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BOOK REVIEWS

Oman's wealth of geology

Robertson, A. H. F., Searle, M. P. and Ries, A. C. (editors) 1990. *The Geology and Tectonics of the Oman Region.* Geological Society Special Publication No. 49. The Geological Society, London, U.K. 845 pp. Price £99.

As noted in the Preface of this Special Publication, there has been an extraordinary surge of international interest in the geology and tectonics of the Oman region. A major driving force for this awakening interest has been the need of the Government of Oman to undertake a geological survey of the country and evaluate its economic potential; this in turn has involved two major oil companies, Shell in the 1960s, and Amoco in the 1980s, together with major scientific teams, particularly from the United Kingdom and the United States in the mid-1970s to the mid-1980s, and France from 1982 to 1984.

Oman is without doubt a scientific gold mine. All geologists ought to visit Oman because of the first-rate exposure, relatively easy accessibility to the most important features and their variety. Geographically, the Oman Mountains lie on the NE edge of Arabia. Geologically, they are the remnants of one or more huge slabs of ophiolitic rocks—the largest and best exposed in the world—lying tectonically on a series of other thrust sheets made up of different facies that ultimately pass structurally down into the thick Phanerozoic cover of the NE edge of the Arabian platform. Unscramble the thrusts and one finds an orderly lateral change from a seemingly passive continental margin to a piece of ocean-floor. Thus Oman allows one to view the evolution of a passive margin from its inception some time in latest Paleozoic to earlier Mesozoic interval to its destruction in latest Mesozoic time without the need to drill it or seismically profile it. One can see the details of how ocean-floor is formed, and one can observe the results of its emplacement. So the story goes.

This reviewer's involvement in Oman has ranged from armchair poring over maps and reports to a hectic 'Geotour' organized in 1976 by the Open University and further secondhand experience at the conference organized in Edinburgh in 1988 whose outcome is this publication. The Edinburgh conference is a consolidation of much that had been started two or more decades ago. The publication contains 48 papers—too many to cite individually. They are subdivided into a large section of 33 papers on the evolution of the Oman Tethyan Continental Margin; 12 papers on the geology and tectonics of South Oman and three on the regional tectonic setting.

There is an excellent 18-page introductory commentary by the editors, which mentions all the contributions individually, sets them in context and draws the reader's attention to significant advances or differences in approach or conclusion. An index map (Figure 1 on p. xii) keys the contributions to their geographic position.

The publication contains a wealth of information in a concise, readily accessible form. In particular, there is a great deal of detailed new structural, stratigraphic, paleontological and sedimentological data whose availability must in part be due to the far-sighted and generous attitude of several of the commercial enterprises who supported its initial collection. There is not much on the Oman ophiolite itself, which is understandable given the publication of the Geological Society Memoir 11 on the Northern Oman ophiolite 2 years before the conference.

While it may be perhaps invidious to select particular papers for mention, this reviewer recollects being surprised by the unexpected account of the geology of the South Oman Salt Basin by Heward. Unlike most of Oman, the Salt Basin contains economically significant oil fields, with possibly as much as 12 billion barrels of oil in total. Their evolution is a fascinating story for a structural geologist and sedimentologist. It is an excellent example of how the movement of salt has influenced and been influenced by its cover. For example, the inversion of former peripheral synclines has given rise to large turtle-back anticlines. Smaller anticlines have also formed over remnant masses of dolomite and shale. Working out the details of this evolution must have required considerable patience and insight.

To this reviewer there are two curious general aspects of this publication: firstly, there are no new fundamental tectonic questions that are being asked in this publication in the sense that the same questions were being asked 10 or more years ago. The reason for this may be simply the second curious aspect: the answers to these fundamental questions are still almost as uncertain now as they were a decade ago.

In other words, while the details have been filled in for many parts of the Oman story, how these details bear on these larger questions is either not known or is still disputed. For example, the age of the formation of the Oman continental margin is still not agreed upon. Blendinger and others suggest ocean-floor spreading was already taking place by early Late Permian time, in contrast to the more prevalent view that the continent broke up in Middle to Late Triassic time (leading to the formation of a Middle to Late Triassic ocean?). The only preserved ocean-floor (the Oman ophiolite) is, of course, of a different age again, having crystallized in Late Cretaceous time. Were there really three margins, or three phases of margin formation? How can we tell? Or, on an entirely different matter, why are the Oman Mountains there in the first place? After all, they were at sea level in Late Cretaceous time. What Cenozoic process has raised them up? And so on. These comments are not meant to imply that these questions are unanswerable, but rather that new methods may need to be developed to tackle them.

The editors and the Geological Society of London are to be congratulated on the rapid publication of the volume—just over 2 years from Conference to bookshelf—in comparison with at least one major international conference held 3 years ago—in no way connected to the Geological Society—whose papers have only just been reviewed! Though the price of £99 may seem high, its 845 pages are excellent value, less than one-quarter of the price per page of another regional synthesis this reviewer came across recently.

The volume is highly recommended as providing an insight into the evolution of a continental margin from its inception to its destruction by the emplacement of a slab of ocean-floor onto it, a process of fundamental geological importance, though one that is still not well understood.

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A colourful three-dimensional view of subsurface structures

Brown, A. R. 1988. *Interpretation of Three-dimensional Seismic Data.* American Association of Petroleum Geologists, Tulsa, OK, U.S.A. 253 pp. Price $72 ($48 to AAPG members), hardcover.

This book is one of the American Association of Petroleum Geologists' memoir series and is based on short courses in three-dimensional seismic methods given by the author. It is the second edition of a book originally published in 1986, and the need for revision in such a short time is testament to the speed of developments in this field. The advantages of three-dimensional seismics in the mapping of subsurface geology are very dramatically illustrated throughout the book. Within the oil industry the increased resolution of sub-surface structure is already proving valuable in both exploration, reservoir evaluation and production. Although clearly aimed at the practising oil geologist, there is much in this book for the structural geologist and I will direct my comments mostly to these aspects.

In the last few decades, seismic profiles have played an increasingly important role within structural geology, providing much needed data from the sub-surface. The structure contour map, for long the tool of