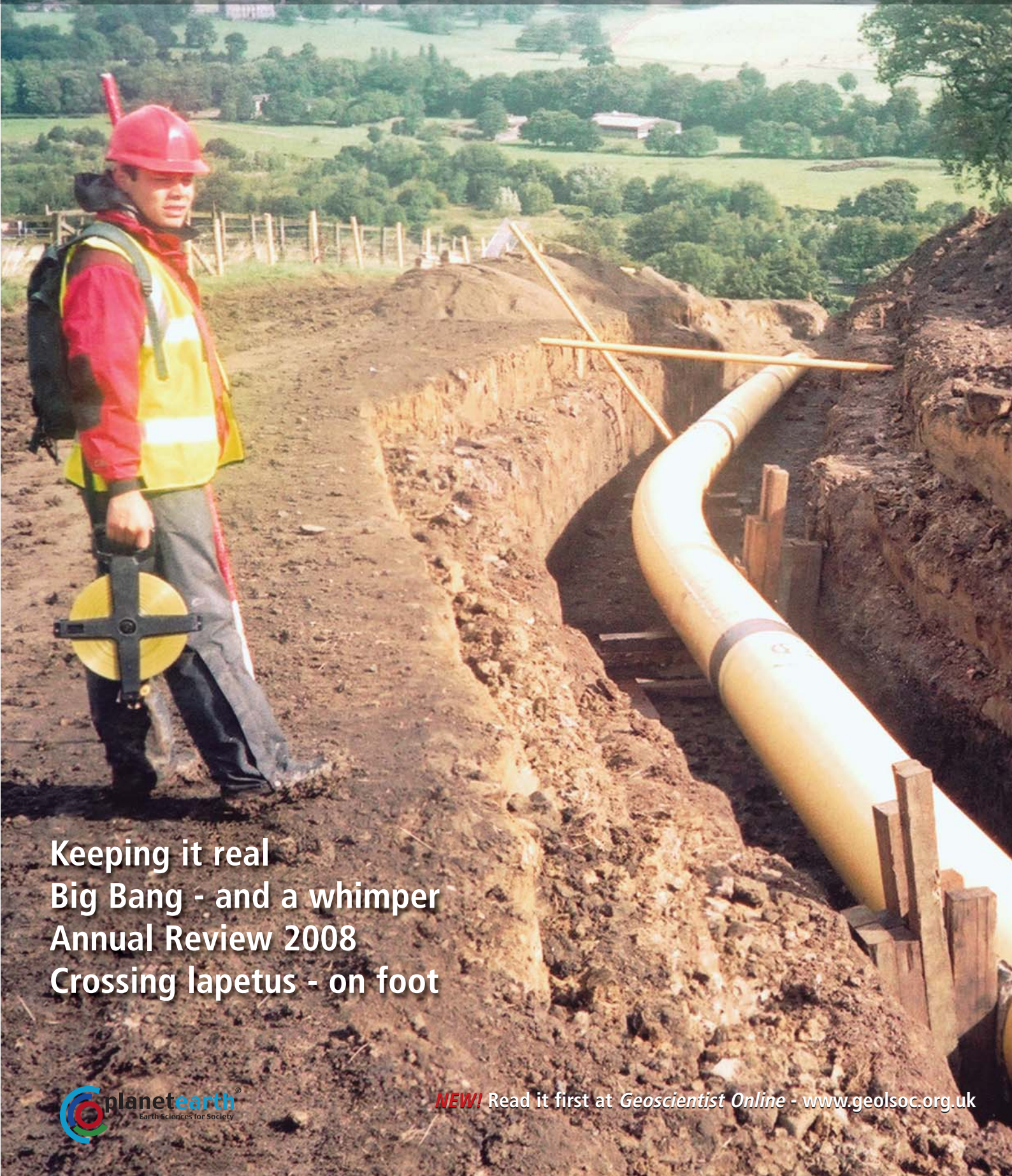


Geoscientist

Volume 19 • No 5 • May 2009



Keeping it real
Big Bang - and a whimper
Annual Review 2008
Crossing Iapetus - on foot



Save the Miller house


Ted Nield issues a call to arms....

On the evening of 23 December 1856, after helping his daughter Harriet with her homework, Hugh Miller (pictured) took a bath and retired to bed. During the night, suffering from what modern medical science knows as an attack of the screaming abdabs, he woke up, reached for his gun, put it to his chest and pulled the trigger. He was 54.

So died the first and greatest geologist-journalist - in a tragic final act that stands as a monument to the need for gun control; a doughty campaigner for freedom of thought, of the Presbyterian Church in Scotland, and of the individual.

When I was a student, I remember, one hot afternoon in the library, putting aside the arid and incomprehensible pages of *Tectonophysics* and taking down a scuffed buckram-covered copy of *The Old Red Sandstone* (of which I now own a much more handsome and much treasured example). From that moment, Miller has been an inspiration to me - first, because his work held out the hope that it might be possible for an innumerate natural historian, masquerading as a scientist, to find room for himself in the world as a geo-journalist. Second, because his outdoor independence of spirit appealed to my youthful Thoreau-esque aspirations. Third, and most of all, because he *wrote* so luminously, and moreover did so despite the trammels of editing a bi-weekly newspaper - *The Witness*.

It came as something of a shock therefore to hear that the National Trust for Scotland is considering closing its museum to Miller, in the great man's home on the Black Isle. NTS has announced plans to alter the way it manages 11 of its properties, including Miller's cottage, with a view to cost savings. I found out when the BBC rang me up about it - and was pleased to give what I hope was a suitably trenchant quote. Alan Owen, for the Glasgow Geological Society, did likewise, as did Nigel Trewin of the University of Aberdeen.

Now - Cromarty folk, if I am any judge of them, are not likely to take this lying down. But local support is one thing. What we as geologists can do is show that Miller is much more than a local hero. Miller is a national figure, even an international one, whose memory deserves continued support from NTS. The northeastern coast of Scotland - St Andrews, Aberdeen, Dundee - together comprise a rich tradition of Earth sciences of which Miller was not just "a" but in that context most definitely "the" progenitor. The public must continue to have access to his greatest memorial, in the heart of the community he served, amid the landscape whose rocks he hewed for a living as a stonemason, and for all the "footprints of the Creator" that will be forever associated with him. 

If you want to support the Miller's Cottage, you can do so by signing an online petition, set up by local SNP councillor Craig Fraser at <http://www.highland SNP.org/CraigFraserSNPBlackIsle.html>. Please note that the donation (to online polling) that you may be asked to make is entirely optional and does not affect your signature of the petition.



Front cover: Laying a pipeline through the English countryside. Life in the "human interaction zone" can be complicated. Katherine Royse tells us why, and what BGS is doing to help - see Feature on p. 16.

Geoscientist

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Editorial Team Editor-in-Chief: Professor Tony Harris, Editor: Dr Ted Nield, Features Editor: Dr Robin Cocks, Editorial Adviser: Dr Joe McCall
Contributing Editor: Dr Sue Bowler, Reviews Editor: Dr Martin Degg, Council Representative: Dr Nick Rogers

Fellowship Queries The Geological Society, Burlington House, Piccadilly, London W1J 0BG Tel: +44 (0)20 7434 9944,
Fax: +44 (0)20 7439 8975, Email: enquiries@geolsoc.org.uk, Society website: www.geolsoc.org.uk

Library Tel: +44 (0)20 7432 0999, Fax: +44 (0)20 7439 3470, Email: library@geolsoc.org.uk.

Advertising D P Media, Suite 201 QC30, 30 Queen Charlotte Street, Bristol BS1 4HJ Tel 0117 904 1283 Fax 0117 904 0085
Email: sales@dpmedia.co.uk

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Lost in citation

As the Society's awards ceremony draws near, David Nowell thinks it is high time that geological maps should be put on the map.

Though William Smith, first winner of the Wollaston Medal, stands alongside Charles Darwin as a recipient of the most prestigious accolade awarded by the Geological Society, most researchers omit geological maps from their cited references. Had the publishers of his proposed book not gone bankrupt, Smith might perhaps have appeared today on British banknotes, alongside Darwin, Faraday and Elgar. Such is the power of the written word (or note) compared to showing the distribution of distinct rock types after the crucial insight that the varied fossil types found in different sediments are unique time markers. Yet without this, there would have been no *Origin of Species*.

Like music, maps contain a great deal of information beneath superficial simplicity - if only you take the trouble to decode them. Compared to conference abstracts and other written flotsam and jetsam, geological maps are far more significant sources. While they underpin many figures, rather than cite them directly authors will leave a trail of references to other papers in which often sketchy maps get adapted and corrupted in the process. Poor diagrams are often compounded by a lack of coordinates and grid references which makes building upon these results with additional techniques and observations much harder, despite this being an essential part of the scientific method. Very occasionally, hiding locations is justified - in which case it should be clearly stated that the details have been lodged with an independent body, even if they are sealed for 50 or 100 years.

Worse still, a lack of citation means policy makers - and even surveys - don't value geological mapping, as funding bodies are often swayed by simplistic statistics as indicators of research quality. We all know narrow self-citing cliques, or authors who publish three or four short repetitive papers, when one or two would do. Bizarrely, when poor research cannot be overlooked, citation is assumed to be positive while others may have flaws but contain useful information. Offshore surveys have even been published without considering their implications for the nearby coast or failing to notice that their results contradict published maps - in which case why?

With talk of an Outer Hebrides alternative energy hub, given their tremendous potential for wave, wind and tidal power, objective mapping of the islands' superficial deposits and shallow offshore waters is desperately needed in order to judge objectively which schemes will be worth backing, rather than relying on narrowly focused data from their proponents. Thus apparently obscure and mundane work can rapidly go from being esoteric to prudent economics. The building of Milton Keynes started with a special survey, and yet the whole "ecotowns" debate has been conducted in a geological vacuum. Even though complete 1:50,000 coverage of Britain draws near, many sheets still need overhauling, and even then society will still require geologists with detailed understanding of the likely ground conditions within our regions in order to maintain this database and provide impartial support and advice to government and citizens and business alike. 

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Win a special publication of your choice

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. Copy can only be accepted electronically. No diagrams, tables or other illustrations please.

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Carousel

Simon Stewart has been named the new head of the Institute of Petroleum Engineering at Heriot-Watt University. Having worked as a senior geophysicist in Baku and Azerbaijan, he is the author of more than 40 papers on subjects as diverse as impact craters and nuclear waste disposal.



David Wilshaw has been promoted to Vice President of Universal Engineering Sciences, Inc. in their Orlando, Florida headquarters. David has responsibility for the geotechnical and environmental services divisions of this ENR Top 500 design firm (see www.universalengineering.com). Before emigrating to the USA in 2003, David was Director of Ian Farmer Associates Ltd. 



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

Horse sense

Distant Thunder


Geologist and science writer Nina Morgan reveals how horse power drove the early geologists

Headstrong horses should certainly be considered among the great unsung heroes of science. Not only did they provide the 'motive power' for many a geological journey. Some, it seems, even became geologists in their own right.

In a life and letters biography of her father, William Buckland's daughter, Mrs Gordon, recalls his favourite old black mare. The horse, she noted, "soon learnt her duty, and seemed to take an interest in her master's pursuits; for she would remain quiet, without any one to

hold her, while he [Buckland] was examining sections and strata, and then patiently be loaded with the specimens collected. Ultimately she became so accustomed to the work that she invariably came to a full stop at a stone quarry, and nothing would persuade her to proceed until the rider got off, and examined, or, if a stranger to her, pretended to examine, the quarry."

Horses imitated geologists in other ways too. Writing from Ireland in August 1835 to his sister Anne, John Phillips describes 'geologizing' with a horse that insisted on stopping at every pub. "Sedgwick & Murchison made me stop with them en route to see a Limestone Quarry & a funny trip it was" he wrote. "The Car (a [illegible word] which by the by is a capital thing for geologizing) was drawn by a tired horse, which in this warm weather would stop at the Whiskey Houses for water. In one case the driver contested this point & the beast would not stir a step forward, so he turned her round & backed her for 100 yards & still we could not conquer but were obliged to give the water."

Water, presumably, being the equine code word for 'Guinness'. 



- The story about Buckland's horse appears in *The Life and Correspondence of William Buckland, D.D. F.R.S* by Mrs Gordon, published by John Murray, London 1894. The quote from the letter from John Phillips is one of a series of 234 letters from John Phillips to Anne Phillips preserved in the archives of the Hope Library at the Oxford University Museum of Natural History (OUMNH) (www.oum.ox.ac.uk). I am grateful to the Director of the OUMNH for permission to quote from the letter, and to the librarian Stella Brecknell for all her help with this project

* Nina Morgan is a science writer living in Oxfordshire.

If the past is a key to your present interests, why not join the History of Geology Group (HOGG). For more information visit the HOGG website at: www.geolsoc.org.uk/HOGG

Anglo American plc Prize



Best Poster on Environmental Geochemistry

Anglo American plc aims to be the world's most successful mining company. Already the leader in platinum and diamonds and a leading producer of coal, we are also a major producer of copper and, increasingly, of iron ore.


Anglo American has made a firm commitment to sustainable development, and this principle is now embedded in all of our policies, strategies and everyday practices in our mining operations worldwide. We assess the economic, social and environmental risks and benefits of every decision we take. We are a major sponsor of environmental studies, especially on the effects of chemicals on human health and the environment. We aim to minimise any negative environmental impacts of mining, and we work with local communities to ensure that they benefit from our activities.

To underline our commitment to improving environmental quality for all, Anglo American is funding a prize for the best poster on environmental geochemistry by a young researcher (PhD student or post-doctoral researcher) at a special meeting of the Geological Society, on Monday 5 October 2009. Further details of the event will be announced shortly.

If you would like to submit a poster, please describe its scope and intention in no more than 250 words and up to three illustrations and submit your proposal as a word file to stephanie.culver@geolsoc.org.uk no later than 31 July 2009. A panel (membership to be announced) will select the best [eight] proposals and invite those shortlisted to prepare their posters. These will be exhibited in the Society during the afternoon and evening of 5 October, when judging will take place.

A prize fund of £6k is available for the judges to award as one, or a number of prizes.

Guidance for applicants

Topics might range from the practical, such as water quality and natural and anthropogenic sources of contaminants in water or waste-water treatment, to policy areas. Substances featured might include natural and man-made radioactive substances; toxic and essential trace elements; persistent organic pollutants used in industry or agriculture (pesticides); veterinary or medicinal pharmaceuticals; and emerging pollutants such as nanomaterials. 

Deaths

Read obituaries online at www.geolsoc.org.uk/obituaries.

The Society notes with sadness the passing of:

***Baumer, A**


***Mills, Anthony B**

In the interests of recording its Fellows' work for posterity, the Society publishes obituaries online, and collects them once a year in its *Annual Review*. 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 (*).

If you would like to contribute an obituary, please email ted.nield@geolsoc.org.uk to be commissioned. You will receive a guide for authors and a deadline for submission. You can also read the guidelines 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 in the next available *Annual Review*.

Help your obituarist

The Society operates a scheme whereby Fellows may deposit biographical material for use by their obituarist. The object is to assist obituarists by providing useful contacts, dates and other factual information, and thus to ensure that Fellows' lives are accorded appropriate and accurate commemoration. Please send your CV and a photograph to Ted Nield at the Society. *Editor* 



BGS Strategy launched

The British Geological Survey launched its five-year strategy *Applied geoscience for our changing Earth* at the Royal Society on 4 March 2009. Prof. John Ludden (BGS Executive Director) is pictured presenting an overview of the strategy (available at www.bgs.ac.uk). The event was attended by over 120 guests representing the UK research community, the private sector, government, and several European geological surveys.

Crossing Iapetus – on foot!

Peter Maguire's Big Charity Walk across Iapetus (from Leicester to Loch Ewe) culminates this month.

Leicester's Emeritus Professor of Geophysics tells us why, and asks for your support.

A major goal of mine for this past two years has been to raise money. 'So why didn't you just keep working?' I hear you say. But it's not for me – it's for charity.

In the last 10 years too many of my family and friends have been hit by cancer. While I realise there are hundreds of others raising funds for cancer care, awareness and research, I just know that more is needed to alleviate the suffering this disease brings, and to support the hard unending struggle of developing methods of cure. So – to achieve my goal, I have set myself to walk from my home in Leicester to Loch Ewe and Inverasdale in the Highlands, from the northern shore of Avalonia to the southern margin of Laurentia – across Iapetus! Six hundred miles.

Bloody mental

One fellow walker, whom I met while recently tramping the hills heard my plan and said, encouragingly: 'You must be *bloody mental*!' He may be right, yet all it needs is about 45 days of tramp, tramp, tramp along country lanes, footpaths, canal towpaths, drovers' tracks, stalkers' paths, the odd main road, open hillside – and a good deal of sunshine! I decided however that I was not up to doing it 'all in one' and have broken it into five stages: Leicester to Edale, to Carlisle, to Glasgow, to Fort William, and finally to Loch Ewe.

As my ageing limbs are not quite as supple as they used to be, I decided to have a go at a lot of it before daring to ask for sponsorship. I have therefore completed the first four stretches, and great they have been: the low crags of Charnwood, that volcanic edifice on the northern margin of Avalonia; the long tramp over the Pennine Carboniferous grits, Kinder Scout and Bleaklow, past 'Wuthering Heights' on Haworth Moor before the limestone cliffs of Malham and the moorland vastness of Pen-y-Ghent and Whernside.


Through Dent, the birthplace of Adam Sedgwick and over the fells to Shap and the market town of Penrith before Carlisle; onto the Ordovician-Silurian accretionary prism of the Southern Uplands Terrane through Eskdalemuir, Moffat and Tweedsmuir. From there the path followed the ever-widening River Clyde along the floor of the Midland Valley to Glasgow and the start of the West Highland Way. On to the Grampian Terrane arc-continent collision on the southern margin of Laurentia; Loch Lomond to Crianlarich, the remote wildness of Rannoch Moor, Glencoe and the Devil's Staircase, Kinlochleven and the last tiring haul across the hills to Fort William.

The stretch to Loch Ewe in Wester Ross remains to be done. For this I am being joined by lifelong friend, Graham Allen. We will walk the southern part of the Caledonian Canal, across the strongly folded and thrust northern Highland Terrane to Glen Affric, overnight camping before Glen Carron, crossing the Moine Thrust to Laurentia! Then Kinlochewe and the final hike on the Lewisian along Loch Maree to our destination – Loch Ewe. We have set aside seven days for near 100 miles. Here's hoping for fine weather!

Now – I hope to raise £1500 for two great causes – one at each end of the walk. The southern one is Hope against Cancer – a Leicester and Rutland based charity that provides funds to support research staff and the best available training for doctors and nurses in the field of cancer care in Leicestershire and Rutland. The northern one is Maggie's Highlands Centre – a cancer care centre in a fantastic chain that is gradually expanding to many parts of the UK.

If you could sponsor me, that would be wonderful. You can give on line via the Justgiving webpages at: www.justgiving.com/peter_maguire_hope, or www.justgiving.com/peter_maguire_maggies (or both!).

So, finally – thanks for your support. They are both wonderful causes and I really do hope you feel able to donate to them – in the light of my doing

'The Walk'! 



Crater impostor unmasked

The supposed “Sirente crater” in the Abruzzi mountains is not the smoking gun of an impact that brought down the Roman Empire after all. It’s a sheep dip. Ted Nield reports.



Photo: Pier Paolo.

The mighty Sirente sheep-dip, complete with customers. Not an impact crater after all.

In 2002, a 130m wide sub-circular depression with raised rims, lying in a karstic plain among the Abruzzi Mountains, shot to world fame on the basis of a scientific paper suggesting it was an impact crater. Seventeen similar depressions nearby (lacking the raised rim) were interpreted as part of a large strewn field, suggesting a shower of fragments had fallen from a massive bolide, “around 412AD”.

The story, based on a paper in *Meteoritics and Planetary Science*, quickly grew in the telling. The supposed event was soon being related to a legend dating from the late 19th Century, about local pagans long ago who had been miraculously converted to Christianity by a falling star over Sirente.


Before long, the supposed impact was being related to Emperor Constantine’s flaming cross, which he reputedly witnessed the day before his victorious battle against the pagan Maxentius in 312 AD. Because this was the event that eventually led to the conversion of the entire Empire (which, as Edward Gibbon made clear in his *Decline and Fall*, was what lay behind the Empire’s fatal weakening) before very long the media were attributing the collapse of Imperial Rome itself to cosmic impact.

As Salford University Space Technologist and sometime writer on things asteroidal Duncan Steel wrote in *The Guardian* (6 February 2003): “Rome of that era came close to suffering a far worse calamity. A small metallic asteroid descended from the sky, making a hypervelocity impact in an Apennine valley just 60 miles east of the city. This bus-sized lump of cosmic detritus vaporised as it hit the ground. In doing so, it released energy equivalent to around 200 kilotonnes of TNT: around 15 times the power of the atomic bomb that levelled Hiroshima in 1945.” First the dinosaurs, then the Roman Empire. Was there *anything* that could not be explained by a load of bolides?

Well, sadly for this colourful story, scientists have now conclusively debunked the idea. The “Sirente Crater” turns out to be nothing more than a dew pond, excavated by shepherds probably during Roman times, for the watering of their animals in the dry karstic landscape. The regular need to de-

silt the depression explains its raised rim: modern shepherds have been seen doing the same for other dew ponds in the area as recently as four years ago. It also explains the total lack of any corroborating evidence to have come to light since the idea was first floated by J A P Ormö *et al.* in their paper. Supposed magnetic anomalies tentatively linked to meteorite hit were discredited as being due to shrapnel and other bits of army ordnance which litter the area since World War 2.

In fact, since the original idea was published, not a single geochemical or geophysical anomaly, shocked mineral grain or siliceous spherule has come forward to support the idea. Now, geophysical surveys, conducted for the first time across the depression itself, have shown that the supposed crater shows no magnetic anomalies attributable to impact, and that there appears to be no disturbance at depth. The lack of any roots to the “crater” also debunks another suggestion that had been put forward – namely that the depressions were the remnants of mud volcanoes. The geology of the area, as revealed at depth, is also inconsistent with this hypothesis.

Circumstantial evidence in favour of a “shepherdogenic” origin however is rather strong. All 20 or so sags now identified occur in dry karstic areas with consistent geology, while the annual sheep migration has been a characteristic of life in the Abruzzi for millennia. All the depressions contain lacustrine silts and all are fed by intermontane springs, some with aqueducts leading to them. 

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New postgrad diploma

Fugro Robertson's Postgraduate Diploma in Applied Petroleum Geoscience is validated by Royal Holloway, writes Adler deWind



Fugro Robertson Limited (FRL) has announced that it has formed what it describes as "an innovative alliance" with Royal Holloway, University of London (RHUL) to offer a Postgraduate Diploma in Applied Petroleum Geoscience. The company and the university have been working towards offering an oil and gas industry-focused postgraduate qualification, and this has now received university validation and is now open for business.

Dave Waltham, Head of Department of Earth Sciences, Royal Holloway, University of London said: "The Department of Earth Sciences at Royal Holloway, University of London has been involved in training for the hydrocarbon industry for 24 years and over 500 graduates from our post-graduate programmes now work in the oil and gas sector worldwide."

Flexible

The Postgraduate Diploma in Applied Petroleum Geoscience has been tailored specifically to meet the needs of candidates in full-time employment and their employers. The time commitment has been kept to a minimum, with each module comprising an intensive teaching period of 5-10 days followed by on-line assessment and an exam at a regional location.

Candidates will be required to complete six modules from a choice of 12; this can be undertaken at their own pace to fit around work commitments, with a time limit of up to three years to complete their programme. The diploma will be offered on a public open course basis in the UK or at clients' offices or regional centres. For further information, view the FRL website (see below).

For further information contact Fugro Robertson Limited:

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"Fossil sneeze" caught



Age estimates of the origin of modern octopuses have been pushed back tens of millions of years following the discovery of three new species, identified from five beautifully preserved specimens. Sarah Day reports.


The octopus has long presented a puzzle for scientists interested in evolutionary history. Lacking a well-developed skeleton, octopuses are composed almost entirely of muscle and skin. When an octopus dies, it quickly decays and becomes little more than a slimy blob. Often, carcasses don't make it this far, but are consumed by scavengers shortly after death.

As a result, the octopus fossil record is virtually non-existent. Until now, none of the 200-300 present day species of octopus has ever been found in fossilised form, and only a single species was known.

The new specimens, described in the latest issue of *Palaeontology*, were discovered in Cretaceous rocks in Lebanon and dated to 95 million years old. They show an astonishing degree of preservation, recording eight limbs with traces of muscles and rows of suckers. Some specimens even contain traces of ink and internal gills.

'They are sensational fossils, extraordinarily well preserved', says Dirk Fuchs of the Freie University of Berlin, lead author of the report. They have been preserved by compression on the surface of the limestone, leaving behind imprints of their soft parts. Some parts were mineralised after death in whitish-yellow apatite (calcium phosphate).

The fossils show a surprising similarity to modern day octopuses, providing important information about their evolutionary history. 'These things are 95 million years old', says Dr Fuchs, 'yet one of the fossils is almost indistinguishable from living species. The more primitive relatives of octopuses had fleshy fins along their bodies. The new fossils are so well preserved that they show, like living octopus, that they didn't have these structures'.

Such soft-body preservation is so rare that Mark Purnell, for the Palaeontological Association, remarked that finding an octopus as a fossil "is about as unlikely as finding a fossil sneeze". Estimates as to the origins of modern octopuses have now been pushed back by tens of millions of years, thanks to the discovery of these rarest and unlikely fossils. 



Ediacara: a major development


Joe McCall heralds a major advance in our understanding of Ediacara.

Edmund Gosse's naturalist father Philip stated: "the world was created complete with fossils to try our faith". The enigma of Ediacara certainly presents us with complexity and obscurity - much of which has long proved difficult to fit with evolutionary theory. Whereas some Ediacara are clearly progenitors of Phanerozoic phyla, others are simply baffling¹. Brasier and Antcliffe² have now published an article that represents a great advance, including an attempted phylogeny of some of the most obscure Ediacara organisms.

The authors emphasise the original discovery status of the Charnwood Forest organisms. These British discoveries were not actually the first to be described: Billings's *Aspidella* from Newfoundland was first; but created scarcely a ripple on the palaeontological pond. Range and Schneiderhohn described *Rangea* and *Pteridinium* from Namibia from 1908 onwards. However, the Charnwood find by Roger Mason in 1958, and the Ediacara finds of Sprigg in 1946, really set the revolution in motion.

The authors have wisely avoided becoming mired in a discussion of biological relationships. They commence by analysing the morphology of the enigmatic leaf-like holotypes of *Charnia*, *Charniodiscus* and *Bradgatia*, all three from Charnwood Forest, using high-definition laser mapping. (The laser method produces a highly detailed digital surface map of the fossil and this can be manipulated to show the structure in three dimensions. It also preserves a record of highly vulnerable fossil surfaces that can be studied, using computers, by future scientists.) The authors then discuss their possible interrelationship and evolution.

They recognise three critically important leaf-like 'rangeomorph' elements: a) not furled, displayed; b) furled, displayed; and c) furled, undisplayed. They then extend their comparisons to *Ivesheadia*, found in Charnwood and Newfoundland, *Beothukis*, found in Newfoundland, and *Fructofusus*, found in Newfoundland. They produce a phylogenetic diagram, showing possible relationships between the eight main taxa. This diagram depends of the assumption that *Ivesheadia* is the most primitive.

This is the first such diagram to be attempted for the Petalonomae Ediacarian fossils, as far as I know. It seems like a giant leap forward - will similar attempts be made on other Ediacaran forms such as the medusoids? Will such analysis using remarkable laser techniques be able to resolve the fundamental question of whether the most obscure Ediacaran fossils represent a biological dead end (as Seilacher has suggested), and tell us exactly how these strange leaf-like and sac-like animals lived? 

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IN *Brief*

Martian gas

The NASA infrared telescope on Hawaii and the Gemini South Observatory in Chile have both detected methane spectrographically in the Mars atmosphere. It apparently emanates in seasonal plumes. Methane is unstable there and must be replenished as it can only survive there for a few hundred years. Two possible sources are volcanic and biogenic. The gas could emanate from subsurface volcanic sources, but no active hotspots are yet detected on the surface of the planet. On Earth, methanogenic organisms produce methane from hydrogen and carbon, but they need oxygen to thrive. Such organisms could conceivably exist on Mars. The source cannot be determined now as the rovers are not equipped with sensors, and sensors must therefore be included in a future mission to resolve this question. As befitted a sniffer dog, the ill-fated Beagle-2 did have such a sensor. JMcC

<http://news.bbc.co.uk/2/hi/science/nature/3577551.stm>



Big Bang – and a whimper

Sarah Day attended two very different events aimed at convincing the young that science was for them, and found that these work best when they are well focused, and allow the science to speak for itself...

As part of National Science and Engineering Week (NSEW – 6–15 March), the Queen Elizabeth II Conference Centre in Westminster played host to *The Big Bang* – a science fair aimed at inspiring students to study for a future in science and engineering.

For the Geological Society, it was an opportunity to raise awareness of the subject, which is often taught in a fragmented way in schools. Armed with a “Seismic Simulator”, cute button badges and pictures of geologists at work in exotic locations, we were encouraged by the level of interest and enthusiasm shown by visitors to the stand, many of whom had been studying geology at school and thinking it was geography.

Nearest to us was a stand about physiology and healthy living. I have to admit; I didn’t notice which organisation this was run by, so distracted was I by the presence of Olympic hottie James Cracknell, who has just come back from an expedition to the Antarctic (as you do). I managed to pull myself together for long enough to ask about the trip, and whether he came across any geologists at work in the region.



“There were quite a lot of American scientists there, but they were doing more molecular science”, he tells me. Then he thinks for a bit. “There were some Norwegian scientists who seemed to be moving lots of boulders around, and doing stuff with rocks”. “Ah ha! They were probably geologists” I tell him.

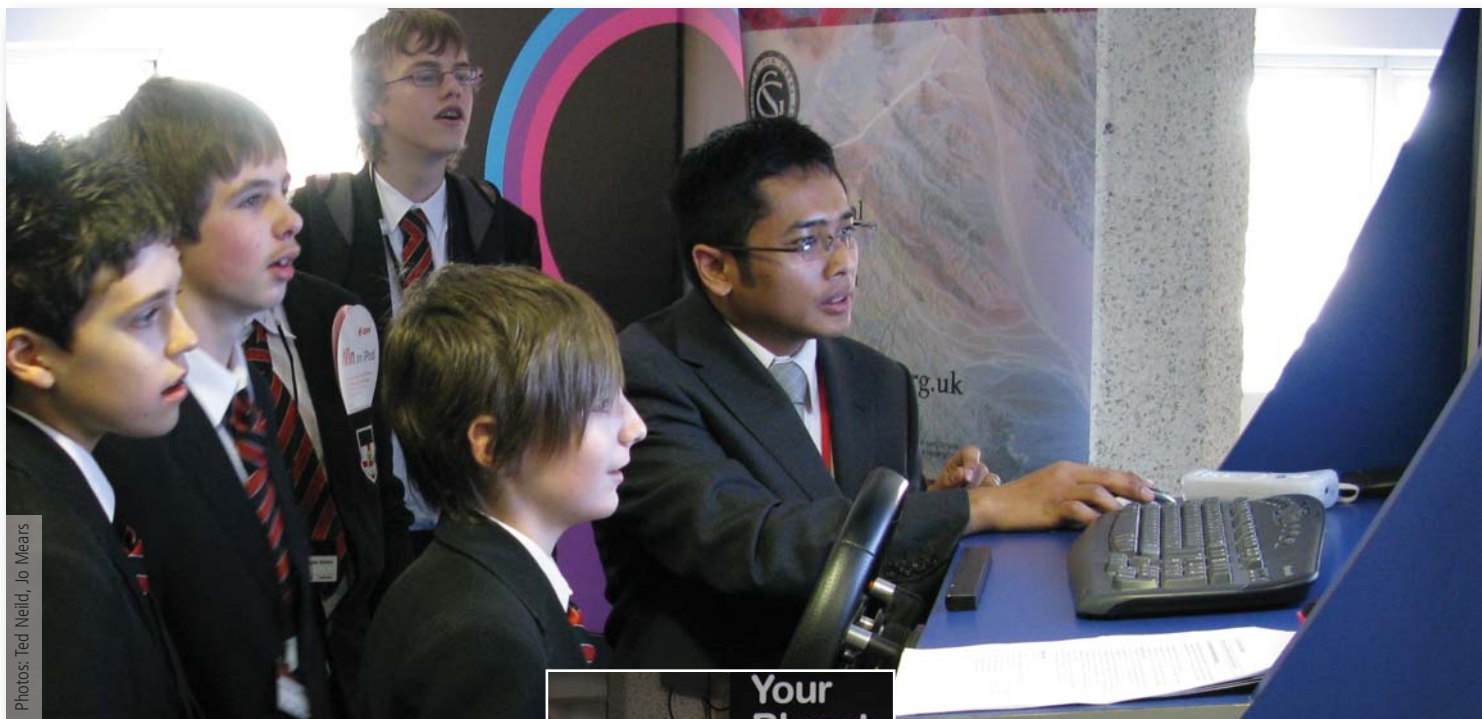
Unfortunately for my article, it turns out James was in the Antarctic to take part in a 495-mile trek across the Antarctic ice cap against five other teams, recreating Captain Scott’s race to the South Pole in 1912. Nevertheless, the trip gave him a unique insight into the environmental issues the world is facing.

“It’s an amazing, beautiful place that needs to be looked after”, he agreed, although he admitted it was hard to observe the effects of climate change first hand. “All we could see was mountains and ice. When you go above the mountains you can’t see anything”. Such unspoiled landscape is under threat, however, with the Protocol on Environmental Protection to the Antarctic Treaty due for review in 2041. The Treaty, signed in 1991, prohibits mineral exploration in the Antarctic, which is sitting on valuable oil and natural gas fields. If not renewed, it is feared that exploitation could follow and destroy the pristine landscape for ever.

“Either way”, James pointed out, “we have to find a way of surviving that doesn’t involve using those resources. We can’t carry on using oil at the rate we are. Hopefully in 30 years’ time we’ll have come up with an alternative. I think we under-use nuclear power, for example.”.

It’s possible that after this he outlined a comprehensive and insightful solution to the energy crisis, but I’m afraid I was distracted by his penetrating eyes and lovely floppy hair, so I missed it.

The Antarctic theme continued downstairs in the competition area, where I found three schools competing to design a jacket worthy of the lovely James to wear on his trip. Particularly impressive was Hadley Catholic High School’s efforts, demonstrated to me in exquisite detail by 12 year-old Helen, who told me their entry comprised 56 hours of work. “We do a STEM club after school with our science teacher” she explained. All three of the Hadley team seemed hugely enthusiastic about their project, and about the



Photos: Ted Neild, Jo Mears

possibility of a future career in science. (Oh, and for James fans, she said that she “likes him more than chocolate”).

Back on the Geolsoc stand, we had teamed up with Paul Denton (right), who was promoting his UK School Seismology Project. Schools can apply to have a free seismometer with which they can observe the effects of earthquakes all around the world. “Seismology is the “hook” we use as a way of teaching science” Paul explained. A subsidiary aim of the project is to raise awareness of the geosciences in schools and to pull it back into the science, rather than the geography curriculum.

The seismometer went down (and up) very well, with kids creating their own mini earthquake by jumping (other techniques, such as bashing the instrument against the table or spitting on it were attempted, but discouraged). Sceptics take note; I overheard one hairy teenage boy say to another: “this is well cool”. So in that case, what prevents so many from pursuing careers in science and technology?

I may have found a clue at another NSEW-themed event. *Voice of the Future*, organised by the Royal Society of Chemistry, aims to give young scientists the opportunity to question ministers involved in science policy, and discuss their concerns about how science is dealt with by Parliament. The event was packed with a mixture of school children, PhD students and post-docs, who participated in a 70 minute *Question Time* to a Panel of MPs from the Commons Select Committee on Science & Technology.

The approach from the ministers was as you might expect: *talk talk talk*. Then, interlude for excessive catering, (including approximately 30 bottles of wine), followed by more talk, much of which involved the repeated phrase “you are the future of science”, uttered in the sing-song tone of a Sunday-school teacher.

This is not the way to enthuse young people about science. If any of them were thinking about a future in science and technology at



11am, then by 3.45 they were probably considering a degree in English literature. I was considering a degree in English literature.

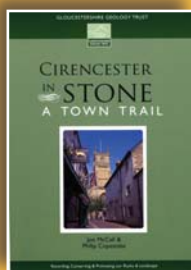
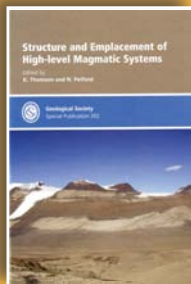
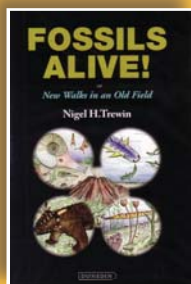
Added to this was the confusing muddle of issues discussed. One minute it was how to combat the energy crisis, the next a recruitment drive for Parliamentary internships for scientists. Various 20-minute speeches by ministers, by contrast, stuck doggedly to the same message. (That’s “you are the future of science”, in case you missed it the first time). My favourite moment came courtesy of Adam Afriyie, Shadow Minister for Science and Innovation, who ran out of things to say after about five minutes, and concluded: “So, yes, what can I say?Science and Engineering Week....It’s great!”

As an opportunity for scientists to ask questions that have been rankling for some time (“where has all my funding gone?” springs to mind), the event is commendable – as was the participation of so many busy MPs. The trouble was, unlike the *Big Bang*, *Voice of the Future* didn’t seem quite sure what it was trying to do, or to whom it should be doing it. Much of the focus was on enthusing young people about careers – by now a familiar theme. But half of the audience were already pursuing science careers, and wanted answers to the more immediate questions about funding and jobs. They quickly realised that they weren’t going to get any answers.

It may have been bigger, more complicated and far more chaotic; but at the heart of the *Big Bang* was a much simpler aim. No one was lectured at; no-one was grinningly told they were “the future”. It simply presented the opportunity to explore the possibilities of science and technology themselves.

Sometimes the best way to enthuse people is to recognise that the enthusiasm is already there. Give them a seismometer and a wiggly line on a computer screen and they’re, quite literally, jumping up and down. The “Big Questions” can wait.

Reviews



Books available for review:

- Treagus, J. (2008), *Anglesey Geology – a field guide* (in English and Welsh), GeoMôn.
- West, R. (2009), *From Brandon to Bungay: An exploration of the landscape history and geology of the Little Ouse and Waveney Rivers*, Suffolk Naturalists' Society.

Interested parties should contact the **Reviews Editor, Dr. Martin Degg 01244 392749; m.degg@chester.ac.uk**, only. Reviewers are invited to keep texts.

Review titles are not available to order from the Geological Society Publishing House unless otherwise stated.

Fossils Alive! or New Walks in an Old World

Nigel H Trewin

Published by: Dunedin Academic Press Ltd

Publication date: 2008

ISBN: 9781903765883 (hbk)

List price: £19.95

211 pp

www.dunedinacademicpress.co.uk

As the title suggests, *Fossils Alive* takes the reader on a time-travel series of walks back into the life and environments of 10 of Scotland's most famous geological localities. Illustrated with sketches and coloured photographs, mostly of fossils, these trips range from the early Devonian of

Tillywhandland and its fish, through 'Dinosaur Dinner on Skye' up to the late Jurassic Helmsdale tsunami.

The idea behind the book is to transport the reader back in time to these localities and experience them as original living environments. Sometimes there is a companion or two so that a dialogue and shared experience are imagined. So it is a laudable attempt to present the life and environments in a popular way for the enquiring reader. The information presented in these time travel 'safaris' is grounded in accurate geological information.

Nigel Trewin's career has given him first-hand field experience of all the localities so he certainly knows what he is writing about. And there is a brief bibliography to direct the general reader to the basic supporting literature.

Each chapter begins by giving the geological background and setting to the particular time and place, what the rocks are like, how they were formed and what the fossils are. The objective of each journey is then made clear. For instance the 'Fish Foray in Forfar' aims to '...visit the shores of Lake Forfar in the early Devonian and see the fish, arthropods and plants in their natural environment'. While on their fieldtrips, our heroes encounter and describe the animals and plants that are preserved today as fossils in these localities. There is often a surprise element to add interest, such as a volcano popping off and a scramble to retreat in their transporter (called the 'bus') – all good clean fun.

Although aimed at the general reader, I am sure that *Fossils Alive* will provide good background information and useful interpretations of sites that are often visited by student excursions.

Duncan Palmer, Cambridge

Structure and Emplacement of High-level Magmatic Systems

Geological Society Special Publication No. 302

K Thomson & N Petford (eds)

Published by: The Geological Society of London

Publication date: 2008

ISBN: 978-1-86239-256-4 (hbk)

List price: £85.00

227 pp

www.geolsoc.org.uk/bookshop

A volume in the Special Publication series usually comprises a collection of papers on a topic of current research. It often has its roots in a conference and thus gives a review of the state of knowledge and areas of research activity at a given point in time. As well as providing a key reference for researchers in the field it has the additional function of providing an overview of the topic for the wider geological community. Special Publication 302 is no exception; in particular it provided one non-specialist with a set of papers that has helped satisfy a curiosity sparked by presentations that I had heard on saucer-shaped sills at recent conferences.

The volume provides a broad picture of recent progress in the understanding of high-level magmatic systems. It contains papers that address the modelling of fracture-induced intrusions and analogue experimental work on appropriately scaled analogue models. Case studies on intrusions range in scale from 3D seismic images of sills in the Atlantic margin to outcrop-scale studies where the exposure is examined in detail. Other case studies make use of recently developed tools, such as Anisotropy of Magnetic Susceptibility (AMS), that allow the re-examination and reinterpretation of classic areas such as Slieve Gullion and the Etive dyke swarm.

The volume is dedicated to Ken Thomson, whose work on offshore seismic data provided a key breakthrough in our understanding of sill emplacement in sedimentary basins. By rendering the sediments transparent and the sills opaque, Ken was able to provide a picture of the 3D geometry of sills in unprecedented detail.

This is a well-produced volume with clear text and photographs together with well-drawn diagrams. It thus maintains the high standard expected of the Special Publication series.

Duncan Woodcock, Daresbury

Cirencester in Stone

J McCall & P Copestake

Published by:

Gloucestershire Geology Trust

Publication date: 2008

ISBN: 978-1-90453-009-1

List price: £4.95

49 pp

www.glosgeotrust.org.uk

This attractively printed volume sits well alongside the similar volume edited by Joe McCall a decade earlier, *Gloucester in Stone*. The older booklet benefited from many pen drawings to draw the reader's attention to pertinent details - and a wall game too. Unfortunately, although the new volume contains many colourful digital images, the absence of hand-drawn figures and annotations to the images means that the ability to focus on detail is left to the experience of the reader, thereby losing some of the potential instructive value.

The Gloucestershire Geology Trust is responsible for both publications, with the later book aimed at encouraging a wider public to value its stone heritage. Cirencester contains a wealth of historically interesting buildings and the widespread use of stone makes it a fascinating study area. The newcomer to the town will welcome the clear foldout street map within the front cover (which doubles as a bookmark); but there is no scale and the user is left to presume that North is at the top!

Although its A5 size makes the book suitable for the pocket and provides sufficient pages for the information needed to describe a worthwhile walk around the town, unfortunately an unnecessarily small, plain and rather thin font has been employed. Plenty of room remains between the lines for a larger style but this reviewer did not find the main text easy to read - in contrast to the information panels, which are much clearer.

In terms of content, the *Geology of Cirencester* chapter is more a Geology of Gloucestershire. This section would have benefited from a more focused map of the vicinity of Cirencester, marking the quarries of relevance to the supply of stone to the town (historical and current) rather than the currently-working quarries alone. The Cotswolds are not actually marked on this map; stratigraphical terms are employed that are not shown on the succession (e.g. Bajocian and Bathonian), and when was the Cenozoic or indeed the Pleistocene? Non-geological readers will no doubt be confused by the multiplicity of such terms with no recourse to explanations in the text and no glossary. Moreton-in-Marsh is not shown, and so the location of the ice sheets remains a mystery.

Once into the geological trail, the layout for each site is good. Clear banners indicate the location, and directions are given in italics. Information is imparted in digestible quantities through good use of captions and boxes. The book ends with a brief "bibliography" (really just a reading list), but why are no websites given, to encourage the reader to delve more deeply into the subject?

For some reason the outer sites employ a different numbering sequence (21 to 23 would have been clearer than returning to a new 1 to 3 sequence). They would also have benefited from details of either walking distances or parking facilities. Furthermore, neither the map nor the site description give any idea how to access the Royal Agricultural College - perhaps emphasising the need for such books to be proof-read by someone less familiar with the town in question.

There are nevertheless strengths within this book - the nice presentation inviting the reader to walk around the town with their eyes focused on the building stones. It is also good to see the final page giving attention to the current extractive industries.

Mike Rosenbaum, Ludlow



Letters

SPOSH or tosh

From Dr John Heathcote (Rec'd & Pub'd 8 Mar 2009)

Sir, I do not entirely agree with the views expressed by Darren Wilcox. There are at least two issues.

Having spent much time thinking this matter through, I believe that DEFRA is right not to issue numerical values to define 'Significant Possibility Of Significant Harm' (SPOSH). There are real uncertainties in the science, both of estimating toxicity at very slight levels, and in modelling pathways affected by the idiosyncratic behaviour of humans interacting with geology.

SPOSH contains the word 'significant' twice. It is possible, using conservative assumptions, to derive a soil concentration where there is the possibility of significant harm to a person – the harm usually considered is death or heritable defect, which meets most people's definition of significant. Whether this possibility of harm is itself significant depends on many factors. How certain is the toxicology, especially of a mixture of substances affecting different metabolic pathways? How predictable is the behaviour of the receptor population? These are in part subjective. DEFRA/EA may be able to help us in establishing POSH, but it requires consideration of individual circumstances to determine if this is SPOSH. What is a tolerable risk in one circumstance may not be tolerable in another.

Some of the problem arises from what is a 'significant possibility'. The input data to the CLEA models include daily intake quantities for the potential toxins, which have been established as having a possibility of causing harm. The size of the possibility cannot be established clearly. However, the intake value for benzo[a]pyrene that underlies the calculation is 20 ng/kg body weight/day, and this is estimated in TOX2 (DEFRA 2002) to be associated with a risk of $1e-5$ /lifetime, approximately $1e-7$ /yr, maybe. This is a very small risk. To put it in context, the equivalent risk from natural radiation is estimated by the Health Protection Agency to be $1.3e-4$ /yr, 3 orders of magnitude greater. The risk of death from other natural causes is even higher. Risks of $1e-7$ /yr are far too low to observe directly through epidemiological studies. HPA, being itself risk-averse, cautions against trying to scale the risk at higher concentrations (HPA, 2008).

It is interesting to consider the Radioactively Contaminated Land Regulations, made under the same legislation as the Contaminated Land Regulations. Here SPOSH is defined in the regulations as *inter alia* a dose of 3 mSv/yr, which produces a risk of $\sim 2e-4$ /yr, an increase of the same order of magnitude as the natural risk.

Having established that small amounts of arsenic or benzo[a]pyrene, or quite large amounts of radioactivity, are leading to a risk of harm that is greater than zero, it is for society to consider whether this risk of harm is significant and we wish to avert it, or unavoidable and we just live with it. If it is natural background we probably live with it.

At times it will involve some difficult decisions, and I would not wish to be the practitioner associated with that one in a million child fatality, but that is how the world is. It isn't an entirely safe world. Contaminated land practitioners, working both for developers and regulators, are needed to work together to agree when the possibility of harm is 'significant', i.e. something must be done, either remediation, or an alternative lower risk development.

- DEFRA, 2002. Contaminants in soil: collation of toxicological data and intake values for humans. Benzo[a]pyrene in soil. DEFRA and EA R&D report TOX2. ISBN 1 857 05741 4.
- HPA, 2008. Benzo[a]pyrene – use of excess lifetime cancer risk estimates. HPA-CLCN-1.

To CPD or not to CPD?

From Alan W Miller (Rec'd 5 Mar; Pub'd 11 Mar 2009)

Sir, I read Prof. Manning's article To CPD or not to CPD? expecting to be persuaded by a factually balanced argument as to pro and cons; but feel somewhat dismayed by the fact that there are those who believe that compulsory CPD is not only desirable but inevitable – not to mention their condescending tone.

Mother often does know best; but who, in this case, would be conceited enough to presume to be mother? The P in CPD stands for Personal. It is and should remain a matter of choice how to manage and develop our careers, and not something to be imposed by others. I was amazed at Prof. Manning's dismissive comments about senior and retired members. I assume the author is not retired, so how does he know?

If someone fervently believes colonic irrigation is good for you, is that a reason to force everyone to take it? I think not. No, compulsory CPD can only appeal to those with OCD (Obsessive Compulsive Disorder) and those who make it their mission in life to impose their views on others for their own good, whether they like it or not.

Well, no more patronising do-gooders acting on my behalf, please. This is my career and I will decide when (or whether) I want my colon irrigated. Don't call me ... I'll call you!

From Mark Davis (Rec'd 6 Mar; Pub'd 11 Mar 2009)

Sir, I can but only wholeheartedly support the concept of CPD – CPD is important at any stage of a career and during any period – economically stable or not! To me, the core of any professional geologist's work consists of deliverables related to the project in hand. But one of the few ways that deliverables can be measured (outside of actually carrying out the work) is by attending related courses and workshops and using these to demonstrate your understanding of the professional aspects of geology.

Rodinia: Supercontinents, Superplumes and Scotland

The 2009 Geological Society of London Fermor Meeting and field trip will focus on the formation, configuration and break-up of Rodinia. Contributions on Proterozoic palaeogeography and processes ranging from geochronology, geochemistry and palaeomagnetism to geodynamic modelling are welcomed.

REGISTER NOW



6 - 13 SEPTEMBER 2009, EDINBURGH

PROGRAMME OF EVENTS

- 6 September: Ice-breaker Reception
- 8 September: Conference dinner and ceilidh
- 7 September: public lecture by Prof. Ian Dalziel at Dynamic Earth, Edinburgh
- 7 - 9 September: Scientific Presentations
- 9 - 13 September: Conference Field Trip

SESSION THEMES

- Formation, configuration & break up of Rodinia: inter & intra-cratonic correlations
- Beyond Rodinia: evidence for, & reconstruction of, older supercontinents
- Palaeogeography of Supercontinental Transitions
- Supercontinents, superplumes & True Polar Wander
- Neoproterozoic oceans - oxygenation, evolution & oceanography
- Neoproterozoic, Palaeogeography, Gondwana & the Iapetus
- The Neoproterozoic petroleum systems & hydrocarbon potential

CONFERENCE CONVENORS

Jenny Tait, Sergei Pisarevsky,
Colin Graham (Edinburgh University)
Kathryn Goodenough,
Maarten Krabbendam (BGS)
Peter Cawood (University of Western Australia)
Rob Strachan (University of Portsmouth)
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Zheng-Xiang Li (Curtin University)
Alan Collins (Adelaide University)
Ian Dalziel (University of Texas)
David Evans (Yale University)
Jonathan Craig (ENI)

CONTACT PERSON: jenny.tait@ed.ac.uk



CONFERENCE FIELD TRIP 9-13 SEPTEMBER 2009

The conference field trip will visit a variety of locations in the Scottish Highlands, looking at evidence for Grenvillian and younger Proterozoic orogenesis; formation and break up of Rodinia; and volcanosedimentary sequences associated with the opening of the Iapetus. The Highlands are beautiful at any time of year, and September is often a particularly good month to enjoy the scenery and geology (although the Scottish weather can be a bit unpredictable!). Participation will be restricted in terms of numbers, so early registration is advised. Please check the website for updates: www.geos.ed.ac.uk/rodinia2009

For further information about the conference or field trip, please contact:

Alys Hilbourne Tel: 020 7432 0981 Email: alys.hilbourne@geolsoc.org.uk

Or visit our website at www.geolsoc.org.uk/events www.geos.ed.ac.uk/rodinia2009



The
Geological
Society

Keeping it **real**



Adler de Wind talks to the BGS's Katherine Royse about how the Survey turns its data into products relevant to decision-making.*

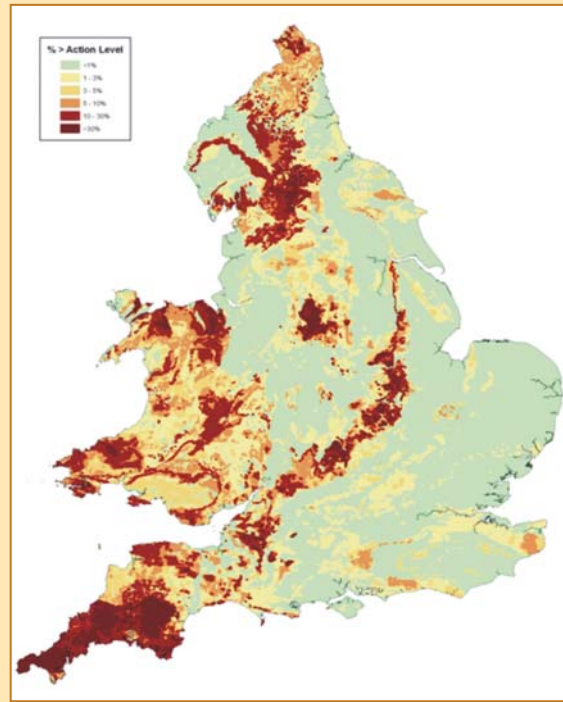
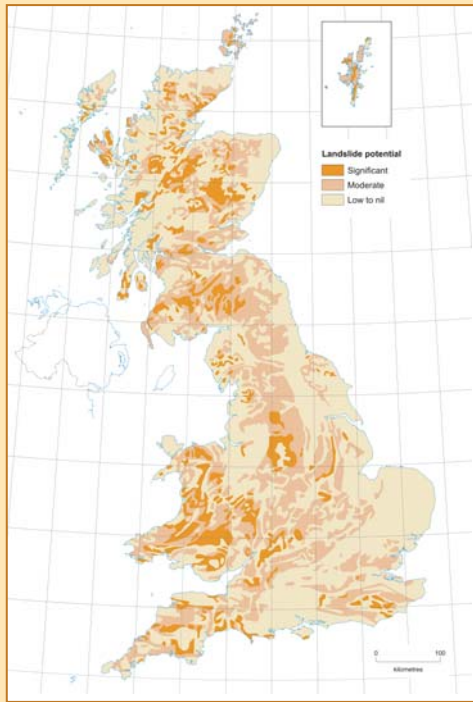
Many of our society's most important decisions - sustaining energy supplies, mineral and water resources, coping with climate change and so on - rest on geological information. Ever since founding the world's first Geological Survey in 1835, Britain has looked to its geoscientists for advice about finding and exploiting natural resources, and on securing a safe living environment for its people. But if sound policy decisions are to be made, those making the decisions need access to all the relevant information, in a form that they can readily use. Geoscientists need to consider how they present their geoscientific information very carefully.

As leader of BGS's "Derived Products" team, the information delivery process is very much Katherine Royse's business. After she contributed (with Diarmad Campbell) a *Geoscientist* 'Soapbox' article on communicating geoscience to government (see *Further reading*) I spoke to her about how Survey scientists are working to achieve their aim of providing geo-information in useful and accessible forms. I wanted to find out more about the fascinating and revealing new datasets that BGS is collating, and learn something of the emerging technological and scientific developments that will influence the way geoscientists in the future will communicate these complex facts to our policy makers. I began by asking her about her team.

The 2001 Nefyn landslide



Landslide potential map for England, Scotland and Wales. Ordnance Survey data are used with the permission of the Controller of Her Majesty's Stationery Office, Crown Copyright. All rights reserved. Licence number 100037272/2008



Radon potential map of England and Wales indicating the highest percentage of homes at or above the radon Action Level in each 1km grid square. © British Geological Survey and Health Protection Agency copyright [2007] Ordnance Survey data are used with the permission of the Controller of Her Majesty's Stationery Office, Crown Copyright. All rights reserved. Licence number 100037272/2008

"BGS's Derived Products team has been set up to develop methods, and create products, that deliver geological and geo-environmental data, interpretations and knowledge for the shallow sub-surface - or the 'zone of human interaction' within the UK - and to do so in a form that is both relevant and accessible. The work we do covers everything from geochemical hazards (like radon and potentially harmful elements such as arsenic and lead), natural hazards (landslides and flooding) to underground asset management (pipeline and concrete corrosion) - and then the impacts of climate change on all of these. The team brings together specialists from a wide variety of sub-disciplines - including geologists, GIS specialists, hydrogeologists, geochemists and geoenvironmental engineers."

"The key questions we try to answer are: what geoscientific information do policy and decision makers need? What data formats should this information be in, to meet these needs? And then, of course, we have to ask why geoscientific data are not fully utilised today - a key issue behind the United Nations' *International Year of Planet Earth* initiative."

"Over the last decade, we have witnessed a major increase in the availability of digital geoscientific data. BGS has invested a lot of resources in producing digital equivalents to its paper archives. One of the first breakthroughs we made - and still probably the most significant - was the launch of the 1:50,000-scale seamless geological map for Great Britain (DiGMap-GB) in 2001. We have also seen parallel improvements in computer-processing capability, especially of standard GIS-packages. These technological advances have made it possible to manipulate, compare, and analyse these vast new national digital datasets in a way that simply was not possible before the desktop PC became a piece of the geologist's standard kit."

Hazards

In order to produce new national datasets that will be relevant to a wide range of users, the Derived Products team has had to consult its stakeholders, and then combine its own geoscientific knowledge with national digital data to produce new national models and datasets that will satisfy those demands."

"Since 2003, the BGS has produced a National Natural Geohazard Model (*GeoSure*), which indicates not only where hazards (like landsliding, shrink-swell, soluble rocks) occur across the UK, but also indicates their likely severity. Using Arc-GIS - a standard package - we have modelled the national distribution and degree of shallow geohazards. We have carried out research into the extent and nature of landslides and karstic features, and done laboratory rock-testing to characterise the shrink-swell characteristics of various rock types in the UK. This helps to identify the factors that cause shallow geohazards. The team then combines the information with the BGS digital map, to give the whole country a *GeoSure* rating for six different shallow geohazards - landslides, shrink-swell, soluble rocks, compressible ground, collapsible deposits, and running sand. That model can then be fine-tuned using the local knowledge of our network of BGS regional geologists, and by the experience of the research teams involved."

"Mining is another area we have tackled. Many minerals other than coal have been mined in the UK, including metalliferous minerals (mainly as cross-cutting veins), and strata-bound resources (like sedimentary iron ores, building materials, evaporite minerals, clays and so on). This assessment, which we first piloted on the Chalk, is managed in a GIS-based system that predicts the likelihood of hazards associated with former or current underground (non-coal) mining activity for any given location in the UK. It can also provide an indication of hazard magnitude. The principal hazard we consider is subsidence and catastrophic collapse of workings; but other hazards, including stability of surface tips, chemical toxicity and mine-waters may also be considered in due course."

Radon

Geology is the most important factor controlling the source and distribution of radon, which according to the latest research (published in the *BMJ* this January) is responsible for around 1100 lung cancer deaths in the UK each year. Although most of those (85%) arise from a combination of radon exposure and smoking, radon is nevertheless implicated in 3.3% of total UK lung cancer deaths - a minority, but by no means an insignificant one."

Radon-222, a naturally occurring radioactive gas with a half life of just four days, derives from the radioactive decay of uranium-238 and is found everywhere – in all rocks and soils. Some radon will enter buildings, and it is here, especially where there is poor ventilation, that dangerously high concentrations can be reached. If the active decay products of radon gas are inhaled, although short-lived, they may deposit on cells in the bronchial epithelium, and so expose sensitive cells to alpha radiation. The evidence from radiobiology suggests that even cells exposed to just one alpha-particle can be appreciably damaged.

To limit the risk to individuals, the government has adopted an “action level” for radon in dwellings of 200 becquerels per cubic metre (Bq/m³). Says Royse: “Research at BGS has demonstrated that variation in radon level is mainly controlled by underlying geology. So our team, in collaboration with the Health Protection Agency, set about developing national radon potential maps. This involved assessing the radon potential of the ground from a geologically and geographically based interpretation of indoor radon measurements. These maps indicate the probability that new or existing houses will exceed the “action level”.

“These maps have important applications, especially in controlling radon through environmental health and building legislation. They are also used to assess radon risk in existing buildings for homebuyers and sellers. However, radon levels often vary widely between adjacent buildings – because of local variations in radon potential in the substrate, and to different construction styles and use. This means that although the map can indicate the relative risk for buildings in a particular locality, it cannot predict the *actual* radon risk for an *individual* building.”

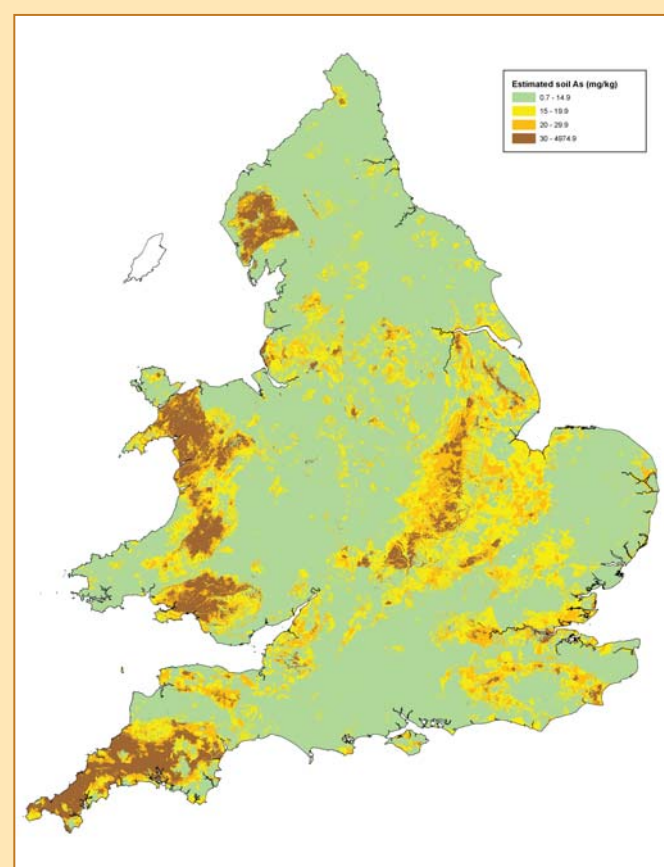
Harmful elements

The radon map leads our conversation naturally to the BGS National Potential Harmful Element (PHE) maps. “The first PHE map to be developed was for arsenic. Arsenic is found widely in rocks soils and drainage sediments, and there are many anthropogenic sources as well. How toxic it is depends on its chemical form. The most common inorganic forms in water, soils and sediment are probably arsenite and arsenate (the former being the more toxic).

“Previous work has demonstrated that in recently glaciated landscapes like ours in the British Isles, parent material (‘PM’) is the main control on soil geochemistry. This is why a significant proportion of soils underlain by ironstones and other such parent materials has naturally elevated arsenic concentrations.

“The *BGS-Estimated Soil PHE* dataset for Great Britain is derived from national, high-resolution geochemical data (from BGS Geochemical Baseline Survey of the Environment (G-BASE) and Imperial College Wolfson surveys) combined with PM maps derived from the BGS DiGMapGB-50 digital geological data. Our team has developed a new method for estimating soil PHE concentrations, by combining a series of geochemical datasets for soil and stream sediment with differing geographical extents using PM polygons as mapping units. Known statistical relationships exist between regional soil and stream sediment geochemistry data, and we use these to estimate soil PHE concentrations based on stream sediment data, in areas where soil data are not yet available. The *BGS-Estimated Urban Soil PHE* data set provides more detailed information for 20 urban centres.”

Opencast mine at Parys Mountain, Anglesey



Estimated soil arsenic in England and Wales. Ordnance survey data are used with the permission of the Controller of Her Majesty's Stationery Office, Crown Copyright. All rights reserved. Licence number 100037272/2008



Groundwater flooding

Mention of streams brings me to ask about flooding, and especially one uniquely geological form of it. “Groundwater flooding is increasingly being recognised as a hazard” says Royse. “In response, BGS has recently produced its first national hazard susceptibility map relating to it.”

“The datasets have been produced using a ‘rule-based’ approach, in Arc-GIS software. The first step applies ‘rules’ to identify – based on geological considerations – areas where groundwater flooding could *not* occur – areas where non-aquifers are present at surface. For all areas that *are* geologically susceptible, a second suite of rules is used to produce a national groundwater level surface – using data taken from published BGS groundwater level contours, levels recorded in the BGS ‘WellMaster’ database, and modelled groundwater levels derived from river base levels.

“A further suite of rules we have developed modifies the groundwater level surface so that it represents conditions of groundwater flooding. Finally, this modified groundwater surface is compared with a digital terrain model (DTM) of the ground-surface elevation, and a final set of rules zones the modelled depth of the groundwater surface based on the degree of susceptibility to groundwater flooding. Once GW flooding data are available they can be used in the context of risk or asset management planning.”

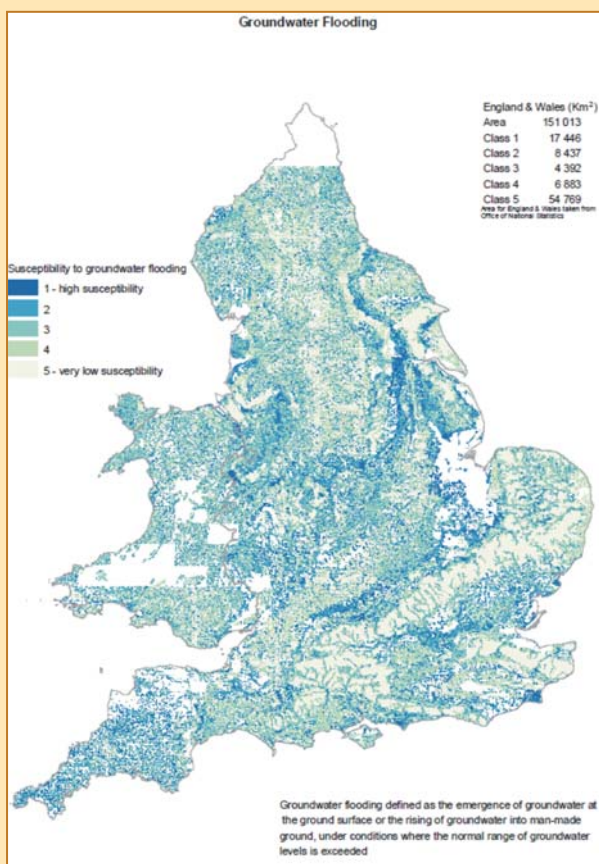
Human interaction

Many processes can affect the zone of ‘human interaction’, across which a wide range of physical, chemical, biological and anthropogenic processes operate. Understanding these processes presents a major challenge to scientists studying the impacts of environmental change. Climate change will have significant consequences for UK planning policy and major development initiatives – developments on floodplains, or the effect of climate change on natural hazards.

Where changes alter the frequency and magnitude of storms, an understanding of process interaction will enable us to predict, for example, the transport and fate of contaminants, and any consequent impact on human health. So the Derived Products team is also developing new datasets – and new ways of using digital geoscience data – to help answer some of these questions. So I asked Katherine about how her team’s work might impact directly on health issues, through their *Geology and Health* project.

“The link between geology and human health issues in the UK is poorly understood” Royse told me. “This project will therefore link geoscientists with environmental health specialists to explore ways we can improve this situation. It will do it by collating geological information that may have an impact on human health, drawing on data captured as part of the G-BASE, and data generated as part of research projects investigating the “bio-accessibility” of geology-based hazards. It will then investigate the potential for developing hazard ratings for the effect of geological factors on human health – ratings that are specifically designed for use by environmental health specialists.

Another area in which Royse’s team is involved is urban geology, especially the 3D-modelling of hazards in this most complex environment. “Geological modelling in 3D can give a readily understood, detailed picture of subsurface conditions. Rapid developments in



Potential effects of Groundwater flooding on Primary Roads and Rail networks in England and Wales. Ordnance Survey data are used with the permission of the Controller of Her Majesty’s Stationery Office, Crown Copyright. All rights reserved. Licence number 100037272/2008

modelling software have provided challenging and exciting possibilities for constructing high resolution geological models of the shallow subsurface.

Adding in hydrogeological and engineering data allows full value to be gained from the 3D geological model - something that has already been achieved in the Thames Gateway. Work is now underway to produce high resolution 3D natural geohazard data, with a view to developing geohazard susceptibility ratings within this 3D environment. Pilots have already been produced for superficial deposits and associated running sand hazards in part of the Clyde Gateway, Scotland.

Managing the underground environment is also a big feature of the team's work. The cost to the national economy of corroding underground infrastructure was originally highlighted by the Hoar Report some 30 years ago, at about 3.5% of Gross National Product. Says Royse: "Although new materials have reduced this toll, it is still a significant concern to industry. Corrosion is a major cause of pipeline leakage; and a pipeline's susceptibility to corrosion and degradation is determined by several environmental factors, as well as by how old it is and what it's made of. We all know that the UK has a huge network of ageing sewage, water, gas and electricity pipelines. Maintaining them presents an increasing financial burden, and we must be able to direct resources towards priority regions where underground structures have been identified as most at risk.

"The 'Underground Asset Management tool', under development now, will assist in the maintenance of pipelines, ducts, cables, building

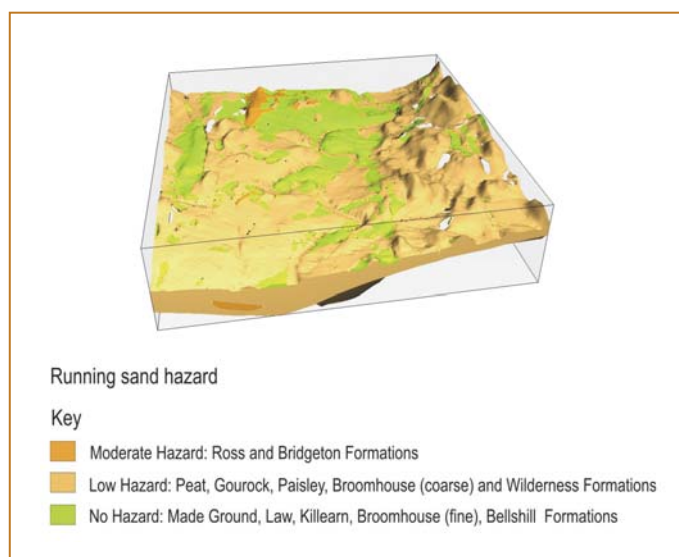


Diagram showing what a 3D Geohazard model of Running Sand looks like for superficial deposits in Clyde Gateway, Scotland

foundations, tunnels and any other ferrous materials at risk from attack. Information is provided to aid initial ground investigations and structural design; it also produces a retrospective assessment, and helps managers to prioritise their work on existing structures and pipelines accurately. Eventually the tool will consist of a set of GIS layers for the whole of Great Britain, which, when combined, will provide a corrosivity value, based on information on sulphate and chlorate vulnerability, mineral corrosivity,

Pipeline construction in England



bedrock and drift geology, shrink-swell, permeability, groundwater levels, and electrical resistivity.”

In future, the hazard susceptibility map idea will be taken to the next stage, by investigating (in collaboration with universities, research institutes and industry partners) various ways of recording national vulnerability to geological hazards. According to Royse, the first phase will look at work carried out by other research councils and academic institutions.

“Eventually we will be able to produce maps of the potential for each geological hazard, with a forward look to the next 10 to 50 years, for the whole of the UK” she says. “Work will also focus on the relationship between climate change and hazard susceptibility.”

LWEC

Industrialists, regulators and decision makers need geo-environmental information to solve the problems created by a growing population, depletion in natural resources, and in response to changes in climate and land-use. For this to happen, BGS will need to provide geoscience data and information that will enable them to understand, as never before, how the Earth system works, how human development is changing it, and how to predict and manage the impacts on the planet, its ecosystems and people.

As Royse says: “Delivering relevant geoscientific knowledge of our dynamic Earth in an accessible way is central to the new BGS Strategy, unveiled at the Royal Society earlier this year. By doing what we do, it is our intention in the Derived Products team to help our wider society make the right choices, in order that it can live with environmental change.”

Further reading

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Miles JCH and Appleton JD. 2005. Mapping variation in radon potential both between and within geological units. *Journal of Radiological Protection*, 25, 257-276.

Royse, K & Campbell, D 2009. Geoscience for wonks. *Soapbox, Geoscientist* 19.1, p3.

Walsby, J C 2008. GeoSure; a bridge between geology and decision-makers. In: Liverman, D. G. E., Pereira, C. & Marker, B. (eds) *Communicating Environmental Geoscience. Geological Society, London, Special Publications*, 305, 81-87.

* Team leader, BGS Derived Products, krro@bgs.ac.uk

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Society Business

Election results

A total of 785 valid votes were cast in the electronic and postal consultative ballot for the President-designate and the result was:

Dr Bryan Lovell	439 (55.9%)
Ms Tricia Henton	346 (44.1%)

Dr Bryan Lovell will go forward to the AGM for election as President-designate.

A total of 802 valid votes were cast for the seven vacancies on Council and the results are as follows:

Malcolm Brown	502 (62.6%)
Susan Marriott	479 (59.7%)
Stuart Monro	473 (59%)
Nick Walton	431 (53.7%)
Richard Hughes	403 (50.2%)
David Vaughan	382 (47.6%)
Paul Maliphant	352 (43.9%)
Clive Oppenheimer	330 (41.1%)
Jonathan Bull	317 (39.5%)
Bernie Vining	314 (39.2%)
Andrew Cunningham Scott	304 (37.9%)

The seven candidates receiving the most votes (above the line) will go forward to the AGM for election as Council members.

Election news

The following names are put forward for election to Fellowship at the OGM on 17 June 2009

ANDJELKOVIC Vukan; ATKINS Stephen David; BARTLETT Tasmin; BOYLE Jonathan James; BRIERE DE L'ISLE Benjamin Jean Charles; BROADBENT Adam James; BROWN Aimee; BUCKLEY Christopher James; BUKHARI Syed Waqar; CLIFTON Abigail Joy; COE Nancy Isabel Jane; CONTRERAS MENDEZ Jorham Alberto; COPESTAKE Philip; CRAM Francis Michael; DAVY Rialynn; DVORAK Ilona Barbara; EDWARDS Paul William; FOOTE Alexander Luke; FRY Daniel Peter; HAYES Stuart; HILL Jessica Ruth; HODGSON James William; HONELL Alice; HOPKINS Neil Richard; ILLINGWORTH David Richard; KEFFORD Natasha; KENNY Peter Thomas; KILSBY Christopher; KNIGHT Alison; KNISPEL Ricarda; LANE Mike; LAVERY Richard Christopher; LAWRIE Michelle; McKENDRY Graeme; MEAKER Georgina Emma; MONTENARI Michael; NASSER Adeel; NEWBURY Sarah Louise; O'DRISCOLL Brian; O'NEILL David; ORIUWA Victoria Obiagew; PARKER Simon; PARKIN Samuel Te Kaha; PRATT Rachel Ellen; SAMPSON Jennifer Elizabeth; SHANNON Catherine Elizabeth; SHEPPARD Neil Michael; SILCOCA Simone Yvonne; SMITHSON Giles Thomas; STOCKDALE Luke Mark; TEBBETT Matthew Christopher James; THEOPHILUS Samuel; THOMPSON Lisa Jane; TODD James Joseph; WADIA Adil Minoo; WARRIER Timothy John; WEBB Matthew David; WEBSTER David Lawrence Rollit; WILLIAMS Ian; WOODS Graham; WORRELL Katie Victoria; WORSLEY Daniel Alun;

President's Day 2009 – 3 June

President's Day will begin with the Annual General Meeting at 11.00 am followed by a buffet lunch with the award winners (ticket only – £25.00 per head). As in previous years, the recipients of the major medals have been invited to give a short talk on their subject, and the Awards Ceremony will be followed by presentations by the Wollaston, Lyell, Murchison and William Smith medallists.

The timetable for President's Day and the agenda for the AGM are below. Apart from lunch, no tickets are required and you may attend for all or part of the day's events. To obtain luncheon tickets please send cheques (made payable to the Geological Society) to Stephanie Culver at Burlington House or email Stephanie.culver@geolsoc.org.uk.

Timetable

11.00	Annual General Meeting
12.30	Lunch with the Award winners
14.00	Awards Ceremony
15.30	Talks by Lyell, Murchison and William Smith medallists*
16.45	Tea
17.15	Talk by Wollaston Medallist*
17.45	Presidential Address
18.30-20.00	Drinks reception

AGM Agenda

- Apologies
- Minutes of the Annual General Meeting held on 4 June 2008
- Appointment of Scrutineers for the ballots for Council and Officers
- Ballot for Council
- Annual Report and Accounts for 2008
- President's Report
- Secretaries' Report
- Treasurer's Report
- Comments from Fellows
- Formal acceptance of the Annual Report and Accounts for 2008 and approval of the Budget for 2009
- Fellowship subscriptions for 2010
- Deaths
- Report of Scrutineers on the Ballot for Council
- Ballot for Officers
- Appointment of Auditors
- Report of Scrutineers on the ballot for Officers
- Election of new Fellows
- Any other business
- Provisional date of next Annual General Meeting

*For titles of talks, please check the website.

Chartership news

FUTURE MEETING DATES

OGMs: 17 June 2009; 23 September 2009; 25 November 2009; 28 January 2010; 21 April 2010

Council: 17 June 2009; 23 September 2009; 25 November 2009; 27/28 January 2010; (residential); 21 April 2010

Annual subscriptions

2010

Council agreed to the following subscription rates for 2010 at its meeting on 22 April 2009. These will go forward to Fellows to agree at the AGM.

	2009 £	2010 £
Junior Candidate Fellow	-	10.00
Candidate Fellow	31.00	15.00
One-off payment for undergraduate course	67.00	40.00
22-27	62.50	62.50
28-33	114.00	114.00
34-59	173.00	173.00
34-59 (Overseas)	133.00	133.00
60-69	87.00	87.00
70+	61.00	61.00
Full time postgraduate student	49.00	49.00
Supplement (to payer) for Joint Fellowship	50.00	50.00

Council are recommending that, in the current economic climate, the majority of subscription rates are held steady for 2010. The Society is looking to achieve greatest economy in terms of back office processes and in this you, the Fellowship, can help particularly by paying your subscription by direct debit which significantly reduces the load on the Fellowship and Accounts offices.

You will see that the rates for Candidate Fellows and the one-off payment for undergraduate courses have been reduced. Council is keen to encourage more undergraduates and those studying geology at school to join the Society, and has introduced a new grade of Junior Candidate Fellow. Young geologists are the future of the Society and Fellows are asked to encourage young people to join the Society.

Journals

Fellows will recall from January *Geoscientist* that the Society is moving towards online access to journals. This is very much in keeping with developments in journal publishing and enables the Society to control the significant costs of printing and posting hard copies. In the subscription call, which will be sent in October 2009, Fellows who wish to continue to receive their journal in hard copy will be asked to pay a supplement of £10 with their subscription fee for 2010.

Practice makes perfect

David Manning (Professional Secretary) has some cheering news. Getting a degree is only the beginning.

It is often the case that those of us who helped you learn while you were at university didn't quite get round to telling you about all of the little surprises waiting for you when you left our care. So, as you enter the exciting life of the professional geologist you will discover that finishing your degree was only the start of your learning experience. Your employer will want you to learn all sorts of new skills in order to do what is required for you to draw your monthly salary, and most employers expect you to pick up those skills pretty quickly. That's where practice comes in, and with it the introduction of a title – Practising Geologist.

The title has not just been "created" by the Geological Society, but is used by some employers, with the Society's blessing, to describe Fellows who are working towards Chartered status. In a growing number of cases, employers have developed training schemes that lead to submission for Chartered status, and these schemes can be endorsed by the Society in recognition of their value in ensuring that candidates for Chartership are well prepared.

One employer that positively promotes professional development is the Environment Agency. The Environment Agency's Mike Harget writes: "The Agency supports the professionalism of its workforce, paying for one membership per employee. The Society has endorsed our Technical Development Framework and this demonstrates our proactive approach to dealing with the skills shortages that we face. It reflects the professionalism of our officers, as it will act as a stepping stone towards Chartered Status. We are also able to award the title "Practising Geologist", again endorsed by the

Geological Society, to officers who meet a prescribed level of capability. We have now awarded six officers this title." One of these, Paula Awty (picture), is shown receiving her award. "This approach is being rolled out across all our operational teams" Harget says.



Training schemes of the type used by the Environment Agency extend our profession's ability to formalise the recognition of competence within a chosen field. This scheme has prescribed levels of capability that map onto the Agency's specific requirements and standards recognised by the Society – enabling individuals to demonstrate step-by-step progression to levels appropriate for Chartership. The Society is interested in endorsing more schemes of this type, as structured post-graduation professional development appears to be very effective in helping to build the capacity of the geological workforce. ☞

- To find out more or discuss the possibility of having your company's training scheme endorsed, please contact Bill Gaskarth (chartership@geolsoc.org.uk). But don't all rush at once – if we are inundated with requests, we will have to ration the process!




All change

Chartership Officer Bill Gaskarth appeals for help as the new system of Chartership application has knock-on effects...

We are now in the changeover period between old and new regulations for dealing with Chartered Geologist applications. The end of the old regulations acted as a spur for many, and 65 applications are currently in the system; from candidates working as far apart as Chile, the Yukon and Hong Kong. Most, if successful, will have been elected at the April 22 Council meeting. Under the new regulations, we have so far dealt with 12 applications – at the first of the planned interview days (April 15, Burlington House).

To process this large volume of applications we have called upon the services of 141 scrutineers, mostly from our old list. We are immensely grateful for all their hard work and thank them wholeheartedly. What this demonstrates, though, is the real need to have a large body of scrutineers on whom we can call. Scrutineers may not be called to serve in a given round, simply because the applicant pool in their area has not produced a candidate; but we need to be prepared.

Applications coming in under the new regs come mostly from geologists who are only just becoming eligible to apply (though there is a sprinkling of more experienced candidates too), and this younger demographic places greater burdens upon the mentoring system. In larger companies, mentoring is commonly done 'in house'. But for the rest, we need experienced CGeols who can offer their services through their Regional Group. So, I hope there may be scrutineers out there from the "old" list who, although not wishing to continue as scrutineers, might be willing to help as advisers/mentors. If so, please offer your services through your Regional Group Chair.

Henceforward, interviews will be concentrated at centres across the UK. As a consequence, we also need scrutineers (covering the various specialisms) in all parts of the country. We would like to use local scrutineers wherever possible, if only because it saves time and money. Our next interview day will be on 15 July in Edinburgh. We do not yet know how many candidates will apply for this date, nor do we have any idea of their likely specialisms – so we need to be prepared to field a broad range of scrutineers. 

- This is therefore an appeal to experienced CGeols in Scotland to consider joining the list of scrutineers for the new regulations! To join the process, contact Bill Gaskarth, Chartership Officer at chartership@geolsoc.org.uk



Shell London Lecture Series 2009

Living coral reefs are teetering on the edge of survival (Darwin lecture)

Speaker: Rachel Wood (University of Edinburgh)

Wednesday 10 June 2009

Please note that there will also be a *matinée* performance on the same day:

Matinée: Tea and coffee 14.30; Lecture 15.00 – 16.00.


Evening: Tea and coffee 17.30; Lecture 18.00 – 19.00

High levels of carbon dioxide in the atmosphere produce a lethal combination of warmer and more acid seawater, and widespread overfishing, pollution, and coastal development

further undermines the health of reefs. This has the potential to destroy the livelihoods of hundreds of millions of people around the world.

Reefs are the centres of some of the most concentrated biodiversity on Earth, and have been throughout their 3.5 billion-year history. Yet reef ecosystems have undergone many phases of diversification and contraction throughout this time, constantly re-inventing new ways to construct reefs in response to changing climate, seawater chemistry, and the rise of new groups of competitors and predators. But the dynamics of past reef evolution and their response to catastrophic events such as mass extinctions provides scientists with case histories which help predict how reefs may respond to current threats and, more importantly, how best to avert them.

About the speaker

Rachel Wood has been a Lecturer at the University of Edinburgh since 2006. She has a long-standing interest in the history of reefs and their evolution, which has involved extensive fieldwork in Asia, Australia and North America. She holds a BSc from Bristol University and a PhD from the Open University and is the author of *Reef Evolution* (OUP). She held a series of postdoctoral fellowships at Cambridge University, and from 2001–06 worked as a Principal Research Scientist at Schlumberger Cambridge Research. 

Sponsored by Shell



Further Information

For further information on the Shell London Lecture series and programme for 2009 please visit our website www.geolsoc.org.uk/shelllondonlectures09

Entry to each lecture is by ticket only. To obtain a ticket please contact Alys Hilbourne. Please note that due to the popularity of this lecture series, tickets are allocated on a monthly basis and we cannot guarantee that you will get tickets when they are requested.

The Geological Society, Burlington House, Piccadilly, London W1J 0BG
Tel: +44 (0) 20 7432 0981; Email: alys.hilbourne@geolsoc.org.uk

All past lectures can be viewed online at www.geolsoc.org.uk/londonlectures



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Don't forget that the Geological Society Library can usually supply photocopies more cheaply than other providers e.g. British Library & the publishers. Remember - our journals have been bought with your money, and are here to be used!

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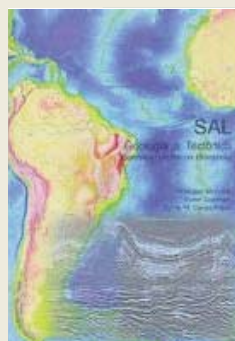
We use Royal Mail's Special Delivery to send all loans to borrowers, in order to guarantee next-day delivery and more particularly, so that the packages are insured in case of loss. Many books are now very expensive and if lost are difficult to replace. Please will borrowers ensure that all loans are returned to the Library by this means, or by a reputable courier who can guarantee the same protection.

WiFi access

WiFi (wireless fidelity) access to the Internet is now available to all readers. If you are visiting the Library and have a WiFi-enabled laptop you can ask the staff for a password to give you free Internet access.

Pick of the crop

To see what other books, maps & serials the Library has acquired, why not register to receive a copy of *Recent additions to the Geological Society Library*, either by post or email? Contact Wendy Cawthorne on wendy.cawthorne@geolsoc.org.uk



Sal: geologia e tectonica: exemplos nas bacias Brasileiras/Webster Mohriak, Peter Szatmari & Sylvia M. Couto Anjos (eds.)
 Sao Paulo: Beca, 2008
 ISBN 978-85-87256-49-2.

Donation

This book has recently been donated to the Library by the editor, Webster Mohriak and

Petrobras. A comprehensive and well presented publication, with many coloured illustrations and maps, it will be welcomed by those interested in Brazilian petroleum geology. An English translation is being considered.

Solent Regional Group launched

The Society has launched a new regional group, writes Amanda Lane

From the dinosaur-trampled Isle of Wight and the stunning Jurassic coast to the west to the actively changing coastline throughout, the Solent is a region with plenty of opportunity to sample both classic south coast geology and current coastal processes.

We have established the Solent Regional Group to enable both professional and amateur geologists in this area to have a focus for fieldtrips and lectures to explore the local geology. We are delighted that the formation of the group has been supported by the Geological Society and thank those on the Council and in the adjacent groups who have contributed in helping us to get up and running.

Our committee is currently a mix of industry and academia, keen to provide a combination of lectures and fieldtrips with a wide appeal, reflecting the local varied geology as well as some more classic subjects, such as volcanoes, and also environmentally topical ones, such as carbon



capture. We are keen for feedback and ideas for future events, plus of course anyone who would like to volunteer to be on the committee.

Those of you in the SO and PO postcodes (plus in certain adjacent postcodes) will have heard from us by now with our programme for 2009. We launched our activities at the start of April with a fascinating field trip in search of the dinosaurs of the Isle of Wight, including a wine tasting session of wines grown on Cretaceous soils!

Our section on the regional groups page of the Geological Society website is up and running so please see there for details of our activities. If you wish to contact us then please do not hesitate to do so: Amanda Lane (Chair) (amanda.lane@gifford.uk.com) or Wendy Furgusson (Secretary) (wendy.furgusson@gifford.uk.com), both on 023 8081 7500.

IGCP 2010

The International Geoscience Programme (IGCP) is calling for project proposals to be launched in 2010, writes Edward Derbyshire.

The IGCP is a joint venture of the International Union of Geological Sciences (IUGS) and the Division of Ecology and Earth Sciences of UNESCO. The Programme is administered by the IGCP Secretariat at UNESCO headquarters in Paris.

The IGCP aims to facilitate research collaboration on geological problems of societal concern, particularly between individuals and groups from both industrialised and developing countries. From the earliest years, British Earth scientists established an enviable track record within the IGCP, providing both leadership and substantial contributions to the success of this unique programme. They have been instrumental in



transforming several of these short-term projects into long-term contributions such as the Global Geochemical Database and the International Landslide Consortium.

Full details of the Programme, including project proposal guidelines, can be found on the Society's website and at www.unesco.org/science/Earth.

Projects may run for up to five years, the launch money provided being used to bring together like-minded specialists to discuss their research in workshops, conferences and the field.

Project proposals of regional to global scale to be launched in 2010 are now called for.

How to apply

All applications require a letter of endorsement by the IGCP National Committee (the External Relations Committee of the Society). The deadline for receipt of completed and endorsed applications in Paris is 15 October 2009. New project proposals should be sent, in the first instance, to sarah.day@geolsoc.org.uk at the Society no later than 15 September 2009.

Join the eScience revolution!

Proceedings of a discussion meeting *The environmental eScience revolution* organised by N S Badcock, E A Garnett, H C J Godfray and R J Gurney

Environmental science is undergoing a revolution. New technologies are enabling scientists to participate in distributed global collaborations enabled by the internet. This is changing the way that researchers are accessing computing power, scientific data repositories and experimental facilities. This new way of working is referred to as *eScience*.

The *eScience* revolution in the environmental sciences is happening at a time when the field is facing huge challenges of the highest possible societal relevance. Climate change and other forms of global change require an understanding of the Earth system at levels not previously attempted, while the urgent need for resource and ecological sustainability has radically altered the agendas of subjects as disparate as power-supply engineering and conservation ecology. The papers in this issue outline some of the advances in environmental *eScience* that have revolutionised the way environmental science is carried out.

This issue is completely free to access via EXiS Open Choice supported by NERC. Go to <http://rsta.royalsocietypublishing.org/site/issues/eScience.xhtml>



The Geological Society Club

The successor to the body that gave birth to the Society in 1807 meets monthly (except over the field season!) at 6.30 for 7.00 in the Athenaeum Club, Pall Mall. Once a year there is also a special dinner at Burlington House. New diners are always welcome, especially from among younger Fellows. Dinner costs £45 for a four-course meal, including coffee and port. The Founders' Dinner has its own price structure. There is a cash bar for the purchase of aperitifs and wine.

Please note – you should keep checking dates here as they may be subject to change without notice.

2009: 20 May. (There will be a close meeting in June at which future dates will be agreed. These new dates will be advertised later in the summer.)






Any Fellow of the Society wishing to dine should contact Dr Andy Fleet, Secretary to the Geological Society Dining Club, Department of Mineralogy, The Natural History Museum, Cromwell Road, London SW7 5BD. Email: a.fleet@nhm.ac.uk – from whom further details may be obtained. DR



Continuing Professional Development (CPD) Courses

- **6 May - Symmons Madge Associates** – *Interpreting Soil Test Results* Cardiff E-Mail: admin@symmonsmdage.co.uk
Website: <http://www.symmonsmdage.co.uk>
- **12-14 May - ESI International** – *Practical groundwater flow and contaminant transport modelling* - A three day course covering all aspects of model development, calibration and use. Also 27-29 October 2009. E: CoursesUK-ESI@esinternational.com
W: www.esinternational.com/esi-courses.html
- **13-16 May - Gemcom Software Europe Ltd** – *Gemcoms Gems Foundation Workshop* Coalville, Leics.
 E-mail: sales-eu@gemcomsoftware.com **Website:** <http://www.gemcomsoftware.com>
- **19-21 May - ESI International** – *FEFLOW - an introduction to groundwater modelling using the simulation system FEFLOW*.
 E: CoursesUK-ESI@esinternational.com **W:** www.esinternational.com/esi-courses.html
- 29 May - Fugro Engineering Services** – *Cone Penetration Testing (CPT)* – **Contact** Steve Poulter T: 0870 4021423 or E: s.poulter@fes.co.uk giving number of attendees and contact details. **W:** www.fes.co.uk/courses/. Also 26 June,
- **4 June - Symmons Madge Associates** – *Site Investigation* – Belfast Email: admin@symmonsmdage.co.uk
Website: <http://www.symmonsmdage.co.uk>
- **9 June - ESI Ltd** – *Detailed quantitative risk assessment using RISC* - A hands-on introduction to this internationally renowned tool for fate and transport modelling and human health risk assessments for contaminated sites. T: 07143 276100 E: CoursesUK-ESI@esinternational.com
- **7-9 July - Gemcom Software Europe Ltd** – *Gemcoms Gems Foundation Workshop* Coalville, Leics.
 E-mail: sales-eu@gemcomsoftware.com **Website:** <http://www.gemcomsoftware.com>
- **7 July - Symmons Madge Associates** – *Site investigation* Dublin E-Mail: admin@symmonsmdage.co.uk
Website: <http://www.symmonsmdage.co.uk>
- **14 July - Symmons Madge Associates** – *Interpreting Soil Test Results* Bristol E-Mail: admin@symmonsmdage.co.uk
Website: <http://www.symmonsmdage.co.uk>
- **17 September - Symmons Madge Associates** – *Interpreting Soil Test Results* Glasgow E-Mail: admin@symmonsmdage.co.uk
Website: <http://www.symmonsmdage.co.uk>
- **8-10 December - Gemcom Software Europe Ltd** – *Gemcom Gems Foundation Workshop* Coalville, Leics.
 E: sales-eu@gemcomsoftware.com **W:** www.gemcomsoftware.com/
- A Professional School in Ground Engineering* at the Building Research Establishment (Watford), First Steps Ltd. For reservations and information contact Christine Butenuth, info@firststeps.uk.com, 0207 589 7394, www.firststeps.eu.com.
- Developing Geological Knowledge for CGeol Status*, First Steps Ltd. For reservations and information contact Christine Butenuth, info@firststeps.uk.com, 0207 589 7394, www.firststeps.eu.com.
- Managing Performance through People*, The Open University. Online Course. Contact David Robinson, d.t.robinson@open.ac.uk, 0870 900 9577, www.open.ac.uk.
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- For endorsed courses run buy ESI International Ltd, visit www.esinternational.com or contact CoursesUK-ESI@esinternational.com
- For endorsed courses run buy FUGRO Engineering Services, visit www.fes.co.uk/courses or contact s.poulter@fes.co.uk

MAY 2009

- South West Regional** • **12 May** – *Fieldtrip to the Cliff Stabilisation Works at Rock Walk Works*. Places on this trip are strictly limited, and need to be booked in advance. Please book by emailing swrg@geolsoc.org.uk with your request and contact details.
- Western Regional** • **12 May** – *UK seismic hazard* – Roger Musson (BGS) Refreshments 6 pm. Lecture commences 6.30 pm. Venue: S H Reynolds Lecture Theatre, Wills Memorial Building, University of Bristol. **Contact:** Charlotte Woodhall-Jones E: Charlotte.Woodhall-Jones@Burohappold.com
-  • **13 May** – *Tracking time of the Earth and solar system*. Randy Parrish (BGS). Shell London Lecture. Performances 3pm and 6pm. **Contact:** Alys Hilbourne T: 020 7432 0981 F: 020 7494 0579 E: alys.hilbourne@geolsoc.org.uk
-  • **15 May** – *Natural Resources Reporting Workshop* – Venue: Dublin Castle, Ireland. International reporting standards for mineral resources and mineral reserves. **Contact:** Susan Pyne - T: +353 1 7162085 E: admin@igi.ie
-  • **20-21 May** – *Groundwater Recharge Assessment* - Recent progress in measuring and understanding recharge processes in a range of hydrogeological environments under current and future climatic conditions. **Contact:** Dr Daren Goody T: 01491 692328 E: dcg@bgs.ac.uk
-  • **20 May** – *Geotechnics in the Quarrying Industry* – Case studies of the influence of geotechnics on quarrying; forum for discussion and sharing of practice. Geotechnics underlying the Quarries Regulations 1999, 10 years on. Venue: Burlington House - **Contact:** Patrick Cox E: patrick.cox@capita.co.uk
-  • **21 May** – *Lyell Meeting: Late Palaeozoic terrestrial habitats and biotas: the effect of changing climates*. Carboniferous and Permian periods were critical in Earth history, as terrestrial biotas first had a significant impact on global climate. **Contact:** Alys Hilbourne E: alys.hilbourne@geolsoc.org.uk
-  • **22-29 May** – *Janet Watson Meeting: Evolution of the Continental Crust*. Two-day meeting to stimulate broad-based discussion of continental crustal evolution. Venue: Burlington House, & NW Scotland (field trip). **Contact:** Georgina Worrall. T: 020 7432 0983 F: 020 7494 0579 E: georgina.worrall@geolsoc.org.uk
- Western Regional** • **30 May** – *A Fieldtrip in the Eastern Mendips* - The trip will be led by Dr Andy Farrant, the author of the BGS field guide to the Mendips, who will share his intimate knowledge of the area. **Contact:** David Birks E: birksd@pbworld.com

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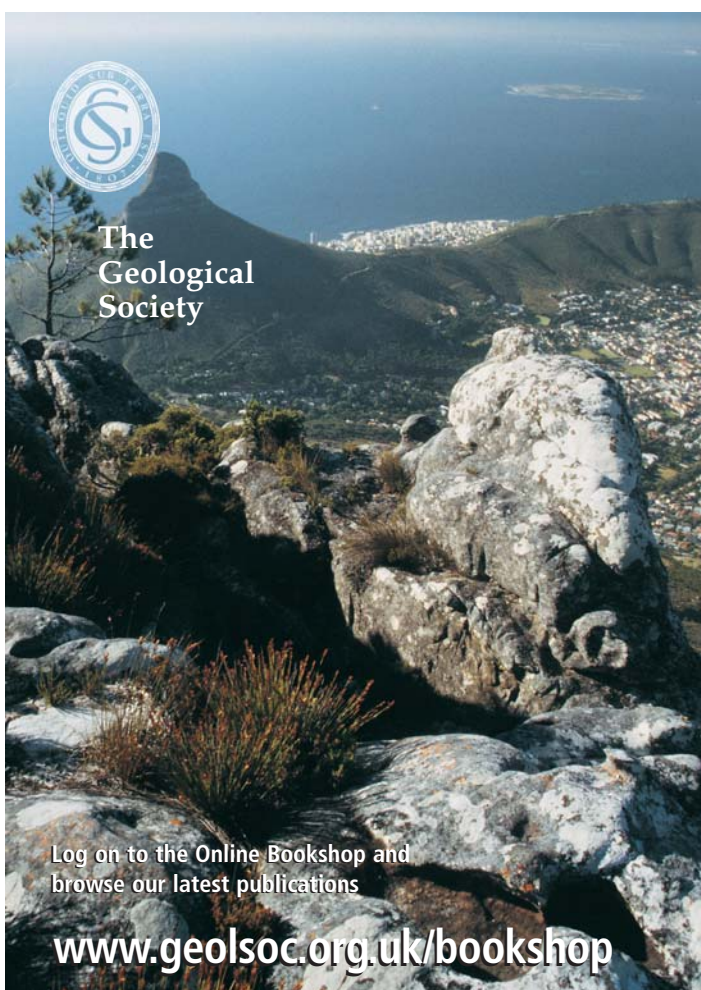
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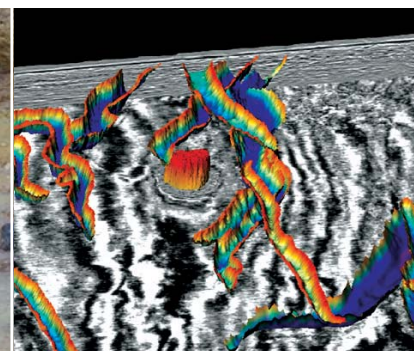
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Glaciogenic Reservoirs and Hydrocarbon Systems

1 - 2 December 2009

The Geological Society, Burlington House, Piccadilly, London



Convenors:

Mads Huuse
(University of
Manchester)

Jonathan Redfern
(University of
Manchester)

Bryan Ritchie
(BP)

Jonathan Craig
(Eni, Milan)

Keynote Speakers:

Jonathan Craig
(ENI)

Dan Le Heron
(Royal Holloway)

Chris Fielding
(University Nebraska)

John Melvin
(Saudi Aramco)

ABSTRACT DEADLINE 30TH JUNE 2009

Recent interest in glaciogenic successions has been fuelled by hydrocarbon discoveries in ancient glaciogenic reservoirs in North Africa, the Middle East and South America. Pleistocene glacial deposits are mainly renowned for their important groundwater resources but also contain hydrocarbons in both N America and NW Europe. Despite their economic importance as reservoirs and associated seal and potential hydrocarbon source rocks, exploration of these systems is extremely challenging as glaciogenic sedimentary environments are complex and still poorly understood compared to most other sedimentary environments. A better understanding of glaciogenic processes and products may be achieved by comparing ancient glaciogenic sequences to better understood modern analogues and recent glacial environments.

This international conference brings together, for the first time, leading researchers from industry, government and academic institutions involved in the research of glaciogenic sedimentary environments and their resource significance, to facilitate the exchange of knowledge across disciplines.

We encourage submissions within the following topics:

- 1 - Global context of glaciations and glaciogenic hydrocarbon systems
- 2 - Modern glacial environments
- 3 - Outcrop and subsurface analogues – Ancient and Pleistocene-Recent
- 4 - Characterising cold climate hydrocarbon systems (reservoir, source and seal):
Geophysics, Boreholes, Outcrop studies
- 5 - Exploration and production case studies of hydrocarbon and groundwater resources in glaciogenic systems

For further information about this conference, please contact:

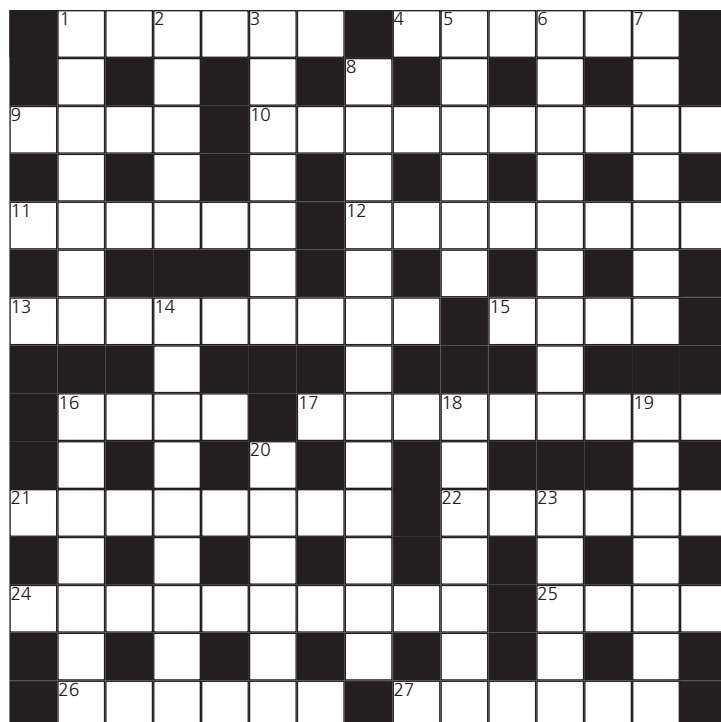
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Crossword no. 123 set by Platypus



Solutions February:

Across: 1 Sphene 5 Conodont 9 Vertebrate 10 Bogs 11 Anhedra 12 Lignin 13 Yet 15 Sisyphus 18 Mammalia 19 Lees 21 Tumult 23 Water Gap 25 Oahu 26 Strabismus 27 Tecumseh 28 Eddies

Down: 2 Paean 3 Extremism 4 Embark 5 Charles Lapworth 6 Needless 7 Debug 8 Negritude 14 Ejaculate 16 Polarised 17 Elitists 20 Stable 22 Uluru 24 Acute

Across

- 1 Daughter of Uranos and Gaia who lay between Gondwana and Laurasia in the pre-Neogene (6)
- 4 Belshazzar's Feast on the Naze? Sir William might be better off up the coast at Snape (6)
- 9 To the world (4)
- 10 Above HWMOT (10)
- 11 Mid pacific home of the sodic trachybasalt (6)
- 12 Three-zoned lenses for the presbyope in your life. (8)
- 13 Came before (9)
- 15 Sheet silicate (4)
- 16 Millstone material (4)
- 17 The property of lacking correspondence of parts across axis, plane or line (9)
- 21 They make the heart grow fonder (8)
- 22 Metamorphosed limestone (6)
- 24 SiAlc crustal units (10)
- 25 Cooking spice obtained from dried covering of the nutmeg fruit seed. No relation to the offensive spray. (4)
- 26 Field drawing (6)
- 27 Analytical estimates of metal content (6)

Win a Special Publication of your choice!

The winner of the March Crossword draw was **Douglas Nichol** of Wrexham.

All correct solutions will be placed in the draw, and the winner's name printed in the July 2009 issue. The Editor's decision is final and no correspondence will be entered into. Closing date – June 11.

The competition is only open to all Fellows and Candidate Fellows 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 enter by scanning the signed form and emailing it as a PDF to ted.nield@geolsoc.org.uk.

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Down

- 1 Topography (7)
- 2 Sparse coniferous biome of the northern hemisphere (5)
- 3 Orthodox Rabbinical school (7)
- 5 Condition involving lack of coordination in muscle movement. Or perhaps a lack of cabs on rainy nights. (6)
- 6 Famous Palaeozoic arthropod *in tres partes* (9)
- 7 Falls between Erie and Ontario that lend their name to a Silurian succession in North America (8)
- 8 Undergoing a glorious deification (13)
- 10 Point on the surface directly above the focus (9)
- 16 Unequally convex on either side, like a moon of that name (7)
- 18 Imitation or representation in art (7)
- 19 Structures left behind - surviving traces (7)
- 23 South American dance rhythm, which when slowed down becomes the bossanova (5)

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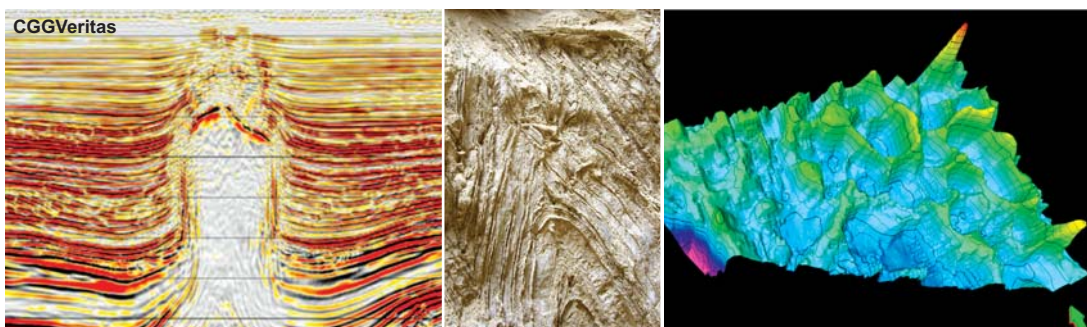


International Conference: First Call for Abstracts

Salt tectonics, sediments and prospectivity

20 - 21 January 2010

The Geological Society, Burlington House, Piccadilly, London



CALL FOR ABSTRACTS - to be submitted by 30th June 2009

This international conference aims to bring together academic and industrial geoscientists to review recent advances in our understanding of halokinetic processes and to explore the links between salt tectonics and sediments. Contributions are invited that address key technical issues that include:

- How does salt tectonics manifest itself in sedimentary basins?
- Comparisons of subsidence rates between tectonically generated basins and salt withdrawal minibasins?
- Prediction of reservoir presence and quality and new generation facies models
- What traps hydrocarbons in salt flank structures - salt side seal or sand pinch out?
- Salt as a trapping and breaching mechanism - are salt welds sealing or leaky?
- To what extent does salt suppress hydrocarbon maturation?
- What role does salt play in sandstone diagenesis?
- Sub-salt imaging - how far have we come, new approaches / techniques to make further improvements?

Papers are welcomed from a wide range of sub-disciplines including, earth surface processes and landforms, outcrop or mining data, subsurface seismic, well and core data, potential fields and physical and numerical modeling.

Abstracts or sponsorship enquiries should be sent to s.archer@abdn.ac.uk

For further information about this conference, please contact:

Georgina Worrall, Conference Manager: +44 (0)20 7432 0983

or email: Georgina.worrall@geolsoc.org.uk

Convenors:

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(University of Aberdeen)

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