

GEOSCIENTIST

VOLUME 27 NO 7 ♦ August 2017 ♦ WWW.GEOLSOC.ORG.UK/GEOSCIENTIST

The Fellowship Magazine of the Geological Society of London

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[REVIEWS SPECIAL!]

Wren's Nest at 60

Celebrating the World's first
National Nature Reserve

ONLINE SPECIAL

The long road from
'disposal' to 'recovery'

FELLOWS' ROOM

Society reoccupies
a valuable amenity

HUTTON'S DEBT

Did Hutton crib his famous
line from Browne?



33 Technical Presentations

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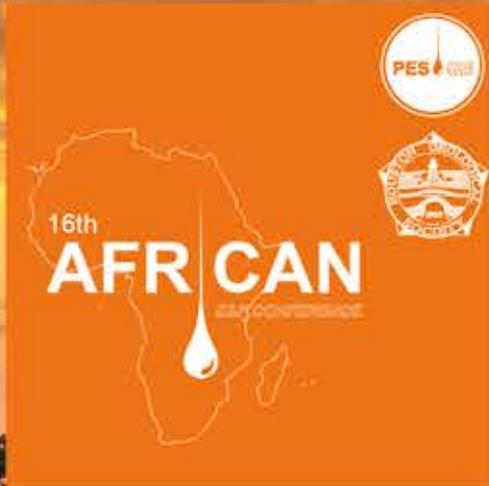
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Andrew Harrison looks back on the 61st year of the World's first NNR *Calymene blumenbachii* or 'Dudley Bug'.
Courtesy, Dudley Museum Services

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**ONLINE
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Petroleum Group

28th ANNUAL DINNER

Natural History Museum

21 September 2017



For further information or to book a table for this event, please contact sarah.woodcock@geolsoc.org.uk

Lyell Meeting 2018

Mass extinctions: understanding the world's worst crises

7 March 2018

The Geological Society, Burlington House

The study of mass extinctions is one of the most interdisciplinary research areas within Earth and environmental sciences. Recent major advances have come from a broad spectrum of fields, including atmospheric modelling, high-precision age dating, volcanology, geochemistry, stratigraphy and palaeontology. The 2018 Lyell Meeting aims to highlight these achievements and showcases the improved understanding we now have of the great environmental catastrophes of the past. The Meeting aims to encompass the full spectrum of crises seen in the Phanerozoic fossil record.

The 2018 Lyell Meeting provides a platform to assess the current stratigraphic and geochemical records of environmental change during mass extinction events and the role of atmospheric climate modelling in understanding the causes of the crises. The goal is to evaluate the relative importance of environmental changes in major episodes of species extinctions, and to further explore the mechanisms that link these proximal kill mechanisms to the ultimate drivers, such as large igneous province eruptions and meteorite impacts. This will be a rare opportunity to hear research developments happening in diverse disciplines applied to all mass extinction events.



Convenors:
Paul Wignall (University of Leeds, UK)
Dave Reed (University of Hull, UK)

Keynote Speakers:
Prof Mike Benton (University of Bristol)
Dr Sofia Lindkvist (Geological Survey of Denmark and Greenland)

Further information:
For further information about the conference please contact:
Naomi Newbold, Conference Office, The Geological Society, Burlington House, Piccadilly, London W1 0BQ
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Call for Abstracts:

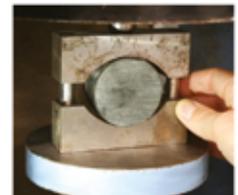
We invite oral and poster abstract submissions for the meeting, and these should be sent in a Word document to naomi.newbold@geolsoc.org.uk by 1 December 2017. Abstracts should be approximately 250 words and include a title and acknowledgement of authors and their affiliations.

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Geoscientist is the Fellowship magazine of the Geological Society of London

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 Published on behalf of the Geological Society of London by
Century One Publishing
 Alban Row, 27–31 Verulam Road, St Albans, Herts, AL3 4DG
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PRINTED BY

Century One Publishing Ltd.

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 ISSN (print) 0961-5628
 ISSN (online) 2045-1784

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Subscriptions: All correspondence relating to non-member subscriptions should be addressed to the Journals Subscription Department, Geological Society Publishing House, Unit 7 Brassmill Enterprise Centre, Brassmill Lane, Bath, BA1 3JN, UK. Tel: 01225 445046. Fax: 01225 442836. Email: sales@geolsoc.org.uk. The subscription price for Volume 27, 2017 (11 issues) to institutions and non-members will be £139 (UK) or £159/\$319 (Rest of World).

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“DEFINITIONS MATTER. THEY REACH OUT INTO THE HUMAN REALM, AFFECTING PEOPLE’S LIVES, POLITICAL POLICY AND ACTION”

FROM THE EDITORS DESK:

Integrating outreach

This month’s feature on Wren’s Nest, Dudley, takes me back to my scientific roots – such as they are – in the Silurian. Despite a snazzy palaeoecological thesis title, knowing what rocks are where, and what fossils they hold, has always been my thing.

Philistines assume that stratigraphy and taxonomy are simple matters, devoid of philosophical difficulty; but nothing could be further from the truth. Even biologists have difficulty defining a species, operating at least 30 definitions - only one of which is the best-known ‘biological species’ definition, involving ‘fertile offspring’. Palaeontologists, needless to say, don’t even have that option.

Then there’s the question of codes. Zoologists use one, botanists another - governed by the International Commission on Zoological Nomenclature (ICZN) and the International Association for Plant Taxonomy (IAPT) respectively, twin branches of the International Union of Biological Sciences (IUBS). Neither takes responsibility for species definition, however – just ensuring that every name is unique.

This presents no small problem to the wider world. Depending on whose classification you use, the number of species classified as ‘endangered’ might be nine or 25. Raising the number of recognised ‘species’ might encourage more hunting/poaching, while also

conceivably generating more conservation funding. Classification has real-world consequences.

In a recent comment piece in *Nature*¹, Australian researchers Stephen Garnett and Les Christidis suggest that the time has come for the IUBS to take the matter in hand and create a taxonomic commission to establish rules applicable across all life-forms, involving other stakeholders in decision-making. They hold up as a good example the deliberations of our own International Union, IUGS, over recognising the Anthropocene as a subdivision of geological time (to be resolved in 2020). They applaud Earth scientists for arguing for the inclusion of anthropologists and historians among the 36 people who will decide. ‘If species ... are at least partly arbitrary’ they write, ‘deliberations must draw upon expertise beyond taxonomy’. Lawyers should be involved too, to ensure that definitions can withstand legal challenge, and so on.

Definitions matter. They reach out into the human realm, affecting people’s lives, political policy and action. ‘Scientific outreach’ (for this is what this really is) must not be thought of just as a bolt-on accessory. If scientists wish truly to embrace the public, they must hold the world close and involve it in the decisions they take.

1. Garnett S T & Christidis L, 2017: Taxonomy anarchy hampers conservation. *Nature* 546 pp 25-27, 1 June.

DR TED NIELD NUJ FGS, EDITOR - TED.NIELD@GEOLSOC.ORG.UK @TedNield @geoscientistmag

SOCIETY NEWS

Honorary Fellowship



Following a proposal from the External Relations Committee, Council recommends the following candidate for election to Honorary Fellowship at a future OGM.

Dr Markku Juhani Iljina

Dr Iljina is the founder of Markku Iljina GeoConsulting Oy. He is an exploration geologist with extensive experience of Fennoscandian geology, specialising in gold, nickel, copper, vanadium, chrome, tungsten, and PGM mineral deposits. He has a broad palate of mineral exploration activities over more than 30 years and has published widely on the results of this work and continues to do so.

Dr Iljina has played a major role in the reorganisation and development of professional bodies. Initially this was in his home country of Finland where he played a lead role in the reorganisation of the Finnish technical and professional bodies that represent geologists so as to properly allow professional geologists

to be recognised both inside and outside Finland for their technical and professional abilities.

During his time as a Council member of the European Federation of Geologists, over a period of about 10 years, he has provided support and understanding of the aspirations of the Society for EFG and supported it in all related professional matters. He has shown himself to be a good friend of the Society and this will only increase in the future. He is an effective ambassador and through his many contacts with Finnish employers will be able to promote professional titles and the highest standards of ethical behaviour. He has been the EFG (European Federation of Geologists) representative in PERC (Pan-European Reserves & Resources Reporting Committee) since June 2012.

It is recommended that he be elected to Honorary Fellowship to enhance and cement this ongoing collaboration into the future.

What your society is doing at home and abroad, in London and the regions



Colourful events



During the evening of Friday 11 August 2017 between 1800 and 2030, the Library will be hosting three special talks around the theme 'The Colours of Geology'.

The Colour of Gemstones

Cally Oldershaw FGS, former Curator of Gemstones for the Natural History Museum in London and first 'Lady Chair' of the Gemmological Association of Great Britain, will introduce you to the colours of gemstones including diamond, ruby, sapphire and emerald, as well as tanzanite, and the rainbow colours of tourmaline. Discover what causes colour in gemstones and how colours can be enhanced.

➤ 1800-1900, Tickets £12.00, Booking essential

The Colour of Maps

Dr Allison Ksiazkiewicz (University of Cambridge) will explore how early geologists described three-dimensional landscape through the visual language of maps and sections of the Earth. Find out about the techniques used in the maps produced by geologists George Bellas Greenough and William Smith and how colour and theories of art played an important role in the first geological maps of Britain.

➤ 1830-1930, Free, no booking required

The Colour of Fossils

Dr Maria McNamara (University College Cork) will explain how the emerging field of fossil colour has revealed unprecedented insights into the ecology and behaviour of ancient animals. Find out about how colour is preserved in ancient animals and how it can shed light on what they looked like, how they communicated with each other, and how the functions of colour have evolved through deep time.

➤ 1800-1900, Free, no booking required



Society Awards 2018 – nominations

Fellows of the Society are invited to submit nominations for the Society's Awards for 2018 to the Awards Committee, writes **Stephanie Jones**.

Full details of how to make nominations are on the website at www.geolsoc.org.uk/About/Awards-Grants-and-Bursaries. Nominations must be received at the Society no later than 29 September 2017.



President's Day 2017

Society Award winners received their prizes at President's Day on 7 June 2017. A list of winners has already appeared in these pages; their full citations and replies may be inspected on the Society website. Full pictures of the presentations also appeared that day on the Society's Facebook feed.

Dawne Riddle.

Society Discussion Group



Programme: 2017

Meetings of the Geological Society Discussion Group (formerly the Geological Society Club) are 18.30 for 19.00, when dinner is served. Attendance is open to all members of the Society. For up to date information concerning topics for discussion and speakers, please go to **W:** <http://bit.ly/2IkAvbd>

- ◆ **Tuesday 19 September.** Burlington House (London W1J 0BG)
- ◆ **Thursday 19 October.** Athenaeum (London SW1Y 5ER)
- ◆ **Wednesday 8 November.** Bumpkins Restaurant (London SW7 3RD)
- ◆ **Wednesday 6 December.** Athenaeum (London SW1Y 5ER)

➤ Please contact Caroline Seymour on carolines@nubianconsulting.co.uk for more information and to make a reservation

FUTURE MEETINGS

Dates for meetings of Council and Ordinary General Meetings until June 2017 will be as follows:

◆ OGMs:

2017: 20 September,
22 November,
2018: 7 February, 4 April

◆ Council:

2017: 20 & 21 September (residential)
22 November,
2018: 7 February, 4 April





Fellows' Room returns

They're out – Royal Academy staff, who have been temporarily occupying the Fellows' Room at Burlington House, will quit in September. Dawne Riddle reports.

The Fellows' Room, a comfortable lounge adjacent to the Upper Library in Burlington House, will return to Society use in the autumn. An announcement in the Society email newsletter, sent out on May 30, broke the news under the headline 'Update on Burlington House facilities for Fellows'.

The note stated: "...after current occupation by the Royal Academy ends, the Fellows' Room will be used as part of the *Plate Tectonics at 50* conference in early October. Council have agreed that thereafter it will become available to Fellows again but also be used for other

purposes such as conferences and meetings, which will mean that access will be unavailable from time to time."

For those periods when the Fellows' Room is being used for 'other purposes', the email Newsletter report concluded, "we are also planning to add some relaxed seating in the Lower Library as well as a coffee machine" for Fellows wishing to rest, or hold informal meetings.

The move brings to an end a situation that sparked concern at the 2016 AGM and reported here a year ago (*Geoscientist* 26.7, August 2016), over an announcement made to staff in May 2016 that the Fellows' Room was to be 'sub-let' to the RA for 13 months, and that it was to close immediately for refurbishment (pictures). The room has been unavailable since then.

Latest news from the Publishing House

Jenny Blythe has the latest from the Geological Society Publishing House

Heavy hydrocarbon fate and transport in the environment

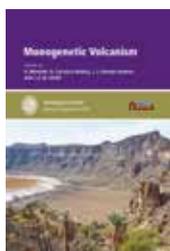
Heavy hydrocarbons are a heterogeneous mixture of compounds consisting mainly of alkylated cyclics, resins and asphaltenes and, depending on the source, can form a significant proportion of crude oil. Their prevalence is expected to increase in the future as heavy oil reserves are increasingly exploited for growing worldwide energy demands. Despite their growing use, heavy hydrocarbons are generally overlooked when assessing the risk of hydrocarbons to human health, ecology and water reserves. Although their human and environmental health risks are considered low, heavy hydrocarbons are known to persist in the environment. This review considers the fate, transport and toxicity of heavy hydrocarbons. It provides a description of the possible mechanisms involved in heavy hydrocarbon attenuation and offers some interpretation of data that provides insight into their persistence in the environment.

◆ Read the open access paper <https://doi.org/10.1144/qjegh2016-142>

New Book! Monogenetic Volcanism

This volume presents new research on small-scale basaltic volcanism and provides a 'state of the art' review of our understanding of the nature, origin and global significance of monogenetic volcanism. It would also appeal to anyone interested in exploring the enigma of monogenetic volcanism in geological, volcanological, geomorphological volcanic hazard and geoconservation aspects.

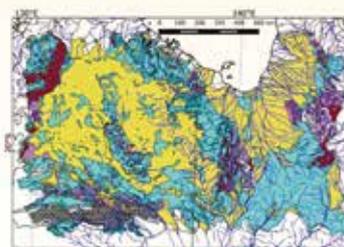
- Available to purchase in print at www.geolsoc.org.uk/sp446
- Available in the Lyell Collection as part of the *Full Book Collection* (for subscribing fellows)



Catchment-based gold prospectivity analysis combining geochemical, geophysical and geological data across northern Australia

The results of a pilot study into the application of an unsupervised clustering approach to the analysis of catchment-based National Geochemical Survey of Australia (NGSA) geochemical data combined with geophysical and geological data across northern Australia are documented. NGSA Mobile Metal Ion@ (MMI) element concentrations and first and second order statistical summaries across catchments of geophysical data and geological data are integrated and analysed using Self-Organizing Maps (SOM). Input features that contribute significantly to the separation of catchment clusters are objectively identified and assessed.

◆ Read here <https://doi.org/10.1144/geochem2016-012>



Hutton's debt to Browne?



Mike Leeder* asks: does geology's most famous aphorism owe more to Browne of Norwich than Hutton of Edinburgh?

Hutton's famous catchphrase '...no vestige of a beginning, – no prospect of an end' (for which 'Google' has 20 000+ entries) comes in the last sentence of the eloquent coda to his 1788 paper, *Theory of the Earth*¹; arguably the Enlightenment's outstanding geological testament:

'...if the succession of worlds is established in the system of nature, it is in vain to look for anything higher in the origin of the earth. The result, therefore, of our present enquiry is, that we find no vestige of a beginning – no prospect of an end.'

Hutton's theory replaced divine intervention with a natural system of perpetual mountainous surface-wasting, periodically replenished by uplift.

But was Hutton's memorable and mellifluous aphorism, *sui generis*, self-penned? I am going to suggest no; because of previous writing by Thomas Browne (1605-1682), medical doctor, polymathic naturalist and a long-term resident of Norwich, knighted there in 1671 by Charles II.

It comes in Section 11 of Browne's 1643 *Religio Medici*² ('Religion of a Doctor'):

'Time we may comprehend, 'tis but five days elder than our selves, and hath the same Horoscope with the world; but to retire so farre back as to apprehend a beginning, to give such an infinite start forward, as to conceive an end in an essence [God's eternity] that wee affirme hath neither the one nor the other;'

The bracketed words are mine. Readers should compare the italicised words with Hutton's more punchy précis. Since Browne denied both Genesis and Revelations 1, 8-9 ('I am alpha and omega; beginning and ending'), his book was promptly banned by Vatican censors.

Naturalist

How did Hutton's debt to Browne come about? Browne was a wise naturalist and a devout, though

sceptical, Christian. Both men had Leiden MDs. I like to imagine Hutton reading *Religio Medici* as a young medical student, perhaps returning to it as an 'improving' agriculturalist in early 1750s Norfolk or recalling it when developing his own 'world theory' in 1780s Edinburgh.

Paramoudra Club

It is ironic that within living memory the City of Norwich School 6th Form had both a Thomas Browne Society (a debating club, founded in 1947) and a more scientific Paramoudra Club, an early-1950s geological debating and field club, and forerunner to the Geological Society of Norfolk. It was devoted to the geology of Charles Lyell – meetings always beginning with readings from Lyell's 'Principles'.

Hutton adapted Browne's writings: Lyell was Hutton's great champion of geological sciences to the post-Enlightenment world. The continuity of associations defines a rich heritage: one over which the irenic and sceptical Browne and the gregarious conversationalist Hutton might well be chuckling!

***Emeritus Professor**, School of Environmental Sciences, UEA, Norwich. His latest book (with Joy Lawlor) '*GeoBritannica: Geological Landscapes and the British Peoples*' (2017; Dunedin Press) is reviewed on p19. He is preparing a more detailed account of the material presented here and welcomes criticisms, suggestions or relevant information from interested Fellows.

References

1. James Hutton 1788 THEORY of the EARTH; or an INVESTIGATION of the Laws observable in the Composition, Dissolution, and Restoration of Land upon the Globe. Transactions of the Royal Society of Edinburgh 1, 209-304 (Facsimile reprint Kessinger Publishing; www.kessinger.net).
2. Patrides, C A (Ed.) 1977. Sir Thomas Browne: The Major Works. Penguin Books, Harmondsworth.

SOAPBOX CALLING!

Soapbox is open to contributions from all Fellows. You can always write a letter to the Editor, of course: but perhaps you feel you need more space?

If you can write it entertainingly in **500 words**, the Editor would like to hear from you. Email your piece, and a self-portrait, to ted.nield@geolsoc.org.uk.

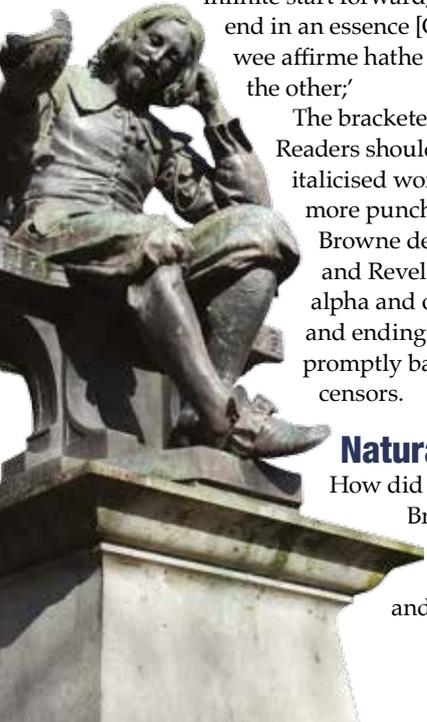
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Pictures should be of print quality – please take photographs on the largest setting on your camera, with a plain background.

Precedence will always be given to more topical contributions. Any one contributor may not appear more often than once per volume (once every 12 months).

“ I LIKE TO IMAGINE HUTTON READING RELIGIO MEDICI AS A STUDENT, RECALLING IT WHEN DEVELOPING HIS 'WORLD THEORY' IN 1780S EDINBURGH ”

MIKE LEEDER



WREN'S NEST AT 60



Andrew Harrison*describes Dudley's great geological site, the World's first NNR, a year on from its 60th birthday

Apart from heavy industry and being the birthplace of Sir Lenny Henry, Dudley is known for one important but often overlooked geological gem. Wren's Nest is internationally known for its fossils, and in September 2016 it celebrated its 60th anniversary as the World's first National Nature Reserve. The accolade was granted in 1956 during the post-war recovery period, when the Council were looking for green spaces where local people could find peace, reconciliation and inspiration. An important location for fossil-finding, Wren's Nest stood out as a site requiring protection. A nominated Site of Special Scientific Interest (1991) and a Scheduled Monument (2004), it is valued for its geology, industrial heritage and wildlife. Today a committed team of Council wardens and Friends of Wren's Nest Group volunteers (Friends Group) maintain the site, which is important for geological teaching and research.

Geography and geology

Wren's Nest is one of three hills, including Hurst Hill to the north and Castle Hill (the site of Dudley Castle) to the south east. They occupy a northwest-southeast trending ridge between Sedgeley and Northfield, which historically provided an important communication route across the region - Central England's watershed. The name 'Wren's Nest' comes from the Anglo-Saxon word, Wrosne, meaning 'The Knot'.

The Wren's Nest and its neighbouring hills represent three Silurian inliers, or periclinal, rising from the low-lying South Staffordshire Coalfield and resulting from Late Carboniferous tectonic movements associated with the Variscan Orogeny. The folded Wren's Nest strata dip at approximately 80° and 24° on east and west limbs respectively. Faulting, slickensides and tension cracks on

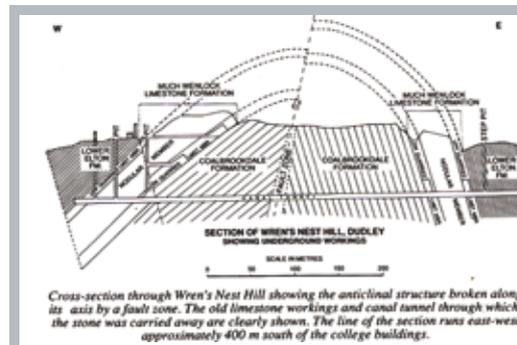
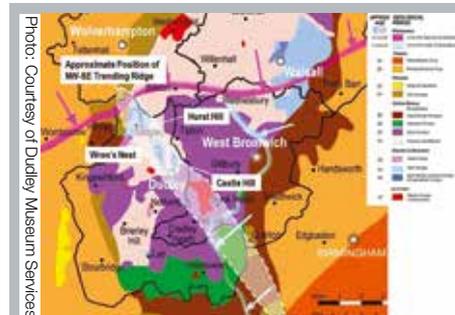
bedding planes also testify to ancient earthmovements.

Wren's Nest stratigraphy comprises variable thicknesses of interbedded limestone, mudstone and shale. The youngest stratum, the Lower Elton Formation, formerly 'Lower Ludlow Shale', belongs to the Ludlow Series. The underlying Much Wenlock Limestone Formation and Coalbrookdale Formation (the oldest stratum), belong to the Wenlock Series. The Much Wenlock Limestone Formation is divided into the Upper Quarried Limestone Member (formerly 'Upper Quarried Limestone'), the Nodular Member and the Lower Quarried Limestone Member (formerly 'Lower Quarried Limestone').

Fossils include brachiopods, bivalves, crinoids, trilobites, gastropods, cephalopods and bryozoans. Abundant corals form dome-shaped bioherms indicate warm shallow marine conditions with plenty of sunlight. The nature of the strata and variable-size ripples within the limestone layers reflect fluctuating low to high-energy conditions and wave activity. Such conditions are found today within shallow back-reef lagoons like those on Australia's Great Barrier Reef. Wren's Nest was most likely situated landward of such a barrier.

Throughout the Wren's Nest rocks we find 37 ash layers, weathered to greenish-grey bentonite clay, each indicating separate volcanic eruptions that smothered the region with ash during deposition, and comparable to ash layers found through rocks of similar age on Gotland (Sweden). Grain size and geochemical analysis of these layers indicates a nearby volcanic source. Geochemically these compare closely with deep borehole cores taken from approximately 2km beneath Cheltenham. The likely source has been identified as a stratovolcano, producing granodioritic lava.

Mid to late Silurian geography and



Top: Geological and Geographical Map of the Black Country
Upper middle: Cross Section through Wren's Nest Hill
Courtesy of Dudley Museum Services
Lower middle: Wren's Nest Fossil Death Assemblage
Bottom: The Main Patch Reef at Wren's Nest



Attendees on the Wren's Nest for the 60th Anniversary Celebrations

Photo: Courtesy of Dudley Museum Services

► tectonics places the Black Country region on the continental shelf of Avalonia, approximately 23° south of the Equator, on the southern fringe of the closing Iapetus Ocean. To the north a volcanic island arc, resulting from oceanic subduction, is believed to account for the volcanic source that affected Wren's Nest.

Zircon crystals from ash layers towards the top and base of the Much Wenlock Limestone Formation have been subjected to radiometric dating. The top layer, at the Lower Elton Member / Upper Quarried Limestone Member boundary, dated at 427.7Ma, has pushed the date for the Ludlow / Wenlock boundary back approximately four million years. The bottom Lower Quarried Limestone Member / Coalbrookdale Formation layer was dated at 429.1Ma. Together these dates indicate that the Much Wenlock Limestone Formation was deposited over approximately one million years.

The ash layers are also revealing abundant microfossils, including numerous scolecodonts, believed to be the mouthparts of annelid worms.

Industry

Strong connections have existed between the Wren's Nest, the local geology and community for centuries. Absent glacial cover after the last Ice

Age left the region with abundant near-surface mineral wealth, including limestone, coal, ironstone and seatearth, associated with the underlying strata. Consequently, the region was historically important as an industrial and manufacturing centre, especially for iron goods.

Wren's Nest was worked for the pure Lower and Upper Quarried Limestone strata. Originally mineworkings comprised shallow pits and quarries. However, from 1796 pillar-and-stall methods were employed as demand increased and workings sank deeper, chasing steeply dipping limestone beds. Mining ceased in 1924, leaving behind a sculpted landscape of trenches, quarries and caverns. Today, these provide various important habitats for flora and fauna, in particular for rare wildflower, butterfly and bat species.

Its blocky nature made the mined limestone ideal building stone, as seen in Dudley Priory and Castle. Crushed and burnt limestone provided lime for mortar, fertilizer for agricultural purposes and, during the Industrial Revolution, crushed limestone as flux for iron smelting. At its height, Wren's Nest produced approximately 90,000 tons of limestone. In 1678, 'Father of the Industrial Revolution', Abraham Darby was born at the family lodge once located on the reserve.

Miners & Murchison

Miners supplemented their income from collecting and selling Wren's Nest fossils. The 1850 Bentley Directory records three shops selling such fossils in Dudley town centre. These included the popular trilobite - *Calymene blumenbachii*, known locally as the 'Dudley Bug' or 'Locust', which adorns the town's coat of arms. Today, Wren's Nest fossils can be found in museums and collections worldwide. Since the 18th Century they have appeared in many publications and scientific papers.

During the 1830s, eminent palaeontologist Sir Roderick Impey Murchison visited Wren's Nest and Castle Hill to study the Wenlock Series. Stratigraphically describing every fossil, his work revealed over 600 species and 30 major taxonomic groups. Today, Wren's Nest represents the type locality for 186 fossil species, of which 87 are found nowhere else.

Murchison's book 'The Silurian System' was published in 1839, earning him the nickname 'King of Siluria', and launched in Dark Cavern beneath Wren's Nest to an audience of learned academics, sponsors and locals. His work would lead to a local Dudley fossil collection being assembled and the establishment of the Dudley and Midland Geological Society in 1842 - precursor to the Black Country



Ripples on Limestone Beds, The Ripple Beds

Photo: Authors' Photo



Photo: Authors' Photo

Halysites Chain Coral



Photo: Authors' Photo

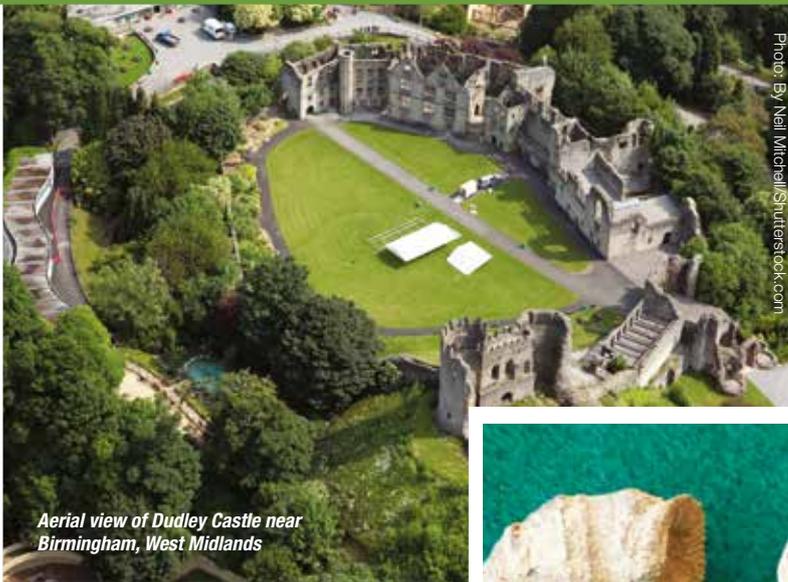
Dome Coral on the Main Patch Reef



Photo: Authors' Photo

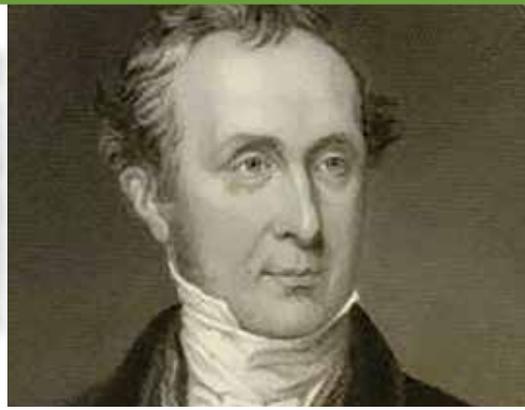


Wren's Nest Welcome Board and Trail Map



Aerial view of Dudley Castle near Birmingham, West Midlands

Photo: By Neil Mitchell/Shutterstock.com



Sir Roderick Murchison

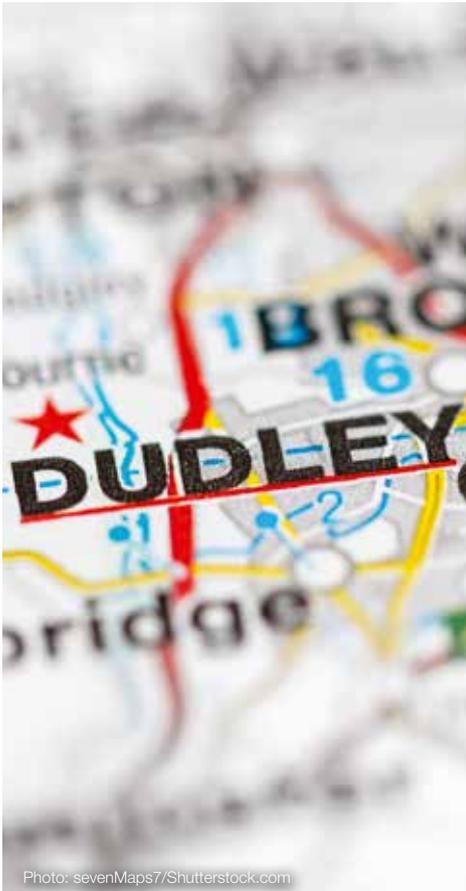


Photo: sevenMaps7/Shutterstock.com



Photo: www.badobadop.co.uk

Silurian sea bed fossils collected from Wren's Nest Nature Reserve, Dudley UK, June 2014

► Geological Society, founded in 1975. Murchison also encouraged the movement for a Museum of Geology in Dudley, which led to the establishment of the Dudley Museum and Art Gallery in 1912.

Geoconservation

Friends Group volunteers and reserve wardens hosted the Wren's Nest 60th Anniversary celebrations, a year ago next month, at the former Mons Hill College Campus. The event included talks from the Friends' Group, Graham Worton (Keeper of Geology) and guest speaker Professor Richard Fortey. After lunch activities included either a guided walk

or fossil hunting on the reserve.

Ongoing conservation work encourages local participation to prevent anti-social behaviour, improve access and provide maintenance, education and other promotional activities. Four trails – Wren's Nest Highlights Trail, Wild Wrosne, Murchison's Walk and Abraham Darby's Walk – cross the Reserve, each exploring geological features, wildlife and industrial heritage. Recent Lottery funded projects including, 'The Ripples Through Time Project' (2006), 'The Strata Project' (2007) and 'The Wrosne Project' (2008) which continue to inspire and educate visitors. As a flagship site for the Black Country's ongoing Global Geopark

bid, the Wren's Nest will hopefully continue to be appreciated for at least another 60 years. ♦

***Andrew Harrison** is Senior Geotechnical and Geo-Environmental Consultant at Rodgers Leask Environmental. He is field secretary and Vice Chair of the Black Country Geological Society (BCGS).
E: andrewcfharrison@yahoo.com

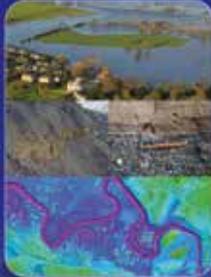
Acknowledgments

Thanks to Dudley Museum Services for the use of photographs and for help with the finer points of this article

The evolution of flooding and flood risk: past, present and future

14-15 September 2017

The Geological Society, Burlington House, London



Flooding is the costliest and deadliest type of natural disaster, claiming more lives than all other natural disasters combined. Prediction and mitigation of flood risk is therefore a key goal for governments and agencies across the globe. Flooding arises from complex, hydrological, hydro-morphological and sedimentological process interactions, whose dynamics and non-linear relations are a significant challenge – both to robust prediction of short term events for emergency response and longer term assessments of flood risk for infrastructure planning, particularly in the context of climate change adaptation. There is a need to better understand the evolution of frequency and magnitude of flood events, based on the paleo-flood-event record, in order to improve baseline estimates, understand the meaning of extremes – and also advance our understanding of the trajectory of flood risk evolution as rivers and coastal systems respond to climatic and land use changes. This meeting, which also brings together both academic researchers and practitioners, will explore how flood risk is not a static entity but an evolving feature of these systems. It will explore how the paleo-record can be used to better constrain frequency and magnitude of events, placing them in an improved context, and will also explore how incorporating morphodynamics and sediment flux predictions are helping improve the prediction of flooding and flood risk into the future. This is particularly important for flood mitigation and adaptation – as the agencies involved in management solutions are moving from hard engineering approaches towards a softer, nature based, approach to reducing flood risk. As such the meeting will explore how the geosciences can inform such changes to approach and thus guide future policy to mitigate flooding and flood risk.

Convenors

Don Parsons (University of Hull)
Eytan Frolich (University of Hull & Environment Agency)
Chris Rackey (University of Hull)
Gordon Sturt (University of Loughborough)

Further information

For further information please contact:
Georgina Worrall, Conference Office,
The Geological Society,
Burlington House, Piccadilly,
London W1J 0BG
T: 0207 434 9544
E: georgina.worrall@geolsoc.org.uk
Web: www.geolsoc.org.uk/flooding17
Follow this event on Twitter: #flooding17

Bryan Lovell Meeting: 23-34 November 2017

Mining for the Future

Call for abstracts

The mineral resource needs of the future will be different to those of the past and present. Our growing global population rightly expects greater prosperity and more equitable access to resources, and is becoming more industrialised and urbanised. We are only beginning to understand the challenge of meeting these needs in a way which is environmentally, economically and socially sustainable. Meeting this challenge will depend on cutting-edge research across the geosciences and in other disciplines, including engineering, economics and social sciences – and will require engagement with industry, the financial community, policy-makers and the wider public.

Introducing our Year of Resources running throughout 2018, this meeting will bring together a wide community of geoscientists and others to explore how we can address this challenge, and start to develop a roadmap for this multidisciplinary effort. It is held in conjunction with the IUGS Resourcing Future Generations initiative, and will inform the major IUGS conference on this topic to be held in Vancouver in June 2018.

To propose an oral or poster presentation, please send an abstract of no more than 400 words to Naomi Newbold (naomi.newbold@geolsoc.org.uk) by 18 September 2017. For further details, visit www.geolsoc.org.uk/Lovell17.

Building Resilience to Geohazards in the Face of Uncertainty

7-8 September 2017

The Geological Society, Burlington House, London



The impact of natural hazards on society continues to grow. Tackling this challenge needs physical and social scientists working together with stakeholders and communities at risk. It needs new ways of working, often in complex settings and difficult environments, to achieve positive and sustainable change.

This meeting aims to capture the growing activity in this area and provide a platform for the discussion of new results from major multi-disciplinary programmes involving researchers who are taking up the challenge to understand geohazards, manage risk and measure resilience. It will bring together the physical and social scientists and other experts to address the role that geoscience and geoscientists can play in building resilient communities and informed policymaking into the future.

Keynote speakers

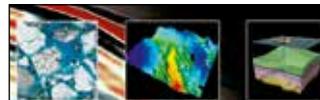
Professor Jenni Bartley (University of East Anglia) in UK Stronger Resilience in Volcanic Areas
Professor James Jackson (University of Cambridge) in UK Stronger Resilience in Volcanic Areas

Convenors

Suzanne Sargeant (British Geological Survey) regarding Resilience to Natural Hazard Knowledge Exchange
Peter Sammonds (University College London) regarding Resilience to Natural Hazard Strategic Advice
Anna Hicks (British Geological Survey) regarding Resilience to Volcanic Areas

Further information

For further information please contact: Georgina Worrall, Conference Office,
The Geological Society, Burlington House, Piccadilly, London W1J 0BG
T: 0207 434 9644 E: georgina.worrall@geolsoc.org.uk
Web: www.geolsoc.org.uk/buildingresilience17
Follow this event on Twitter: #geohazards17



Registration Open

Cross-border Exploration between UK & Norway – Comparisons, Contrasts and Collaborations

27-28 November 2017

The Geological Society, Burlington House, Piccadilly, London



Convenors:
Gro Haalwest
Aker BP
Ian Wilson
Kitty Hall
Petroleum Group

Confirmed Speakers from:

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Aptiner Catalyst
Bakley Aakton
Dana Petroleum
Gesa
Hansa Hydrocarbons
Hurricane Energy
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TNO
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Event Sponsors:



Can additional high value barrels be discovered through improved collaboration between UK and Norway? The objective of the conference is to enhance technical understanding of the status of key plays on each side of the border, to establish points of similarity and difference in both activity and success, and to highlight new opportunities. Important recent discoveries on either side of the border will be examined and the conference will seek to establish where new plays in one country have not yet been understood or explored across the border. Key note presentations will be made by leading figures from both Norway and UK.

This two day international conference will bring together explorationists from UK, Norway and other European countries with the following themes:

- Play opening discoveries as yet unexplored cross-border
- Differences in how competence is organised and technology adopted
- Examples of specific play knowledge being explored cross border
- Challenges on median line including data continuity and differences in nomenclature
- How to build a geology-without-borders view
- Issues for service industry
- Differences in exploration performance
- Danish and Dutch (and other) cross border examples
- Impact of regulatory and fiscal frameworks

For further information or to register please contact:

Sarah Woodcock, The Geological Society, Burlington House, Piccadilly, London W1J 0BG
Tel: +44 (0)20 7431 9544. Or visit the conference webpage: www.geolsoc.org.uk/PGS-Cross-Border

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WWW.GEOLSOC.ORG.UK/LISTINGS
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ENDORSED TRAINING/CPD

COURSE	DATE	VENUE AND DETAILS
Lapworth's Logs	n/a	'Lapworth's Logs' is a series of e-courses involving practical exercises of increasing complexity. Contact: info@lapworthslogs.com. Lapworth's Logs is produced by Michael de Freitas and Andrew Thompson.

DIARY OF MEETINGS 2016/2017

PLEASE NOTE THAT THERE ARE MANY MORE MEETINGS FOR WHICH WE DO NOT HAVE SPACE. ALWAYS CHECK WITH WWW.GEOLSOC.ORG.UK/LISTINGS

COURSE	DATE	VENUE AND DETAILS
Petrochemistry - 2017: 3rd World Congress on Oil, Gas and Petro Chemistry Petroleum Congress	24 August	Venue: Alimara Hotel, Berruguete, Barcelona, Spain. Cost: \$799. See website for details W: www.petroleumcongress.com/ Convener E: secretary@petroleumcongress.com

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New CPD system

Q How can I...

SEARCH

Photo: RunTheJewels/Shutterstock.com

Sir, I would agree entirely with Messrs. Talbot and Eccles (*Letters, Geoscientist 27.05*) that professional geologists, (ie., those offering expert services for payment) ought, both ethically and in their own business interests, to undertake CPD; and that where they seek to advertise such services by joining a Chartered body, that body is entitled to insist on this. Whether or not such body has the right to set itself up as a professional regulator is another matter; my preference would be that this function is better performed by public authority / government agency to avoid the 'closed shop' danger. However I believe that the Society has a unique role to play in advising any regulator and setting standards; it was for this reason that I became a professionally active CGeol in 1991. I am now retired and self-funded; I do not offer service for payment so there can be no legitimate public interest in what CPD I undertake. By most normal definitions (not the circular definition offered by Talbot and Eccles) I am not 'a professional'. When I put data and opinion into published work it benefits from peer review to ensure that it is neither unsubstantiated nor outdated and that my discussion of the views of others follows due courtesy. That producing such work has necessitated CPD should be obvious. The need to report it to central bureaucrats is not.

The GSL Code of Conduct is, since 2015, presumably that of the AGI Guidelines (a decision of Council not by poll of the Fellowship I believe). These make no distinction (as worded) between 'professional' and 'scientific' activity and by implication 'Chartered' or Non-Chartered'. Seemingly the only difference between Chartered and Non-Chartered Fellows is by now the requirement for a centralised registration of CPD. However I have always believed that, to the outside world, the designation CGeol adds something that is not immediately obvious in FGS alone, just as a senior degree adds to a first degree. It reflects a qualification milestone and demonstrates one's support (not least financial) for the Chartership structure as a means of improving professional standards.

Academic degrees are also milestone qualifications that reflect knowledge relevant to the time of their award; but universities do not require evidence of continued further study to allow the degree continued validity. The point of collecting any data is surely that it has a use. It seems to me that those having attained CGeol status should be offered a choice: tick the 'non professionally-active' box and save the submission and storage of CPD data that is of no use to anyone, or tick 'professionally-active', and ensure that their CPD data can be independently corroborated by those considering the possible use of their services. In the latter case they are surely entitled to the safeguards over the use of data that my Soapbox article mentioned.

DAVID JAMES



Sir, John Arthur's Soapbox 'What on Earth is going on?' (*Geoscientist 27.05*) deplored the closure of MSc courses in Exploration Geophysics at three universities and argued the undoubted importance of geophysical techniques for site investigations.

However, the situation is not as bleak as he portrays it. A review of current MSc courses containing the word 'Geophysics' shows that nearly all of them are taught in conjunction with named subjects such as Structural Geology (Leeds), Marine Geology (Southampton), Soil Mechanics (Imperial) and so on. The Departments have recognised the importance of providing geophysicists with a firm understanding of the geology, petrophysics and soil mechanics which our techniques can image so effectively.

Many years ago, Professor Perce Allen recognised this fundamental truth when he founded the Geological Geophysics BSc course at Reading University. Sadly this course, with its many opportunities for graduates, was closed by the then University Grants Committee following the 1988 Earth Science Review. However, I think we may conclude that the teaching of Exploration Geophysics at MSc level is not dead, but exists very effectively in conjunction with detailed studies of the geological targets.

CLIVE MCCANN

The Earth in Human Hands



Astrobiology is a niche area of Earth sciences and it is in this context that this book considers the Anthropocene.

Although at first I wondered if this would be a little contrived, as Grinspoon sets out to convince you - thinking with a planetary science hat on about many topical Earth science issues is more important and relevant than most people think. He presents the Anthropocene as a result of our planetary system rather than a direct consequence of human actions. However, I have to admit that until part-way through, when politics and social science were brought into the mix alongside geology, the title felt a little bewildering.

I read this book with a background (perhaps obviously) in geology and an interest in anthropogenic impacts on the Earth. The first few chapters were mainly familiar material for me - but unexpected anecdotes and the introduction of some unexpected concepts made for entertaining reading. There was some juxtaposition between relatively advanced scientific vocabulary and explanations of fairly basic geological concepts and I think someone with little knowledge of Earth sciences could struggle.

The book considers some of the philosophical questions related to our role as caretakers of the planet as a whole rather than considering individual Earth science systems such as weather. Instead of jumping to extreme conclusions, Grinspoon argues why astrobiology supports favouring stability over innovation and that we are 'perhaps engineering Earth only in the way that your infant is engineering your home media system by sticking cookies in the DVD slot'.

However the book stops short of suggesting answers to many of the questions which are posed to the reader and instead presents novel, space-research-related ways in which to approach problems, and allows you to draw your own conclusions. As the author reminds us - 'The difference between us and the dinosaurs is that they didn't have a space programme'.

I enjoyed reading this book. What sets it apart from some titles on similar topics is its less 'authoritative' tone; perhaps a more appropriate and enjoyable reading experience for those with a background in

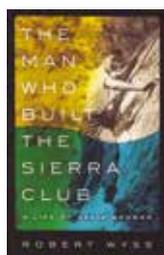
the subject. Unlike a university set text, it has more character and encourages you to think about a wide range of topical Earth science issues - everything from the implications of contacting aliens to whether we should consider the use of fossil fuels as akin to slavery.

Reviewed by: **Dawn Brooks**

THE EARTH IN HUMAN HANDS - SHAPING OUR PLANET'S FUTURE

by DAVID GRINSPOON, 2016. Published by Grand Central Publishing 522pp (hbk) ISBN: 978145558912852800
List Price: \$28.00 USD.
www.grandcentralpublishing.com

The man who built the Sierra Club: a life of David Brower



At 406 pages this is a large volume that provides a detailed account of the life of David Brower. Many may struggle to identify him, though some will recognise that he founded Friends

of the Earth in September 1969. Fewer will recall his connection to the Sierra Club; a Californian 'walking club' that he transformed into a campaigning environmental association.

The interest to UK readers is the link to John Muir who, after growing up in Dunbar, emigrated to the United States, was instrumental in founding the Sierra Club (1892), and also became the father-figure of the American National Parks after his famous camping trip in Yosemite with president Theodore Roosevelt in 1903.

The story of how Brower joined the Sierra Club and developed it into a campaigning, environmental organisation - as well as transforming its membership numbers - is fascinating. At the time, of course, there were plans to dam major rivers in the Rockies, and those wishing to preserve 'wilderness' were at odds with government. The text, in places, is dense, with frequent references to the American political system and the politicians. There are, however, some memorable quotes, my favourite being where Brower, on a trip down a river in a deep canyon, was horrified when the politicians suggested that he would get a better view if the river

were dammed and he would then be higher up the canyon walls. This he likened to flooding the Sistine Chapel to get a better view of Michelangelo's ceiling!

After years of campaigning and promoting conservation, Brower was all-powerful; but in 1966 there was a change and his role went from Messiah to sage and he left the organisation. Wanting a new challenge he formed 'Friends of the Earth', basing it in New York rather than California where he had 'history'. FoE has gone from strength to strength and is now familiar to all those with environmental concerns. Brower's vision and building of the organisation is carefully documented though, again, non-American readers may struggle to follow the political history so carefully laid out by the author.

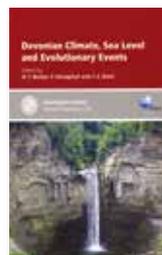
This is a book that is clearly one that those concerned with geoconservation should read as, throughout, there are references to places such as Dinosaur National Monument. One must, however, be prepared for a difficult 'read' with only 18 b/w images to lighten the task. Those who are proud of the legacy of John Muir will certainly find items of interest. If you have the time - it is quite fascinating in places.

Reviewed by **Malcolm Hart**

THE MAN WHO BUILT THE SIERRA CLUB: A LIFE OF DAVID BROWER

by ROBERT WYSS, 2016, Columbia University Press. Distributed in the UK by John Wiley & Sons Ltd, Bognor Regis, West Sussex.
List Price: £26.00.
<https://cup.columbia.edu/book/the-man-who-built-the-sierra-club/9780231164467>

Devonian Climate, Sea Level and Evolutionary Events



This Geological Society Special Publication presents a number of papers encapsulating the latest research surrounding our understanding of the geological and palaeontological

records of climate change and the evolutionary changes associated with them in the Devonian.

Having recently reviewed the book on the same topic by Suttner *et al.* (2016), I was keen to see how this volume measured up. It is a fascinating read, although obviously aimed at a slightly different, (dare one say, more 'academic')



audience. The 14 chapters cover a wide range of topics and subject areas, with a global coverage and encompassing a wide range of techniques.

The book is essential reading for anyone interested in the Devonian world and is a welcome addition to the subject, summarising as it does the work of all the scientists involved in ICGP 596. It is really interesting for someone who teaches geology (like me) to see how multidisciplinary approaches are being used to answer questions from deep time and increasingly coming up with answers and also with further questions for research!

This volume builds on the excellent books already covering the Devonian world by the same publisher, for example Königshof (2009). As with all books from the publisher the quality of reproduction is second to none, with excellent use of colour where required. Tables and diagrams are clearly reproduced and enhance the readability of the text.

Covering the use of modern techniques to give a much improved dating and correlation of Devonian events, I will be using this text to revisit my teaching of the understanding of mass-extinction events and global sea-level fluctuations during that period. In particular I found the coverage of a multitude of biotic crises during the Devonian really enhanced my understanding. The wide variety of techniques covered and the wide geographical coverage mean that there should be something for everyone with an interest in climate change and evolutionary events during an important time in our planet's history.

This volume deserves a wide readership. It complements perfectly the work of Suttner *et al.* (2016) and if you were tempted to purchase that volume, then I would suggest you would be keen to have this book on your shelves as well! Indeed I feel very lucky indeed to have had the opportunity to review it.

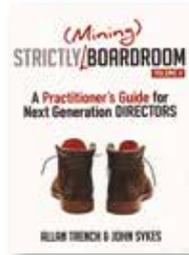
• References available online. *Editor*

Reviewed by **Gordon Neighbour**

DEVONIAN CLIMATE, SEA LEVEL AND EVOLUTIONARY EVENTS

by R T BECKER, P KÖNIGSHOF AND C E BRETT
(Eds) Geological Society Special Publication
#423 ISBN: 978-1-86239-734-7
List Price: £130.00 Fellows' price: £65.00.
W: <http://www.geolsoc.org.uk/SP423>

Strictly (Mining) Boardroom – Volume II



Where to start? Attention should be on the fact that the subtitle has DIRECTORS in capitals. This book of personal reflections and views is aimed at those in the mining sector who are on a career path that will result in their becoming senior directors in mining companies. It therefore is not big on geological detail, but does look at the economics and operations of businesses in relation to mining activities.

The authors are Australian and the focus of attention is on the Australian mining sector; so there is a significant amount of information relating to Australia and much less on international mining, but all in the context of how you might plan and run a mining enterprise. So the focus on Australia is not a distraction for the reader.

The book is a collection of articles tackling a very wide range of topics. Generally, it is very easy to read. Although some parts require a better understanding of elements of economics than I have, the target audience should be familiar with them.

Initial sections cover what the Board of a mining operation should look like – what skills and competencies make a good Board. It looks at the roles and responsibilities of Boards, and the authors provide suggestions and recommendations throughout as to how the status quo that exists in the industry may be challenged and improved.

An interesting chapter looking to the future for mining justifies improving the gender balance at Board level (and throughout the industry). There are also three scenarios looking at how global mining will develop up to 2040, from somewhat bleak to positive (from a private mining company's perspective).

Throughout the book, the need to maintain exploration at a high level is discussed and addressed from many different angles. Operating and maintain existing assets is covered, but to a lesser degree. Finally, the book provides an insight into mineral economics, and finance, policy and regulation. The latter in particular poses challenging questions to those who might be responsible for developing

national mining policy.

There is surprisingly little on the challenges the industry faces relating to legacy issues and environmental degradation, two of the largest issues that new and old mining face in the future.

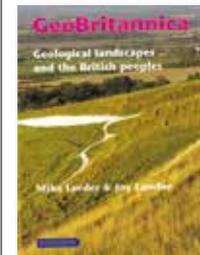
An interesting book, a good introduction to the mining sector and no doubt a useful guide for future 'DIRECTORS'.

Reviewed by: **James Montgomery**

STRICTLY (MINING) BOARDROOM – VOLUME II: A Practitioner's Guide for Next Generation DIRECTORS

by ALLEN TRENCH & JOHN SYKES. 2016.
Published by: Major Street Publishing Pty Ltd.
294pp (ppk). ISBN : 9780994542410.
Online Price Aus \$34.95.
W: www.majorstreet.com.au

Geobritannica



The authors state that this book "... attempts to put the geological history, landscapes and materials of Britain ... into historic, societal and artistic concepts." They trace its 'ancestry' back to A

E Trueman's *Geology and scenery of England and Wales*, W G Hoskins's *The making of the English landscape* and Jacquetta Hawkes's *A land*, books that a certain generation of reader will recognise as 'classics'. We have waited a long time for a reputable heir!

Early chapters introduce readers to basic geology and the history of geology together with its influence on art and literature and the use of rock in people's lives, especially as building stone. There is a chapter on palaeogeography with simplified maps which is particularly useful, explaining the concept of plate tectonics and placing Great Britain in context during each geological era

In the final section of the book entitled 'GeoRegions', Great Britain is divided into 17 areas with a chapter devoted to each. Simplified geological and topographical maps are placed adjacent to each other at the beginning of each chapter to set the scene, making comparison easy, before the geology, culture and art is discussed. Without doubt this is the section to which readers will turn first.

It is beautifully illustrated throughout with clear captions

and acknowledgment of sources. The paintings shown are very often familiar but the book makes one look at them from a different perspective. It is worth possessing a copy of the book for these alone!

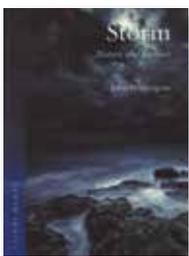
There is a very useful glossary and bibliography at the end of the volume, my only criticism being that the bibliography, split into the three corresponding sections of the book, does not repeat the Chapter numbers contained in those sections. It would have made finding references much easier, but it is a minor niggle, easily solved by annotating one's personal copy!

The book has been written to appeal to the 'interested amateur'. This it does admirably, but I am sure a professional geologist will find it equally rewarding to read. Copies are available for sale in the Society's Bookshop (online and in Burlington House) at a discounted price of £22.49 for Fellows.

Reviewed by: **Wendy Cawthorne**

GEOBRITANNICA: GEOLOGICAL LANDSCAPES AND THE BRITISH PEOPLES BY MIKE LEEDER & JOY LAWLOR, 2016 Published by: Dunedin Press xiv, 281pp (hbk) ISBN 9781780460604 List Price: £24.99. W: <http://www.dunedinacademicpress.co.uk/page/detail/GeoBritannica/?K=e2015040315443911>

Storm - nature & culture



This is seemingly an age of increasingly ferocious storms, so this book is timely. It is also excellent – fascinating, well written and hard to put down. The seven chapters have many

beautiful illustrations. Some are very well known others not, but all were worth including.

The first chapter deals with the place of storms in religion, around the world and through the ages. Most English-speaking readers will know the place of storms and many of the stories about them, in current, major religions. Fewer, perhaps, will know much about them in Greek, Hindu, Roman and/or Scandinavian mythology, let alone that of the Aztecs, Maori or Nootka. While limited – this is just one chapter – the comparisons and parallels are intriguing;

a book on this one part of the topic might well be justified.

The next three chapters deal with nature, effects – changes in the course of history – and events. Like chapter one, these hold you in place and are full of extensive information, some well-known but much not. Discussion of an event's effects is often interesting, especially when, as here, unrelated but otherwise similar events are compared. The occasional comparison of damage 'value' has little value, though, because the underlying costs, which tend to increase quite rapidly with time, cannot be compared. The 'most expensive' storm, or knick-knack, rarely remains in pole position for long.

Storms in literature and spectacle are covered in their respective chapters in much the same way as above. Both the breadth of cover and individual detail deserve top marks, although it is inevitable that many 'lesser' sources are not included.

The final chapter – 'Futures' – was slightly less satisfying than its predecessors. The breadth of knowledge applied and the detail are both excellent, as is much of the comment. A little more strength would have helped, however. It is, indeed, wise to cut back on human activities likely to affect the rate and/or extent of climate change, for that and other reasons. Such things can only work slowly, at best, though, and some of the change, however caused, is irreversible in anything less than the very long term. It is imperative, therefore, to adapt activities, cultures, and modes of life to fit climate change, not just try to reverse, halt or slow it. Despite that, this really is an excellent book and is a welcome addition to my collection.

Reviewed by: **Jeremy Joseph**

STORM – NATURE AND CULTURE by John Withington, 2016. Published by: Reaktion Books, London, UK. ISBN: 978-1-78023-661-2. Paperback. 192 pp. List Price £14.95. W: www.reaktionbooks.co.uk

Glaciovolcanism on Earth & Mars

This delightful monograph provides an excellent introduction to the hitherto neglected topic of how volcanic eruptions interact with the cryosphere. The distinctive properties of extensive volcanic deposits were first recognised in Iceland as



having occurred during past glaciations. Since then there has been a growing realization of the particularly dangerous hazards produced by magma coming into contact with ice and meltwater, and enhanced production of fine volcanic ash.

Glaciovolcanism played a significant part in the eruptions of Mount St Helens, and melting magnified an otherwise small Andean eruption by producing deadly lahars in 1985 which flowed down from the Nevado del Ruiz killing more than 24,000 people in Columbia.

Following a brief introduction, this well-structured account with numerous photographs, figures, graphs and tabulations, starts with a round-up of main provinces, with mostly Quaternary examples - though, Kerguelen and Spitsbergen are easily omitted, and it is inconceivable that many eruptions in France did not occur in the vicinity of ice. Indeed, even in the Eifel maars were probably erupted though permafrost: any tentative evidence may simply have been overlooked, as this possibility only occurred to me reading the chapter about Mars with references to rootless cones (p.367). Eruptions are outlined for fourteen historically observed volcanoes, including Eyja, whose volcanic ash grounded flights during the 2010 Easter holidays, though (unlike the Icelandic topographic survey), Eyjafjallajökull, the name given to its glacier, is used following the literature!

The technical chapters start with physical properties and chemistry, including how varying silica and volatile content affect the temperature and viscosity of lavas. Physics includes more complex thermal equations (including (6.6) a very rare error confusing gravity with the gravitational constant), fragmentation processes and modes of emplacement. Next, analytical methods are outlined, then landforms associated with glacial environments, before a handy guide to the formal terminology for describing glaciovolcanic sequences. This is backed up by three compositionally themed chapters describing typical volcanic products formed under glacial conditions, including ice-impounded lavas. The chapter on hazards expands on earlier examples. Throughout the text is extremely well illustrated, even if the middle pages containing 25 high quality colour versions don't need captions stating that they also appear in black and white. This is in stark contrast to some of the pages, which are incredibly faintly printed for such



an expensive volume.

The penultimate chapter on Mars benefits most from its colour illustrations, as it briefly outlines how low surface gravity of 3.71 ms^{-2} and atmospheric pressure probably influenced past eruptions. This is coupled to a very high obliquity with past axial tilts approaching 47° compared to 25° currently, which means Martian glacial periods are the opposite to ours with higher polar insolation and warmer climates than usual. The final chapter sets out how future research might be enhanced in a number of avenues, including the timing of eruptions in relation to the glacial cycle and likely responses to climate change, plus selecting Martian landing sites which may have harboured extra-terrestrial life sustained by volcanic geothermal heat.

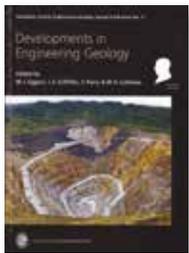
- References available online. *Editor*

Reviewed by: **David Nowell**

GLACIOVOLCANISM ON EARTH AND MARS - PRODUCTS, PROCESSES AND PALAEOENVIRONMENTAL SIGNIFICANCE

by J L SMELLIE AND B R EDWARDS Published by: Cambridge University Press 2016.
ISBN: 978-1-107-03739-7
List Price £112, \$140 xii + 483pp Hardback
W: www.Cambridge.org

Developments in Engineering Geology



The 20 chapters in this volume are a series of case studies arising from the 34th International Geological Congress ('34IGC') in Brisbane,

Australia (2012). The chapters are from a range of contributors, including academics, government researchers, and consultants. The book is divided into five themes, reflecting the '34IGC' symposia within which the work was presented: (1) urban engineering geology; (2) mining engineering geology; (3) managing geohazard risk; (4) geological models; (5), geomechanics. Hence, a broad range of topics are covered, and the index at the back of the volume will be useful for readers who want to dip into specifics.

The first chapter by Eggers

will be useful for those new to engineering geology. It provides useful discussions on relationships between geology and engineering, which tends to vary depending on the part of the world you work in, and the local relevance of professional accreditation. Eggers also provides a history of how engineering geology has evolved, outlining some of the organisations intrinsic in its development.

For engineering geology novices, this provides a platform with which to explore the rest of the book, while others may delve straight into the individual chapters. My favourite chapter is on geotechnical issues at an open-cut coal mine in the Late Permian Baralaba Coal Measures in Queensland, Australia. It presents some of the longstanding issues that I and many other geologists have had to deal with there over the years. Such case studies from the Bowen Basin rarely make it into the international literature beyond an extend abstract in a conference proceedings, so to see a full-length paper is most welcome.

As is sometimes the case with edited volumes, the figures are of variable quality. The vast majority of figures are in black and white. This is somewhat of a pity, as some of the figures would have been enlivened with colour; several of the figures in Kozlyakova *et al.*, for example, and this detracts from the book.

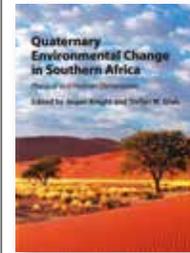
Another thought is that there is a four-year gap between the 34IGC and publication of this volume. New technology is emerging all of the time in engineering geology, given its position at the nexus of engineering and remote sensing disciplines. Hence, recent technological advances such as structure-from-motion (SfM) photogrammetry and other unmanned aerial vehicle (UAV) technologies are absent. Nevertheless, in summary this will be a worthwhile volume, and presents interesting case studies by eminent practitioners in the field of engineering geology.

Reviewed by: **Martin Brook**

DEVELOPMENTS IN ENGINEERING GEOLOGY

by M J EGGERS, J S GRIFFITHS, S PARRY and M G CULSHAW (eds), 2016. Published by: Geological Society Engineering Geology Special Publication #27 253pp (hbk) ISBN: 9781862399723
List Price: £90.00.
W: <https://www.geolsoc.org.uk/SPE27>

Quaternary Environmental Change in Southern Africa



This book consists of 25 chapters on a highly diverse series of topics from hominin origins, geomorphology, sedimentary environments, climate,

paleoanthropological archaeological record and fauna relating to the theme of this book with chapters one and 25 setting the theme and summary of the book respectively. Each chapter describes and summarises the current status of research of the topic relating to that chapter. This includes illustrations relating to the topic under discussion and selected illustrations are reproduced in colour in section of the text. As each topic is a stand-alone paper this has resulted in some very similar plates being reproduced twice.

As indicated above, with such a wide range of topics, a general reader might find their level of interest varying and being stimulated or otherwise from paper to paper; but overall the book provides very interesting insights into the variability of the environment, during the last 2.6Ma.

Also coming to the fore are the challenges that researchers face in respect of the accuracy (or to be more precise the inaccuracies) of dating events or sites covered by these topics, and the current scarcity of sites over this large area which can lead to a meaningful correlation of events and sites in Southern Africa.

This brings me to a niggling comment that - while the book is described as covering 'Southern Africa', many, but not all of the authors present maps and data from South Africa. There is not one contribution from researchers in Botswana or Namibia whose countries fall within 'Southern Africa'.

Coincidentally, there is, in the December issue of *Geobulletin* by the Council for Geoscience of South Africa, a striking reproduction of a poster commissioned by the Institute for Coastal and Marine Research in Port Elizabeth, South Africa, of a representation of the Palaeo-Agulhas Plain. This was exposed some 60,000 years ago, to the south of the

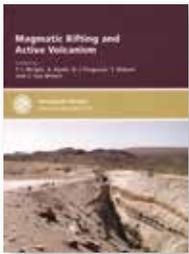
southernmost point of South Africa, in which the current coastline of RSA is shown as mountains in the distance (30km) to the north. After reading this volume, I was able to appreciate how the world is a dynamic entity, and not a static one. The book also highlights the adaptability of humans and their ancestors to the variable climes of the last 2.6Ma.

Reviewed by: **Alan Golding**

QUATERNARY ENVIRONMENTAL CHANGE IN SOUTHERN AFRICA: PHYSICAL AND HUMAN DIMENSIONS

Edited by: Jasper Knight and Stefan W Grab. 2016
Cambridge University Press ISBN: 9781316572900
(ebook) ISBN-13: 978-1107055797 (hbk). 450pp.
List Price (hbk) £79.99. W: www.cambridge.org

Magmatic Rifting and Active Volcanism



The association of magmatism with the extensional rifting of continental crust is a key factor in the fragmentation or break-up of established continental lithosphere. Deciphering the

complex interactions between magmatism and rifting is problematic as the collective 'end-products' of this (now-inactive) system are concealed beneath substantial sedimentary deposits.

This Special Publication explores the relationship between magmatism, rifting and active volcanism documenting the current geoscientific research conducted over the complete rift system, from initiation of continental break-up to the final 'products' preserved within continental margins and at active mid-ocean ridges. The volume concentrates on currently active rift systems in order to understand system components that are now inactive, with particular emphasis placed on the East African Rift system and Ethiopian Afar region.

Introduced with an overview paper from the editors, the volume presents 17 papers organised into four thematic sections, chronologically arranged to cover the spectrum of magmatic rift settings, from the initiation of continental break-up to sea floor spreading: Role of magmatism in continental rifting, Magma-dominated rifting in the Afar triple junction, Mid-ocean ridges and continental margins and

Hazards from magmatic rifts.

The first section focuses on East Africa and also includes a case study of the Colima Rift in western Mexico. The second (and main) section reports new observations and insights on the magma-dominated rifting in the Ethiopian Afar region, which is undergoing the final phases of continental break-up (or potentially where sea floor spreading has initiated).

The third section describes the tectonic and magmatic processes operating at active mid-ocean ridges and examines the closing stages of continental fragmentation / break-up from rock associations preserved within continental margins. The final section additionally addresses hazards related to active magmatic rift settings and their significance for appropriate risk management and hazard-reduction strategies.

In summary, the volume provides an excellent overview of the recent interdisciplinary geoscientific developments within this important and evolving field. The contributions are well-written and edited, complemented with appropriate figures, photographs and data-tables, features that one has come to expect from the GSL Special Publication series. The editors and contributors are to be congratulated. An informative and recommended read.

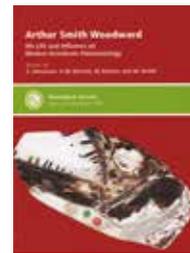
Reviewed by: **Mark Griffin**

MAGMATIC RIFTING AND ACTIVE VOLCANISM

by Wright T J, Ayele A, Ferguson D J, Kidane, T and Vye-Brown, C (editors). Geological Society of London Special Publication No 420. 2016. Geological Society of London. ISBN 978-1-86239-729-3. Hbk. 374pp. ISSN 0305-8719.
List Price: £120.00, Fellows' Price £60.00 W: www.geolsoc.org.uk/SP420

Arthur Smith Woodward - His Life and Influence on Modern Vertebrate Palaeontology

This is a most useful, and handsome, volume. Using the resources of the Natural History Museum in London, where ASW (1864-1944) was Keeper of Geology 1901-1924, it lists his incredible bibliography of 742 entries, starting with his Trip from Crewe to North Wales, which he printed himself in 1878. This volume, and its online supplements, chart both ASW's life and



the important legacies of his museum work, and his wife's contributions and memories.

Its second part deals in greater detail with his scientific work; on both fish and tetrapods, and his contributions to Antarctic, Australian, and South America geology. It gives a mere nod to ASW's sad work on human evolution, sullied by his being taken in by that remarkable impostor Charles Dawson (1864-1916) at Piltdown. New light now shows there was a) only a single perpetrator (pointing only at Dawson, *Geology Today*, Sept-Oct 2016) and b) that Dawson's earlier work in Sussex was already of doubtful authenticity (Sussex Archaeological Collections, vol. 151, 2013). One of the main rationales of this book was to publicise the great contributions ASW made to vertebrate palaeontology.

But problems remain. In 1980, Albert E Gunther claimed ASW was 'from a cultured family of silk traders in Manchester [sic], enabling him to devote his life to science untroubled by pecuniary difficulties'. This volume counter-claims 'the family were comfortably off, but by no means wealthy'. ASW's own record of his meteoric rise in Victorian science gives no clues. But ASW's life may not have been that easy, when we consider his extended family.

His wife, Maud Leonora Ida, née Seeley (1873-1963), contributes her 122-page Memories [online at <https://www.geolsoc.org.uk/SUP18867>]. She was the daughter of palaeontologist Harry Govier Seeley (1839-1909). Her mother Eleanor Jane, née Mitchell (1845-1925), was granted a civil list pension in 1910: 'her husband having merited the financial gratitude of his country by his useful discoveries in science'.

Both Mitchells and Seeleys had to face straightened circumstances. Eleanor's brother, busy gathering data on William Smith (1769-1839), was unable to complete it through financial crises. And both Harry's father and grandfather were declared 'insolvent' (when not being 'in trade' meant much more draconian treatment than mere 'bankruptcy').

ASW's own fine career in science during Victorian times suggests that such careers were still not being adequately rewarded.

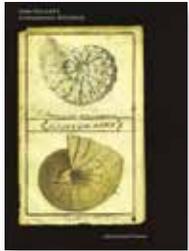
Reviewed by: **Hugh Torrens**

ARTHUR SMITH WOODWARD - HIS LIFE AND INFLUENCE ON MODERN VERTEBRATE PALAEOLOGY

Edited by Z JOHANSON, P M BARRETT, M RICHTER AND M SMITH, 2016. Published by the Geological Society of London (SP 430) 362pp (hbk) ISBN 978-1-86239-741-5.
List Price: £110.00. Fellows' Price: £55.00.
W: www.geolsoc.org.uk/SP430



John Phillips's Lithographic Notebook



A review of a book about the history of lithography might seem out of place in a magazine aimed at geologists. But there are plenty of reasons why they will find it fascinating.

Lithography – printing from stone – was invented in 1796 as a cheap method for publishing theatrical works. It soon caught the attention of geologists as a useful method for printing maps, drawings, and manuscripts. William Smith (1769–1839) was one of these, and he seems to have encouraged his orphaned nephew, John Phillips (1800–1874), to look into its potential uses.

Phillips arrived in London in November 1815 to work with on his uncle's extensive fossil collection and became, in effect, Smith's geological apprentice. He went on to rise through the ranks and became, in 1853, the first 'Professor of Geology' at Oxford University. Soon after his arrival in London, the teenager began a series of experiments to improve and understand the process of lithography. His notebook, recording his experiments and observations, is now preserved in the archives of the Oxford University Museum of Natural History.

Phillips's work is presented in full as a series of double-page spreads, with a facsimile page from the notebook on one and a transcript and annotations by historian of printing, Michael Twyman, facing. It is a wonderful example of a lab notebook from the past. It not only provides an insight into the development of lithography, but also Phillips's skill as an experimentalist and his ideas for improving it.

Documents like this, which were not meant for publication, often bring the personality of the author to life. Just the sight of Phillips's clear copperplate handwriting is evocative of a time when handwriting was a major means of communication. Charmingly personal comments appear in some places. On one page Phillips bemoans how thoughts fly out of his head, and writes: 'When a thought suddenly occurs it most probably will soon depart, therefore I think it best to mark it in a black letter.' We've all been there!

Twyman's introduction, annotation

and endnotes are a model of scholarship: informative, clearly, concisely and engagingly written. The book itself – a beautiful slim hardback with text and illustrations printed on heavy, cream-coloured paper – would grace any coffee table. But it also highlights the links between geology and lithography, sheds new light on the activities and motivations and talents of both Smith and Phillips, and emphasises the importance of presentation in communication. Treat yourself!

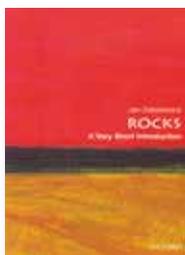
Reviewed by: *Nina Morgan*

JOHN PHILLIPS'S LITHOGRAPHIC NOTEBOOK

by MICHAEL TWYMAN (ed), Printing Historical Society, London, 2016, 103pp. ISBN 978-0-900003-16-5.

List Price: £30.00 (£15 to members of the Printing Historical Society).

Rocks - a Very Short Introduction



This is a thorough and succinct account, accessible to all who would like a concise introduction on a wide and highly researched topic – rocks. As with many 'VSI' books, you are introduced to the wider concept, such as how primitive Earth and minerals were formed from supernova explosions and stellar outbursts, before exploring the differing rock types, plate tectonics, rocks on other planets, the 'Anthropocene' and the concept of human-made rocks.

Zalasiewicz is a great storyteller who captures your imagination as concepts are explained using straightforward prose. Not only is it a great overview of Geology 101, but the author treats us to a few surprising facts along the way. Hornfels has been utilised in past musical performances as a xylophone-like instrument, capturing the hearts of (among others) Queen Victoria!

Other than those of planet Earth, rocks from further afield are also discussed, such as our Moon, rocks of near and distant planets, and planets of other star systems, exploring the evidence and history of our knowledge.

Aside from rocks as we know them, Zalasiewicz also delves into human-made rocks such as concrete and – surprisingly – how more than 50,000 crystalline species have been made so far. Enough aluminium has been produced in the last 150 years to cover the USA entirely in kitchen foil. However, the geological longevity of human-made rocks and minerals is not yet determined, so we don't know the full extent of our footprint for ages to come.

This book is a great pocket-sized short read and gently touches on the principles and concepts behind Earth sciences. The author also provides a recommended reading list for you to explore to your heart's content.

Reviewed by: *Amy-Jo Miles*

ROCKS: A VERY SHORT INTRODUCTION

JAN ZALASIEWICZ, 2016. Published by: Oxford University Press, 160pp. ISBN: 9780198725190

List Price: £7.99. W: <https://global.oup.com/ukhe/product/rocks-a-very-short-introduction-9780198725190?cc=gb&lang=en&>

BOOKS FOR REVIEW

Please contact ted.nield@geolsoc.org.uk if you would like to supply a review. You will be invited to keep the review copy. See a full up-to-date list at www.geolsoc.org.uk/reviews

- ◆ **NEW! Energy Science - principles, technologies and impacts** by John Andrews & Nick Jelley. Oxford UP 2017508pp, sbk (3rd edn)
- ◆ **NEW! The Cambrian Fossils of Chengjiang, China - the flowering of Early Animal Life** by Hou-Xiang Guang et al, 2nd Ed., 311pp, Wiley Blackwell hbk
- ◆ **NEW! Principles of Radiometric Dating** by Kunchithipadam Gopalan Cambridge UP207pp hbk
- ◆ **NEW! Atlas of Trace Fossils in Well Core: Appearance, Taxonomy & Interpretation** by Dirk Knaust 2017 Springer Verlag209pp, hbk.
- ◆ **NEW! Water Wells & Boreholes (2nd Edn)** by Misstear, Banks and Clark. Wiley 2017518pp hbk
- ◆ **NEW! Geochemistry and Geophysics of Active Volcanic Lakes** by Ohba et al. GSL Publishing SP#437 295pp, hbk
- ◆ **Silver - nature & culture** by Lindsay Shen. 2017 Reaktion Books 208pp flexicover.
- ◆ **Rocks, Ice and Dirty Stones - diamond histories** by Marcia Pointon. 2017 Reaktion books 257pp hbk
- ◆ **Anomalies - pioneering women in Petroleum Geology 1917-2017** by Robbie Gries. Jewel Publishing 2017 405pp, hbk
- ◆ **Salt Tectonics - principles & practice** by Jackson PA and Huden MR. Cambridge University Press

PEOPLE NEWS

CAROUSEL

All Fellows of the Society are entitled to entries in this column. Please email ted.nield@geolsoc.org.uk, quoting your Fellowship number.

◆ Bruce Cairns



has recently been appointed Chief Policy Advisor at Radioactive Waste Management

Limited, having spent over 10 years at the various UK Government departments responsible for nuclear energy and radioactive waste management.

◆ Patricia Henton



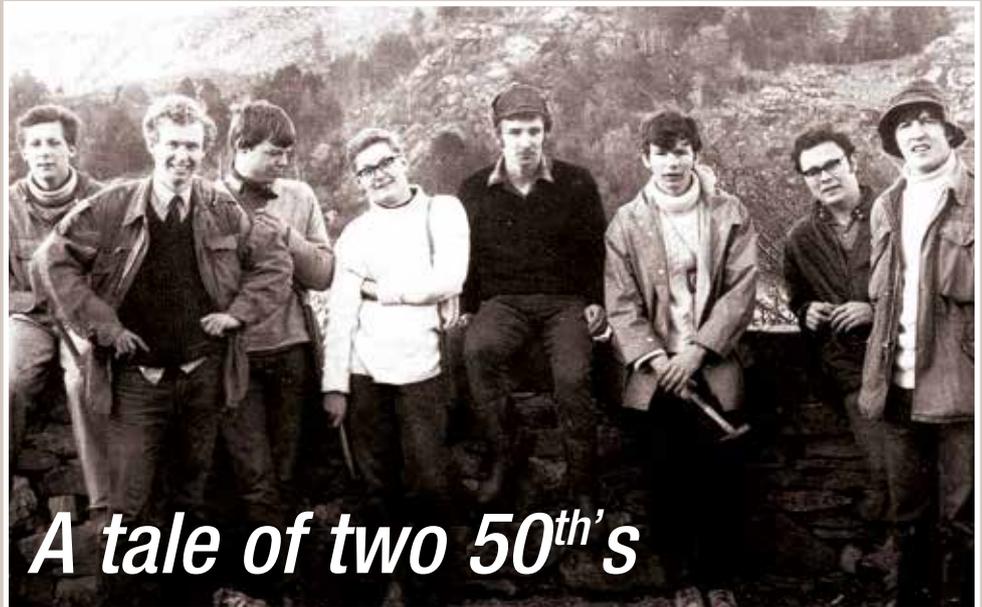
Council member and lately Non-Executive Director, Coal Authority, was awarded the MBE for services to the Environment and Professional Education in the Queen's Birthday Honours List.

◆ Susan Turner



has had a meeting organised in her honour - the 14th International Symposium on Early and Lower Vertebrates,

in the Holy Cross Mountains, Poland, 3-8 July 2017. The festschrift will be published in *Acta Geologica Polonica*.



On 5-8 July a conference took place in Portsmouth, celebrating two significant landmarks in applied geology, writes *Steve Branch*.

50 years ago, the undergraduate Engineering Geology and Geotechnics programme at the University of Portsmouth admitted its first students. Introduced in 1967 soon after the establishment of the Geology department, the course has aimed to supply industry with highly competent, practical engineering geologists and geotechnical engineers. Over its 50 years graduates of the course have gone on to make significant contributions to the ground and mining engineering sectors the world over, and the conference offered the opportunity for these alumni to come together and celebrate their achievements.

The second landmark was the 50th anniversary of the *Quarterly Journal of*

Engineering Geology & Hydrogeology. A series of talks was lined up from notable contributors to the journal, such as Eddie Bromhead (current Chief Scientific Editor), Mike Winter, Jim Griffiths, and many others, who explored and reviewed the significant contribution of the journal over the last half century.

The conference was well attended, with significant support from a wide range of professional organisations and engineering consultants and contractors, such as the British Geotechnical Association, The Geological Society of London, Atkins, BAM Ritchies, GEA, Aecom, WSP-PB, Ramboll, Keller, PBA and many more.

► <http://www.port.ac.uk/engineering-geology-50-conference/>

IN MEMORIAM WWW.GEOLSOC.ORG.UK/OBITUARIES

THE SOCIETY NOTES WITH SADNESS THE PASSING OF:

Absolom, Sydney Stuart *
Armitage, John *
Ayers-Morgan, Christopher *
Butcher, Norman Edward *
Downey, Marlan
Drysall, Alan Roy *

Gardener, Roger *
Geddes, James D*§
Howell, Frank Travis *
Jenner-Clarke, Hugh Clifford David *
Laws, Michael James *
Leighton, James *

Marshall, Mr John A *
Maud, Rodney Richard Morgan
Palmer, Stephen J *
Pipes, Kenneth P *
Rawcliffe, Eric *
Robson, David *

Shingleton, Sam *
Small, John *
Whitlow, Roy *
Young, Paul Ivor *

In the interests of recording its Fellows' work for posterity, the Society publishes obituaries online, and in *Geoscientist*. The most recent additions to the list are in shown in bold. Fellows for whom no obituarist has yet been commissioned are marked with an asterisk (*). The symbol § indicates that biographical material has been lodged with the Society.

If you would like to contribute an obituary, please email ted.nield@geolsoc.org.uk to be commissioned. You can read the guidance for authors at www.geolsoc.org.uk/obituaries. To save yourself unnecessary work, please do not write anything until you have received a commissioning letter.

Deceased Fellows for whom no obituary is forthcoming have their names and dates recorded in a Roll of Honour at www.geolsoc.org.uk/obituaries.



DISTANT THUNDER

Buried Treasure

Geologist and science writer Nina Morgan goes underground to discover a treasure trove.

Vases and ornaments made from the fluorspar variety Blue John were must-have ornaments for the wealthy in the second half of the 18th Century. Although similar fluorspars are found elsewhere, the 'authentic' Blue John is found only in veins in the caverns and mines of Treak Cliff, near the Peak District town of Castleton in Derbyshire. The first known references to Blue John date from around 1700, but serious mining began around 1750, and the popularity of Blue John ornaments took off.

Fans included George III and Queen Charlotte who owned a set that included a clock, censers and candelabra in Blue John made in 1770 by the manufacturer, entrepreneur and Lunar Society member, Matthew Boulton. The stone was also used widely as decorative panels in fireplace surrounds in large houses. Large bespoke items, such as the Chatsworth Tazza (a vase made from a single piece of Blue John in around 1842 for the Duke of Devonshire and now on display at Chatsworth)

were popular among the wealthy. Meanwhile a trade in smaller Blue John items and jewellery for the masses flourished in 'petrification' shops in Derbyshire.

Magical mystery tour

In the 19th Century the Blue John caverns – formed within a reef limestone mass of early Carboniferous age – became a popular tourist destination. Visitors were guided by candlelight through the show caves which contained 'rooms' with exotic names such as the Variegated Cavern and the Crystallised Cavern to marvel at displays of flowstone, stalagmites, stalactites and 'organ pipes' which formed where stalactites and stalagmites meet.

In his book 1833 book *Introduction to Geology*, a book that inspired Charles Lyell [1797 – 1875] to take an interest in geology, the geologist Robert Bakewell [1767–1843], waxed lyrical about the caverns, writing that:

"were the descriptions of the grotto of Antiparos translated into the simple language of truth, I am inclined to believe it would be found inferior in magnificence and splendour of

mineral decoration to the natural caverns in the Fluor Mine."

Under the carpet

Although commercial mining of Blue John ended around 1926, small quantities of Blue John are still excavated from parts of Treak Cliff. The Treak Cliff show caves, reopened in 1935 by the then leaseholder, John Royse, remain a popular tourist destination.

When Royse retired in 1945 and handed over the management of the caverns to the current leaseholders, Peter Harrison and his family, he left behind a legend and a mystery. During the handover, Royse revealed that he had discovered a significant new source of Blue John at Treak Cliff, but he died before he could describe its location.

This vein was only re-discovered by chance in January 2013 by the cavern manager, Gary Ridley and Harrison's grandson, John Turner, hidden under a piece of carpet and a layer of clay. The location, Harrison said, was one that "we've walked over for years and years". At current rates of extraction, the find is expected to last for at least a decade. And there is more to come. In 2015, Ridley discovered a further new vein

just off the tourist route while trying out a new method of mining using a stone chainsaw.

In the 1870s when supplies were relatively plentiful, Blue John sold for £40/ton 'in the rough'. This translates into £3500 - £3700 in today's money. At that price, the Blue John mines at Treak Cliff may well be turning into gold mines. But fashions in ornamental stones change quickly, so shareholders are advised not to book that luxury holiday just yet!

➤ **Acknowledgement**
Sources for this vignette include: the entry for *Robert Bakewell* by Hugh Torrens in the *Oxford Dictionary of National Biography*; the Wikipedia Entry for Treak Cliff; Trevor Ford, *Blue John Fluorspar, Geology Today*, vol 10 (5), 1994, pp. 186-190; James Croston, *On Foot Through the Peak*, third edition, 1876, and the website: www.bluejohnstone.com

* **Nina Morgan** is a geologist and science writer based near Oxford. Her latest book, *The Geology of Oxford Gravestones*, is available via www.gravestonegeology.uk



Source: Wikimedia commons

Bowl made from Derbyshire Blue John, on display in Castleton Visitor Centre

OBITUARY Robin Temple Hazell 1927 - 2017

Robin Temple Hazell, died in Bodmin, Cornwall on 19 February, 2017 aged 89. Evacuated to New Zealand during WW2, Robin completed secondary education and began university studies at the University of Otago. At the end of the War, he returned to the UK and entered the Royal College of Science in London taking a degree in Geology in 1948.

He joined the Geological Survey of Nigeria, mapping several marble, limestone, and coal deposits; but his main interest was groundwater. He studied and documented the groundwater resources of Nigeria in several bulletins of the Geological Survey and other papers.

Independence

At Nigeria's independence (1960) aged 33, he retired from the colonial service and set himself up as an independent consultant as 'Temple Hazell Associates'. In 1974, he registered Water Surveys Nigeria Ltd. The company became a leading hydrogeological firm in Nigeria and operated all over Africa, Middle East and Europe.

In the late 1960s, the groundwater supply to the Guinness brewery at Ikeja, north of Lagos became contaminated. Robin suggested that the Cretaceous aquifer that crops out 50km north of Ikeja should persist to the brewery at a depth of 700m, and that they should drill it. The brewery bought the idea.

Supervising the drilling was a nerve-racking experience

Pioneer of systematic groundwater development in Africa



“HE WAS A MAN OF DEEP FAITH AND FORTITUDE, ATTRIBUTES WHICH SUSTAINED HIS SPIRITS”

until, at 750m, the driller called an urgent meeting to announce that the mud was steaming and bubbling. The aquifer had been reached, and

the water was hot. It turned out to be artesian, at 71°C – and was the deepest water-supply borehole in West Africa at the time.

Surveys

During the International Drinking Water and Sanitation Decade, Water Surveys was catapulted into borehole siting at mass-production levels. Thousands of boreholes had to be sited on the crystalline terrain of northern Nigeria.

Robin felt the best way for the siting to stay ahead of drilling was by aerial photograph interpretation and electromagnetic (EM) conductivity surveying. He developed an empirical system of EM data collection and interpretation. The boreholes were drilled at an 83% success rate.

He was until his death a member of the choir of his church, an avid bridge player, crossword solver and raconteur, regaling his audience with anecdotes from his eventful life - a gift to be put into great use in his hilarious memoir, 'Life on the Rocks'.

Compassion

He remained a very compassionate person. Once in Bauchi, I fell ill. He put me on a plane to London to see a Harley Street doctor at his own expense. He was a man of deep faith and fortitude, attributes which sustained his spirits when he lost his first wife, Kath and later their two daughters.

He is survived by his second wife, Ursula, the pillar of his old age, and Sam, his grandson. For me, his death brings to an end an era spanning nearly 40 years of almost daily communication. He guided me through my professional life and was always a good friend. May he rest in peace.

➤ By Dotun Adekile, Nigeria
A longer version of this obituary may be seen online.
Editor.

HELP YOUR OBITUARIST The Society operates a scheme for Fellows to deposit biographical material. The object is to assist obituarists by providing contacts, dates and other information, and thus ensure that Fellows' lives are accorded appropriate and accurate commemoration. Please send your CV and a photograph to Ted Nield at the Society.

OBITUARY David Murray Boyd 1926 - 2016

David was born at Dalmuir, Clydebank, Scotland, and educated at Kilmarnock Academy. He entered the University of Glasgow and was awarded a double first in Natural Philosophy and Geology in 1946. He remained there as a lecturer in geophysics until 1955.

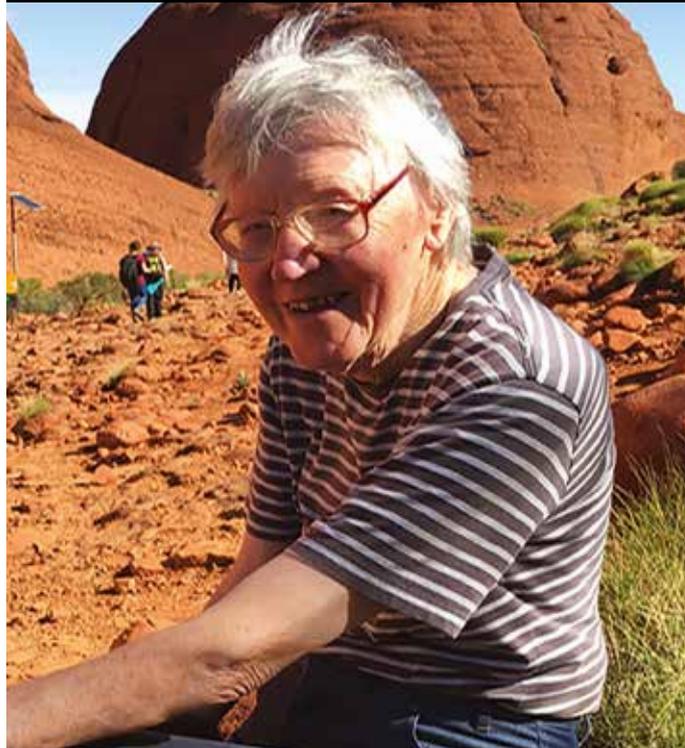
He joined London mining consultants John Taylor and Sons, working on the evaluation of lead and coal mines in the UK, copper mines in Cyprus and diamond and gold mines in India, before joining Hunting Geology and Geophysics Ltd (Borehamwood) in 1958 as Chief Geophysicist to work on exploration problems worldwide.

Huntings

In 1948 Huntings was one of only two companies that had a licence to fly surveys worldwide using the Gulf fluxgate magnetometer, and it was the experience he gained in interpreting these surveys that formed the basis for David's subsequent career. As Huntings was also very experienced in the use of photogeology this provided a very strong background for the teams working with David on regional surveys.

From 1958 until 1968 David was working on very large aeromagnetic surveys from many countries including Angola, the Spanish Sahara, Ghana, South West Africa, Somalia, and on various trials with airborne electromagnetic

Pioneer of airborne surveys in geological mapping, equally at home in commercial and academic geology



“FOR A GEOSCIENTIST TO DEVOTE OVER 50 YEARS TO ACTIVE EXPLORATION WITHOUT BEING DEEPLY INVOLVED IN ‘MANAGEMENT’ MUST BE UNIQUE!”

surveys in the UK, Kenya, the Copper Belt, Cyprus and Tanzania. However, it was the United Nations Development Fund survey in 1962-63

of large areas of Uganda, which revealed to David, and others working on the interpretation, the great value of such low-cost surveys in areas with poor exposure.

This period culminated in David's landmark paper at the Canadian Centennial Mineral and Ground Water Conference, 1967: The contribution of airborne magnetic surveys to geological mapping, which is still a compelling read. In 2012 David wrote that he still thought of the Hunting's experience as 'the most important aspect of my career ... and I have been able to pass on the ideas I learnt in Australia'.

Adelaide

David decided to return to academia and was appointed Professor of Geophysics in the Department of Economic Geology at the University of Adelaide in 1969. His main focus was nurturing honours graduates who would be sought after by the mining industry, and many of his students became leaders and achievers in the exploration industry. Another of David's contributions to the mining industry was his support of the Australian Mineral Foundation Course, which led to his book *Geophysics and Geology*. He remained actively involved at the University until 1992.

David was an adviser on many Australian government airborne survey programmes, including the South Australian Exploration. He was also an adviser to air survey companies in Finland, India, China and in Africa. David was elected President of the Geological Society of Australia (1986-87), and in 2016 was awarded the Gold Medal of the Australian Society of Exploration Geophysicists.

For a geoscientist to devote over 50 years to active exploration without being deeply involved in 'management' must be unique! David is survived by his widow Jenny, Hugh and their children Jim, Hugh and Sarah, and three grandchildren.

► By Derek Morris

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OBITUARY William Braham 1957 - 2016

William (Bill) Braham was born on 8 January 1957 and grew up in Royston, Barnsley. He was the youngest son of Hubert Braham and the only son of Mary Clenton. He graduated from Southampton University with a BSc (Hons) in Geology in 1978 and started working on oil rigs in the North Sea and Nile Delta as a mudlogger with Gearhart Geodata Services Ltd.

Scholarship

He married Rosey, a fellow Southampton undergraduate, in 1980. A year later Bill was granted an MSc Scholarship by Gearhart to study Palynology at Sheffield; the subject of his thesis being an investigation into the palynological stratification of the Lower Cretaceous Speeton Clay.

Following his MSc, he and Rosey moved to Aberdeen, where Bill continued working for Gearhart Geodata as their Senior Stratigraphic Palynologist.

In 1987 he joined Palaeoservices in Aberdeen; initially as a Geologist/Palynologist and then as Acting Operations Manager. Following his divorce, Bill transferred to Palaeoservices in Watford as the Senior Palynologist. In 1994, Bill joined Kronos Consultants, as a Stratigraphic Palynologist; then a decade later

Respected stratigraphic palynologist for the North Sea and Eastern Europe, amateur historian and bibliophile



“ HE WAS A TRUE YORKSHIREMAN, WITH A DRY ACERBIC WIT AND WAS ONE OF THE FUNNIEST AND MOST INTELLIGENT MEN YOU COULD HOPE TO MEET ”

became an Independent Consultant, based in Hemel Hempstead.

His work initially covered the Jurassic and Cretaceous palynology of the North Sea, but soon expanded to include the Tertiary and Palaeozoic in Europe, Asia, North Africa and the South Atlantic. He was also involved in real time

wellsite bio-steering and overpressure deduction in the North Sea, Poland, Kazakhstan, Georgia and Sudan.

Field classes

A passion for history took up much of his private life. Bill was an active participant in a number of historical discussion groups, with whom he shared much of his original historical research. He was a respected authority on the English Civil War and the American War of Independence, amassing an extensive library, including many rare volumes. He had recently been commissioned to write a comprehensive account of the Battle of Worcester, 1651.

Bill was a highly respected stratigraphic palynologist. Numerous colleagues regarded him as one of the best interpretative geologists that they had had the pleasure of working with.

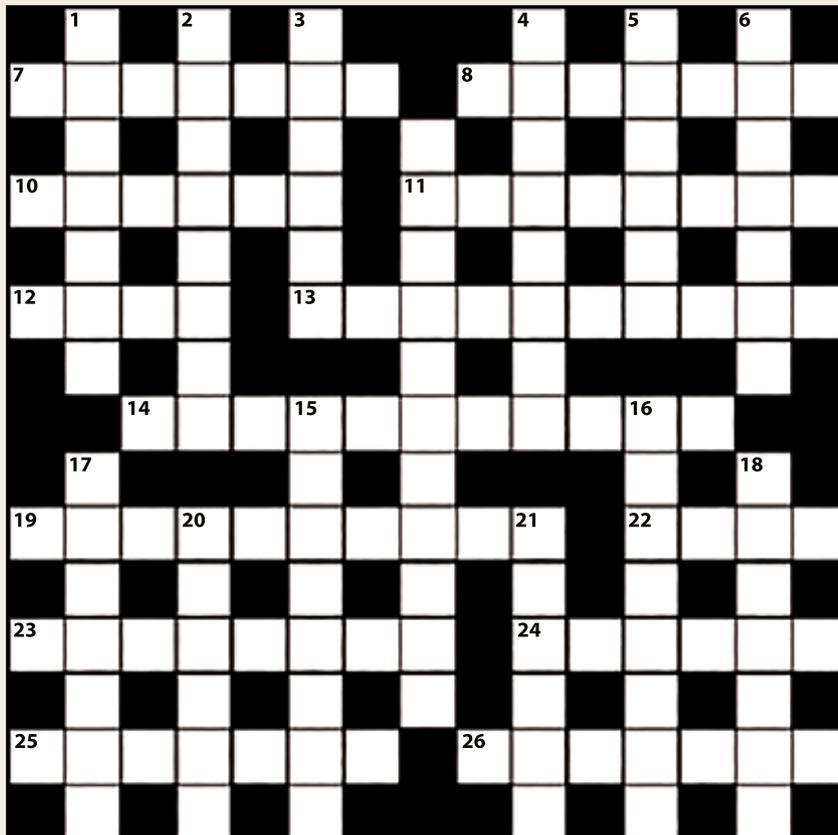
Bill died at home on 15 July 2016, aged 59, as a result of a Pulmonary Embolism.

He was a true Yorkshire man, with a dry acerbic wit and was one of the funniest and most intelligent men you could hope to meet. He will be sorely missed by many friends and colleagues.

► By Barry Constable

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CROSSWORD NO.217 SET BY PLATYPUS



ACROSS

DOWN

- 7** Mineral formed at the same time as the rock bearing it (7)
- 8** Upper jaw in most vertebrates (7)
- 10** Hillslope water flow, consisting of 'base' and 'quick' (6)
- 11** Genetic change (8)
- 12** Himalayan monster man (4)
- 13** When an igneous rock has neither excess nor deficiency in Si (10)
- 14** A shape which reduces the drag from air moving past (11)
- 19** Subject to scrutiny and certification by an official body (10)
- 22** Hydrous silica composed of minute spheres (4)
- 23** Projecting watchtower over a defensive gate (8)
- 24** Subsidiary fault in a shear zone, parallel to shear direction (1,5)
- 25** Young female horses, typically under four years old (7)
- 26** Of or like a lizard (7)

- 1** With voids filled by injection (7)
- 2** Usually planispiral cephalopod with frilled suture lines (8)
- 3** Various superficial deposits (6)
- 4** Unicellular microorganisms with cell walls but no organelles or organized nucleus (8)
- 5** Decree from on high (6)
- 6** Organic compound containing one or more hydroxyl groups attached to a carbon (7)
- 9** Synonym for a violet variety of quartz often used in jewellery (11)
- 15** Scraped off from a downgoing oceanic plate (8)
- 16** Temperature contour (8)
- 17** Type of crust from which 15d material is scraped (7)
- 18** Carbonate depositing banks in the W Atlantic (7)
- 20** Chaotic eroded debris (6)
- 21** Natural gas composed entirely of methane (3,3)

WIN A SPECIAL PUBLICATION!

The winner of the June Crossword puzzle prize draw was **Dudley Seifert of Aurora, Colorado..**

All correct solutions will be placed in the draw, and the winner's name printed in the August 2017 issue. The Editor's decision is final and no correspondence will be entered into.

Closing date - August 18.

The competition is open to all Fellows, Candidate Fellows and Friends of the Geological Society who are not current Society employees, officers or trustees. This exclusion does not apply to officers of joint associations, specialist or regional groups.

Please return your completed crossword to Burlington House, marking your envelope "Crossword". Do not enclose any other matter with your solution. Overseas Fellows are encouraged to scan the signed form and email it as a PDF to ted.nield@geolsoc.org.uk

Name

Membership number

Address for correspondence

Postcode

SOLUTIONS JUNE

Across:

- 7** Epigene **8** Derived **10** Natron
- 11** Germinal **12** Mine **13** Wildflysch
- 14** Deformation **19** Octahedral **22** Peat
- 23** Somerset **24** Member **25** Pumices **26** Lignite

Down:

- 1** Aphasia **2** Aggrieve **3** Unknow **4** Retrofit
- 5** Sicily **6** Tenancy **9** Agglomerate **15** Overstep
- 16** Orpiment **17** Scrotum **18** Jadeite
- 20** Acetic **21** Limnic

THE JANET WATSON MEETING 2018



A Data Explosion: The Impact of Big Data in Geoscience

27 February – 1 March 2018

The Geological Society, Burlington House, London



The rise of 'Big Data' has been characterized by a rapidly increasing availability and diversity of data that will play a role in shaping the future of Geoscience Research and the Hydrocarbon Industry. The Geoscience community has been slow to embrace the Big Data technologies that are revolutionizing other sciences such as the pharmaceutical industry and medical research. Where advances in data acquisition and interpretation technologies are being made in academic Geoscience, progress in uptake has been hampered by unstructured data, stored in silos.

This three day meeting will bring together early career geoscientists with leading industry and academic experts to discuss the opportunities and challenges of Big Data and showcase advances in data collection and interpretation technology. It will present an opportunity to learn and collaborate between Geoscience and Computer Science on the subject of Big Data. This will be an excellent forum for networking and an opportunity for graduate students and young professionals to present their research. The conference offers more experienced hydrocarbon geoscientists new research, ideas and concepts and the chance to add their experience to a panel discussion.

Conference themes

- Opportunities and Challenges associated with Big Data in Geoscience
- Data standards, storage and security challenges
- Novel Approaches to data collection
- Technology Advances in interpretation and reservoir characterization, e.g. virtual geoscience
- The future role of Big Data in academic and industry Geoscience

The final day of the conference is dedicated entirely to workshops and demonstrations of technology advances in Big Data on a variety of scales, from regional subsurface interpretation, to virtual fields and virtual outcrops, with special sessions on automated interpretation and artificial intelligence.

A panel discussion on 'The future of Big Data' will be held at the close of the second day.

Call for abstracts

There is a call for abstracts and oral and poster contributions are invited. Abstracts should be sent in a Word document to naomi.newbold@geolsoc.org.uk by 31 October 2017. The abstract should be approximately 100 words and include a title and acknowledgement of authors and their affiliations, where possible.



Further information
For further information about the conference please contact:
Naomi Newbold, Conference Office,
The Geological Society, Burlington House,
Piccadilly, London W1J 1BG.
T: 0207 434 9944
E: naomi.newbold@geolsoc.org.uk
www.geolsoc.org.uk/janet18
Follow this event on Twitter: @janet18

Conveners:
Nicki Dallas (191) Mike Smith
Catherine Gill (192) Richard Baker
Julie Hurrell (193) Richard Baker



Fermor Meeting 2017: Factory Earth

25-27 September 2017

The Geological Society, Burlington House



It is more than 10 years since the last detailed look at the role that volcanic and magmatic processes play in the role of ore deposits formation. The topic is still current and is ready for a wide-ranging re-assessment. The meeting will address the fundamental controls on metal transport and deposition in magmatic systems and address questions such as: What role do sulfide melts play in metal transport? What are the key components of fertile magmas and how can they be identified? What role do volatiles and semi-metals play in transporting and depositing metals? How are ore metals concentrated during magmatic differentiation and transferred to the hydrothermal environment?

Topics for discussion:

- Volcanic and ore processes, timescales and catastrophes
- Magmatic hydrothermal plumbing systems
- Sulfides, through the crust, melts, minerals and volatiles
- Volatile compositions
- Magmatic and hydrothermal systems, from mantle to surface

Conveners:

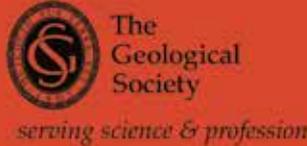
Jon Nelson, Dan Selver,
Francis Cooper, Paul
Shaw, Mike Edwards,
Mike Woodsworth

Registration fees:

- GSI Fellows... £200
- Non Fellows... £250
- Retired... £150
- Students... £100

Further information:

For further information about the conference please contact:
Naomi Newbold, Conference Office, The Geological Society,
Burlington House, Piccadilly, London W1J 1BG.
T: 0207 434 9944 E: naomi.newbold@geolsoc.org.uk
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