whose primary perspectives are oriented towards the north. This feeling was not lessened by the discovery that it constituted the proceedings of a symposium, for past experience has been that products of this nature are often patchy in their quality. In the event these factors have proved to be largely unfounded and a volume of some quality has been compiled by the editor and his assistants, plus of course, the contributors themselves.

It is often not realised by those geologists who tend to switch off when post-Cretaceous topics are under discussion, that a revolution comparable in its magnitude to that arising from the plate tectonic theory has occurred in Cainozoic geology. The Cainozoic revolution has been due in large measure to the successful abstraction from the deep ocean basins of cores registering long records of sedimentation. Examination of these cores has yielded abundant data on palaeoenvironmental parameters from over two thirds of the earth's surface where previously knowledge had been effectively zero. A major benchmark event occurred about a decade ago when for the first time it was possible to publish a detailed map of global surface character at a specific time in the past. This was the CLIMAP (Climate, long-range investigation, mapping and prediction) reconstruction of the world eighteen thousand years ago showing the distribution of land, snow, ice, vegetation types and sea surface temperatures. Since then it has become increasingly realistic to model former atmospheric circulation patterns. The fact that successful attempts at understanding climatic change must adopt a global viewpoint, has been highlighted and this necessarily means examining both hemispheres in equal detail. However, the concentration of workers in the northern hemisphere has meant that the task of southern hemispheric investigation has fallen upon the shoulders of a relative few. "Late Cainozoic Palaeoclimates" is a milestone on the path towards a fuller appreciation of the pattern of global climatic change and its effects of landforms, sediments and biota.

The volume is organised into six parts and within these the non-specialist is naturally going to be attracted to the overview type of contribution. An initial section (3 papers) is titled palaeoclimatology and the keynote opening paper by H. Flohn reviews equatorial and Southern Hemisphere climatic evolution from an atmospheric standpoint. S.P. Harrison *et al.* examined the last glacial-interglacial stage transition by predicting circulation patterns 18, 9, and 8 thousand years ago and the testing against the palaeohydrological responses. South America (6 papers) features J.H. Mercer's excellent review of the record of glacial variations since the Mio-Pliocene transition. Australasia (7 papers) includes M.J. Salinger's account of New Zealand's climates over the last 5 M.a. and J.M. Bowler and R.J. Wasson on glacial age environments of inland Australia. Southern Africa, the venue of the symposium, naturally has the most material (14 papers) and of these that by K.W. Butzer presenting a fine synthesis of the South African Late Quaternary is noteworthy. The fifth part (6 papers) has the southern deserts as its theme and the first three by Thomas and Goudie, Wasson and Lancaster discuss aspects of the palaedune fields. Finally, there is a part (6 papers) devoted to the African faunal record and those who have read the admirable 'thriller' by Johanson and Edey on "Lucy—the beginnings of humankind" will appreciate H.B.S. Cooke's account of horses, elephants and pigs.

The text format, apart from title pages, is camera ready copy and is entirely satisfactory. Numerous maps and diagrams have been prepared to full publication standards and their reproduction is first rate. Unfortunately, there is no index but no doubt it could be argued that the impressively short period between the symposium and publication (less than a year) made this difficult. Perhaps the major omissions is any substantial account of Antarctica, it is only featured in one paper. This is at variance with the publishers dust jacket comment 'Antarctica and the surrounding oceans play the major role in regulating atmospheric circulation patterns even across the equator'. In view of the adopted title this omission is anomalous although it has to be noted that there is a rich recent literature on Antarctica.

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DERCOURT, J. and PAQUET, J. *Geology: Principles and Methods*, 1985 (French edition published 1983). Graham & Trotman Ltd., i-xxi + 384pp., 462 figs., selective bibliography (72 refs.) and index, £27.95 (hardback edition) or £13.95 (paperback). ISBN 0 86010 484 2 or ISBN 0 860 10 489 Pbk.

The publishers in their advertising material lead with the comment that "Geology: Principles and Methods" is an important new textbook. Further claims include it being ideal teaching material for undergraduate level courses. At the outset let me make it clear that in no way can this book be considered to be a textbook. The publicity material, the various forewords, and a quick scan through the book whetted my appetite but before page 100 I nearly gave up in frustration and despair. The prefatory fanfares talked of a refreshing readable text but the reality is very different.

Organisation is very much a problem. Brian Windley made a point of the fact that the chapters in his "Evolving Continents" could be read in any order the reader chose which is fine for a text aimed at third year students and senior learners. "Geology: Principles and Methods" is introductory in its style (and intent) yet Chapters 4, 5 and 6 (igneous and metamorphic rocks) require quite an overview of the subject for understanding. Much of the material discussed fairly freely in these chapters is not formally introduced in the book until later. The problem lies in using a case history approach which, at a very early stage, requires the reader to possess a sophisticated level of geological appreciation. After formal discussions on mineralogy and igneous-rock classifications, the unfortunate tyro would be thrown into an analysis of ophiolites, aspects of gross-scale structures in orogenic belts, and complex deformational, metamorphic, and stratigraphic aspects with no groundwork having been done. The continual reference to pages further along in the book is disconcerting and would be hard to cope with for one starting out in geology. Similar problems in the case histories of "Granites and Associated Rocks" which follow immediately on the heels of the basic rocks, lead to a heightened feeling of disjointedness. It seems very unreasonable so early in an introductory text to ask readers to cope with the intricacies of a high-grade terrain, with complex migmatite, metamorphic, and granitic histories; particularly when metamorphism is dealt with in the *next* chapter. To break away from the standard oft-repeated format of introductory texts is a fine ideal but in this case it does not work. The attempts to integrate and synthesise come far too early in the build up of the subject.

Having severely criticised the book as an introductory text, what does it offer the more established reader? For them the problems outlined above may well turn into bonuses as they could cope with the level of knowledge required when reading the case histories. The emphasis on examples from mainland Europe will broaden the scope of most readers and perhaps provide encouragement to pursue foreign language literature further. Several other positive features may be mentioned. A chapter on continental erosion and one on the marine environment does away with the normal very traditional treatment of landforms which dominates many North American and British textbooks. A section on deformation mechanisms explains how rocks respond to stress difference and accommodate shape changes; unfortunately the attempt is not fully successful because of an idiosyncratic approach. This is a disappointment because French researchers have been world leaders in studying microscopic deformation processes which sum to allow plate motion, mountain building, and similar global scale processes. The Applied Geology section is good but not as new as claimed by the publicists: several texts clearly show the economic implications of geology and justify study of the subject in economic terms.

A major disappointment, and one which showed the somewhat dated nature of the work, is the treatment of the tectonics of the Canadian Cordillera. Some branches of geology are expanding rapidly and none more so than the understanding of the tectonics of the continents. Besides new techniques (e.g. COCORP and similar applications of reflection profiling) the study of the western cordillera of North America has been the most influential in the upsurge of interest in continental tectonics. An appreciation of the far-travelled nature of many terranes in the cordillera has led to a new model of orogenesis which is now being over-enthusiastically applied in true band-wagon fashion. Nonetheless it is an important concept that is totally absent in a new book that devotes a significant part of a chapter to the virtual type area for these ideas.

Final comments must relate to the many many problems with the translation which is distractingly poor on a large number of pages and several passages are opaque. In my opinion it is not in a fit condition to be released on the English market. Problems with the translation further reinforce my comments in relation to the book being clearly not an introductory text. Students would pick up some disastrously odd ideas from reading this book. If I had paid for the book I would have seriously considered the Graham & Trotman "money-back guarantee". As the book now stands it needs a moderate amount of work to make it the equal of the best English texts which it has the potential to emulate.

N.B. This book may be obtained at the prices given above, plus postage, directly from Graham & Trotman Ltd., Sterling House, 66 Wilton Road, London SW1V 1DE. Telephone 01 821 1123. Telex. 298878 Gramco G.

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MAALOE, S., *Principles of Igneous Petrology*, 1985. Springer-Verlag: Berlin-Heidelberg-New York. 291 figs. XIV, 374pp. Hardcover DM 138. ISBN 3 540 13520 0.

Modern igneous petrology has become a very diverse topic, encompassing such features as geochemical modelling, experimental petrology and isotopic systematics. It is therefore encouraging to find a publication which attempts a synthesis of these new developments. The first seven chapters of this book are concerned with phase diagrams, the murals of the experimental petrologist. Although such diagrams can appear daunting, Maaloe's explanations are clear and concise even for a novice of this topic. Throughout these chapters the reader is gradually introduced to more and more complex systems without being overawed by the phase diagrams.

The remaining chapters of the book deal with partial melting, fractional crystallisation, oxygen fugacity, magma kinetics, magma dynamics and isotope geology. Of these topics the sections concerning magma kinetics and magma dynamics are extremely useful, since they are not normally discussed is such a text. In all of these chapters many of the more modern developments in the field of igneous petrology are well explained.

All of the chapters are well structured, which makes for an interesting and easy read. However, it should be noted that the entire book represents a discussion of the theoretical aspects of igneous petrology and as such represents a good text for final year undergraduates and research workers. Although any enthusiast of igneous petrology may gleam much information from this book.

Judging from the price quoted by Springer-Verlag (DM138) this will not be a cheap book for British readers but this reviewer hopes that they will produce a cheaper soft-back edition.

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