REVIEWS

Geology of the Nottingham District by A.S. Howard, G. Warrington, J.N. Carney, K. Ambrose, S.R. Young, T.C. Pharaoh and C.S. Cheney, 2009. Memoir of the British Geological Survey (Sheet 126). 212 pages, 48 figures, 22 photos, 21 tables, 978-0-85272-579-5, £24.

At last; it's out. The new sheet memoir for Nottingham has been published. Fourteen years after its companion map, and exactly 100 years after its predecessor. Ripples of applause across the East Midlands. So good to see this in print – and such a close thing when it may be one of the last of the 1:50,000 sheet memoirs to be produced in paper form.

It is excellent to have available this invaluable geological resource for the Nottingham area, another splendid BGS example of serious, competent, authoritative and detailed geology in the finest tradition. But after that bald statement, it is perhaps rather difficult to warm to such a tome. Easy reading it is not. But for raw geological data it is magnificent, because it's all there: 26 pages on the applied geology, 46 pages on the Carboniferous and older rocks, 58 pages on the Permo-Triassic, 14 pages on our little corner of Jurassic, 22 pages on the Quaternary, 25 pages on the structure and concealed basement, and the usual end pages. Some would dismiss the long chapters on bedrock geology as boring, old-style, stratigraphic geology, but these are presentations of the solid facts that must lie at the heart of any real geological research.

Perhaps the part nearest to easy reading is that on the applied geology, with overviews of mineral resources, water resources, flooding, engineering properties of the ground and the various human activities that have left their mark. Also welcome is the Quaternary chapter on unconsolidated sediments and landscape evolution, which now receives full and proper coverage, in contrast to the old days when anything above the Pliocene (or should we now say Neogene) was almost dismissed as mere soil by the geological purist.

Inevitably, one must make comparisons between this new volume and the earlier BGS offering on the Nottingham geology (*Nottingham: a geological background for planning and development*, published in 1990 as Technical Report WA/90/1). They even have the same cover photograph of Castle Rock, though prior to the recent removal of its sylvan screen. The 2009 Memoir covers a much larger area, as the 1990 Report covers only the southwestern corner of Sheet 126. And only the Memoir has the wealth of stratigraphic detail on both the solid and the drift geology. There is of course overlap, where the 2009 section on applied geology is largely a condensed and updated version of the 1990 material. The 1990 Report has its 16 large fold-out derivative maps with various aspects of the geology, mostly at 1:25,000, while the 2009 Memoir has 130 more pages (and should be accompanied by the 1:50,000 map). The new memoir is an affordable £24 (though the map will cost another £12), while the earlier report is a rather daunting £90. So some similarities, but very different; each to his own choice; but any local geologists, amateur or professional, will want to have their own Memoir, and many will gain from having both.

Like it or not, we are in transition to the electronic age. And the new memoir reflects this, as it is produced by short-run, on-demand, digital printing that avoids the high costs of litho preparation. This is recognisable by the text being a fraction less crisp than that in a litho print, but this is no great problem, and it does have the advantage of allowing full colour reproduction on all the maps and photos scattered through the pages. The presentation is excellent.

Few members of the Society will feel the urge to read this memoir, but many will feel the need to have it as an essential reference – it is after all very good value for a huge amount of local information. Essential for anyone doing serious geology around Nottingham, and a key reference for years to come.

Tony Waltham

Darwin's Lost World: the Hidden History of Animal Life by Martin Brasier, 2009. Oxford University Press. 304 pages, 37 photos and figures, 978-0-19-954897-2, £16.99 in hardback.

In the famous book *The Origin of Species by Means of Natural Selection* published 150 years ago, Charles Darwin expressed his concern that the fossil record showed evidence that the animal phyla we know so well today appeared suddenly in the Cambrian (then regarded as a lower part of the Silurian system) with no antecedents in Precambrian rocks, then regarded as Azoic (without life). This new book is a welcome addition to the numerous tomes about Darwin, and Martin Brasier has concerned himself with the same problem – the so-called Cambrian explosion and the poor record of previous fossil life, in particular with what is now known of the array of Precambrian fossils found since Darwin's day.

Martin Brasier's book is a personal, broadly autobiographical account of how his thinking has evolved since he started his professional career as the naturalist on a Royal Navy survey ship, as did Darwin. Moving to a lectureship at the University of Hull, and later to a Chair of Palaeobiology at Oxford University, the author has taken part in expeditions to many parts of the world, seeking the evidence provided by strata deposited across the Precambrian-Cambrian boundary, particularly in Newfoundland, Russia, Siberia, China, Mongolia, Oman and Australia, and of course the more accessible Charnwood Forest. His account is at times light-hearted, providing us with an entertaining description of the logistics of reaching these far-flung localities and the problems of doing field work there. The results of his investigations can be summarized as saying that the Cambrian explosion was a more drawn-out affair than usually seen with a variety of fossil organisms, some known as Small Shelly Fossils, of uncertain nature, appearing before the earliest Cambrian trilobites. He describes the now-well-known Ediacaran biota of mainly frondose and disc-shaped organisms preserved either in shallow-water sandy sediments or in volcani-clastic deposits as showing no clear evidence that they were ancestors of Cambrian phyla, and, rightly, he emphasises that we know little about their biology: how did they feed and reproduce? Can the quilted body structure advocated by Seilacher be substantiated? Thus Martin Brasier shows that Darwin's Dilemma is far from solved. In contrast to the widely-held belief that jellyfish should have been the most primitive forms of life, he expresses the opinion that none of the disc-like fossils in Ediacaran rocks were jellyfish impressions; some were holdfast of fronds, but others appear to have been too complex or too large to be holdfasts. He argues that the "embryos" found in the Doushanto Formation of China could have been clusters of algal/bacterial cells, with the dark blob in the centre being a carbonized part of the inner cell layers, not an animal cell nucleus. Martin also briefly discusses the "Snowball Earth" hypothesis when world-wide glaciations and deglaciations may have stimulated the evolution of multi-cellular life forms.

After discussing the pros and cons of the arguments offered by palaeontologists around the world, Martin Brasier comes to a conclusion that the absence of trace-fossils such as worm trails in late Precambrian rocks indicates that the bioturbation caused by worm-like animals was a critical factor and that such creatures only arose at the beginning of Cambrian times. Without worms or bioturbation in Neoproterozoic times, organic detritus was buried in sea-floor sediments and not readily available as food for other marine life. Hence the evolution of burrowing, sediment-feeding worms may have been the trigger for the development of more complex life forms such as Archaeocyatha, often dubiously grouped with sponges, and trilobites. This hypothesis will be tested by future researchers.

In reviewing how Martin Brasier sees Darwin's Lost World, it should be noted that he has little to say about stromatolites, the carbonate structures built by cyano-bacterial colonies which Russian palaeontologists in particular have tried to use as form-genera with stratigraphic significance for subdividing and correlating Proterozoic strata. Nor does he have much to say about the Precambrian unicellular organisms generally known as acritarchs, used for stratigraphic correlation by G. Vidal and others. Both stromatolites and acritarchs are known far back into the Precambrian, long before the appearance of the Ediacaran biota. The microbes found in siliceous stromatolitic structures in the Gunflint Chert of Canada are noted but little is said about the paleo-environment of the Banded Iron Formations of which the Gunflint Chert is a part. However, these shortcomings are only of minor significance in the context and Martin has provided us with a highly readable and entertaining book. Some will disagree with some of his comparisons and aside remarks but there is plenty of food for thought about what really might have happened in late Precambrian times, the "Lost World" of Charles Darwin.

There is an eight-page colour photographic section and a scatter of line-drawings but I felt the book could have been improved with more illustrations and simple geological maps or sections of the strata at the localities visited. The book concludes with 210 end-notes, some of which should have been integrated with the main text, and a full bibliography and index.

Trevor Ford

The Making of a Land: Geology of Norway edited by I. Ramberg, I. Bryhni, A. Nottvedt and K. Rangnes, 2008. Norsk Geologisk Forening, ISBN 978-82-92-39442-7. 624 pp, £40.

This is an incredible book, a true tome of monumental proportions, yet beautifully produced, with lots of specially created artwork, and all at a ridiculous price. It is a treasure to peruse and enjoy, especially, but not only, by anyone planning a visit to the fiordlands. The geology of Norway is complicated by the massive structural deformations of the Caledonian, and is presented here largely as an assembled interpretation, which is a fascinating insight to the depths of modern understanding.

There is a wealth of geological information on Norway and its northern outpost of Svalbard. There are also many boxed texts on special themes – including Ediacaran fossils, sulphide ores, ophiolites, the larvikites, the Kongsberg silver, the Storrega submarine slide and the strandflats. New, important and interesting data about the Scandinavian glaciations take 70 pages. Norway is famous for its igneous and metamorphic terrains, but the geology offshore (and across much of Svalbard) is largely sedimentary, and so important for the mainly Jurassic source rocks and reservoir rocks that yield both oil and gas. It is good to read that the broad picture suggests that only 1% of Norway's hydrocarbons have yet been found.

With over 600 pages, more than 450 photos, a similar number of diagrams and maps, and a large (A1) geological map of Norway in an end-pocket, this book is remarkable value. That's what comes of oil company sponsors (and freedom from any commercial publisher). But it means that you've already half-paid for it by filling up with petrol. So whether or not that petrol is for the drive north to catch the Bergen ferry, it's worth shelling out just a little more to obtain this truly splendid book.

Tony Waltham