

Book review

Paleozoic Sequence Stratigraphy: Views from the North American craton. Edited by B. J. Witzke, G. A. Ludvigson, and J. Day. *GSA Special Paper 306*. The Geological Society of America, P.O. Box 9140, Boulder, Colorado 80301-9140, U.S.A. 1996. 452 p. US\$115.00 (paperback). ISBN 0-8137-2306-X.

This volume is particularly welcome because, in a very real sense, sequence stratigraphy had its birth in studies of the North American craton. In a classic paper, Larry Sloss (1963) showed how broad, inter-regional unconformities could be used to subdivide the North American Paleozoic into a series of widely recognisable stratigraphic packets (sequences). From that, and from the fact that Peter Vail studied under Sloss, has followed the development of sequence stratigraphy within the oil industry (Payton 1977), and its maturation into a powerful paradigm for the interpretation of sedimentary rocks (e.g., Vail et al. 1991).

Special Paper 306 contains 30 papers on aspects of the Paleozoic stratigraphy of North America. The papers were first presented as part of a special symposium convened at the 1992 meeting of the North-Central Section of the Geological Society of America, and sponsored by the Great Lakes Section of the Society of Economic Paleontologists and Mineralogists. The volume therefore suffers the usual problem of conference publications, in having been long in gestation and somewhat out of date, with very few references to papers written after 1991. In a striking example of compartmentalisation in science, there is scarcely a single reference to the important modern work on sequence stratigraphy being accomplished by non-North American authors. That problem notwithstanding, the volume contains many excellent summaries of the stratigraphy of North American Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, and Permian rocks. It is a strength of the volume that the main part of most of the papers is represented by conventional stratigraphic description. Therefore, for those from outside North America who wish to gain a knowledge of American Paleozoic rocks of any particular age, the relevant chapters in this volume are a good place to start. That said, and because the sequence stratigraphic interpretations are generally simplistic and uncritical overlays to the basic stratigraphy, it is also true that few of the papers make a substantive contribution to our understanding of sequence stratigraphy. Exceptions to this generalisation include the thought-provoking discussion by Robert Shaver on the problems associated with differentiating tectonic and eustatic influences on Silurian sediments, the excellent historical summary of Pennsylvanian stratigraphy by Pius Webel, and the distinction by Bisnett and Heckel of differing shallow water (onshore) and deeper water (offshore) black shale facies in

classic Pennsylvanian cyclothems. Other readers will doubtless find their attention caught also by chapters that lie close to their own personal interests.

It is particularly appropriate that the concluding chapter in *Special Paper 306* was written by Larry Sloss himself. Following his recent death, this most interesting chapter has turned out to be the swansong of one of the great practitioners of the art and science of stratigraphy. Rightly, Sloss is concerned to remind us that Exxon-style sequence stratigraphy originated in studies of continental margins, where the interplay of tectonics and eustasy may be easier to separate than it is for sediments from cratonic interiors. There are order-of-magnitude differences in rates of subsidence (and therefore in accommodation space, and therefore in the thickness and completeness of sedimentary sections) between cratonic interiors and other depositional settings. Sloss therefore concludes that "the major impediments to the application of the practices of the new sequence stratigraphy to the sedimentary cover of the craton are largely problems created by differences in scale". He remarks also that we do no honour to the debt that we owe to the developers of sequence stratigraphy "by applying principles and practices that were not designed for our (cratonic) data and our (cratonic) purposes". Remaining provocative right to the end, in spawning sequence stratigraphy, but in remaining critical of any examples of its inappropriate application, Larry Sloss has left an indelible mark on all our thinking.

In summary, this is an important source book which belongs in every geological library, and also in the personal collections of any who are daily practitioners of North American cratonic stratigraphy. For the rest of us, when the library copy arrives, it is definitely worth browsing for papers that lie close to our personal interests. And all stratigraphers, surely, will want to read and contemplate Larry Sloss' final chapter.

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Payton, C. E. ed. 1977: Seismic stratigraphy—applications to hydrocarbon exploration. *American Association of Petroleum Geologists memoir 26*: 516 p.

Sloss, L. L. 1963: Sequences in the cratonic interior of North America. *Geological Society of America bulletin 74*: 93-114.

Vail, P. R.; Audemard, F.; Bowman, S. A.; Eisner, P. N.; Perez-Cruz, C. 1991: The stratigraphic signatures of tectonics, eustasy and sedimentology—an overview. In: Einsele, G.; Ricken, W.; Seilacher, A. ed. *Cycles and events in stratigraphy*. Springer-Verlag. Pp. 617-659.