

BOOK REVIEWS

A Field Guide to the Northeastern Appalachians

Roy, D. C. (editor) 1987. *Northeastern Section of the Geological Society of America*. Geological Society of America Centennial Field Guide Volume 5. 481 pp. Price \$43.50.

As a part of its 1988 centenary celebration, the Geological Society of America is publishing an encyclopedic 71-volume account of the geology of North America, including a series of six field guides. This volume, No. 5 in the field guide series, consists of short discussions of 100 localities covering the Appalachians from Maryland to Newfoundland, and spanning the range from the Coastal Plain to the continental interior.

Field guides are a vital but neglected element of the geologic literature. Good ones serve as a bridge between published papers and critical outcrops. They enable other investigators to find that elusive but critical refolded fold or graded bed, help students and professionals to develop a sense for the geology of a region, and remind all of us how good (or bad) the data on which we base our theories really are.

Measured against this ideal, how well does the volume succeed? On the basis of coverage, it seems to have succeeded very well. Naturally there are localities that I would have gladly omitted and others I would have included (surely the coverage of economically significant localities is too low!), but on balance Professor Roy has succeeded in selecting areas representative of a wide variety of northeastern geology. Except for a few localities described by state survey geologists having little experience with the rocks, most accounts are by local experts whose writing has the ring of authenticity.

The volume is too bulky for convenient use in the field (it includes nearly 500, 8½" × 11", pages) and probably too expensive (\$43.50) for student purchase, so I suspect that most will use it as a source for planning field trips in the library rather than as a back-pack companion. Fortunately it contains GSA's usual encouragement to photocopy for "scientific or educational advancement". The book is in general well-produced; the illustrations are legible (and easy to reproduce), the type is aesthetically pleasing, and errors are rare, except for two annoying reversals of figure captions. My only major criticism of the format is that a regional tectonic map would have helped to place local descriptions in context and provide a common thread linking individual contributions.

The effectiveness of the locality descriptions is variable. Some are superb. Nickelsen's account of the structural stages of the Allegheny orogeny exposed in an abandoned Pennsylvania strip mine contains just the right blend of regional maps, detailed local maps, outcrop sketches and careful description, enabling a visitor to find the critical features in an outcrop, and to understand their regional significance. Marshak and Engelder's description of the miniature Hudson Valley fold-thrust belt, exposed in its entirety in a series of roadcuts 2.5 km long, is an excellent, well-illustrated account of a classroom-scale orogenic belt. Stanley's discussion of exposures of the Champlain thrust fault on Lone Rock Point at Lake Champlain is a good, succinct introduction to one of the best exposures of an Appalachian thrust fault, and don't make the mistake of concentrating exclusively on structural features. Sevon's account of the relict periglacial boulder field in Pennsylvania's anthracite district and the beautiful description of glacial features on Mount Washington by Goldthwaite, Billings and Creasy are too good to miss.

A few articles are less helpful, generally because they are really literature reviews rather than field guides; they discuss the regional geology and list outcrops to visit, but fail to locate critical features in those outcrops or discuss the importance of those features to regional interpretations.

Despite these caveats, the volume as a whole is a useful and welcome addition to the literature. It provides easy access to accounts of outcrops previously described only in guidebooks of very limited distribution, and should entice a wide audience to explore the beauties and complexities of northern Appalachian geology.

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The Welsh Basin

Fitches, W. R. and Woodcock, N. H. (editors) 1987. *Sedimentation and Tectonics of the Welsh Basin*. Wiley and Sons, Chichester. Price £34.95.

This collection of papers is the fruit of a joint meeting of the Tectonic Studies Group and the British Sedimentological Research Group of the Geological Society. The topic is an attractive one both because of the perennial fascination of the Welsh Basin and because it gives an excellent opportunity to look at the interaction between sedimentologists and structural geologists.

Nearly half of the volume is primarily sedimentological, the rest structural. The tectonic significance claimed for the sedimentological work is largely confined to indications of syn-depositional faulting. The more significant contribution of the sedimentological papers is in refining the stratigraphic and temporal controls and in interpreting the sediments in terms of palaeoenvironments. An interesting re-interpretation of Ludlow Series turbidites in the Welsh Borderland as distal storm deposits is put forward by Tyler and Woodcock.

A bridge from sedimentology to structure is provided by another interesting paper, by Maltman, on microstructures in deformed sediments from the classic slump beds of the Denbigh Moors. He shows that the characteristic structures in these deposits are pre-diagenetic shear zones, often microscopic, which result in polished, finely striated and crenulated surfaces in outcrops. The phenomena are identical to those produced experimentally by deforming argillaceous sediments with not more than about 70% water content. Only the top few meters of sediment would appear to deform by pervasive grain slippage without the formation of shear zones.

Several papers concern major structures which have exerted important control on sedimentation, notably the NE-SW-trending Bala and Llangranog Lineaments. The prolonged record of movement on the various faults composing the Bala Lineament is well demonstrated, but it seems rather feeble to admit that the paucity of structural information near the Bryn Eglwys Fault precludes detailed consideration of the Bala Lineament in northeast Wales. A modest amount of field work would surely have provided the data needed.

The authors regard N-S faults as of comparable importance to the more conspicuous ones trending NE-SW. Other structural papers on South-Central Wales, the Central Wales synclinorium and the Llandovery District contain plenty of new data.

The direct interaction between sedimentology and structure displayed in the papers is not very strong, although the editors, in their introduction, emphasize the control of sedimentation by syn-sedimentary faults, many of them probably following Basement faults. The Caledonian deformation that inverted the Welsh Basin involved renewed reactivation of Basement faults.

How far then have these and many other modern and sophisticated studies advanced our understanding of the Welsh Basin, since the time of that great geologist O. T. Jones? On the evidence of this book, one's impression is that the more important advances have come from the sedimentological side and from tectonic advances made elsewhere in the world. One misses here an overall view, especially of the tectonics. Even more, one regrets our lack of a deep seismic reflection survey across the Welsh Basin. The uncertainty about subsurface structure is perhaps reflected by the fact that only one section in the book attempts to show structure even down to 5 km.

From the point of view of the reader, the merit of the book is that it collects together sixteen papers on the Welsh Basin which would otherwise have been scattered in many different journals. This is an advantage for those—and there are many—who are particularly interested in the Welsh Basin: the interest of most of the papers is essentially local.

The work is well produced. The English is not always perfect: syn and post (not wooden!) are not English words; in places six or seven nouns and adjectives are strung together; source is not a verb. The reproductions of photographs are poor but diagrams and maps are good.

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