

photographs, which give a better sense of how the material will appear in the field. Some SEM images are included, but I am doubtful of their use to the casual reader. It would perhaps be better to focus on providing more photos of poor specimens to disabuse general readers of the notion that the fossils one finds in the field are complete and free of matrix.

Given that many of the new sheet *Memoirs* now contain far less detail than their older versions it is encouraging to encounter extra chapters devoted to the processes of mineralization, rather than just a list of mineral resources in the area, and the interaction between humans and geological process and resources are welcome extensions of topics that were previously lumped together in the economic geology chapter. The chapters on the Quaternary and Geology and Man are outstanding in their efforts to explain the importance of Earth sciences relevant to human activity since our species first arrived in the area. By contrast, the whole of engineering geology in the fourth edition was covered by a single paragraph on page 96. Geodiversity and geo-conservation also get welcome attention throughout the new edition. However, there is no explanation of the intimate links between biodiversity and geodiversity in limestone pavement areas and the key role of geological processes in creating the conditions for the Teesdale Sub-Arctic Flora.

Given the commitment of BGS to innovation in publishing, perhaps the next logical step would be to make the *Regional Geology* series available as PDFs or other machine-readable documents. When working with palaeontological monographs or papers, the ability to search in electronic versions for taxonomic names or the names of authors is extremely useful. I think such features would be similarly useful for searching for stratigraphic unit or mineral names. Being able to zoom in on images or change colours on maps and illustrations would also be helpful to readers who are colour blind or have other visual impairment. As the manuscripts for this series must now be prepared by desktop publishing, I can see no obvious technical impediment to this approach.

My overall impression is of a much needed 21st century update, in terms of style, production techniques and content that will serve the needs of a broad range of readers. The deep knowledge about the regional geology of northern England, and adjacent areas, shines through and is an important reminder of why we need specialist regional geologists and stratigraphers. It also warns us that such knowledge can be lost if it is not archived and made accessible.

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Mining between Ceres and St Andrews. John McManus. Windfall Books, Kelty, Fife, 2010. 95 pp. ISBN No. 970-0-9557264-8-4, £10, paperback.

This recently published book joins a growing list of short illustrated publications about Fife's heritage. Others have dealt with castles, medieval abbeys and churches, salt and coal works at Preston Island, Valleyfield and St Monans, and the stunning coast. Indeed, apart from the odd photograph of former collieries in books like *Old Wemyss* and *The Lost Village of Buckhaven* for example (titles published by Stenlake), there are few modern books that deal with any aspect of mining in Fife. However, Hutton presented a photographic record of *Fife: The Mining Kingdom*, also published by Stenlake, in 1999. It is noticeable that the mines of East Fife appear only on pages 110–111, the last two in the book with photos of collieries (and miners) at Largoward and Rameldry. The only book I can recall that takes the kind of integrated approach to the study of mining in Fife that this new work addresses was by Walter Stephen around 1968 under the title of *The Binnend Oilworks and the Binn Village* and was the product of an adult education class in industrial archaeology at Burntisland. This earlier book is wider in its approach as it includes the social history.

Curiously, this new book does not have an index or numbered chapters. It includes sections on formation of coals, coal mining history and methods, geological structures, summary of the structure of the Ceres–St Andrews Coalfield, coal ownership and the working arrangements, the Ceres Coalfield, the eastern coalfields (in 9 subsections) and postscript. I tend to read short books for review from cover to cover as quickly as possible. I coped until the end of the section on the Ceres Coalfield. After that the mind became blurred by information overload. I doubt the author intended anyone to read his narrative non-stop.

The section 'Formation of Coals' provides a readable account of the geology of Fife and the sedimentary environments and climates in which the Devonian and Carboniferous rocks were laid down. Unfortunately, although the author has adopted the current stratigraphical terminology for the Carboniferous, he continues to use the outdated 'Calcliferous Sandstone Measures' for strata that would now be assigned to the Pathhead Formation. This is understandable given that the published 50 000 scale geology map is years old. However a little word in a BGS ear could have produced figures from the digital version that showed all the new terms. What I do like is that the section encourages the reader to go outdoors, to the Scores cliff at St Andrews to see the coal bearing strata.

The section 'Coal Mining History and Methods' valiantly traces the development of extraction methods from outcrop excavation, small drift mines, bell pits, stoop and room to long wall mining. Using block diagrams, the author is generally successful in providing the reader with an insight into the way coal was removed and how groundwater was managed to deepen the workings below ground through day levels. However, I would like to have seen a photograph included of exhumed stoop and room workings in an opencast coal site and I do have one or two issues with figures later in

the book. The geological map (Fig. 8) has areas of missing ornament; Figure 9 appears to have an error (the early fault followed by dyke) in coal outcrop pattern; the coal seams of Ceres White Den (Fig. 10) seems to show opencast mining in the Lower Five Foot Coal correctly but the same ornament appears in the Lower Four Foot Coal underground for example. I assume this figure attempts to show unrecorded workings underground.

Although this book is not about social history, I think readers will feel some social empathy with the miners and their wives and children who all worked arduously in the collieries in their particular roles. It is fascinating to think how their progress in working the coal underground was probably advertised in the landscape by the redeployment of the wooden pithead winding frames from one site to another over a time span of months rather than years.

This book will be of interest to Fifers generally (and East Fifers in particular), people like me who just love all things Fife, those with an interest in mining and its history and some just interested in the geology and looking for a brief readable account. This book encourages readers to get outdoors to see some of the mining features (I must go to the Drumcarrow area) but is not a field guide. It is not for cavers as it carefully avoids the pitfalls of suggesting where access to old adits hint at exploration in the galleries of old coal, ironstone and limestone mines. I look forward to further books on this particular topic. Go out and buy a copy before the limited print run sells out.

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Regional Geophysics of Northern Scotland. K.E. Rollin 2009. *Regional Geophysics of Northern Scotland*. Version 1.0 on CD-ROM. Keyworth, Nottingham: British Geological Survey, £25.

Just over 30 years ago, the Finnish Geological Survey undertook a very high resolution air-borne magnetic survey of the whole of Finland and revealed, in unexpected detail, a coherent image related to hitherto unknown tectonic processes in the Baltic Shield. Although the UK aeromagnetic coverage began earlier, it has evolved more gradually, and in a piecemeal fashion, with more widely spaced flight lines; consequently, it does not have the same coherence or resolution. This CD '*Regional Geophysics of Northern Scotland*' shows that the painstaking task of putting it all together has been effective in now giving us a nationwide image of the magnetic signatures of basement and igneous structures.

In contrast to magnetics, the UK has one of the most impressively complete and uniform coverages of gravity data. In 1982, the Institute of Geological Sciences (IGS), a new assemblage including the Geological Survey, published gravity maps with various levels of processing

and a report entitled '*British Regional Gravity: 1 Northern Britain*'. This CD shows just how much progress has been made in the last quarter of a century.

The principal value of this guide is as a reference work, bringing to light what potential field data exist and what patterns are revealed when they are processed with modern graphical enhancement techniques. The images, their analysis and the models created to help interpret them, are combined with a review of the tectonic and geological setting of the area, and a brief review of relevant deep seismic profiles. So, although the publication intends to be primarily about potential field data, it does serve, just about adequately, as a more comprehensive tool for introducing a classical geologist to what we know about the whole upper crust of Northern Britain.

I think that it is helpful to look upon the CD as a tourist guide rather than an encyclopaedia. It is able to draw the users' attention to a comprehensive coverage of detailed images and illustrates and explains what types of conclusion may be drawn from them. This ability partly reflects the medium of publication; the CD allows the user to see a sometimes bewildering array of differently enhanced images that could never be economically viable in a printed publication. I particularly liked the 'rotating Sun' display in which a movie displays the gravity or magnetic field in shaded relief with the direction of illumination moving round the whole perimeter. To see lineations suddenly become prominent, for some optimal solar direction, only to disappear into obscurity as the Sun moves on was an inspiration. Hence the CD does exploit the medium successfully.

It is not an encyclopaedia in the sense that it is not the place to go deeply into a problem and find a definitive answer. The sections on quantitative modelling are good as they consider alternatives and give a proper sense of being provisional. An earlier reviewer of the CDs covering two other areas of Great Britain saw them as a good exemplar for students, being taken from the data and their distribution, through maps and sections to the simplifying geophysical models of structures that fit them, is a necessary part of an educational process.

The ability to copy and print the maps and images is an important step towards the user being able to complete the process by finding firmer conclusions based on more extensive and focused work. For those of us who prefer to study a larger version of the data in the smaller region of interest, the CD offers the route of printing a paper copy. Nevertheless the inability to enlarge the images on screen is a small but unnecessary niggle. A zoom option is sometimes available but then only with one level of magnification. Many online digital document displays, such as the National Library of Scotland's digital map site, allow a continuous range of magnification and to choose where the magnified window on the image is centred. This would have made the CD better suited to the needs of specialists.

On a more technical side I found the section on lineaments off-putting. The root of the word implies an elongated feature so drawing lots of short criss-crossing