

note the imbalance of presentation between clastics and carbonates and the omission of some major sedimentary rock clans. The bias of the first author to limestones is extremely apparent in that almost half the book deals with carbonate rocks, together with 97 out of 217 photomicrographs. Illustrative material on breccias and conglomerates is totally absent. Fine-grained clastic sediments (the claystones) are omitted because of their grain size—surely the undergraduate and/or amateur geologist is entitled to view at least one SEM shot of clay minerals or authigenic feldspar! Yet again, volcanoclastics are not treated in a sedimentary petrology book. All these factors lead to an overall imbalance of presentation of sedimentary rocks.

Another omission of some note is terrigenous clastic rock porosity. Limestone porosity is granted an introductory classification figure, four pages of text and 10 photomicrographs. Have the authors never heard of North Sea sandstone reservoir rocks? This major hydrocarbon-bearing province is famous for its terrigenous clastic reservoirs and associated varieties of porosity.

Finally as my 'banner' title proclaims there is little in the book for structural geologists. Unstrained grains are the order of the day, and although pressure-solution phenomena receive mention, in both the carbonate and clastic sections, illustrating them from the latter group of rocks with thin sections of italcolumite from Brazil is surely bizarre. Some of the litharenites figured in Part One of the book have undergone strain and low-grade metamorphism which is not commented on in the text. Likewise, the alignment of micas deformed by a crenulation cleavage (p. 14) is not considered worthy of remark.

In conclusion, despite its lack of balance, it must be stated that the book is of high quality considering its price and hence it should be of great use to those starting thin-section work on sedimentary rocks. The professional, however, might judge this atlas inferior to Scholle's (1978, 1979) memoirs on clastic and carbonate rocks which remain an excellent purchase at £36 for the pair.

#### REFERENCES

- Horowitz, H. S. & Potter, P. E. 1971. *Introductory Petrography of Fossils*. Springer, Berlin.
- Scholle, P. A. 1978. *A Color Illustrated Guide to Carbonate Rock Constituents, Textures, Cements, and Porosities*. American Association of Petroleum Geologists, Tulsa.
- Scholle, P. A. 1979. *A Color Illustrated Guide to Constituents, Textures, Cements, and Porosities of Sandstones and Associated Rocks*. American Association of Petroleum Geologists, Tulsa.

B. P. J. Williams

#### Rugged geology in difficult terrains

Holland, C. H. (editor) 1985. *Lower Palaeozoic of North-Western and West-Central Africa*. Wiley, Chichester, 512 pp. Price: hardback £69.00.

Having participated in the writing of the first two books in this series it is with sorrow that the reviewer notes from the Preface that this volume will be the last one of the series. Syntheses of the geology of vast areas such as this one are difficult to bring to fruition and it has taken in this case about a decade and a half. Where chapters have not been revised since 1975 this is a weakness but the information given in this carefully written, edited and published contribution to international geological communication is by no means ephemeral, and has not unduly suffered from delay. The publication is a fine, commendable synthesis of the Lower Palaeozoic geology of often difficult and remote regions. The excellent frontispiece of the late Henri Hollard in the bare, hot

landscape of the Anti-Atlas Mountains sets the scene perfectly—other areas will be contrastingly humid but the milieu generally will challenge and satisfy those who come to terms with it in the pursuit of geology (one is tempted to say 'real' geology).

Divided into four parts: Tunisia, Algeria, Morocco and lastly, west Africa and the western part of central Africa, it is immediately obvious that Tunisia is slim (3 pages), Algeria is larger (86 pages) while Morocco gets the most (246 pages) with west and west-central Africa second largest (160 pages). All parts are by French-speaking authors and reflect great contributions to the development of a vast region.

In Tunisia, the Lower Palaeozoic rocks do not crop out, so drill cores are the evidence and more is perhaps known than is here given, but the brief résumé is a welcome contribution. The maps in the Algerian section are often too detailed for reproduction at the given size but a lens will reveal much more detail than the naked eye can readily absorb; the reproduction in the copy reviewed does seem to be a little thin in places, but more ink might have resulted in blackening out of other details. This criticism is particularly apparent in Fig. 3 (pp. 8 and 9) but applies also elsewhere.

The maps and diagrams are often disappointing in their reproduction. Figure 6 showing isopachs of the Cambrian is a real disaster with 21 intended shades of white–grey–black which come out with at least four indistinguishable blacks.

The detailed Tables (I & II, pp. 14 and 15) are extremely useful and summarize the situation (or state of the art) but at some stratigraphical levels the absence of biostratigraphical data has led to the wise addition of question-marks in the Precambrian and Cambrian subdivisions. In the Ordovician system the situation for biostratigraphical zonation improves radically (e.g. Table 3) and in the Silurian system too the time-control is much improved (26 zones of graptolites are given for the Région du Nord, Table 4), but a word of caution on page 54 notes that "most of the published lists of graptolites are in need of revision, a task currently in progress".

In the section on Morocco the pages on the Precambrian–Cambrian Boundary and the Lower Cambrian are of special interest to the reviewer. The topic has been the subject of particular international interest in the last decade or so. In about 55 pages an excellent summary is given by the late H. Hollard but it suffers from the lack of correlation with strata of similar age in other parts of the world. The Moroccan outcrops are rich in fossils at some levels but the lack of diagnostic correlative fossils at critically significant horizons frustrates research in a way which leads to tentative conclusions. The general details from Morocco are of great benefit to have in English and much useful information is presented. The task is quite incomplete, however, and it was clearly a difficult one for Hollard, particularly in dealing with controversial papers by Choubert and incomplete research by Hupé. The half-tone photographs do no justice to the scenery and geology and Plates 3, 4, 5 and 6 are particularly poor. Having said that, it is only just to draw attention to the many excellent maps, diagrams and tables (e.g. Fig. 36) which brilliantly back up the text, especially in the Ordovician and Silurian sections. The whole is a mine of information to be used for decades to come.

In the final section on West Africa and part of Central Africa three very able field and laboratory geologists are the authors and they attempt in 160 pages to give a summary of 24 states as diverse as Chad, Sierra Leone, Mauritania and the Congo Republic. In this mammoth task they appear to the reviewer to have succeeded in producing an important work of reference to a very high standard. For interested Anglophones this must be required reading. The maps are clear and legible, the sections and diagrams excellent, the photographs are remarkable but not aesthetically satisfying. An esker 50 km long and 1 km in cross-section must be an awe-inspiring sight from the air. In their Conclusions the authors outline frankly the principal difficulties, in that research is not yet adequately developed, is geographically scattered and, excepting the Silurian sequence, fossils are exceptionally rare. References take up 18 pages and are an invaluable source of information about a widely scattered and obscure literature.

J. W. Cowie