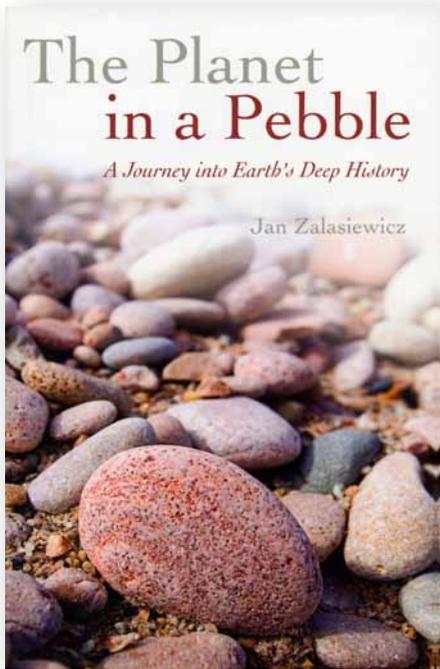


Book reviews

The Planet in a Pebble by Jan Zalasiewicz. Oxford University Press, Oxford. 2010. Hardback, 234 pp. Price £16.99. ISBN 978-0-19-956970-0



Enthusiasts for a particular style of Scottish geology will be familiar with Jan Zalasiewicz's work on graptolite biostratigraphy in the Southern Uplands; see, for example, *Scottish Journal of Geology*, **39** (1) for 2003. In 'Planet in a Pebble', despite a

brief excursion back to the Scottish graptolites in company of Charles Lapworth, his brief is much bigger and much bolder, and it starts with a pebble of Welsh slate. It is a delightful and ingenious device. Pick up a pebble, any pebble. Look at it—really look at it. What can it tell you? Of course, different pebbles may have different tales to tell, but that teased here from the chosen one would take some beating. As we discover, building a pebble is not a simple process.

Our pebble's atoms and elements take us back to the origins of the universe and to distant supernovae, its minerals tell of the formation of our home planet and generation of its geological plates. Some of those mineral grains allow age determinations to be made, others might tell of their unique geological origin. How did the grains come together? Tides and wind, storm surges and turbidity currents are all invoked—and perhaps the grains encountered living organisms. The author's background in palaeontology comes through strongly as we learn of the intricacies of graptolite construction and evolution, of acritarchs and chitinozoa, of symbiotic algae and of seething

bacterial mats. Where did all this happen? Palaeomagnetism comes into play.

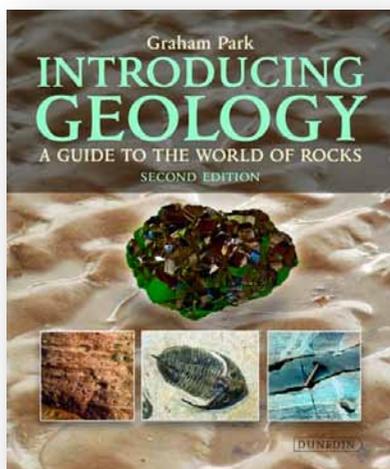
As our proto-pebble is buried and lithified we follow it into realms of elevated temperature and pressure: it passes through the oil window, minerals transform, cleavage is imposed as continents collide, ore-bearing veins are injected. Then it's back to the surface as mountains rise and are eroded, ice covers the land locking our guide into permafrost, before the pounding waves smash it from the cliffs. Even then there's still time for a lesson in cosmogenic dating before a final speculation on our pebble's future prospects. Could the whole story be repeated?

The faint-hearted potential reader may perhaps be deterred by the conjured visions of nepheloid plumes, rare-earth-element mobility, quorum sensing in microbial communities, methane clathrates and the like, but there is absolutely no need for concern. Despite its scope and willingness to tackle up-to-the-minute techniques and conundrums, this book is quite remarkably accessible. It is beautifully written, becoming quite lyrical in places, and abounds with gentle humour and humility. There is no pretence that we know all the answers, but 'Planet in a Pebble' provides more

than enough to be going on with and does so with verve. It is a skilful celebration of modern geological methods and, what's more, it is excellent entertainment.

By Phil Stone

Introducing Geology: a guide to the world of rocks by Graham Park. Dunedin Academic Press, 2nd Edition, 2010. Paperback, 134 pp. Price £9.99. ISBN 978-1-906716-21-9



As we enter the second decade of the 21st century, increasingly a knowledge of geology is required to allow us to better understand current events in the natural world.

The global repercussions of the recent Icelandic ash clouds, the 'great escape' of the trapped Chilean metal miners, the tragic loss of the 33 New Zealand coal miners and the oil leak from the BP drilling rig in the Gulf of Mexico; these are but a few of the recent events which have filled the media headlines for weeks on end. At the same time, TV programmers and producers are increasingly using the Earth and Planetary sciences as an entertainment vehicle, with a cascade of items by enthusiasts like Professors Iain Stewart and Brian Cox for example, supported by other experts in various specialities.

In 'Introducing Geology', Professor Graham Park offers an excellent primary text on the subject which provides the tyro, amateur or serious student, with a good overview of the basic concepts of the science covering its many different subject areas. The birth and death of oceanic basins, ocean crust subduction, continental collision, mountain building and their associated volcanic episodes are examples of the range of topics presented. When taken together with the numerous geological processes and products involved, it becomes clear that a wide breadth of knowledge is required to master all aspects of the science. To accommodate the size of his subject,

the author has divided the text to describe both the rock forming minerals involved and the forces, both internal and crustal, which have played their part in forming our planet from its earliest origins.

The concept of 'deep time' is often difficult to convey to the reader and Professor Park has devoted 3 chapters of his book to an explanation of this aspect of geology. Taking the reader back to the beginning at 4.6 billion years ago, he describes the four great ages of time through which the earth has passed. By an explanation of radiometric dating he explains the concept of absolute age and how it compares with relative age dating as recorded in the fossil record. The principles of superposition and the use of stratigraphy, which led James Hutton to the realisation of the age of the earth, are well illustrated. These ideas on superposition are then allied to a description of the main fossil groups and their evolution over time. The concept of evolving life forms leaving their fossil remains in the rock strata was the first indication that the rocks were laid down layer upon layer, and has allowed correlation of synchronous events across continents, e.g. the Carboniferous limestone strata of Western Europe.

A chapter of the book is devoted to an area of interest which was

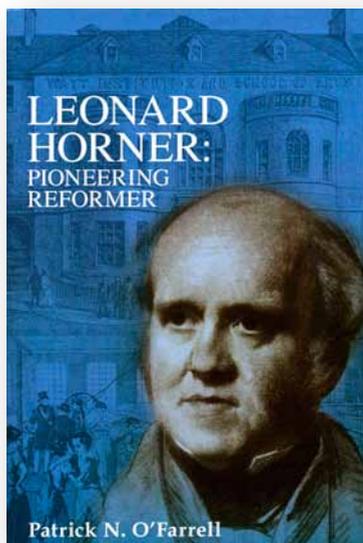
once referred to as 'geology in the service of man'. This chapter is an examination of the extractive industries on which mankind depends and in particular the vital fields of oil, gas and coal production. Although much thought is currently being applied to methods of reducing the amount of carbon dioxide being released into the atmosphere, there can be little doubt that as world energy requirements increase, so fossil fuel utilisation will continue to grow. As well as describing structural oil and gas traps, there are also descriptions of the other important extractive processes and a section on hydrogeology and the search for potable water, a vital resource which continues to diminish worldwide through over-abstraction and contamination.

Terms and concepts new to the beginner in any sphere of study require much repetitive checking and cross referencing. This is particularly so for the student working alone in the widening field of 'distance learning'. By highlighting terms/ subjects throughout the text and by providing a comprehensive glossary, the author has greatly increased the usefulness of his volume and has made it a reference source of lasting value. The diagrams and illustrations and the increased use of colour when compared with the earlier edition

augment the text very well and this little volume, by one of our finest geologists, should prove a real boon to those seeking primary information on Earth science.

By Tony Irving

Leonard Horner: Pioneering Reformer by Patrick O'Farrell. Heriot-Watt University, Edinburgh, 2010. Hardback, 378 pp. Price £20. ISBN 978-0-9566729-0-2.



At the end of 1970 I moved north with my family from Reading to help set up the Open University in Scotland. With a long-standing interest

in the history of geology and having become the Edinburgh Geological Society's Secretary in 1974, I became aware in 1975 that four doors away from the OU's office at 60 Melville Street in Edinburgh's West End, at number 52, there lived in the 1830s the little-known Leonard Horner and his family. Horner's bust, along with that of the goldsmith George Heriot, adorned the front of the Heriot-Watt University building in Chambers Street, now the Crown Office.

Leonard Horner's eldest daughter, Mary, married the great Victorian geologist Charles Lyell in 1832. Another daughter nearly married Charles Darwin. So, on 25 August 1975, I put on a small exhibition in the OU office on Lyell in advance of the Scottish Excursion which preceded the main Lyell Centenary Symposium at Imperial College in London that year. During the Scottish Excursion, organised by Gordon Craig, a dinner was held in the Royal Hotel in Forfar on 29 August following a visit earlier that day to the Lyell home at Kinnordy, just outside Kirriemuir in Angus. After the dinner, I got everyone present to sign my copy of the Society's new Excursion Guide, *The Geology of the Lothians and South East Scotland*. The signatures include Lady Lyell and her son, Lord Lyell and also those of George W. White of Urbana, Illinois,

North America's leading historian of geology at that time, Leonard G. Wilson who as Lyell's biographer had already published Volume 1 of his now three-volume work on Charles Lyell, Gordon Herries Davies of Trinity College, Dublin, Ireland's leading historian of geology, Martin Rudwick of Cambridge and many others. One signature in this unique copy I have is that of James Greig, retired Professor of Electrical Engineering at King's College, London, then living on the Kinnordy estate. He told me that he was going to write a biography of Leonard Horner. He never did.

At last, we now have the most excellent biography of Leonard Horner, launched in the Edinburgh Business School of Heriot-Watt University at Riccarton on 8 October 2010 in the presence of Lord Lyell who has written the Foreword. The book is written by Patrick O'Farrell, former student of Gordon Herries Davies at Trinity College, Dublin, and now Emeritus Professor of Economics at Heriot-Watt University. It follows his excellent illustrated history of the University published in 2004.

Beautifully illustrated, each of the nine chapters in Patrick's book concludes with an extensive list of the sources quoted and so is an important addition to scholarship.

The book traces the extraordinary life of one of the most important but until now, little-known figures in 19th Century Britain. Any one of Leonard Horner's many achievements would have been a major contribution, but to realise that he covered so much is almost beyond belief. He must have had a formidable intellect and quite extraordinary work rate.

Leonard Horner was born in Edinburgh in 1785, the year in which James Hutton first presented his Theory of the Earth to the infant Royal Society of Edinburgh. His grandmother was friendly with Hutton. Like his older brother, Francis, who became MP for St Ives in Cornwall and died early, in Pisa, in 1817, Leonard attended the High School and University in Edinburgh where he was much influenced by the lectures of Thomas Charles Hope who had succeeded Joseph Black in the Chair of Chemistry. Leonard joined the world's oldest Geological Society, in London, the year after it was founded, in 1808. He became Secretary and was twice President. He retained an amateur interest in geology throughout his life and was instrumental in rescuing Hutton's missing manuscript, eventually put together as Volume 3 of the *Theory of the Earth* in 1899.

In 1821, it was Leonard Horner who founded the Edinburgh School of Arts for the Instruction of Mechanics in the Freemasons' Hall in Niddry Street in Edinburgh, now St Cecilia's Hall, which evolved into today's Heriot-Watt University. With Lord Cockburn of Bonaly he co-founded Edinburgh Academy and then became the first Warden of London University in 1828, a post he held for three years. Because of his pioneering zeal as a reformer, he was appointed the first Inspector of Factories in Britain and held the post for 26 years. Patrick's book details the many tussles he had with the mill-owners in the North of England.

The geological community in Edinburgh and beyond is profoundly grateful to Professor O'Farrell and to Heriot-Watt University for this penetrating and long-overdue biography of Leonard Horner.

By Norman E Butcher

"One of the major figures in 19th Century educational and social reform" Ann Jones, Archivist, Heriot-Watt University.