Book reviews

CD ROM review

Wireline Logging. *S. Boyer (ed.)*. CD-ROM 1999. Editions Technip, Paris

Gone are the days when multimedia titles were rare. It is surprising that support and training information in this form has not been available in petrophysics sooner, especially considering that most of the major wireline tool operators and analysis companies routinely supply information concerning their capabilities on CD ROM catalogues. This CD claims to contain a course in well logging, based on information provided by the Institut Francais du Pétrol.

It is quickly apparent that the CD is aimed at those new to wireline logging, and will probably be disappointing to those who have some experience in this field. However, as a teaching tool to introduce new students to basic wireline logging operations, it does an extremely good job. The numerous colour video clips, stills and animated sketches are clear and informative, and the descriptive soundtrack is clear and logical, leading the user in a stepwise fashion through the information.

The contents of the CD are listed on the initial summary page (Fig. 1). This page allows access to the main sections of information, as well as to an 'Interactive Log', a quiz, and a glossary of terms. Each of the main sections can be accessed directly, and once started the section will play, pausing occasionally and waiting for prompts to continue. Once a section is complete the CD progresses to the next. These main sections begin with a brief introduction to the philosophy and basic terminology of wireline logging. This is followed by a detailed description of the logging operation with a considerable number of movie clips showing logging engineers at work. The next section contains details of how a log is arranged, and what its various components mean using images of a typical log that are very clear. The fourth section takes each major tool in turn, briefly describing its operating principle and showing some typical results using animated graphics. The tools covered in this way include caliper, SP, gamma ray, density, neutron, sonic, laterolog (Fig. 2) and induction resistivity, and imaging

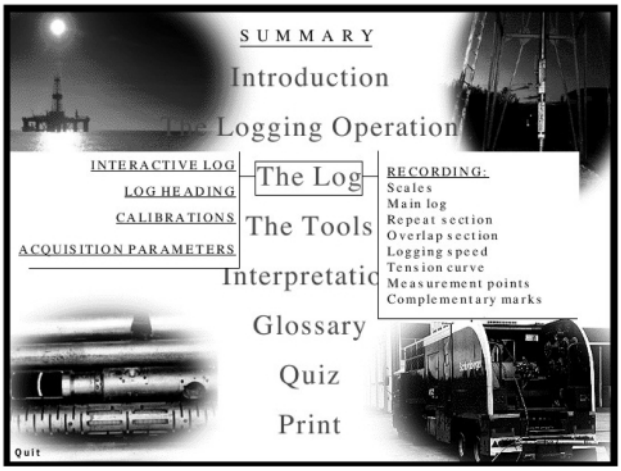

Fig. 1. The summary page showing subsections in 'The Log' section.

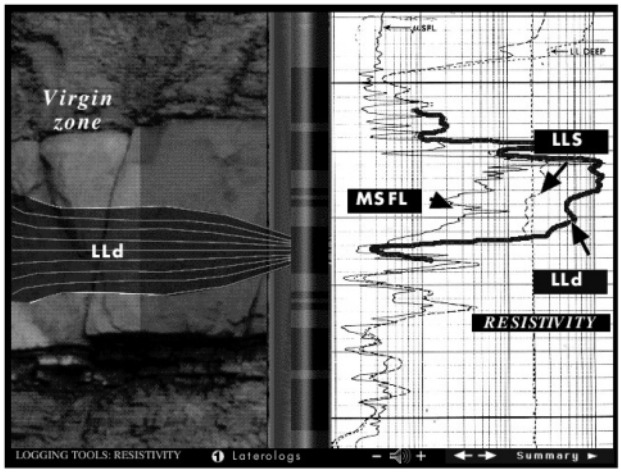

Fig. 2. A screenshot from the description of laterolog resistivity tools.

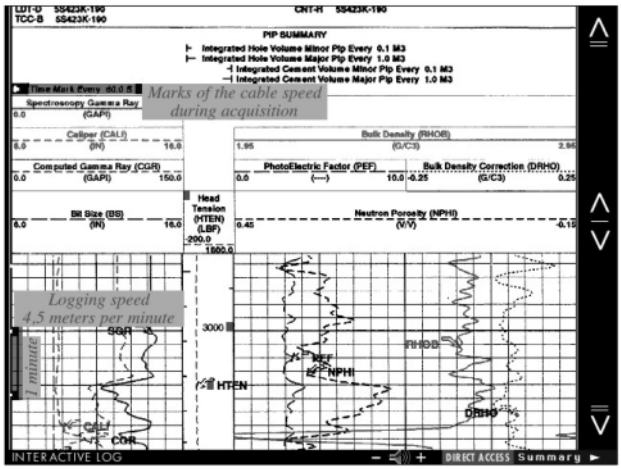

Fig. 3. Screenshot from the 'Interactive Log'.

tools. However, there are only a few minutes with three or four slides or sketches for each, allowing only the basic principle of each to be described. The CD would benefit from including more detail on the principal uses for each tool, their limitations, and the effect on the quality of the log data of various unwanted environmental effects. The last section contains a very brief introduction to the analysis of the wireline data. This is the weakest part of the CD and is passed over with unseemly haste. The lack of information here can only be excused if the publishers have it in mind to also publish a CD-ROM dedicated to wireline analysis. Even if this is the case, this CD would be improved enormously by the inclusion of a simple case study of a 'typical' wireline interpretation from the initial corrections and QA through to hydrocarbon saturation calculations.

One section that is not accessed in this linear fashion is the 'Interactive Log', which can be found on the summary page. This is a typical log (Fig. 3), of considerable length, which can be scrolled through quickly and easily. The log contains many

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little red boxes, which give a brief description of every aspect of the log including header, footer and calibration information, as well as the curves themselves and complementary marks. As such, the 'Interactive Log' is a practical glossary of log reading, and is an extremely useful addition to the CD.

The CD also contains a more conventional glossary of terms and a quiz that are also accessed from the summary page. The glossary is complete insofar as it contains concise yet clear definitions of the terminology used in the CD, but is a long way from being a comprehensive glossary of wireline logging. The quiz is useful, underlining that this CD is meant as a training tool in elementary wireline logging. There is a database of questions each requiring a 'yes' or 'no' answer. This database is accessed randomly providing questions covering the whole of the material in the CD. The questions are quite demanding and need to be read carefully if the correct answer is to be given. Successful answers allow the user to progress to the next question, while unsuccessful answers produce a brief reason why the answer is incorrect, and the question will reoccur later in the quiz. The only way of leaving the quiz is by exiting to the summary page, and no statistical information is given concerning how successful the user has been, or whether the user has a particular weakness in any particular area of knowledge. Both would be useful additions, as would a brief bibliography and list of hypertext links for those searching for more detailed information. However, the level of the questions and the explanations ensure that the user gains more knowledge by the simple process of doing the quiz.

The CD can be run in English or French. Unlike many multimedia titles, this CD does not make use of hypertext links, preferring to take a single route through the information. While the great advantage of multimedia is its ability to integrate information through hypertext, the linear arrangement of the information here is probably the best way of introducing the subject of wireline logging to a new student. Navigation is extremely simple using a tool bar at the bottom of the screen. A selection of controls here allows the user to skip forward, backwards and to the summary page, which contains the contents, and there is also a volume control. The user may interrupt a video or automated sequence at any time by clicking approximately in the centre of the screen, and a double click there starts the latest sequence again. Both the sound and picture quality on the review copy was extremely good. A useful addition, is that the spoken text and glossary can be printed out in part or in total.

In summary, this CD-ROM volume is an extremely useful introduction to wireline logging. It is ideally suited for students in their first course on the subject, and it should find a market amongst institutions who teach this subject and with those managers in allied fields who want to broaden their knowledge to include wireline logging. I will be recommending that my students spend time using it in the first few weeks of their wireline logging course. However, the lack of practical detail makes it unsuitable for even moderately experienced users of wireline logs.

The price of the CD-ROM is 1200FF, which, as an individual purchase, is not particularly good value for money. However, as a course resource or company purchase it represents good value for money for the amount of material presented, and copies can be obtained from Editions Technip, Paris (editions.technip@compuserve.com).

Minimum Configuration and Reviewer's System

PC: 486 Processor (Pentium recommended), colour monitor with video driver (32 768 colours, 15 bit resolution) and sound card, Windows 3.1 or Windows 95, 6 Mbytes (16 Mbytes recommended), CD ROM × 2 (× 4 recommended), Quick Time software 2.1 (supplied on CD ROM).

MAC: 68040 Processor, colour monitor with video driver (32768 colours, 15 bit resolution) and sound card, System version 7.0 or greater, 6 Mbytes (16 Mbytes recommended), CD ROM × 2 (× 4 recommended), Quick Time software 2.1 (supplied on CD ROM).

Review System: The above review was carried out on an RM PC: Pentium II 300 MHz processor, colour monitor with video driver (65 536 colours, 24 bit resolution) and sound card, Windows 95 (ver. 4.0), 64 Mbytes RAM, CD ROM × 24, and 2 Gbytes free HDD.

Paul W. J. Glover

Muds and Mudstones: Physical and Fluid-Flow Properties. *A. C. Aplin, A. J. Fleet & J. H. S. Macquaker (eds)*. Geological Society, London, Special Publication 158. ISBN 1-86239-044-4 (HB), 1999, 200 pp. US$108/£65. Geological Society members US$48/£29.

This book contains useful reviews and recent research results on shale/mudstone properties, particularly in their relation to fluid flow and consequent impact on near-surface and sedimentary basin-scale phenomena. It should be of most use to academic and industrial research specialists working in a wide range of disciplines from environmental systems to subsurface fluid pressure development, petroleum migration and rock mechanics. The book is divided into thematic sections on physical properties, experimental studies and case studies. For physical properties, the topics include porosity, permeability, thermal conductivity and mechanical behaviour, as well as the impact of chemical diagenetic processes. The experimental studies section consists of papers on the permeability anisotropy of consolidated clays, hydraulic performance of landfill-lining clays during deformation and gas transport properties. Case studies has papers on top-seal leakage for hydrocarbon traps, origin of overpressure development offshore mid-Norway, porosity characteristics of Cambrian mudrocks from the Alleghanian fold-and-thrust belt, USA, and preferential fluid-flow pathways in marine Bartonian clay affecting the semi-confined Ledo-Paniselian (Eocene) aquifer in Flanders, the Netherlands.

The paper on porosity by Pearson considers the various types of porosity in mudrocks, and is mainly focused on 'geochemical' porosity for calculations of solute diffusion-related water-rock reactions. Many will find the most important paper to be that on permeability by Dewhurst *et al.* which presents a literature overview integrated with relatively recent research results from the London Clay and North Sea mudstones. The main focus is on the effects of grain size, for example silt/clay content, porosity and mechanical compaction/effective stress. The authors struggle with the apparent paradox of field data that indicate that mudstones can serve as pressure seals while at the same time facilitating fluid migration. Unfortunately, consideration of potentially fruitful lines of research regarding clay diagenesis are dismissed with the statement 'Although in sandstones the occurrence of illite severely reduces permeability, there is no reason to believe that this will also be the case in mudstones'. They are then constrained to explore the possible causal roles of geological faulting and fracturing, which in the end provide little, if any, predictive value. None the less, the paper contributes a timely and illuminating, if not

enlightened, perspective of this critical area of geoscience research.

The emphasis on fractures is often a repetitive theme, for example in gas transport, where Harrington & Horseman state that 'In the absence of pressure-induced cracks, water-saturated clays and mudrocks are totally impermeable to gas'. The paper on top-seal leakage of hydrocarbon traps through faults and fractures focuses on ductile versus brittle properties of mudrocks and implications of sealing versus leakage during mechanical failure. Unfortunately it does not contain well documented case histories, which would have added greatly to the value of this contribution. Peters & Maltman also focus on the transient increase in hydraulic conductivity during deformation experiments of the Welsh and Scottish boulder clays, for evaluating the performance of landfill linings.

Overall, this book provides a valuable compilation from which to advance our knowledge of the geological evolution of mudstone properties.

Paul H. Nadeau

Signal Processing for Geologists & Geophysicists. *J. L. Mari, F. Glangeaud & F. Coppens*. ISBN 2-7108-0752-1 (HB), 1999, 480 pp. US$89/520FF. Editions Technip, Paris.

Early in my career, a French geophysicist confided that it was not some innate brilliance of the national psyche that had produced so many famous French mathematicians. 'It's just that pencils and paper are cheap', he quipped. This is not to imply any cost-cutting evident in the production of this substantial book, translated from the 1997 first edition, *Traitement du signal pour géologues et géophysiciens*, by Derrick Painter. None the less, an unmistakable whiff of Gallic pride soon manifests itself when the reader is reminded, early on, that Snell's law is 'also known as Descartes law'. Needless to say, Fourier, Lamé, Poisson and others commonly dominate the discussion, especially in Part Two, 'Signal Processing in Geophysics', which comprises almost 60% of the book. This is where the average geologist could lose interest as Glangeaud and Mari, the two authors responsible for Part Two, get down to some serious equation-laden discussion of the finer points of 'forward and inverse Fourier transforms' and similar topics.

Thus, the book may disappoint the more mathematically impaired who might not even persevere with the whole of Part One, 'Seismic Acquisition and Processing', the responsibility of Mari and Coppens. Today, however, such perseverance would probably be expected of 'third-year university students . . . who have decided to specialise in the study of Earth Sciences', who, in the last paragraph of the General Introduction, are declared to be the 'target audience' at which this book is 'aimed'. Amusingly, the paragraph ends with a dedication 'to all those who, at any time, have fallen into a *trap* [my italics] related to the problems of sampled functions'. Given this is a translation, it seems improbable that the authors had in mind the numerous dry holes drilled to phantom targets that, with hindsight, turned out to be products of the seismic method – improperly applied.

The subject is treated comprehensively, nevertheless, with generous coverage of sonic logging and VSPs in Chapters 2 and 3, respectively, each of which spans some 20 adequately illustrated pages. The rest of the book too is augmented with numerous illustrations, with the bulk of those in Part Two apparently created specifically for this work. In Part One, on the other hand, many illustrations are derived from previous work, all fully accredited in the 15 page bibliography arranged section-by-section near the back of the book. As befits the affiliation of Mari, Glangeaud and Coppens, many references are to IFP (Institut Français du Pétrole) reports, and images drawn from the archives of *Gaz de France*. This ensures that the serious student of signal processing is not often distracted by dramatic structural geology, only rarely visible in the illustrations.

This book has much to offer the practising oil industry geoscientist with sufficient mathematical ability and determination to strengthen his or her grasp of seismic fundamentals. It is not, however, considered a substitute for such renowned reference works as, for instance, Yilmaz's (1987) *Seismic Data Processing*, probably a better bet for the pragmatist more concerned with results than theory.

REFERENCE

YILMAZ, Ö. 1993. *Seismic Data Processing*. Society of Exploration Geophysicists, Tulsa.

Philip H. H. Nelson

The Oil and Gas Habitats of the South Atlantic. *N. R. Cameron, R. Bate, V. Clure & D. Smith (eds)*. Geological Society, London, Special Publication 153. ISBN 1-86239-030-4 (HB), 1999, 474 pp. US$148/£89. Geological Society members US$65/£39.

A quick review of my stockpile of journals revealed how poorly documented the petroleum geology of this region of the world is: I found, for instance, five African papers in ten years' copies of the *AAPG Bulletin*. The editors of this book are, therefore, to be complimented on the efforts they have made to fill this yawning gap in the documentation of the world's petroleum reserves. The editors set themselves two objectives, first to overview the petroleum geology of the region and second to demonstrate the contribution that universities and service companies can make to background work supporting South Atlantic exploration. In the case of the first objective, they have struggled – chiefly because of the well known reciprocal relationship that exists between prospectivity and willingness to publish. The contents page of the volume will prove disappointing to some as a result: there are no papers on Nigeria or Gabon, one on Angola and two on Brazil, whereas Namibia and the Falklands attract eight papers between them. And, unfortunately, we do not see a cross-section or seismic line across an oil field anywhere in the volume. These failings arise from the book's timing relative to several recent major discoveries in the area that have made all the major operators unwilling to reveal their secrets on the hotspots of the region.

Enough of what is missing. What of the book's strengths, which are considerable. The second objective of the book – to demonstrate support provided by universities and service companies – receives a very large tick. Many geologists working the region will find themselves lacking the services originally provided by now-redundant research departments and they will find this book goes a long way towards the provision of the overviews and analyses necessary to support their work at the 'coal face'. Thus, the strengths of the book are in topics such as regional tectonics, individual basin structure, oil typing and biostratigraphy. In addition, there are a number of significant reference papers on the stratigraphy, petroleum reserves distribution and regional tectonic elements that will ensure the book retains a position on the desktops of many geologists working the region.

The outstanding feature of the book is the quality of, and use of, colour within the figures, and specific mention must be made of the tectonic elements map provided on CD-ROM by

Davison – itself worth the purchase price to many readers. This is a major improvement on the rather bland illustrations of many previous Special Publications and will hopefully be maintained in the future.

There are 28 papers in the volume, most of which fall nicely into a series of themes and topics. The introduction paper and a later one by Coward *et al.* are essentially Petroconsultant's statistics-derived overviews of the proven reserves in the region, presented in historical and stratigraphic contexts, respectively. The excellent stratigraphic columns provided by Coward for each basin deserve mention. Karner *et al.* provide the critical tectonic overview of the region, the strength of this paper lying again in the colour figures depicting interpreted gravity profiles of each margin. There are a number of basin-specific structural papers, including a good overview of NE Brazil by Darros de Matos and two on the now very topical area of Equatorial Guinea; that by Turner on raft tectonics deserves special mention, particularly as such movements have controlled the trapping style of recent discoveries. The papers on oil and gas habitats and geochemistry include two well illustrated overviews of the African and Brazilian margins, a very useful oil-typing study of the South Atlantic region as a whole and a pertinent petroleum systems review of onshore and shallow water Angola.

The second portion of the book becomes more specialized and many general readers may be offput by some of the titles; however, most of these papers do contain significant information and are worth reading. There are several papers on black shale deposition and associated biostratigraphy, for instance, which give the reader a good understanding of the controls on source rock deposition in West Africa, particularly the influence of upwelling and biological productivity. Ostracods are the subjects of a couple of papers – not one of my pet topics, but I found fascinating the paper by Bate on the environmental indicators provided by different ostracod shell ornaments. The last eight papers on Namibia and the Falklands, covering a series of tectonic and seismo-stratigraphic topics, plus two on Kudu Field onshore analogues, will be of specific interest to those working south of the Walvis Bay Ridge. The four Falklands papers are all high quality and contain useful data but clearly were written before the recent wells were drilled. As the results of these wells are now widely known, these papers are, unfortunately, already out of date, illustrating the problems associated with the long timescale it takes to produce these volumes.

The best way of summarizing this volume would be to suggest that it is mis-named. With only 6 of 28 papers comfortably sitting under an 'oil and gas habitats' umbrella, the name of the book is a little misleading. A more accurate title would have been 'Scientific Contributions towards the Petroleum Geology of the South Atlantic'. These contributions are significant and the book represents a major advance in documenting these particular topics. As a reference volume on regional tectonics, stratigraphy, biostratigraphy and geochemistry, this book will no doubt be well thumbed by future workers, both in academia and industry and the illustrations alone are worth the purchase price. The editors recommend that an update volume is produced before too long and one can only hope this may include more data released by oil companies on the major oil fields of the region.

D. S. Macgregor