

Book Reviews

The Scottish Gold Rush of 1869 R.M. Callender & P.F. Reeson. Northern Mine Research Society, British Mining 84. 2008. ISBN 978-0-901450-63-0-0, £12.00.

The allure of gold, stemming from its durability, resistance to tarnish and above all rarity (average crustal abundance < 4 ppb) has existed for at least 5500 years and judging by the current price level continues to this day. This being the case it is surprising that few people are aware of the Scottish Gold Rush that occurred in Sutherland in 1869. The authors suggest that this could relate in part to the remoteness of the location from the tourist trail. However, the main reasons why the event is not widely known outwith geological and prospecting circles are probably that it was short lived, affected only a few hundred people and did not cause widespread suffering. Whatever the reasons, this extremely readable and widely researched book will be a welcome addition to most reader's bookshelves, not just for the geologist and prospector but also for those with an interest in Scotland's socio-economic history.

The book details the findings of the Baile an Or (Town of Gold) Project, a five year study of the gold workings in the Strath of Kildonan, initiated in 2003 and largely funded by the Heritage Lottery Fund, with additional support from the Northern Mines Research Society, Timespan and The Gold Museum of northern Lapland. The project adopted a multidisciplinary approach encompassing an extensive literature and archival search, archaeological digs, geology, geophysics and applied photography. A replica of one of the temporary miners huts was also constructed and furnished. The text is extremely well illustrated with 55 black and white figures comprising photographs, line drawings and maps, the majority of which are clearly and sharply reproduced.

The opening 50 pages give a month by month account of the search which is largely drawn from contemporary press reports. Like a number of other mineral discoveries in Scotland the initial stimulus came from somebody who had experience of mining and prospecting activities overseas. In this case it was one Robert Nelson Gilchrist who, on returning to his native Helmsdale from the Australian and New Zealand goldfields recognized the Helmsdale river as a potential source for alluvial gold, particularly since a small nugget had been found there earlier in the 19th century.

The comprehensive description of mining activity, which focussed on the Kildonan and Suisgill burns, includes methods used to extract gold from stream beds and banks by pan, rocker and sluice, together with one or two attempts at sinking shafts and tunnelling, although it is not clear whether the latter two methods were still aimed at alluvial deposits or whether they were

attempts to locate bedrock sources. The technical aspects are complemented by accounts of the miners, most of whom came from the Helmsdale area and Caithness, although they were later joined by former miners from further afield whose experience greatly aided the novice local men. In the early stages of the gold rush the miners walked in daily from Helmsdale involving a round trip of at least 20 miles, but temporary villages of tents and wooden huts were soon established at Kildonan (Baile an Or) and at Suisgill (Carn nam Buth) where in addition to living quarters there were shops that could supply the miners with everything from food and clothes to tools.

The book also describes several visits to the diggings by the landowner, the 3rd Duke of Sutherland. On one such trip he was accompanied by Sir Roderick Murchison who shortly afterwards addressed the Geological Society on the geology of the Strath and on current developments therein. The high quality and close resemblance to gold from Otago was recorded in a paper presented to the Edinburgh Geological Society in March 1869 by W Lauder Lindsay. Short biographies of some of the principal characters are presented, including the Duke, Robert Gilchrist and Alexander Johnston, the Wick photographer who recorded a number of scenes of the workings including the well-known photograph of the Baile an Or village.

In the early stages the diggings were largely unregulated, but at the end of March 1869 the Duke instituted a system of licensing which cost the miners £1 per month. A 10% Crown royalty on gold collected was also imposed, which required the miners to make weekly declarations. The last monthly licences were issued in December, after which the Duke terminated the diggings possibly because of continuing damage to valuable sheep pastures, although by then the severe winter weather had also significantly reduced the number of miners. The quantity of gold recovered is difficult to assess; the official (declared amount) was around 600 oz, but it is believed that the actual recovery could have been up to five times that amount.

There were three subsequent attempts to reopen the diggings, the 1886 'trespass', the 1895 'trial' and the 1911 initiative, the latter two being promoted by Sutherland County Council. Finally, in 1967 13 boreholes, totalling around 180 m, were sunk to obtain an estimate of gold distribution and grades in the unconsolidated sediments of the Helmsdale Valley. The gold rush stimulated interest in adjacent areas most notably Glen Berridale although exploration was resolutely opposed by the Duke of Portland. Prospecting in Strath Brora is also described, but the discovery there in the 1990s of bedrock gold surprisingly is not mentioned. The section on geological background is sadly rather spoilt by a number of inaccuracies, omissions and dubious assumptions.

For example, most base metal mineralization in the Northern Highlands is in the form of sulphides or oxides and certainly does not occur as metallic chlorides; also, there is no mention of copper. Comparisons with the Brora and Rhynie gold occurrences are tenuous, as is the suggested connection with the Helmsdale Granite. Indeed Plant & Coleman (1972) state that granite veins associated with the Strath Halladale Complex are the primary source.

Despite these shortcomings and one or two typographic and grammatical errors, this is probably the most comprehensive account of this unique event and as such is commended to all with an interest in Scottish local history and mineral prospecting.

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Reference

PLANT, J. & COLEMAN, R.F. 1972. Application of neutron activation analysis to the evaluation of placer gold concentrations. In Jones, M.J. (ed.) *Geochemical Exploration*. Proceedings of the fourth International Geochemical Symposium, London, 17–20 April 1972. Institute of Mining and Metallurgy, London, 373–381.

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Granite and Grit: a walker's guide to the geology of British mountains by Ronald Turnbull, Francis Lincoln Ltd, London, 2009. 208 pp. ISBN 978-0-7112-2914-3. £20.

This splendid A4-format book is aimed firmly at the hillwalker or climber with no previous knowledge of geology and in that it succeeds admirably. Indeed, it contains some of the most interesting, entertaining and, above all, clear descriptions and explanations of rocks that I have seen aimed at that readership. But it is not intended to be a text book; it is obviously a labour of love from an author with both a wide-ranging knowledge of British hills and a remarkable enthusiasm for their geology. It is best described as a series of essays, each on a particular rock type or on a geographically related group of rocks. They all skilfully weave together aspects of the appearance, composition and origin of the rocks with entertaining anecdotes from the history of science and from the author's own walking and climbing experience.

The photographs, almost all by the author, are not only technically and artistically brilliant but also show excellent examples of the features being described. Finding suitable illustrations for books is always difficult and many professional geologists would love to have such a collection at their disposal. The specially drawn diagrams are attractive and easy on the eye, though the details from Geological Survey maps would have been better if they had been simplified and redrawn in the same style.

The author's writing style is clear, enjoyable and, above all, refreshing. He is not afraid to be informal and

even colloquial, liberally scattering the text with expressions that my editors would never allow me to get away with. Through this he manages to convey some very complicated notions simply and effectively, without any sense of 'dumbing down', without patronising the reader, and very often with delightful humour. He describes the Lewisian gneisses as 'like Harris Tweed, rough and warm and cuddly under the hand' and explains that 'gneiss resembles Scotch broth, in that it's been heated and boiled about for so long that it's irrelevant what the original ingredients were'. Greywacke is described, appropriately, as 'like a tough concrete mix'; and in the Yorkshire Dales 'the hills rise in flat layers, like a pile of pancakes' – I like it. The difference between the Northern Highland and Grampian Highland terrains is neatly summed up with the memorable quotation, 'Walk slowly with a big rucksack across the Moine; and quickly with a picnic over the Dalradian'; you will have to read the book to see the context.

The author is not a geologist. He conveys a slightly quizzical view of how geologists see the world, but the text is none the worse for that and it is good to see ourselves as others see us. But the *Acknowledgements* reveal that the book has not even been checked through by a geologist and sadly this does show.

There are far too many examples of incorrect or dated terminology, such as 'Hyrceanian Orogeny', 'Moine Schists', Silurian and Devonian 'eras', 'Borrowdale Volcanic Series' or, worse still, 'the Borrowdale Volcanic' (NB singular). Such things will probably only irritate the professionals, but inaccurate or conflicting terminology is confusing for readers. There are also far too many factual errors so that, for example; the Ennerdale and Eskdale granites are said to be of Devonian age; the Millstone Grit is shown on top of Coal Measures; 'sea-shells' are said to occur in Dalradian rocks; both the Old Red Sandstone and Torridonian are described as dominantly marine; the Strontian and Foyers 'granites' are still regarded as parts of the same pluton; and the Giant's Causeway and Staffa are attributed to the same lava flow. The *Glossary* is much better than most aimed at this readership and there are some really neat definitions, but this too is spoilt by too many errors.

Still worse are wrong or misleading interpretations. The author clearly has a good grasp of the overall principles of geology and even highlights and explains concepts that are commonly confused or overlooked. So, I am somewhat puzzled as to how so many fundamental errors have crept in. There are far too many to list here but, for example, he suggests that quartz veins form by crystallization from molten silica and indicate the presence of underlying granite; that andesites originate by the mixing of melted crust with melted basalt; that the landslips of northern Skye are due to the presence of columnar jointing in the basalt; and that the dominant east-west glens of the Northern Highlands follow the Caledonian structural trend. He somehow misses the point of the historical Neptunism versus Plutonism debate, confusing the issue with discussion of

seashells on mountain tops and giving the impression that this is an ongoing debate.

I would like to think that most of these points would have been picked up by any competent practising geologist and could very easily have been corrected. This would have added considerably to the value and authenticity of the book for very little extra effort.

However, broad Earth processes, geological history and the work of ice are beautifully explained for the beginner in the first two chapters. Commendably the author emphasizes that the current shapes of our mountains have only been sculpted during the ice ages of the last 2 million years, something that many non-geologists fail to appreciate. But, sadly, he fails to spell out the major concept that most 'popular' books get wrong i.e. that the rocks which form our mountains were last uplifted to their present elevation only 45 to 20 million years ago and hence that the age of the mountains is Palaeogene and broadly the same as the Alps. This is hinted at in a few places, so the author is clearly aware of the fact, but it is a lost opportunity. The development of ideas about the glaciation of Scotland is neatly described, and *Scottish Journal of Geology* readers will be either amused or enraged by the quote, 'it is traditional to see Murchison and the Edinburgh Geological Society as intellectual fossils' (when it came to accepting Agassiz's theories)!

The main section of the book works through the selected rock types in approximate order of decreasing age, with diversions to explore other themes. Each chapter extols the virtues and, with good humour, bemoans the drawbacks of the various terrains, and many are illuminated by accounts of the author's own walks; those in the Rhinogs and in Coir' a' Ghrunnda particularly held my attention. But what has the author got against granite? Personally I find granite slabs and their well-drained gravelly regolith delightful under foot and granite is a joy to climb upon. Yet he refers to granite lands variously as 'grim', 'forbidding' or simply 'not cheerful'.

There are many astute observations, such as how the bedrock lithologies of the Yorkshire Dales are reflected in the stone walls and, by contrast, how the Skiddaw 'slate' terrain of the Lake District is marked by a prevalence of hedges rather than walls. There is good discussion of the origin of granite tors in the Cairngorms, which in a later chapter are contrasted neatly with 'gritstone' tors. A vivid description of ignimbrite flows in Snowdonia includes a perceptive appreciation of its sub-marine ignimbrites, which were the first to be recognized in ancient rocks only 35 years ago.

The most confusing chapter is supposed to be about dolerite sills but it goes on about Scotland's lowland volcanoes and then gets diverted into explaining oceanic volcanism, seafloor spreading and continental drift, which seem totally out of place in this context. The text also implies that the Salisbury Craigs Sill is part of the Arthur's Seat volcano and amazingly, both here and in a later chapter, that the Great Whin Sill was 'squeezed out by volcanoes in the Edinburgh area'!

Two chapters, *Walking the fault* and *A 200-million-year walk over Dufton Pike*, do not fit into the overall 'lithological' pattern. But they are entertaining essays about specific walks with geological themes and serve to sum up what geology is all about. As could the neat Conclusion, which presents a most charming personal point of view and could even be seen as a good geologist's creed.

My criticisms, although many, could justifiably be seen as quibbles when applied to a book of this type. Its overall concept and execution is original and exemplary, it does what it sets out to do with style and, above all, is a joy to read. It should sell like hotcakes at the very reasonable price of £20. So maybe the publishers will be looking for a second edition soon and, if so, I for one would be delighted to offer my services to correct those errors of fact and interpretation and so, I am sure, would many of my colleagues.

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Fossils Alive or New Walks in an Old Field Nigel H. Trewin. Dunedin Academic Press Ltd, Edinburgh, 2008. ISBN 978-1-903765-88-3, £19.95.

In this jaunty book highlighting many of Scotland's classic fossil localities, author Nigel Trewin, Emeritus Professor of Geology at Aberdeen University, has offered up a 'homespun' account of the life-and-times of Scotland's ancient animals and the land/seascapes they inhabited. Each chapter, or rather, Excursion, focuses on a specific cast of fossil characters centred on the Scottish localities where their remains have been found and documented. In many instances, Trewin has been intimately involved in documenting and describing the fossil sites and organisms, thus these weaving-of-the-tale accounts are based on extensive first-hand experience and knowledge.

The book is comprised of 10 Excursions, so-called because they involve Trewin, often accompanied by a colleague or colleagues, utilizing a time-travelling vehicle (the 'bus') that is used as a transporter back into the geological past to witness and experience what the environment of the present-day fossil localities would have been like when the fossils of interest lived. This is the kind of stuff that has formed the basis of a rich and vibrant science fantasy industry; one might view it as a bit silly but I doubt if their isn't a single person who hasn't, at one or more times, wished to be able to travel back in time to witness past events (or, perhaps in many instances, try to alter a decision one has made or an event one has unwisely participated in!). Trewin's own illustrations and sketches are sprinkled throughout the text, often accompanied by actual photos of the fossils highlighted in each Excursion, and provide the visual images to enhance the reader's mental journey with Trewin and friends back into Scotland's geological past.

These remind one of the uncomplicated illustrations used in many children's books, but they suffice for the scientific level of chatter between the time-travelling companions.

Therein lies what I view as an unavoidable dichotomy for this type of book, the attempt to marry literally a suite of detailed palaeontological/scientific facts with a Hollywood-esque sojourn into Deep Time. As a professional geologist myself, I found the manner of juxtaposition of geo-facts with geo-fantasy somewhat dissatisfying. This is not because I am being scientifically prudish (I enjoy a good fantasy as much as the next person), but rather from what is the fairly profound and serious nature of the Introduction and Epilogue. Let me stress that this is a minor, and likely, personal whinge, and other readers might well disagree, but I raise this point for the following reason. Trewin uses the Introduction as a vehicle to inform readers about his personal view on how science, particularly geology, is done. This viewpoint has been honed over Trewin's distinguished career as a geologist and reflects his experience in testing scientific ideas and evolving them as new discoveries are made and new insights obtained. It is an honest and serious account of one's lifetime doing science. The Epilogue is solemn stuff – the nature of Earth System change and the potential for humankind's role in influencing that change, the future of life on Earth, etc. Both these chapters are in stark contrast to the sprightly, science-fantasy style of the 10 Excursions. I found it difficult to think that a reader can be expected to take seriously the seriousness of the messages woven into the Introduction and Epilogue when the body of the book has Trewin, for example, crouching in fear from being scented by carnivorous Jurassic reptiles or sharing saucy comments with a female colleague about the sexual exploits of ammonites. Perhaps I'm being overly critical and a tad 'old fashioned', but it seems to me that either one writes a book in which the seriousness of the 'message' is conveyed throughout, or one dispenses with the lecturing and simply gets on with writing a fun, informative read.

That whinge aside, the 10 Excursions are an enjoyable read. The first part of each Excursion provides the scientific background (the 'facts'), describes the fossil localities, the fossils themselves and the evidence used to reconstruct the ancient environments and lifestyles of the organisms. The second part is the science fantasy (i.e. line up for the magical mystery geo-tour)

based as closely as possible on the facts. The first four Excursions are to the world of the Devonian, highlighting the exquisite fish fossils of Forfar, Dura Den and the Orcadian Basin, and the unique Rhynie Chert flora and fauna. Trewin, an admitted devout angler, takes the opportunity to do what most fishermen do, namely, brag about the ones that got away (or almost got away). Excursion 5 (my favourite) is shorter than most but provides a delightful account of a day-in-the-life of 'Mrs Phillips', a Carboniferous trilobite at Bishop Hill in Fife. Excursion 6 is one of the longest and takes the reader to the volcanic origins of Edinburgh and a sweaty hike through the jungles, swamps, rivers and shorelines of the Carboniferous. Permian reptiles and desert wanderings and eluding Jurassic dinosaurs and a swim in the sea form Excursions 7 (to Elgin) and 8 (to Skye), respectively. Like most Hollywood-esque travelogues, sex is required and this is provided in Excursion 9 as Trewin snuggles up with an American colleague (female, of course) in the tight confines of The Bus as they submerge into the Jurassic sea off the coast of Skye and become geo-voyeurs observing ammonites playing the mating game. The last Excursion is to the Jurassic of Helmsdale and experiencing the earthquakes and submarine processes forming the Helmsdale Boulder Beds.

Overall, *Fossils Alive* is a fine attempt at exercising the imagination muscles (including Trewin's naughty, but spot-on, little dig at the inadequacies of research funding agencies; each Excursion could have done more were it not for the miserliness and short-sightedness of the money lenders funding The Bus). In addition, factual details and insights are peppered throughout the text, e.g. the arc of vision that a trilobite's eye would have provided, to the perils of modern sea level changes inferred from those of the Carboniferous. This book is one that the amateur palaeontologist, the layperson interested in Scotland's natural heritage and even professional geologists would want to have on their bookshelves for a rainy day's read, as well as a primer for an outing to these sites of natural scientific interest and importance.

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