BOOK REVIEWS

"Biostratigraphy in production and development geology"

These are difficult days for biostratigraphy: mergers and downsizing have reduced the biostratigraphic workforce to a fraction of its size in the seventies and eighties. In these circumstances it is heartening to see the recent advances that biostratigraphy has made in the hydrocarbons industry. Many of these are described in the excellent volume "Biostratigraphy in production and development geology" edited by R. W. Jones (BP) and M. D. Simmons (University of Aberdeen, formerly of BP).

The key to this revolution has been the realisation of the value that biostratigraphy can play in reservoir description, field development, well-path planning and biosteering and of course in decision support and the business "bottom-line". The editors have ably brought together a sequence of papers, mainly by practising oil-industry biostratigraphers, describing applications in development and production biostratigraphy from a variety of geological settings from the Tertiary and Mesozoic of the North Sea to the Tertiary of Venezuela, Nigeria and the Gulf of Mexico.

In the first paper of the collection, Payne *et al.* appraise the "Old Model" of reservoir biostratigraphy, describing its inability to integrate with broader geoscience and to sell its value by pushing its data in a way that solves production problems. The result of this was, according to these authors, a marginalisation of biostratigraphy to the outside of the decision-making process. Payne *et al.* describe how biostratigraphers have developed a more pragmatic, field-focussed approach involving the use of all possible biostratigraphic events — be they acmes, first or last appearances, or climate proxy signals indicated by key taxon ratios.

High-resolution biostratigraphies of the kind advocated by Payne *et al.* are described in two of the larger papers of the volume by Duxbury *et al.* and Morris *et al.*. Both papers describe an integrated biostratigraphy and sequence stratigraphy of Jurassic North Sea intervals. Morris *et al.* describe how their biostratigraphy of the Magnus Sandstone (East Shetland Basin) defined a "time slice" framework which allowed detailed (illustrated) palaeogeographic maps to be made and reservoir geometry to be modelled. Papers by Bergen & Sikora and Sikora *et al.* describe detailed biostratigraphic and biofacies schemes for the chalk of the Norwegian North Sea, and graphic correlation of these against a composite standard so that absolute dates can be applied. The result of this is a series of very detailed, field-focussed palaeogeographic maps at substage intervals.

As a palynologist specialising in the Palaeozoic, I found the paper by McLean & Davies particularly interesting for its account of Late Carboniferous clastic reservoirs and

their relationships to sequence stratigraphic models. Importantly, the authors emphasize how data interpretation is limited by methodological factors and how levels of confidence need to be expressed by biostratigraphers, especially when working within multidisciplinary groups where understanding of the value or limits of biostratigraphic data may not be great.

The latter half of the volume is concerned mainly with regions outside the North Sea and concentrates on Tertiary sequences of Borneo (Simmons *et al.*), Venezuela (Jones *et al.*), Nigeria (Armentrout *et al.*, Van der Zwan & Brugman) and the Gulf of Mexico (O'Neill *et al.*). These papers indicate the very high level to which micropalaeontological information can be related to marine and onshore coastal palaeoenvironment, relationships that cannot easily be established for biostratigraphic data from older Mesozoic or Palaeozoic rocks. The work of Armentrout *et al.* notably shows how such palaeoenvironmental data can be related to glacio-eustatic change and thence to sequence stratigraphy.

In all, the volume contains nearly twenty papers by specialists in calcareous and siliceous microfossils and palynomorphs (fossil pollen, spores and microplankton), and should be of interest to all academic and industrial micropalaeontologists and palynologists. The volume is well illustrated (often in colour) with excellent charts, maps and plates and can be recommended without reservation.

Mike Stephenson
Stratigrapher, British Geological Survey

"Biostratigraphy in production and development geology", edited by R. W. Jones and M. D. Simmons. ISBN 1 86239 031 2. Geological Society Special Publication No. 152, 318pp, £70. http://bookshop.geolsoc.org.uk

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Sedimentological studies

At the core of two recently-published university textbooks — "*Sedimentology and sedimentary basins*" by Mike Leeder, and "*Sedimentology and stratigraphy*" by Gary Nichols — are a series of chapters on depositional environments. Those in Dr Nichols' book occupy nine chapters (104 pages): glaciers, arid continents, rivers, lakes, deltas/estuaries, coastlines, shallow seas, deep seas and volcanoes. Those in Dr Leeder's book occupy 11 chapters (198 pages): deserts, rivers, alluvial fans, lakes, ice, estuaries, river deltas, linear clastic shorelines, carbonate shorelines, shelves, oceans. These differences in length and emphasis reflects differences in the readership towards which each textbook is directed:

Thus, "*Sedimentology and stratigraphy*" is aimed at first-year undergraduates with little previous formal instruction in the subject. Early chapters summarize the compositional attributes of sedimentary rocks. Five chapters consider aspects of stratigraphy (lithostratigraphy, biostratigraphy, dating/correlating techniques, sequence stratigraphy; and "subsurface stratigraphy"), and one briefly considers types of sedimentary basin. The strengths of the book include the clear writing style, appropriate for the intended readership, and the high quality of the illustrations (line drawing and photos).

"*Sedimentology and sedimentary basins*" will be appreciated by a more advanced undergraduate and post-graduate readership. As the subtitle "*From turbulence to tectonics*" indicates, the scope of the book is wide and three early chapters for example comprise a "User's Guide to Sedimentological Fluid Dynamics". These chapters are welcome because fluid dynamics is a topic which often seems to be poorly taught to (sometimes innumerate) geology students. The following six chapters are grouped as "Sediment transport and sedimentary structures", and deal principally with air- and water-formed bedforms and gravity flows (the sixth

considers secondary and liquefaction structures). Part 5 considers "external" controls on sediment derivation, transport and deposition, i.e. those controls which are due to changes in climate, sea level or tectonic factors. The final two brief chapters consider tectonic subsidence and basin formation. The writing style is robust yet clear, and there is a welcome balance between the rigorous and the less formal. Other notes of informality are introduced in the chapter "mottos" and some far-from-pompous photo captions. Again, the clarity of the illustrations — line drawing, photos and a suite of colour plates — is excellent.

Both of these textbooks can be recommended and will no doubt be widely appreciated by the respective readerships. The authors and publisher are to be congratulated.

"Sedimentology and stratigraphy", by G. Nichols. ISBN 0 632 03578 1. Blackwells Science, Osney Mead, Oxford OX2 0EL. Paper covers, 355 pp.

"Sedimentology and sedimentary basins", by M. Leeder. ISBN 0 632 04976 6. Blackwell Science. Paper covers, 592 pp, £35.