

# Geoscientist

Volume 20 • No 10 • October 2010

The survivor of St Pierre  
Stabilising Lyme  
Oldest Fellow at 100  
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# Climate scientists are innocent. OK?

## *Not necessarily, says Ted Nield*

Here's a truly scary thought – human beings are NOT responsible for Climate Change.

There is comfort to be had in the notion that we are responsible for things – such as the climate change we know is happening on Earth. After all, that gives us a chance of doing something about it. The alternative, that climate change is being done to us by the sun and the climate system, acting under their own innate inexorable mechanisms, is surely much more frightening because it renders us helpless.

Now beware - believing things because they are comfortable is dangerous. No scientist should ever drop his or her guard against believing through faith, or fall victim to the notion that an idea is simply too awful to entertain. But for reasons of practical policy, we should now recognise that the probability of our being responsible for most of the measured warming of the last century stands at well over 90%, and should be accepted by everyone, everywhere, as fact. (Though the contrary belief, if true, would do nothing to absolve anyone of the need to cut emissions just as drastically.)

But climate scientists have come in for much public criticism of late. First, keen-eyed sceptics discovered some rather trivial but highly embarrassing errors in the IPCC's latest Assessment Report. Then came the leaked emails from the Climate Research Unit at the University of East Anglia. "Climategate", as it became known, became the subject of three separate inquiries (by the House of Commons Science & Technology Committee, the Royal Society Scientific Assessment Panel, chaired by former President Lord Oxburgh, and the Independent Climate Change Emails Review). And all they found was that climate scientists were guilty of nothing worse than innocence.

It is understandable that UEA scientists felt reluctant to comply with requests from self-styled "sceptics" but it was to say the least unwise to refuse them. For a start, to do so would be unlawful. For another, caginess made them look guilty and so handed their opponents a more powerful weapon than any in their own arsenal. Finally, believing they could get away with it betrayed the sort of innocence that beggars belief. If it weren't all so serious, one could almost find it touching.

Innocence by contrast is not something of which one can accuse climate-change deniers. Like those before them who scattered the chaff of doubt over the link between smoking and cancer, they are as strong in the dark side of public relations and media management as scientific institutions are (usually) weak. Little wonder - it is their primary purpose and they are backed by powerful interests. Of course they're good at it.

Meanwhile the media suffer pressures of their own - the most dangerous being the need always to have news. Scientific consensus changes rarely and slowly. But denialists can come up with news easily because, being unconstrained by evidence they can construct any number of simple (and suspiciously agreeable) messages whenever they like.

The answer to this is plain. Science too needs the arts of persuasion - and requires the help of trained professionals. Cheap, DIY solutions will simply pack the babes off into the wood, carrying a loaded gun. **✉**



Front cover: Le Cachot de Cyparis, St Pierre, Martinique. The cell in which Auguste Cyparis was incarcerated for being drunk and disorderly, and so became the only inhabitant of St Pierre to survive being in the centre of town during the 1902 eruption that killed 28,000. See p. 14. Photo – Ted Nield.

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# Not so jolly hockey stick

*Bob Ward thinks a recent Geoscientist review gave a controversial climate-sceptic book too easy a ride.*

It was somewhat startling to see in August's *Geoscientist* a glowing review of *The Hockey Stick Illusion – Global warming and the Corruption of Science*. Joe Brannan (an oil industry geologist) heaped praise on author Andrew Montford for producing “an impressive case that the consensus view on recent climate history started as poor science and was corrupted when climate scientists became embroiled in IPCC [Intergovernmental Panel on Climate Change] politics”. But while he clearly relished Montford's portrayal of the palaeoclimatology community as “amateurish, secretive, evasive and belligerent”, Brannan failed to point out that this incredible yarn is based on a misleading and one-sided version of events, littered with inaccuracies (Go to the Online version of this Soapbox for a link to my review in *The Guardian* newspaper.)

Playing the role of villains in Montford's account are Michael Mann and his co-authors, who published palaeoclimate reconstructions in 1998 and 1999 for the northern hemisphere over the last millennium, concluding that: “the 1990s were the warmest decade, and 1998 the warmest year, at moderately high levels of confidence”. The results of these studies were shown in a graph, nicknamed ‘The Hockey Stick’, with a long handle of gently declining


temperatures for most of the millennium, and a blade of steep warming in the 20th Century.

The hero of Montford's story is Steve McIntyre, a Canadian mining consultant, who has fiercely attacked the methods of Michael Mann and colleagues. McIntyre's criticisms were at least partially responsible for prompting the United States National Academy of Sciences (NAS) to review Mann's work. The investigation concluded that while McIntyre had made some valid observations about the limitations of the statistical techniques used to construct the Hockey Stick, Mann and co-workers' overall conclusions were plausible – though subject to greater uncertainty than had been originally acknowledged. McIntyre dismissed the NAS report as “schizophrenic” because it did not accept the bulk of his complaints.

Montford's book presents McIntyre's case, complete with speculations about his opponents' motives, and gives little space to the detailed rebuttals provided by Mann and his co-authors. Indeed Montford admits in his Preface that the book grew out of a summary of postings on McIntyre's blog ‘Climate Audit’. This explains the bias in his story.

So why didn't Joe Brannan point out any of this in his *Geoscientist* review? The answer can perhaps be found on McIntyre's blog, where one Joe Brannan posted the following comment in March 2010:

“Steve, I am a climate sceptic sympathizer who admires your tenacity in unearthing inconsistencies in the AGW [anthropogenic global warming] argument...To me it seems that no matter how good your blog is, you will not win the argument without mainstream journalist support. The question then becomes how you can persuade one or two scientifically literate writers to critically look at some of the evidence”.

It looks like Joe Brannan may have taken matters into his own hands through his book review for this magazine. 

*Bob Ward FGS is policy and communications director at the Grantham Research Institute on Climate Change and the Environment at London School of Economics and Political Science.*

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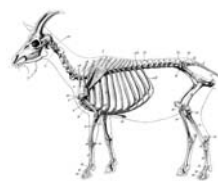
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Win a special publication of your choice

Does something in your geological life really get your goat? If you can rant entertainingly about it in 500 words, share your frustration in *Soapbox*. Email your piece, and a separate mugshot, to the Editor at [ted.nield@geolsoc.org.uk](mailto:ted.nield@geolsoc.org.uk).



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# Carousel

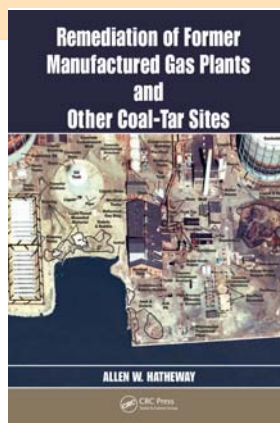


**Neil Chapman** (MCM and ITC School, Switzerland, and University of Sheffield) has been awarded the 2010 James Watt Medal of the Institution of Civil Engineers for a paper on the geological disposal of the UK's radioactive wastes.



**Tony Doré** of Statoil was awarded the OBE for services to geology in the Queen's Birthday Honours List. Tony has over 30 years' experience in the petroleum exploration industry, and holds an honorary professorship in Petroleum Geoscience at the University of Durham. He has published 50 scientific articles on correlation, basin modeling and petroleum systems. He has served as Statoil's Head of GEX NA for the past three years, holding various other positions in Statoil since 1994.

**Allen Hatheway's** 12-year compilation of *Remediation of Former Manufactured Gas Plants & Other Coal-Tar Sites* is in press with Taylor & Francis and due for distribution in March, 2011. Allen notes that this 1,100 page compendium not only establishes the role of Geologists in the cleanup of derelict coal-tar sites, but that it is the only master handbook, worldwide, and written by one independent author; someone not affiliated with the utility industry. 



## Deaths

- Read obituaries online at [www.geolsoc.org.uk/obituaries](http://www.geolsoc.org.uk/obituaries).

The Society notes with sadness the passing of:

Badham, Nick\*

**Clark, David**

Davies, Rhys\*

**Harwood, H J\***

Locke, Matthew\*

Mann, Paul Dunstan\*

Morley, William\*

Pearson, Christopher Martin \*

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

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

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


## WANTED - JGS missing issue!

*From Thomas Hofmann, Vienna.*

Since the 19<sup>th</sup> Century our departmental library has received the *Journal of the Geological Society* and we have an almost complete set. However, Issue 2 from Volume 157 is missing. Does anyone out there have one they could give us? This would be very important for us, because we would like to bind all 6 issues together into one volume, as we have done for well over a hundred years!

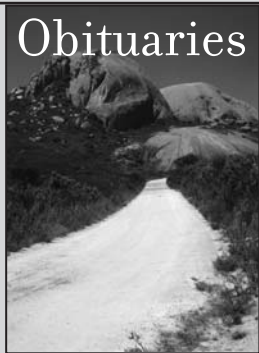
- Please contact Thomas at [Thomas.Hofmann@geologie.ac.at](mailto:Thomas.Hofmann@geologie.ac.at).

## 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. 



## Obituaries



Obituaries appear in *Geoscientist* as soon as possible after they are published at [www.geolsoc.org.uk/obituaries](http://www.geolsoc.org.uk/obituaries), where you will also find instructions to authors. If you wish to write an obituary for any of the deceased marked with an asterisk in the *Deaths* column, please contact Ted Nield to be commissioned. All communication should be addressed to [ted.nield@geolsoc.org.uk](mailto:ted.nield@geolsoc.org.uk). Please do not write anything until you have been commissioned.



### Mauro Beltrandi 1921-2009

Dr Mauro Beltrandi died peacefully in London on 1 December 2009 aged 88.

Born on 21 October 1921 in Tortona, Italy, he was conscripted into the Italian army, imprisoned by the Germans in 1943 and sent to PoW camps in Poland and East Germany. On returning to Italy at the end of 1945 he studied geology at the University of Florence. He graduated in 1948 and soon after joined AGIP as a petroleum geologist.

Mauro was hired by the Gulf Oil Corporation in the early 1950s to

work with Professor Hollis Hedberg, then Gulf's head of exploration, and was to spend an entire career applying scientific thinking to the development of new oil reserves for the Company. He ran Gulf's exploration programme in south-central Italy, where in Abruzzo the Cigno oil field was discovered, and was involved in other discoveries in Ragusa, Sicily.

In 1957, the year he married his wife Maria, he was transferred to Tripoli, Libya. As a result of his exploratory work, Gulf drilled the first discovery in the Murzuk Basin. He spent the next couple of years trying to convince Gulf's management of the opportunities that Libya presented. However Gulf decided to move out of Libya - just before the greatest discoveries were made. Frustrated by this he left Gulf in 1960 and went to Rome to work as a consultant and an independent geologist. Between 1962 and '65 he worked as an exploration geologist in east Africa based in Somalia.

Mauro's forte was the exploration of entire petroleum basins - he had a true talent in quickly assembling, digesting and presenting large amounts of data in a clear and efficient manner. This was in marked contrast to the piecemeal exploration that was the common US practice at the time. In 1965 Gulf Oil lured him back, and from their office in Rome he supervised European explorations.

In 1969 he was transferred to Gulf's geological research division (GR&DC, Pittsburgh USA), where he taught US exploration personnel to develop a broader exploration perspective. He returned to Europe in 1971 and as Gulf's Vice-President in London was deeply involved in new ventures in the "Eastern Hemisphere", including mainland Europe, the Middle East and Africa. He successfully grew this business and recruited a new generation of geologists and geophysicists. In 1981 he spent his last year with Gulf Oil in Houston, involved in worldwide exploration new ventures. Throughout the 1980s and 90s he worked as an independent petroleum exploration consultant based in London.

With his infectious enthusiasm for life, physically active and young at heart, he remained in contact with many of colleagues and friends and wrote two books; the first based on his experiences in a German PoW camp during World War II. The second dealt

with his fieldwork in locating the first oil discovery in Libya, and is yet to be published.

At his funeral in Kensington, Roger Bignell, one of his ex-colleagues from Gulf Oil, told the congregation: "Despite rising to the position of Vice President, he never lost his love of and his interest in geology. He was a true explorationist.... In the corporate world, as in life, he was always a great supporter of the little man, the underdog and the young, he saw through egos and stood up to bullies. With his integrity, generosity and spirit he was what we would all call a true gentleman."

Maria, two sons (Luigi and Fred) and two grandchildren (Thomas and Julia) survive him. ☞

*Fred Beltrandi, with grateful acknowledgments to his father's many colleagues who helped in compiling this obituary.*

### Roger Iain Holt Williamson 1961-2010



Roger Williamson died at home, in Hagley, Worcestershire on 13 July 2010 aged 48. Diagnosed four years previously with a rare gastro-intestinal stoma tumour, his treatment was fully successful for the first three years. During this time he worked and lived with his family and had a very full life including - travelling in America, Europe and Malaysia, climbing in the Alps, playing golf, enjoying the British countryside and mountains, and socialising with his many friends.

He was born in Wigan, Lancashire where he attended Upholland Grammar School prior to graduating in Geology from the Department of Earth Sciences at Leeds University in 1983. For the next year he worked in the north of England in his father's practice in site investigation and geological resource evaluation. He then returned to Leeds where he was awarded an MSc in Engineering Geology in 1985. He then worked in the West Midlands for Johnson, Poole and Bloomer and subsequently the Dudley Local Authority.

In 1990 he joined the staff of Ground Investigation and Piling of Wolverhampton. There he became a Director with special responsibility for ground contamination and landfill gas risk assessments together with mining remediation projects. He acted as a Professional Scrutineer for the Society with regard to applicants for Chartered Status.

Roger was highly respected by and popular with a wide circle of friends and colleagues. He was a particularly straightforward person and you knew where you were with him - particularly on the rugby pitch, playing his favourite sport for his school, Orrell Colts, Leeds University, Ambleside and Stourbridge. He was still playing until late 2006.

He is survived by his wife Gail, their sons Ross and Billy (both rugby enthusiasts and with strong scientific leanings), his parents Iain and Patricia and sister Catriona. ☞

*Iain A. Williamson*

## DISTANT THUNDER

# More than equal

*As geologist and science writer Nina Morgan discovers, there are some things only a woman can do*

Even though the scale of the achievements female fossil collectors such as Mary Anning and Elizabeth Philpot are now becoming more widely appreciated, there remains a lingering impression that the significant contributions to palaeontology made by women in the 19th Century are more the exception than the rule. The social mores of their time dictated that however intelligent, members of the gentler gender were not viewed to be as physically tough as their male counterparts. But as a collection of letters from Barbara Hastings, Marchioness of Hastings (1810-1858) housed in the Natural History Museum in London reveals, women in the 19th century could – and did – demonstrate a scientific determination that belied their designation as the weaker sex.

Although self-taught, and noted for her taste for gambling and her racy aristocratic lifestyle, Hastings turned herself into a palaeontologist who was respected by many of her male contemporaries. Her stamping grounds included the Eocene deposits of Hordle Cliff near Lymington on the Hampshire coast, and for six productive years she devoted her life to the collection, preparation and recording of the fossil vertebrates she discovered there. She built a museum as an extension to her home that housed several thousand fossil specimens, discovered several new species of crocodile as well as the tortoise, *Trionyx barbara*, which was named after her. She also published three academic papers about her work under her own name and presented her findings at the British Association meeting in Oxford in 1847.

"She was a 'fossilist' who knows her work", wrote the geologist Edward Forbes, who also noted that she was "one of the most excellent (and without exception the cleverest) women I ever met." The anatomist and vertebrate palaeontologist Richard Owen was another great admirer. He was also a frequent correspondent, and it was to him that she revealed her true devotion to science. Explaining the delayed arrival of some fossil specimens she wrote to him saying, "Were I in travelling condition I wd bring up my treasures myself, but as in two months time I am expecting my confinement, I am compelled to be quiet." But not one to let 'minor' events like pregnancy hold her back she wrote to Owen again to say: "I expect to be confined the end of next week ... are you likely to want any series of crocodile bones before I am about again in the month of February?"



Once her daughter was born, she contacted Owen again to enquire whether some *Trionyx* specimens "which I packed up only a few hours before my baby was born – all arrived safe" "I am dying to resume my labours – in the geological line," she continues. Now that's a level of determination none of her male colleagues could hope to emulate!

## Acknowledgements

The idea for this vignette and the quotes from Barbara Hastings' letters quotes were taken from an article entitled: *Barbara Hastings: the first lady of fossils* by Karolyn Shindler, which appeared in the Daily Telegraph on 15 June 2010. I am grateful to Karolyn Shindler for also providing additional background information.

A HOGG conference on *Geological Collectors and collecting* is planned for 4-5 April 2011 at the Natural History Museum, London. To receive further information and announcements about the conference, e-mail: [ninamorgan@lineone.net](mailto:ninamorgan@lineone.net)

*Nina Morgan is a geologist and science writer based near Oxford.*

If the past is the key to your present interests, why not join the History of Geology Group (HOGG)? For more information and to read the latest HOGG newsletter, visit the HOGG website at: [www.geolsoc.org.uk/hogg](http://www.geolsoc.org.uk/hogg).

## Interview

# Beyond the deep water horizon

*Adler deWind interviews Society President, Dr Bryan Lovell.*



*AdW: The final sealing of the flow of oil from the Deepwater Horizon blowout will be followed by no doubt extensive litigation and recrimination. But it has already faded now from the news. As an oil man, and lately one converted to the need to cut emissions, what do you think the main lessons have been?*

BL: "You're right, I am or at least was an oilman [above]; but you don't have to have been on a rig to recognise that loss of life dwarfs all other considerations. After that, we have the reckoning - environmental impact, costs and responsibilities. Yet these can only be made when critical evidence is to hand, and that is clearly not yet true. We do not yet (September 2010) have the full story of what happened on the rig itself, or at the blowout preventer, and we are only in the first stages of a \$500 million research programme into environmental impact. That research will doubtless include a comparison of this human-induced escape of oil with natural seepage, which scarcely anybody ever mentioned during hour upon hour of speculation about perceptions and personalities."

*AdW: Are these natural seeps really that large – significant – then?*

BL: "Oh yes. Oilfields leak naturally - about 600,000 tonnes of oil a year escapes into the seas from natural seeps, and an

estimated quarter of that flows from various places on the Gulf of Mexico seabed – something like 400 tonnes a day. For comparison, that's an order of magnitude less than the rate of flow from the point source at Deepwater Horizon. Now – a spaceman visiting the Gulf today - a spaceman who knows his geology but not our history - might ask why we are looking for high-cost oil and gas there, rather than drilling much more cheaply onshore in, say, Iran. As a veteran of early deepwater Atlantic drilling offshore Ireland, and a former Middle East exploration manager for BP, I'm happy to have a crack at that question.

"Only part of the Earth was formerly covered by the Tethys Oceans, whose geological evolution led, over tens of millions of years, to the generation and preservation of abundant oil in what is now the Middle East. By the 1980s access to that oil could be gained only on post-imperial terms, which was of limited interest to many oil companies. And so we had the move into deepwater Atlantic exploration, and subsequent successes offshore Angola, Brazil — and in the Gulf of Mexico.

"Now – the oil from *Deepwater Horizon* may not be washing across to Cancún in Mexico, where the climate summit is being held this month, but we may be sure the environmental reaction will be. And it occurs to me that during the weeks that oil from *Deepwater Horizon* escaped into the sea, across the globe the human race was continuing to add to the hundreds of billions of tonnes of carbon that it has already dumped into the atmosphere (deliberately, not accidentally) as we burn fossil carbon. And where did all that mighty handy carbon come from? Such places as the Gulf of Mexico and many others, in the form of coal, gas and oil."

*AdW: So – you're saying - much bigger quantities, yet completely invisible?*

BL: "Right. One lot of fossil carbon, the bit that has been spilt from *Deepwater Horizon*, has been obvious. The invisible and odourless carbon dioxide added to the atmosphere by mankind burning fossil carbon is not at all obvious. In the atmosphere, it is measured in traces: if it had a smell, it might catch the attention of a springer spaniel, but might still not alert a human being. Yet its effects are significant. The dog is barking, and we need to act now. The response to *Deepwater Horizon* needs to be seen in this context."

*AdW: "So is the mudslinging over Deepwater Horizon in your view a distraction? Even – dare one say - a diversion?"*

BL: "A distraction, certainly! But let me emphasise once again that the loss of life does dwarf other considerations and makes some of the subsequent witchhunts look even more unpleasant in retrospect. As for the environmental significance, with every sympathy for those affected locally round the Gulf, let's now get back to the real global issue, back to the barking dog. An early cliché of the Climate Change literature was the one that went: "we are carrying out an uncontrolled experiment with the planet". Well, that is no longer true. We have the control now, and it's in the geological record. Since that classic Norris and Rohl paper on the 55 Ma warming event (PETM) in *Nature* in October 1999, we've been able to see quite clearly what happens when you dump carbon into the atmosphere at the rate and volume of the past couple of centuries – significant global warming. The temperature of the deep ocean waters rises by several degrees centigrade. Global sea level rises by several metres even without any contribution from melting ice. Acidification of the oceans contributes to widespread extinction of marine life,




accompanied by widespread extinctions on land. The “natural” experiment has been repeated several times on planet Earth.

*AdW: “What caused those earlier big releases of carbon – don’t we need to know that before we get too excited about our own activities?”*

*BL: “We are still working out the details of the triggers for those carbon blasts in the past, specifically the interaction of the astronomically controlled periodic Milankovitch cycles with Earth-controlled episodic events. The episodic events may be volcanic, or may be caused by the effects at Earth’s surface of the putative hot blobs in mantle convection that are a particular favourite of mine. But regardless of all those interesting remaining questions, we know already that we are well on the way ourselves to creating our very own carbon blast, just as impressive as that at the Paleocene-Eocene boundary. We know what we have to do – we should stop pulling the carbon trigger, stop taking carbon out of the ground as soon as we reasonably can. My old buddies in the oil industry won’t like that idea one little bit, but they’ll like the prospect of being paid twice, once to take the carbon out and again to put it back in the form of carbon dioxide.*

*AdW: Is that change of heart - about releasing carbon - likely, do you think? Or are we just going to see the wall coming, but not be clever enough to do anything about it in time?*

*BL: “We can be clever all right, but can we be convinced enough to act? George W. Bush talked about the USA’s addiction to oil, China and India depend on coal. Shaking off the fossil-fuel habit isn’t going to be easy or quick, but in the meantime, we can help ourselves by applying the odd patch or two. Once most of us are convinced by the message of the past, we will find that we have an unlikely ally in – the oil business. The oil industry can pump carbon dioxide given off, say, by coal-fired power stations, into safe underground storage. Unlike *Deepwater Horizon*, this uses routine technology. Yes, it will be opposed by some (for offering succour to the villainous fossil-fuel industries); but coal will continue to supply much of the world’s electricity for years. Big Oil should prepare to act on the heroic scale required to make a dent in the problem of carbon release.”* 

- Bryan Lovell is Senior Research Fellow in Earth Sciences at Cambridge University. He is author of *Challenged by Carbon: the Oil Industry and Climate Change* (CUP).



Mackie at 100, with Professor Rick Sibson (Otago), 2010 Wollaston Medallist.

# Captain Jack’s century

*Emeritus Professor John Mackie FGS, Father of the Society, is 100 this year. He joined the Society in 1936...*

Former mining student, Malayan tin prospector, prisoner of war and head of the Otago School of Surveying, Professor John Mackie has led a full and fascinating life. Now retired to Nelson, he doesn’t get around much any more, but still has a mind like a steel trap - especially when it comes to remembering colleagues and students.

As founder and head of the National School of Surveying at the University of Otago, Mackie was responsible for training a whole generation of surveyors. “I got on well with the students because I felt I was one of them – they were my friends” he says. Wellington’s Peter Burgess, who trained as a surveyor under Mackie in the early 1970s agrees. “Jack Mackie is one of those truly memorable guys. He was always dapper, but quite at home at student parties. I remember one party, when I was a little worse for wear and relieving myself on the lawn, Jack was doing the same - while reminding me of his geodesy lecture the following day.”

On the advice of his science teacher at Otago Boys’ High School, John Williams, he attended the Otago School of Mines and achieved a first class master’s degree in Geology and a Bachelor of Engineering. Great emphasis was placed on practical mining, with the students obliged to spend a year underground as part of the course. So, during the summer vacation of 1929/30 Mackie worked in the Liverpool State Colliery, on the West Coast, pushing trucks to keep up with the miners as they blasted and hewed the coal. “It’s hard work down there. You’d come up from underground dirty and thirsty and share the big bathhouse... It was quite an experience for a young student” he says.

On completion of his degrees at the end of 1934, Mackie was offered a job tin prospecting in Malaya and, within a few months, was exploring extremely remote parts of that country (in those days a British protectorate). He got to know the country and the people, including the Sakai, who hunted with blowpipes. There was a



huge amount of tin mining: on the west coast alone there were, he estimates, over a thousand alluvial gravel mines and two hundred dredges. After just 18 months' prospecting, Mackie then joined the Colonial Service as a mine inspector. His main concern was with mine safety – collapses were quite common – and control of the tailings. "There's a lot of tailings from alluvial mining and, if you don't keep a lid on this, there's one hell of a mess."

Mackie was keen to carry on his student hobby of rifle shooting but, in the absence of a rifle club, the best way to pursue this was to join the army volunteers and rose to the rank of captain. "The most hazardous part of training" he recalls "was firing the Vickers machine gun. It would sit on a tripod and you'd sit behind it. The hot shell cases would fire out the back - and up your shorts. You should have heard the swearing."

In 1941 Mackie was with British forces trying to defend the Malay Peninsula. After the fall of Singapore, he joined 100,000 others at the notorious Changi Prison before being transferred, after a year, to Borneo. His weight fell from 70 to 41kg. They kept a secret radio under the hearth of the cookhouse fire. "This was enormously risky for the penalty for this, like that for trying to escape, was beheading" Mackie recalls. That the tide was turning in the Allies' favour was confirmed in early 1945 when four American B52 bombers flew over. After considerable delay they were eventually set free by the Australian Ninth Division. "One thing I shall never forget – fresh-baked crust bread with butter – it was manna from heaven," he says.

After the war Mackie returned to his old job. The war had caused a great shortage of tin and he felt honour bound to help to clean up the mess left by the Japanese. However, mindful of his father's failing health, Mackie resigned from the Colonial Service once the tin mining was rehabilitated. He was pleased he did because his father died just a few days later. In 1947 he married Sue Bacon (now deceased) and they had two children: Andrew and Marguerite.

Mackie was drawn back to the School of Mines as a lecturer in surveying. An ambitious attempt to turn the School of Mines into a much bigger Faculty of Technology collapsed when it was decided that New Zealand lacked the home-grown industry to warrant it.

This spelt the end of Otago's School of Mines, which Mackie describes as a great shame because their graduates were sought worldwide. Some surveyors could see that the old cadetship system was out of date and a university path into the profession was needed, Mackie says. Conversely, there was resistance from some surveyors, who didn't want to lose the cheap labour! Nevertheless, the National School of Surveying was launched in

1963, initially with Mackie as the sole lecturer. Starting with only two diploma students, the school now has more than 1100 alumni around the world.

**“The hot shell cases would fire out the back - and up your shorts. You should have heard the swearing.”**

Since then Mackie has witnessed a revolution in technological advances, such as the use of computers and equipment such as GPS. "Surveying used to be a very mathematical profession, requiring a tremendous number of calculations using logarithms" he recalls. His book on field astronomy, *Astronomy for Surveyors*, became a standard text throughout the English-speaking world and ran to nine editions.

In recognition of his contribution to the University and the surveying profession, Mackie received an Honorary DSc from Otago in 2000. The the Institute of Surveyors set up a trust in his name to encourage teaching and research in cadastral surveying. He was awarded an OBE in 1995. Clearly,

Mackie's experiences were the key to his rapport with students: "When I started teaching, some of the students were ex-war blokes. I'd been in a war too. We used to wear our battle dress in the field because it was warm. That's how I got my nickname – Captain Jack."

- *Captain Jack* is the title of John Mackie's autobiography, published late in 2007 and available from the New Zealand Institute of Surveyors' national office, PO Box 831, Wellington. Article edited from an original by Nigel Costley, published in the Otago University Alumni Magazine. Reproduced by permission.




## Advances in Carbonate Exploration and Reservoir Analysis

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Hydrothermal modification of carbonate reservoirs  
Photo courtesy of Peter Hunt and Ian Sharp, Shell

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To register click on [www.geolsoc.org.uk/carbonate\\_exploration](http://www.geolsoc.org.uk/carbonate_exploration) or contact Steve Whalley using the details below. There will also be a half day workshop by Task Geoscience held in the afternoon of Wednesday 3rd November on "Carbonates and Image Logs" There is a maximum of 15 spaces and these will be allocated on a first come first served basis. Registration for the workshop opens on 4 October.

For further information please contact:  
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## Earth's oxygen highs

*Scientists using charcoal preserved in ancient bogs have been able to reconstruct the oxygen content of atmospheres past. Ted Nield reports.*

Variations in the Earth's atmospheric oxygen levels are thought to be closely linked to the evolution of life. Over the past 400 million years, the level of oxygen has diverged considerably from the 21% value we breathe today – but by how much? Scientists from Royal Holloway, University of London and from The Field Museum in Chicago, have revealed that the amount of charcoal preserved in ancient peat bogs (now turned to coal) can provide an accurate measure of how much oxygen there was in past atmospheres.

Until now, scientists had relied on geochemical models to estimate atmospheric oxygen. In fact, a number of competing models exist, each with significant discrepancies and no clear way to resolve them. However, all models agree that around 300 million years ago in the Late Palaeozoic, atmospheric oxygen levels were much higher than today. These elevated concentrations have been linked to gigantism in some animal groups, in particular insects like the dragonfly *Meganeura monyi* with a wingspan of over 60cm. Some scientists think these higher concentrations of atmospheric oxygen may also have allowed vertebrates to colonise the land.

Higher oxygen levels came about as a direct consequence of the colonisation of the land by plants. When plants photosynthesize they give off oxygen. However, when the carbon stored in plant tissues decays, atmospheric oxygen is used up. To produce a net increase in atmospheric oxygen over time, organic matter must be buried. The colonisation of land by plants not only led to new plant growth, but also to a dramatic increase in carbon burial, especially during the Late Palaeozoic when the huge coal deposits accumulated.

### Mississippian burning

Dr Ian J Glasspool (Chicago Field Museum) says: "Atmospheric oxygen concentration is strongly related to flammability. At levels below 15% wildfires could not have spread. However, at levels significantly above 25% even wet plants could have burned, while at levels around 30 to 35%, as have been proposed for the Late Palaeozoic, wildfires would have been frequent and catastrophic".

The researchers, including Professor Andrew C Scott (Royal Holloway University of London) have shown that charcoal found in coal has remained at concentrations of around 4-8% over the past 50 million years - indicating levels of atmospheric oxygen close to modern values. However, there were times when charcoal percentage in coals went as high as 70%. This indicates very high levels of atmospheric oxygen, promoting frequent, large, and extremely hot fires. Such oxygen highs include the Carboniferous and Permian Periods from 320-250 million years ago and the Middle Cretaceous Period, approximately 100 million years ago.

"It is interesting", says Scott "that these were times of major change in the evolution of vegetation on land, with the evolution and spread of new plant groups - conifers in the late Carboniferous and flowering plants in the Cretaceous". These periods of high fire (resulting from elevated atmospheric oxygen concentration) might have been self-perpetuating; more fire meaning greater plant mortality, more erosion, and thus greater burial of organic carbon - which would have then promoted elevated atmospheric oxygen. "The mystery to us is why oxygen levels appear to have more or less stabilised about 50 million years ago".

### Reference

- Glasspool, I.J. and Scott A.C. 2010. *Phanerozoic atmospheric oxygen concentrations reconstructed from sedimentary charcoal*. Nature Geoscience DOI: 10.1038/NGEO923

## Burning of the leaves

*Could cultivating broad-leaved plants really prove a practical precaution against the potential dangers of present-day global warming? Ian Randall\* reports.*

An international team of researchers has discovered an increase in fire activity at the Triassic/Jurassic boundary, 200 million years ago. They believe it was caused by a climate-driven increase in lighting strikes, and a matching shift towards more inflammable plants.

By measuring the proportions of fossilised charcoal from eight plant-rich beds in Astartekløft, East Greenland, the team was able to observe a five-fold increase in fire activity from the Late Triassic into the boundary with the Jurassic. This peak coincided with a maximum in atmospheric carbon dioxide levels at the boundary – symptomatic of the increase in global temperatures believed to have been brought on by massive volcanism from the Central Atlantic Magmatic Province.

A change in the nature of the flora of the time, induced by rising temperatures, may have enabled wildfires to spread faster. The vegetation found in





the Astartekløft sections shows an increase in narrow-leaved morphologies across the Triassic/Jurassic boundary, coinciding with the peak in fire activity as measured by the charcoal. The researchers believe that narrower leaves, which have a low surface area to volume ratio, burn much better than broader ones.

The theory was put to the test by igniting a variety of modern day leaves of comparable morphologies to Triassic/Jurassic samples within a “fire propagation apparatus calorimeter”. Using this device the various ignition times, heats of combustion and hydrocarbon emissions were recorded from the burning of each leaf type.

Narrow leaves were seen not only to burn more quickly than broader ones – which in turn provides them with a much greater potential for the rapid spread of fires – but were also seen to burn at higher temperatures. A greater hydrocarbon flux was seen in the narrow-leaf samples, further indicating a tendency for rapid ignition and higher rates of flame spread.

“Global warming probably led to increased storm activity, and this coupled with a climate-driven increase in vegetation flammability led to a significant rise in fire activity at the Triassic-Jurassic boundary” says Claire Belcher, lead author on the paper, which was published in *Nature Geoscience* earlier this year.

The team believes that the wildfires themselves most likely started from lightning strikes – a phenomenon known to be increased by rising global temperatures. Warming increases the concentration of water vapour in the upper troposphere, which leads to greater frequency of electrical storms.

Belcher says: “A change in average global temperatures of one degree Celsius is predicted to result in a 40% increase in lightning activity.”

## Reference

- *Increased fire activity at the Triassic/Jurassic boundary in Greenland due to climate-driven floral change.* C. M. Belcher et al. *Nature Geoscience*: 23 May 2010

\*Ian Randall has just graduated in Science Journalism from City University and is working as an intern on Geoscientist.

# Funny old world

*Unconsidered trifles,  
by ‘snapper’*

## Alarm on Nicker Hill



The *Independent on Sunday*, a newspaper that is given away free in hotels, splashed on August 22 with a story about the “30,000 whistleblowers”, many of whom were apparently public servants, who had made suggestions on Mr Osborne’s “consultative” website about how to stem the waste of public funds ahead of the next Budget. A graphic on the spread covering pages 8 and 9 included an old BGS map of Cornwall, red-stamped with the word “SELL”. Any alarm about resurgent privatisation ideas can however be quelled. An extensive search of the list by Snapper eventually revealed that the graphic was supposed to illustrate suggestion number 60, namely “Sell Cornwall”. Much more sensible.

**Monitors:** *Snapper.* All contributions gratefully received. Please write to the Editor at Burlington House, or email [ted.nield@geolsoc.org.uk](mailto:ted.nield@geolsoc.org.uk) marking your submission ‘snapper’.

# IN *Brief*



**Joe McCall**  
describes some  
meteorite news that  
has streaked across  
his firmament  
recently...

## Nullarbor update



The Bunburra Rockhole achondrite stony meteorite with black fusion crust, and a small area of interior surface showing grey, right; as found.

Fifty years ago, when I was involved with the Meteorite Collections at the Western Australian Museum, we realised that the Nullarbor Plain, an arid limestone desert, was littered with meteorites<sup>1</sup>, and that these dark objects could easily be recognised on the light limestone surface. Now more than 300 have been found there. New falls will also show up easily.

Dr Phil Bland of Imperial College has reported previously in *Geoscientist* on the setting up of the network (NDF). He and others have now published an update of results to date<sup>2</sup>. Four fireball photographic observatories were established in 2007 and the first ground search mounted in 2008. On the first day of the ground search, the meteorite Bunburra Rockhole was recovered within 100m of its predicted fall position! It was initially described at the 40th Lunar & Planetary Science Conference in 2009 (see Abstract 1664) and consortium studies are ongoing. It is a rare basaltic achondrite, and had unusual orbital characteristics.

The photographic network has now observed about 550 fireballs and additional falls. It will be expanded from a trial facility to a full network, but funding for the necessary follow-up fieldwork is proving difficult to obtain. The facility is scientifically extremely important, being the only one in the southern hemisphere. The first orbits have been obtained of

southern hemisphere fireballs. The facility may also have discovered a new meteor shower. Of multi-station events observed, 11 probably produced falls of meteorites on the ground, while five certainly did so. One meteorite had an initial mass of 20 tonnes, but it was carried out into the southern ocean.

## References

1. McCall, G.J.H. 1967. *The progress of meteoritics in Western Australia and its implications*. In: Moore, P., ed., 1968 Yearbook of Astronomy. Eyre & Spottiswoode, London, 146-155.
2. Bland, P.A., Spurný, P., Shrubny, L. et al. 2010. *Meteorite falls observed by the desert fireball network: an update* Met. & Plan. Sci. 45 (Supp.) A16.
3. <http://www3.imperial.ac.uk/pls/portallive/docs/1/65165700.jpg>



Confirmed structures in Finland (from Ferrière *et al.*<sup>3</sup>)

## Too many holes

In the *History of Meteoritics*<sup>1</sup> I concluded it was unlikely that the 170 or so terrestrial structures attributed to impact would be found to have other causes. However, in a recent review<sup>2</sup>, I wrote that the crowd of such structures recognised in Scandinavia remained unexplained (there are 62 in all, of which a likely 26 are confirmed by shock effects<sup>3</sup>). A recent article by Ferrière *et al.*<sup>4</sup> gives a map of those confirmed by shock effects in Finland alone, and all 11 fall within an area extending for ~500km in the country's southern half. They are of widely different ages and do not represent a single bombardment.

Only a handful of Quaternary craters of up to 1-2km diameter have a meteoritic material association: Wolfe Creek and Barringer being the most renowned, while there is also the single 25km diameter Pliocene Eltanin structure in the deep southern ocean (with mesosiderite and howardite specks). Shock effects in quartz and shatter cones, believed not to occur in endogenous terrestrial explosive structures, have been entirely relied on to confirm the remainder.

The shocked quartz in the Keurusselkä structure, newly described and finely illustrated<sup>3</sup>, do, in their droplet-decorated shock lamellae, resemble the remarkable shock-melting droplets which I illustrated long ago when describing the Mount Padbury mesosiderite's eucrite inclusions<sup>5</sup>. However, this extreme crowding of large-scale structures in Finland, makes me re-iterate my remarks<sup>1,2</sup> concerning the very marked geographic imbalance in

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the distribution of such structures, which is not to be satisfactorily explained in terms of large impact frequency. There remains a niggling doubt in my mind whether the opposing views of Bucher<sup>6</sup>, Nicolaysen<sup>7</sup> and Currie<sup>8</sup>, that shock effects alternatively derive from some form of cryptoexplosion structures, generated from within our planet, may not yet come back into play.

## References

1. McCall, G.J.H. 2006. *Meteorite cratering; Hooke, Gilbert, Barringer and beyond*. In: McCall, G.J.H., Bowden, A.J., Howarth, R.J., eds., *The History of Meteoritics and key meteorite Collections*. Geological Society of London Special Publication 256; 443-469
2. McCall, G.J.H. 2009. *Half a century of progress in research on terrestrial impact structures*. *Earth Science Reviews* 92; 99-116.
3. McCall, G.J.H. 2008. *Paasselkä crater*. *Geoscientist* 18 (3); 10
4. Ferrière, L., Raiskila, S., Osinki, G.R., Pesonen, L.J., Lehtinen, M. 2010. The Keurusselkä impact structure, Finland. *Impact origin confirmed by characterization of planar deformation features in quartz grains*. *Meteoritics & Planetary Science* 45; 434-446.
5. McCall, G.J.H., Cleverly, W.H. 1968. *The petrology of the Mt. Padbury mesosiderite and its achondrite enclaves*. *Mineralogical Magazine* 35; 1029-160.
6. Bucher, W.H. 1963. *Cryptoexplosion structures caused from within or without the Earth ('Astroblemes' or Geoblemes' ?)*. *American Journal of Science* 262; 596-649.
7. Nicolaysen, L.O. 1972. *North American cryptoexplosion structures interpreted as diapirs, which obtain relief from strong natural confinement*. *Geological Society of America Memoir* 132; 605-620.
8. Currie, K.L. 1972. *Geology and petrology of the Manicouagan resurgent caldera*. *Geological Survey of Canada Bulletin* vol. 198; 153 pp.

*And finally...*

## Dwarf status revoked

In 2006, astronomy's governing body ruled that Pluto, because it did not clear the asteroidal debris in its vicinity by gravitation, was a *dwarf planet*. Those who issued this dictum were henceforth referred to as *the übernerds of Prague* by their opponents, who include Alan Stern, principal investigator of the 'New Horizons' mission now on its way to Pluto. He thought the definition was "sloppy science".

Pluto was the only planet discovered in the USA, by Clyde Tombaugh of Illinois in 1930, and this change was naturally unpopular throughout the USA, and nowhere more so than in Tombaugh's home state where March 13, the date of its discovery, is celebrated as 'Pluto day'. Illinois duly passed a law early last year, re-establishing Pluto as a planet there (though nowhere else, of course). This interesting case of local legislation revoking scientific decisions makes the mind boggle, should it set a precedent; even though I am firmly on the side of the Illinois Angels in the matter!

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# Le cachot de Cyparis

*Ted Nield visits Martinique in search of the most famous survivor of all time...*

Every geology student learns, knows and loves the story; of the destruction on 8 May 1902 of the Martinique town of St Pierre by the first documented pyroclastic flow in modern times; of the subsequent coining of the term *nuée ardente* by French volcanologist (and 1918 Wollaston medallist) François Antoine Alfred Lacroix; of the 28,000 people who died in an instant; but most of all, of the one who was saved by having been drunk and disorderly the previous night and thus got himself banged up in solitary confinement. That man was Louis-Auguste Cyparis.

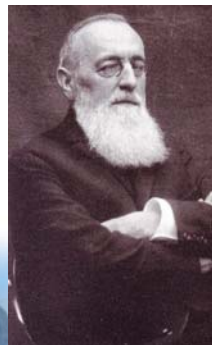
As with all disasters, there are many tales of people who cheated death; but it is Cyparis's tale that everyone remembers – chiefly for the way its many ironies seem to mock Providence. While St Pierre's more fortunate citizens, who had the freedom to flee but largely chose to stay and die, he – a feckless, and evidently violent drunkard (some say murderer, though this is probably a myth) – denied the opportunity to go anywhere, was locked in the most sheltered place in town, was thus spared and, after receiving a pardon, even became a celebrity. May 8 was also Ascension Day, and St Pierre's population had been swelled by flocks of the faithful, praying for deliverance from the volcano.

Le Mont Pelée (2500m) dominates the north western end of Martinique, its extinct predecessors stretching away to the south and east of the island. The port of St Pierre, which lies almost due south of the summit, sits astride two of the many deeply-incised rivers that drain the edifice, and provide radiating conduits for deadly mudflows and pyroclastic flows during periods of eruption.

In 1902, St Pierre was the former colony's capital – though it has been supplanted since the disaster by its rival, Fort de France, now the capital of the fully fledged French *Département*. Although people returned, St Pierre never recovered and now boasts a population one sixth of that in 1902. The ruins left behind by that morning in May still lie, overgrown, sometimes built over, and everywhere a vivid reminder of a disaster that, like *Titanic*, stands as a symbol for vaunting human ambition laid low by the blind whims of that most unsuitable parent, Mother Earth.

In 1902, old folk would have remembered the previous eruption of 1851. But that had been a footling affair. The first signs of unrest were noticed in March; by April, explosive activity made it plain to all. Sulphurous fumes choked people and horses in the streets. In May, ash fell on St Pierre. Three days before the main eruption, the crater lake *Étang Sec* burst and sent a torrent of boiling water down the nearby *Rivière Blanche*, just around the coast to the north. The torrent rapidly became a mudflow, entraining 50-ton blocks, destroying a sugar-cane processing plant, killing all 30 workers, and on reaching the sea sending up waves that capsized the yacht *Prêcheur*, killing everyone.

Alfred Lacroix, who coined the term "nuée ardente"



The Centre de Découverte des Sciences de la Terre, awaiting the next nuée.

Soufrière towers above St Pierre on one of the rare clear days that allows sight of the summit.



Soufrière from the remains of the Théâtre



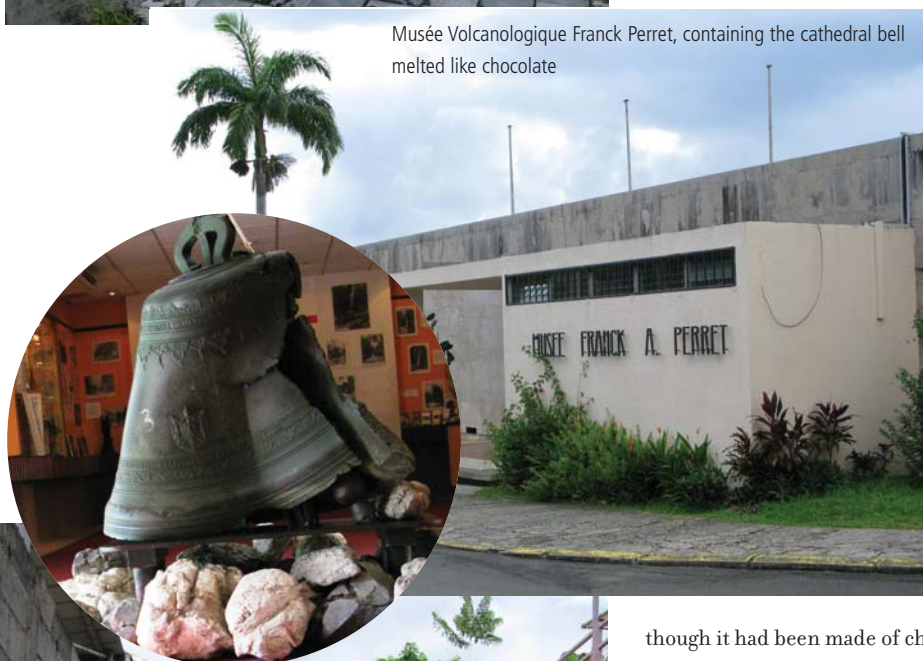
But back in St Pierre, in true disaster-movie style, local elections (scheduled for 10 May) made politicians reluctant to call for an evacuation. A “scientific commission” cobbled together a calming report; the local newspaper toed the line, urging calm. The wife of the US Consul, a Mrs Prentiss, wrote her last letter, telling her correspondent that she and her husband had passed up a chance to leave on an American vessel, confident that all would be well. She died, along with everyone else, at 0752 the next morning. Crews of the steamship *Grappler* and the sailing vessel *Roraima*, which had only sailed into the bay that very morning, were also nearly all killed; though the *Roraima*’s survivors left accounts of bonded warehouses exploding, and torrents of burning rum flowing through the town.

The *nuée* killed most people instantly, and so quickly that their clothes often survived without suffering any damage. Fully dressed corpses were later found, in rooms set for breakfast; bottles and glasses melted by the momentary intense heat. US geologist Angelo Heilprin, who visited the town some weeks after and wrote a book about it, described iron girders “looped and festooned as if... made of rope”. Such accounts have made St Pierre a place of pilgrimage for geologists ever since.

### Finding the *Cachot*

No matter what Caribbean port you may have sailed from, Fort de France will come as a striking contrast. Suddenly, you are in France – complete with flyovers, motorways, council blocks and *embouteillages*. You drive north along the coast road to St Pierre; if you are lucky, there may not be clouds to obscure the volcano as you round the headland and gaze into the bay. As the road passes through the modern town it divides in two and begins to climb, the right-hand fork (Rue Victor Hugo) passing the *Musée Volcanologique Franck-Perret* – a modest private museum to the disaster. In the centre of its single gallery stands a huge bronze bell, bent and torn by the blast as

Musée Volcanologique Franck Perret, containing the cathedral bell melted like chocolate



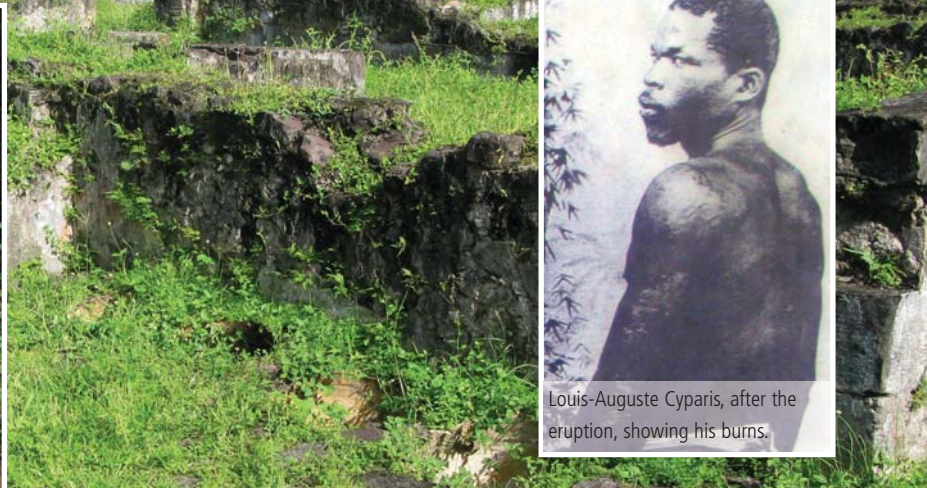
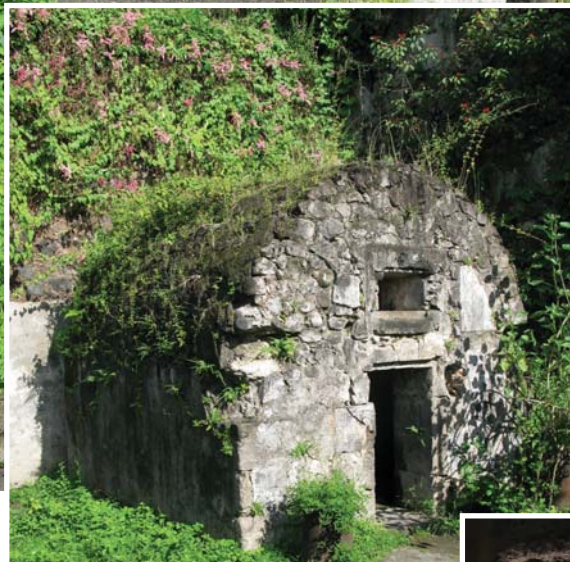
though it had been made of chocolate.

From there it is a short drive along the Rue Victor Hugo to the ruins of the old *Théâtre*, symbol of St Pierre’s colonial gentility, of which nothing now remains but entrance steps and marble floors. Just beyond it is the *Rue de la Prison*. Walk a hundred metres up this short *cul-de-sac* and wander freely among the overgrown ruins of the old gaol, which sits, unattended, unmarked, and seemingly little changed since that fateful day.

Many of the accounts ascribe Cyparis’s survival to the fact that his cell was “partly underground”. This is slightly misleading – the prison, a former barracks, is cut back deeply into the volcanic rocks of hillside, and the cell stands in the back corner, nestling beneath the high back wall and that of the neighbouring theatre. Go in, and sit where Cyparis sat. He would have been waiting here for his *petit déjeuner* when even through the cell’s thick walls he heard ominous and deafening detonations. Seconds later, the light went. Hot air and ash blasted through the cell’s only apertures (for, contrary to most accounts, the *cachot* had two, then both covered by gratings – one over the door and the other at the back). Cyparis’s back and legs were severely burned. Although his injuries were momentary, they left Cyparis in agony, enduring







Louis-Auguste Cyparis, after the eruption, showing his burns.

The remains of the prison are now deeply overgrown.



Cyparis's cell, originally a magazine, used for solitary confinement. Interior view shows the rear aperture, facing the retaining wall.

the sound of the firestorm that then engulfed the town. For four days he eked out a bowl of water - until his cries were heard by two men picking through the rubble and he was rescued, driven half mad with pain and thirst.

Cyparis was to re-tell this story many times; for after being pardoned, he joined Barnum and Bailey's circus and - adopting the stage name Ludger Sylbaris - relived his ordeal every night. But as the disaster faded from the news, Cyparis disappeared from the billings, dying - of natural causes - in 1929.

### Visiting St Pierre and surroundings

- Ruins of the theatre and prison of old St Pierre – Admission free.
- *Musée Volcanologique Franck-Perret* – Rue Victor Hugo 97250 Saint-Pierre. Homely private museum opened in 1933 to the disaster by the eponymous local volcanologist. Contains the largest exhibition of objects and other remains, and interesting photographs in well presented displays. Strong on human interest, less strong on geology. Vitrine displays in French only. Open every day, 0900–1700 Admission: Adults €3.00.
- *Centre de Decouverte des Sciences de la Terre*. Le Corbusieresque educational folly, just a little further on and up the mountain from the Prison. Opened 2005. Those who know the preposterous Giscard-inspired *Vulcania* (*Geoscientist* 13.10 October 2003) will be disappointed, if such a thing is possible. Designed to cater for study tours and tourists - by whom it is almost entirely uncontaminated. There is a wordy and worthy permanent exhibition on the science of the 1902 eruption (in French only); but all the real objects it would need to make it interesting are in the *Musée Volcanologique Franck-Perret*. <http://cdst.e-monsite.com/>. Admission €5.00.
- **Anse Latouche** – ruined sugar refinery and rum distillery north of St Pierre, in the valley of the Rivière Latouche, also destroyed on 8 May 1902. Now a botanical garden and industrial museum with a difference. On no account miss the chance to eat at the nearby *Restaurant 1643*.

**Next month – Geologist and marathon runner Nigel Platt takes a turn around Santorini.**

*All original photos © Ted Nield*





# Great divide

*The Lucy's Ledge Fault at Lyme Regis divides the famous resort in two - landslipping to the west and stable ground to the east. Geoff Davis\* and Bruce Menzies<sup>#</sup> explain how detailed geological understanding now literally underpins its recent remediation.*

Aerial photograph of Lyme Regis showing the central area of landslipping. The Cobb, Lyme's ancient harbour, is seen to the west. Copyright permissions, West Dorset District Council.

Landslipping at Lyme Regis, Dorset, on the south coast of England, has caused structural damage to property for hundreds of years. Its effects are therefore so ingrained in the town's built heritage that even the most un-geological of its many admirers over the centuries seem to have been as conscious of the underlying geological unease as of the more obvious threat posed by the sea.

The great surgeon Sir Frederick Treves (1853-1923, remembered today for the part he played in rescuing "Elephant Man" Joseph Merrick from the freak shows of London) wrote in his 1914 *Highways and Byways of Dorset* that Lyme's houses "like the Gadarene Swine, appear to be running down a steep place into the sea...and are only prevented from tumbling into the ocean by a sudden sea wall, over which they hang, unsteadily". While prolific editor Arthur Mee (1875-1943), in his *Dorset* guidebook (*King's England* series, 1939) thought that "the hills seem to be tipping the houses into the sea".

This, of course, is much more than mere semblance. Yet curiously, when superimposed onto a map of the town, a plot of damaged properties from recent times shows that this damage is concentrated to the west of the town - with little or none occurring immediately to the east.

*"The Earth here has a tendency to slide into the sea, and so its parasites desired to keep it above water."*

F J Harvey Darton,  
"The Marches of Wessex"  
(1922)



## In the teeth of the gale

Lyme Regis, sitting astride the mouth of the River Buddle (or Lym) on an actively receding stretch of West Dorset coastline, has always faced considerable challenges from the twin threats of landslipping and erosion.

The earliest geotechnical projects undertaken at Lyme were designed to protect it from destruction by the sea. First mentioned in the Domesday Book (1086), the town received its Royal Charter (adding the "Regis" to its name) in 1284, and during the 13th Century it developed into the major trading port and shipbuilding centre of Lyme Bay. Later, it became a fashionable resort, a kind of Bath-on-Sea, exemplified by the quaintly named "Ozone Terrace" - recalling a time when ground-level ozone was considered to be a good thing. The town soon developed a strong literary, artistic and scientific following. Jane Austen began the trend, with her final (and posthumously published) novel *Persuasion*, whose character Louisa Musgrove comes a nasty cropper on some treacherous steps - the so-called Granny's Teeth - which stick out like corbels from Lyme's most notable piece of geotechnical engineering, its curving 265m (870ft) breakwater and harbour wall, known as The Cobb.

Austen's book brought literary pilgrims throughout the 19th Century (Tennyson, visiting Lyme resident Francis Palgrave - of *Golden Treasury* fame - is said to have demanded to see the site of Miss Musgrove's tumble immediately upon arrival), and it was this early tourist trade that allowed Lyme's most famous daughter, Mary Anning, to earn a meagre living. Many of the well-to-do visitors (including Buckland and Conybeare) came to pursue their interest in the hottest scientific topic of the age - geology - and so enabled Mary to turn her fossil-finding talents to good commercial use.

The Cobb, Britain's oldest significant coast-protection system still in operation, was first constructed in the 13th Century by Edward I, though the present structure was largely built in 1825 when (as Treves wrote): "it rose afresh from the ruin wrought by the memorable gale of the previous year". In the 20th Century, the Cobb received fresh publicity when it co-starred with Meryl Streep and Jeremy Irons in the film of *The French Lieutenant's Woman* by John Fowles (who worked as curator of the town's Philpot Museum from 1979 to 1988). The film's most striking image, of Miss Streep standing on The Cobb in a hooded cape above a storm-tossed sea, clearly epitomised the town's vulnerability to southwesterly gales.

The town's other sea defences are considerably more recent. Not until around 1860 was Lyme's principal sea wall (along the town's frontage) successfully completed, while the wall on its eastern flank was built as recently as the 1950s. The sharp recession of the coast at the end of this wall (see aerial photograph) illustrates that, were it not for such defences, the part of the coast occupied by Lyme would also have retreated at the same rate (estimated at about half a metre per year). There is strong historical evidence that a large part of original mediaeval Lyme has been lost to the sea; in effect, the port of Lyme now stands on a promontory entirely of its own making.



Cobb extension



Beach replenishment using 60,000 cubic metres of shingle from the Isle of Wight, and 40,000 cubic metres of sand from France. The beaches were retained by new jetties and realigned and extended breakwaters (8-10 tonne blocks of granite from Norway - again brought by barge). The size and alignment of the retention structures were determined by physical modelling at the hydraulics research station at Wallingford.



Slopes (and the new sea wall) were stabilised by (1100) bored piles reinforced by steel tubes and in some cases universal beams, and also using steel tube soil nails called "Grundomat" - see above & below. Sub-horizontal drilled drainage arrays were used to empty vertical joints of ground water.





## Landslipping

In our own times, as the value of property and the wealth of those occupying it have risen, geotechnical emphasis has broadened away from coastal reinforcement to address the more insidious threat of land slippage. Such problems have been particularly serious during the 20th Century, when some 15 individual properties were destroyed and many more severely damaged. This situation was unlikely to improve unless some action were taken, as the climate in West Dorset appears to be getting wetter - every year of the decade since 1993 having been wetter than the long-term average (1868-2002). Several major sea-wall breaches have also occurred along the main frontage, as well as frequent substantial damage to Cobb Road and the complete loss of the main coastal road east to Charmouth. As a result, a major programme of ground stabilisation and coastal management was commissioned, implemented and recently completed, by West Dorset District Council (WDDC).

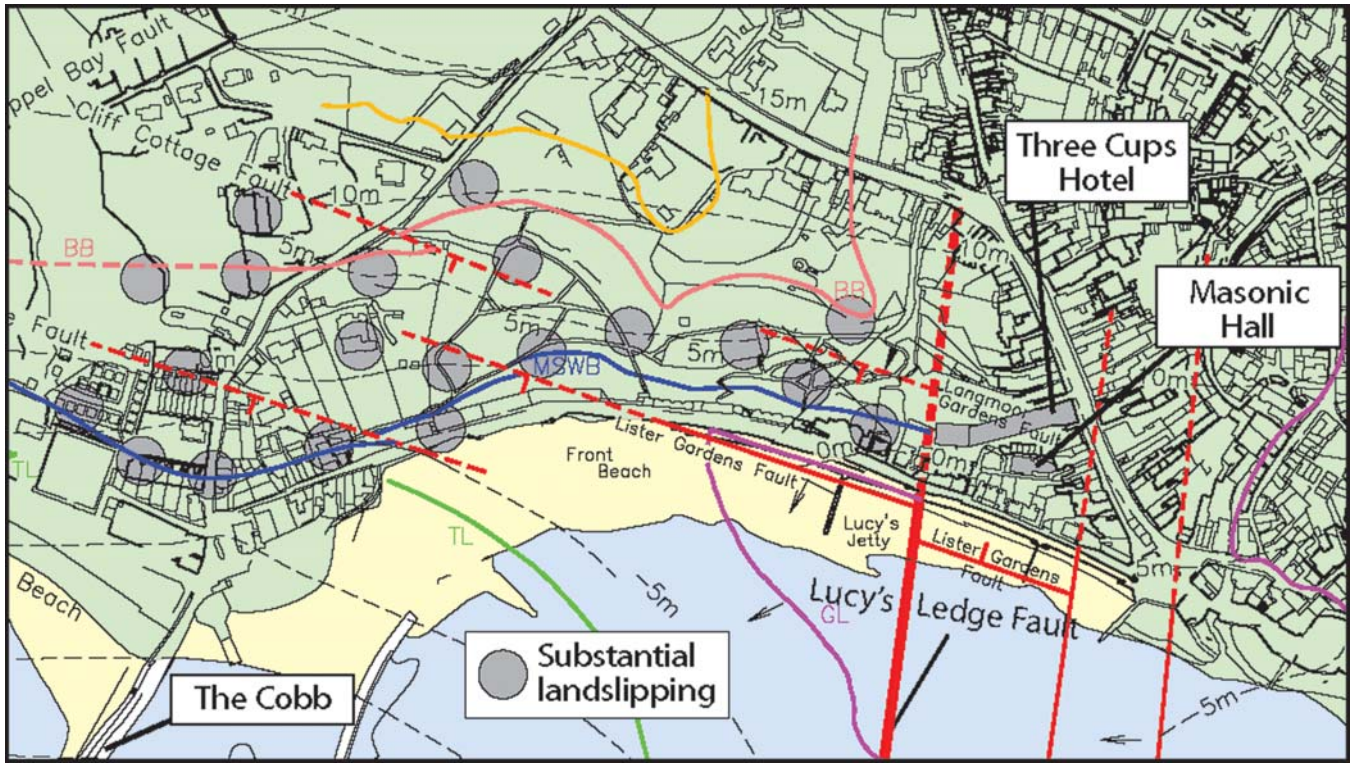
Ground conditions at Lyme Regis comprise a sequence of interbedded mudstones and layers of limestone within two Lower Jurassic units – the Blue Lias Formation below and Charmouth mudstone Formation above – and atop them, the Upper Greensand and Gault Formations of the unconformable Lower Cretaceous cover. Landslide deposits, consisting of largely cohesive materials of variable thickness, mantle the *in situ* geology. The diagram shows a typical ground model section based on observations<sup>3</sup>. Groundwater levels within the landslide materials lie close to ground surface, while pore pressures recorded within the *in situ* geology suggest under-drainage.

Coast protection and slope stabilisation works began in 2005 and were finished in 2007. These measures comprised a combination of slope drainage, slope strengthening (including bored piles and reinforced earth berms), the provision of new jetties to retain the beach, the realignment and extension of existing breakwaters, strengthening and refurbishment of existing seawalls, and beach replenishment<sup>4</sup>. However before the stabilisation works could begin, it was necessary to understand the curious asymmetry of the landslip pattern across Lyme Regis.

See also previous page for explanations. Vertical trench drains were placed normal to the sea. The garden slopes were reformed into berms using reinforced earth, employing geomembranes. The whole stabilisation scheme cost over £26 million. The Princess Royal officially opened the works and replanted gardens.







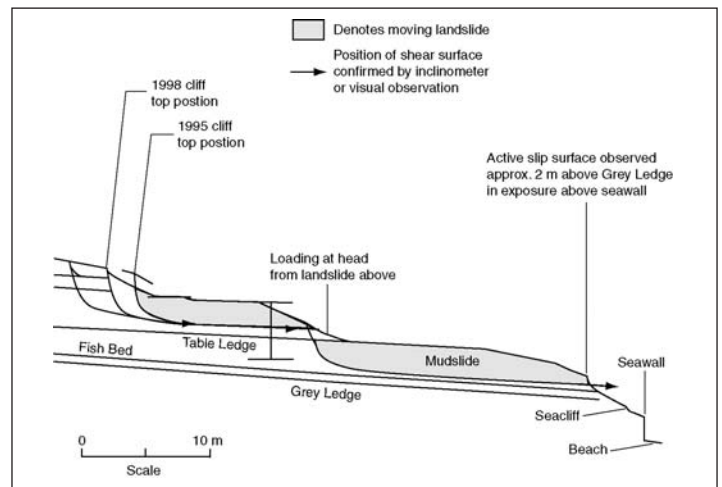
Map of Lyme Regis town showing incidence of substantial landslipping and geological faults - including Lucy's Ledge Fault. Data abstracted from <sup>1</sup>. © West Dorset District Council and High Point Rendel. Reproduced with permission. Base map: Crown copyright, Ordnance Survey. All rights reserved.

## The Lucy's Ledge Fault

As we have seen, when the WDDC plotted the locations of substantial landslipping and other movements in the 20th Century onto a map of Lyme Regis<sup>1</sup>, it became evident that the damaging earth movements covering the period 1902 - 2000 were clearly concentrated to the west of the town. No such movements occurred to the immediate east during this period.

The WDDC and their consultants also produced a detailed geological map of Lyme Regis<sup>1,2</sup>, which shows the existence of several geological faults passing under the town. These generally have small throws; but crucially, the dip of the strata often changes across them. One such fault clearly coincides with the observed boundary between the unstable ground to the west and the relatively stable ground to the east, revealed by the plot of landslip data. This is the so-called "Lucy's Ledge Fault"<sup>1</sup>, named for a prominent limestone outcrop exposed during low tide on the Lyme Regis foreshore. On the geological map, the Lucy's Ledge Fault can be seen to run perpendicularly to the shoreline, cutting through (or near) the old garage in the car park behind the landmark *Three Cups Hotel* – which has stood on the same site since the 17th Century (though the current building dates from the 19th Century) and played host to such luminaries as Jane Austen, Jimmy Cagney, Charlie Chaplin, General Eisenhower as well as Longfellow, Chesterton and Tolkien.

The main agency driving landslips west of the Lucy's Ledge Fault is the dip of the ground strata downwards towards the beach. This is in fact the same process that drives landslipping all along this stretch of coast, where units of varying permeability dip seaward at different angles (*Geoscientist* 19.12, p. 5). The



Typical ground model section at Lyme Regis, after Fort *et al.* (2000).





ground thus slides downslope and down-dip towards the shore, propelled by a combination of gravity and hydraulic forces generated by ground water in joints separating the moving blocks sliding along detachment planes where more permeable strata above meet less permeable ones below.

Clearly, the degree of seaward dip is crucial in regulating this process, and the clue to the Lyme Regis's "great divide" lies in the small changes in dip that occur across these minor faults. Beneath the westerly zone of active and damaging landslipping, the strata dip seawards at 5.4°. To the east of the Lucy's Ledge Fault, however, the seaward dip is only about 3.2°. This difference of 2.2° is enough to create essentially stable ground conditions east of the fault.

The outcrop known as Lucy's Ledge is formed by a relatively resistant limestone layer; one which has played a crucial role in the WDDC plan for stabilising landslips in Lyme. A major part of the plan has involved strengthening the slope using 1150 bored piles and rock nails to socket the unstable landslide units into stable strata below - the limestone forming Lucy's Ledge being one such unit. In determining the position and depth of piling, detailed knowledge of the underlying geology and groundwater regime has been crucial, because the subsurface depths of each of the landslide-controlling units has had to be determined to within a few hundreds of millimetres in critical areas, to ensure that piles or drains are constructed deeply enough to penetrate the landslide shear surface and provide the slide with sufficient restraint. Thus, the precise whereabouts of small faults, even those with fairly negligible throws, was critical – since any local change in the elevation of a particular crucial horizon could severely compromise the effectiveness of the stabilising measure.

Thanks to such detailed knowledge of geology – a subject in whose history Lyme Regis enjoys almost legendary status – the land stabilisation measures, coastal defence improvements and public amenity works carried out by WDDC should ensure that residents and visitors alike continue to enjoy this jewel of the "Jurassic Coast" in safety and security for many decades to come.



## References

1. West Dorset District Council 2000: *Lyme Regis Environmental Improvements. Preliminary Studies. Summary Report*, Report 14/1, August 2000, WDDC.
2. Gallois R W and Davis G M 2001: *Saving Lyme Regis from the sea: recent geological investigations at Lyme Regis., Dorset*. Geoscience in South West England 10, pp 183-189.
3. Fort, D S, Clark, A R, Savage, D T and Davis, G M 2000: *Instrumentation and monitoring of the coastal landslides at Lyme Regis, Dorset, UK*. Proc. 8<sup>th</sup> International Symposium on Landslides, Cardiff. Thomas Telford Publishing, London, pp 573-578.
4. Fort D S, Martin, P, Clark, A R and Davis G M 2007: *Lyme Regis Phase II coast protection and slope stabilisation scheme, Dorset, UK - the influence of climate change on design*. In: *Landslides and Climate Change* by McInnes, Jakeways, Fairbank and Mathie (eds) pp 419-428.

## Suggested further reading

Brunsdon, D, 2002: *Geomorphological roulette for engineers and planners: some insights into an old game*. Quart. Jour. Eng. Geol. & Hydrogeol., 35, 101-142 (Glossop Award address by doyen of engineering geomorphologists Denys Brunsdon, a resident of West Dorset.)

## Acknowledgements




We gratefully acknowledge copyright permissions from West Dorset District Council and High Point Rendel to abstract data from maps contained in the Summary Report (WDDC, 2000), specifically from the following: Map 1. Location of substantial landslipping and other movements in the 20<sup>th</sup> Century (Drg No. LRE122J\609). Map 2. Geological map of Lyme Regis (Drg No. H431/P/CG-H/9.3.1 June 1998). Much of the mapping of the Lyme Regis foreshore was carried out by Dr R W Gallois. We also acknowledge permission from West Dorset District Council to reproduce the aerial photograph of Lyme Regis.

**\*Geoff Davis** is an engineering geologist with a particular interest in the assessment and management of coastal instability and erosion. A large part of Geoff's recent experience was gained with West Dorset District Council as team leader for the Lyme Regis Coast Protection Scheme. Most recently, Geoff has worked on a variety of projects including investigation and risk assessment for landslides and coastal erosion in the UK, and the assessment of offshore geohazards on the Nile Delta. He has published 12 papers on aspects of landslide management, site investigation and public relations.

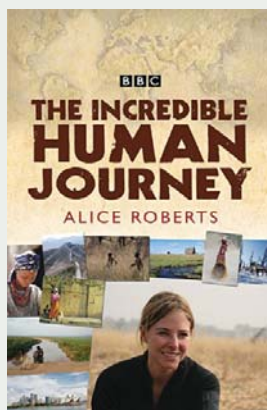
**#Dr Bruce Menzies** is the founding President of Global Digital Systems Ltd (GDS –[www.gdsinstruments.com](http://www.gdsinstruments.com)). He is co-author of five books on geotechnical engineering including one on slope engineering (including a section on remedial measures at Lyme Regis). He has co-authored a book on geology for civil engineers. He was Visiting Scholar at the Hong Kong University of Science and Technology in 2003. He holds doctorates from the universities of Auckland and London, is a Chartered Engineer, a Fellow of the Institution of Civil Engineers, a joint winner of the British Geotechnical Association Prize 2002. A list of relevant publications is included in the online version of this article.

# Reviews

Copies available for review:

-  Brook, A. (ed) (2010), *What on Earth in Under Sussex? A series of essays exploring the history of geology in Sussex* (revised edition), Guildbourne Publishing.
-  Howarth, R.J. (ed) (2010), *John Stuart Webb, FEng, and the History of Applied Geochemistry at Imperial College, London*, special journal issue of *Geochemistry: Exploration, Environment, Analysis*, Vol. 10 (3).
-  Zalasiewicz, J. (2010), *The Planet in a Pebble A journey into Earth's deep history*, Oxford.

Interested parties should contact the **Reviews Editor, Dr. Martin Degg 01244 513173; 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.**



## The Incredible Human Journey

**Alice Roberts**

**Published by: Bloomsbury**

**ISBN: 978-1-4088-0288-5**

**Publication date: April, 2010**

**List price: £9.99 376 pp**

**[www.bloomsbury.com](http://www.bloomsbury.com)**

Dr Alice Roberts is quite well known for her TV work in connection with *Coast* and for her own series *Don't Die Young*, which drew on her expertise as medical doctor and anatomist based at Bristol University. In *The Incredible Human Journey*, which was shown on the BBC in 2009, she turns her attention to palaeoanthropology and attempts to tell the story of how *Homo sapiens* has colonised Earth during the past 200,000 years. Although accompanying a big budget TV series, the book is unlike many of its natural history contemporaries in that it has shunned the formulaic approach of filling its pages with a catalogue of beautiful glossy photographs. But don't let that put you off. It may be true that a picture tells a thousand words, but Roberts's story – and that is just what this is, a good story – does a perfectly good job on its own.

The story begins with our origins in Africa and traces the radiation of *Homo sapiens* around the coast of the Middle East to SE Asia and Australasia, then to the west and into Europe, before finally making landfall in the Americas. Each chapter provides not only a detailed account of the fossil, archaeological and genetic evidence that has enabled researchers to reconstruct how, why and when each stage of the journey took place, but also a tale of human endeavour and resourcefulness told chiefly through the developments of tool kits, survival in adverse climatic conditions and the spread of agriculture. But it is not all anatomy, genetics and carbon dating, as Roberts counterpoints the anthropological narrative with her own journey to many of the places featured in the book. This is also an account of her own experiences with primitive peoples, her own thoughts on the characters who made many of the key discoveries, and her own wonder at being able to tread the same ground as our ancient ancestors. Her agreeably light-hearted style and natural talent for teaching make both the science and her journey hugely accessible.

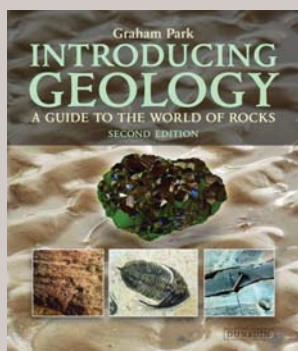
All in all, Roberts takes us on a fascinating tour of the world and human pre-history; part travelogue, part detective mystery, always compelling. However, not all the questions raised during the telling are solved convincingly, while others remain completely unresolved. But far from being a frustrating outcome this actually enables the reader to participate in the debate. For me the hook that first snared was the realisation that Neanderthals were already living quite happily in Europe when *H. sapiens* arrived, a fact that is all the more puzzling by their seemingly inexplicable demise, leaving "us" to multiply without competition. But there are numerous other conundrums. Why do Peking Man tool kits appear so primitive? Did climate change stimulate the spread of agriculture? Is it really possible that pre-Clovis culture reached America by crossing the Atlantic?

This enthralling field of natural history is inextricably linked to the ancestry of each of us. We should all be dipping into *The Incredible Human Journey* to find out more, if only to have a much better appreciation of who we are, and where we have come from.

*Sean Mulshaw*

*Wokingham, Berkshire*





## Introducing Geology: A guide to the world of rocks (Second Edition)

**Graham Park**

**Published by: Dunedin Academic Press**

**Publication date: 2010**

**ISBN: 978-1-906716-21-9**

**List price: £9.99 134 pp**

**[www.dunedinacademicpress.co.uk](http://www.dunedinacademicpress.co.uk)**

This book is well written in an easy to read and interesting style, with many good photographs and informative, well-drawn diagrams. It is suited to anyone starting out in geology, including GCSE students and those on A or AS Level courses. It is also particularly valuable to someone who has not practised their geology for a while and who wants a refresher, or to a non-specialist interested in things they read about in the press, such as gemstones, plate tectonics or the age of the Earth.

The text encourages people to look at the landscapes around them, the rocks in the landscapes and to try and understand how they developed. It has a logical structure, progressing from gemstones to igneous, metamorphic and sedimentary rocks, to fossils, earthquakes and folding and faulting. It then discusses continental drift, sea floor spreading, plate tectonics and why certain rocks ended up in certain places. Of particular interest to the general reader, I expect, will be the sections on mountain building, metamorphism, hotspots, earthquakes, the main groups of fossils and mass extinctions.

The book also discusses the history of the Earth from the Hadean to the Cenozoic. It makes the observation that there is much speculation about the existence and extent of human-induced global warming, and that it is hard to judge this against the extremes of climatic variation observed through geological time. The author then points out that what is worrying and easier to measure and predict is the mass extinction that is presently under way as a result of human exploitation.

Finally the author explores the relationship between geology and industry. Everyone – certainly all readers of this magazine – will be familiar with the role that geology has played in the location and extraction of the highly valuable reserves of oil and gas that underpin our civilisation. The various modes of formation of valuable ore deposits (e.g. hydrothermal and residual deposits) are also discussed, together with their detection by both traditional and modern prospecting methods, including geophysical and geochemical techniques. The book also discusses extractive industries (coal, building stone, cement and aggregate) that have been central to energy production and the construction industry for hundreds of years.

The book includes a comprehensive glossary. It is well bound and the print quality is excellent, making it very good value at £9.99.

*Steve Rowlatt, Bishop's Stortford*

# Letters

*Geoscientist* welcomes readers' letters, and every effort is made to publish them as promptly as possible. You can help by keeping letters to around 300 words or fewer. Please write to **Dr Ted Nield**, Editor, at The Geological Society, Burlington House, Piccadilly, London W1J 0BG or email [ted.nield@geolsoc.org.uk](mailto:ted.nield@geolsoc.org.uk).

All letters are published at

**[www.geolsoc.org.uk/letters](http://www.geolsoc.org.uk/letters)**, and a selection subsequently presented in the magazine. Please note that letters may be edited.

## Changes in access to BGS Keyworth Library

*From Ken Hollywood\* (Rec'd 23 August 2010)*

Sir, From October 11 to the end of November, The BGS Keyworth library is undergoing a major restructuring project and is being relocated to another building. The collection is being rationalised, with selected stock being distributed to other collections within the UK.

The process has commenced and is expected to be completed by late 2010 and this will inevitably affect the range of services that we currently offer. It is unavoidable that there will be periods when we have to close, especially when stock is being transferred to the new location.

However, we shall endeavour to keep any disruption to a minimum and will continue to provide a service during this period of change. We ask you to notify us in advance of any visit you wish to make by contacting our Help Desk at [libuser@bgs.ac.uk](mailto:libuser@bgs.ac.uk) (0115 936 3205).

Our Edinburgh library ([mhlib@bgs.ac.uk](mailto:mhlib@bgs.ac.uk) 0131 650 0322) will act as our backup and if necessary we can arrange to have material transferred to Keyworth to satisfy your requests. For ticketholders, access to Keyworth library will be extended for a period beyond your usual renewal date to take account of any closed periods.

Progress reports such as revised opening hours will be posted to our website at [www.bgs.ac.uk/services/library/home.html](http://www.bgs.ac.uk/services/library/home.html). If you wish to be kept informed, please send your email address to [khol@bgs.ac.uk](mailto:khol@bgs.ac.uk). We are sorry for any inconvenience this may cause.

I apologise in advance for any disruption to your normal service.

*\*Ken Hollywood, Head of Research Knowledge Services, British Geological Survey*

## YES Network Study

*From Jo Venus\* & Leila Gonzales<sup>#</sup> (Rec'd 26 August 2010)*

Sir, The YES Network is conducting a study to determine the key decision points in the career pathways for early-career geoscientists (from university through 10 years post-graduation). This study aims to identify the factors contributing to individual career decisions and will also monitor those career choices over a ten-year period.

The results from the study will provide direct insight into the factors for decisions pertaining to enrolment and retention in geoscience university programs as well career pathway choices. All survey participants for each year will be entered in a draw to win a select number of prizes.

We are encouraging all geoscientists whatever career stage/discipline to participate: the more responses we get, the more accurate our conclusions will be. If you fill out only one survey in this year (or millennium) let it be this one! It has only a few questions and takes but a few short minutes to complete.

This survey is being supported by the American Geological Institute (AGI), the Geological Society of London (GSL), and the Geological Society of America (GSA). AGI is providing web and database-hosting for the survey, and GSL and GSA are providing prizes. If your organisation would like to support this effort, please contact Joanne Venus (eejhv@leeds.ac.uk) or Leila Gonzales (lmg@agiweb.org).

The YES Network is an international association of early-career geoscientists who are primarily under the age of 35 years and are from universities, geoscience organisations and companies from across the world. For more information on the study, please visit [www.networkyes.org/index.php/projects/descision\\_points\\_survey/](http://www.networkyes.org/index.php/projects/descision_points_survey/).

*\*President, YES Network; <sup>#</sup> YES Network & AGI*

## Support Contaminated Land Specialists!

*From Angela Baird (Rec'd & Pub'd 12 August 2010)*

Sir, I believe it is important that engineering geologists/geotechnical engineers and contaminated land specialists have an appreciation of each other's requirements and work together to achieve the best results from any ground investigation, especially during such financially challenging times as these.

What is the Society doing to aid communication between these specialists? The Engineering Group appears to be doing well in actively supporting and raising the profile of the engineering geologists. However, based on my experiences, Engineering Geologists do not have a monopoly on being underappreciated at work. I believe there should be more support for contaminated land specialists, particularly, within the construction industry - where the focus often falls heavily on the engineering aspects, with contamination aspects "tagged on".

I was hoping that the (still!) un-revived Environment Group might take on this challenge. Failing that, perhaps the Engineering Group could assist the contaminated land specialists and their group, and work together to encourage and support each others' specialisms, thus strengthening their links and stance within the construction industry?

## Keep the Tertiary!

*From Andy Butler (Rec'd 9 August; Pub'd 12 August 2010)*

Sir, Tertiary, Neogene & Paleogene are terms in common use and are useful in their own right.

Generally, my colleagues and I use "Tertiary" as a catch-all for post-Mesozoic, pre-Quaternary systems and Paleogene or Neogene for convenience in lumping together Paleocene-Oligocene and Mio-Pliocene sequences. "Tertiary" will always remain in usage, even if only informally, and I believe it would be better to reflect that in the official stratigraphy. I agree from experience that the boundary between the Eocene and Oligocene has the greater stratigraphic significance and that ideally the Paleogene / Neogene boundary would have been set at the end Eocene.

I feel that as a division of stratigraphy that has served us well and is in common useage, "Tertiary" should be preserved in the scheme. I do not agree that this adds "unnecessary complexity for future generations of geologists to learn".

*From John Buckeridge (Rec'd 23 August; Pub'd 25 August 2010)*

As a palaeontologist, I am concerned that we are even contemplating deleting the Tertiary. In addition, I find the term K/T Boundary to be a very useful one - an alternative such as K/P would certainly confuse, as there are many Ps in the system. If the boundary between the Palaeogene and Neogene were altered (along the lines suggested by Pearson & Hounslow), apparently moving the Oligocene into the Neogene, it would create widespread confusion. The term Tertiary is certainly of more than "historical relevance".



# Society Business

## Future meetings

### OGMs:

29 September 2010;  
24 November 2010;  
3 February 2011;  
13 April 2011.

### Council:

29 September 2010;  
24 November 2010;  
2/3 February 2011;  
(residential);  
13 April 2011.

## AWARDS 2011

Nominations for Society Awards 2011, which will be presented at President's Day next year, should be submitted to the Awards Committee to arrive no later than **Friday 8 October 2010**.

Fellows wishing to nominate persons for an Award should go to [www.geolsoc.org.uk/awards](http://www.geolsoc.org.uk/awards) and follow instructions.

*Edmund Nickless*

## Membership renewals – do's and don'ts

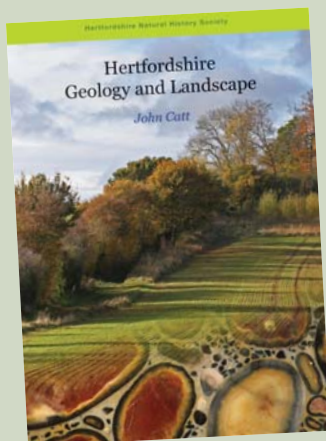
This is a very busy time for the Fellowship and Accounts offices. To help us deliver the most efficient service to the greatest number, please:

- ✓ **DO:** Renew online! It's quick and easy on [www.geolsoc.org.uk](http://www.geolsoc.org.uk).
- ✓ **DO:** Choose Direct Debit. It's safe, and saves you (and us) hassle now and in future.
- ✓ **DO:** Check the website for answers - [www.geolsoc.org.uk/renewals](http://www.geolsoc.org.uk/renewals). Email us with any queries.
- ✗ **DON'T:** Send cheques. This is expensive and inefficient.
- ✗ **DON'T:** Telephone with queries if you can email.

## Honorary Fellows

Fellows are reminded that they may nominate candidates for Honorary Fellowship at any time. To find out how to do this, please go to [www.geolsoc.org.uk/honoraryfellowship](http://www.geolsoc.org.uk/honoraryfellowship). *EN*

## Reader Offer!



## Hertfordshire Geology and Landscape

Pre-publication offer price: **£29 (P&P free)** for a limited period – details of ordering can be found on the HNHS web site at [www.hnhs.org](http://www.hnhs.org) or from HNHS, 24 Mandeville Rise, Welwyn Garden City AL8 7JU. Full price will be £39.

This major new work on Hertfordshire's Earth heritage is soon to be published by the Hertfordshire Natural History Society with the Hertfordshire Geological Society. It will be a landmark publication for the county, which until now has lacked an authoritative work on its geodiversity.

The book gives a comprehensive and authoritative account of the basic geology of the county and its relationship with various aspects of geodiversity and biodiversity.

Editor John Catt worked on soil research at Rothamsted and is Honorary Professor of Geography at University College London. The chapter authors are John Catt and other local experts from the Hertfordshire Geology Society. They cover:

- The character of Hertfordshire and an introduction to Geology
- Concealed bedrock geology - Chalk – Palaeogene deposits – Neogene period – The Quaternary and landscape development
- Soils, agriculture and plant ecology
- Prehistoric archaeology and human occupation
- Hydrogeology, water supply and waste disposal
- Mineral resources and church building stones

This book is for everyone interested in the county and its natural history as well as professional geologists, physical geographers, soil scientists, archaeologists, ecologists and conservationists.

ISBN 978-0-9521685-9-1: Publication expected December 2010

*A4 format, hardbound, about 400 pages, illustrated in colour throughout with over 200 maps, diagrams, figures and photographs. Published by Hertfordshire Natural History Society (Registered Charity 218418). More details at [www.hertsgeolsoc.ology.org.uk](http://www.hertsgeolsoc.ology.org.uk).*



## From the Library

The library is open  
to visitors

**Monday-Friday  
0930-1730.**

For a list of **new acquisitions** click the appropriate link from <http://www.geolsoc.org.uk/gsl/info>

**Virtual 'Help yourself box':** The Library has a selection of journal issues which are not required due to duplication, defect or damage. A list of these can be found on our website in the section on Library Collections - Serials, under the heading 'Surplus Journals' [www.geolsoc.org.uk/gsl/info/collections/serial/page3358.html](http://www.geolsoc.org.uk/gsl/info/collections/serial/page3358.html).

Here you will find information on how to request them. They are available to both individuals and libraries. Please note that there may be a charge depending on the type of material and the weight, if posted.

**Document delivery:** 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!

**Postal Loans:** 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.

**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](mailto:wendy.cawthorne@geolsoc.org.uk).

# Rare book of the month!

*Étude sur le nord-Etbai entre le Nil et la mer Rouge* by Ernest Ayscoghe Floyer (1893)

Often a rare book holds more treasures than the words printed on its pages or the design on its spine. Over the summer months the Librarian was dealing with an enquiry concerning Ernest Floyer's 1893 study of Etbai in Egypt when she found a letter stuck into its pages. Dated October 12, 1892, with the address of Hawarden Castle, nr. Chester, the letter, in a hand often difficult to read, thanks Floyer for sending a section from his forthcoming book, concerning the Phoenicians, the Greek geographer Strabo and the writings of Homer. The signature was later verified as that of British Prime Minister William Ewart Gladstone.

Floyer (1852 – 1903) was an explorer and writer, noted for his travels around the Persian Gulf in the 1870s, and later for intrepid endeavours in Egypt. *Étude Sur la Nord-Etbai* highlights the strengths of his writing, encompassing all manner of subjects, including, of course, geology. As well as for his writings, Gladstone may have known Floyer for the part he played during the 1884-5 military action in Egypt, when, as Inspector General of Egyptian Telegraphs, he received a medal for his services in the Gordon Relief Expedition.

The letter itself is of interest to the historian and classicist, and also the geologist and geographer. 'My belief,' Gladstone writes, 'is that Homer had a fairly clear idea of the relative position of Phoenicia, Egypt, Libya, though he cannot have had the proper geography of all the countries he names'. In the light of recent attempts, involving Fellows of the Geological Society, to find Homer's Ithaca, this short letter, hidden unnoticed for over 100 years in one of the Society's books, has numerous resonances and implications.

## Sources

- Cornish, Vaughn. Obituary of Ernest Ayscoghe Floyer <http://freepages.genealogy.rootsweb.ancestry.com/~floyer/efloyer.htm>
- Bittlestone, Robert, et al. *Odysseus unbound: the search for Homer's Ithaca* Cambridge: Cambridge University Press, 2005
- Nield, Ted. 'Ithaca theory gains support' *Geoscientist* 17.2 February 2007

The Library operates a sponsorship scheme to help preserve and restore its rare books. For more information, contact Michael McKimm in the library, or see the *Sponsor A Book* page on the Society's website: [www.geolsoc.org.uk/sponsorabook](http://www.geolsoc.org.uk/sponsorabook)







# Shell London Lecture Series

## Impacts!

**Speaker:** Jay Melosh, Purdue University

**Date:** 13 October 2010

Impacts have brought us samples of Mars and the Moon in the form of meteorites and may have transferred life from Earth to Mars or vice versa. Asteroids that cross the Earth's orbit are being catalogued as potential threats to our civilization. Overturning more than a century of conventional wisdom that excluded sudden catastrophes from Earth History, recent work has demonstrated that asteroid and comet impacts play major roles in our Solar System. From the impact-scarred faces of the Moon and Mars to the death of the dinosaurs, impacts have set the course of planetary evolution

Jay Melosh is a Distinguished Professor in the Department of Earth and Atmospheric Sciences, Purdue University, West Lafayette, IN, USA. His principal research interests are impact cratering, planetary tectonics, and the physics of earthquakes and landslides. He is a science team member of NASA's Deep Impact mission that successfully cratered comet Tempel 1 on July 4, 2005.

**Matinee:** Tea and coffee 14.30; Lecture 15.00 – 16.00

**Evening:** Tea and coffee 17.30; Lecture 18.00 – 19.00

### Further information

Please visit our website

[www.geolsoc.org.uk/shelllondonlectures10](http://www.geolsoc.org.uk/shelllondonlectures10).

Entry to each lecture is by ticket only. To obtain a ticket please contact Leila Taleb around four weeks before the talk. Due to the popularity of this lecture series, tickets are allocated in a monthly ballot and cannot be guaranteed.

**Contact:** Leila Taleb, Event Manager,  
The Geological Society, Burlington  
House, Piccadilly, London W1J 0BG,  
T: +44 (0) 20 7432 0981  
E: [leila.taleb@geolsoc.org.uk](mailto:leila.taleb@geolsoc.org.uk)

In association with



## The Geological Society Club



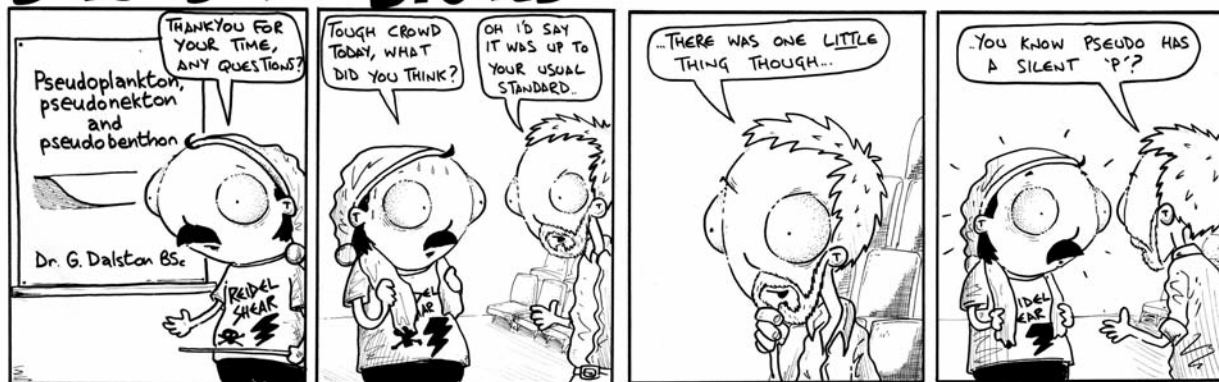
The Geological Society Club, the successor to the body that gave birth to the Society in 1807, meets monthly (except over the field season!) at 6.30 for 7.00 in the Athenaeum Club, Pall Mall. Once a year there is also a special dinner at Burlington House. New diners are always welcome, especially from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

**2010:** 20 October    **2011:** 26 January; 23 February; 16 March; 13 April (Burlington House - prov.); 18 May

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](mailto:a.fleet@nhm.ac.uk) - from whom further details may be obtained. DR

## STICKS AND STONES



# WHEN KNOWLEDGE COUNTS...



## ... COUNT ON FUGRO

### Free 1 day technical courses:

#### Water Survey Techniques

28th October 2010 Wallingford, Oxon

#### Cone Penetration Testing \*

29th October 2010 Wallingford, Oxon

26th November 2010 Manchester

10th December 2010 Glasgow

presented by Fugro Water Services and Fugro Engineering Services Ltd

\*accredited for CPD by Geological Society

Fugro Water Services will share our expertise in advanced survey techniques with the water industry at our free course to be held in Wallingford on Thursday 28th October 2010. We also continue to offer our well-established Cone Penetration Testing course. See overleaf for dates.

### The course in Water Survey Techniques includes:

- remote sensing (satellite)
- airborne survey
- ground investigations
- geophysical survey
- oceanographic monitoring.

For consultants & engineers in the water or geotechnical industry.

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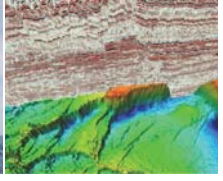


**Earthworks-jobs.com**

## Northern North Sea: Recent Developments in Exploration and Production

Friday 5 November 2010  
Kings College Conference Centre, University of Aberdeen

**REGISTRATION NOW OPEN**

The Northern North Sea still provides fresh opportunities for exploration, development and production. In common with other mature provinces it has seen an influx of smaller independent operators filling the vacuum left in the wake of departing majors from aging assets. The industry has targeted new play concepts leading to exploration successes eg (Rinnis Discovery) whilst embracing the challenge of developing unconventional accumulations (eg heavy oil) and extending the life of mature assets. Demand for continual improvement in oil recovery has required ongoing technological innovation to meet production challenges and maximize field value.

Following on from the successful workshops held on the Southern Gas Basin (2007) and Central North Sea (2008), the purpose of this one day joint SPE/Geological Society seminar is to provide a forum for the exchange of ideas arising from recent experiences of exploration, development and production activities in the Northern North Sea.

For further information about this conference, please contact:  
**Steve Whalley, Event Co-ordinator: +44 (0)20 7432 0980**  
or email: [steve.whalley@geolsoc.org.uk](mailto:steve.whalley@geolsoc.org.uk)

*At the forefront of petroleum geoscience*  
[www.geolsoc.org.uk/petroleum](http://www.geolsoc.org.uk/petroleum)





## Continuing Professional Development (CPD) Courses

• **1 October ProGeo 2010.** **Venue:** Kenn Centre, Kennford, Exeter, Devon. Geotechnical Issues in the South West with reference to Eurocode 7 Confirmed talks at the moment are as follows: Jim Griffiths – University of Plymouth - The Engineering Geological Setting of South-west England; Gary Walker – Scott Wilson - Geotechnical Design & Ground Investigation after Eurocode 7; Andy Matthews – Devon County Council - Case Study incorporating EC 3 6 & 7; Mark Taylor – Network Rail – Mining Legacy in the South West in relation to the rail industry. **Contact:** Cathy Smith. E: swrg@geolsoc.org.uk

• **5-7 October GEMS Foundation Course** **Venue:** Coalville. The GEMS Foundation course is a comprehensive three-day course designed for new users of GEMS. GEMS courses are designed to provide theory through lecture-style classes, augmented by hands-on exercises. GSL Members receive a 15% discount, please mention this when registering. To register or for more information: E: sales-eu@gemcomsoftware.com T: +44 1530 835554.

• **13 October Site Investigation.** **Venue:** Cardiff. Site Investigation Professionals from many backgrounds work in the construction industry and have need to request a site investigation without fully understanding how it is done or what it can be expected to produce. The course explains the approach to designing a site investigation, explains how a site investigation is carried out and introduces the delegates to the interpretation of site investigation results. **Contact:** Symmons Madge Associates T: 01446 775959 E: admin@symmonsmadge.co.uk W: www.symmonsmadge.co.uk

• **19-21 October Surpac Foundation and Geology Workshop.** **Venue:** Coalville. The Surpac Foundation and Geology Workshop is an amalgamation of both the Foundation course and the Geology course. It is a comprehensive 3 day workshop designed for new users of Surpac regardless of discipline and geologists new to the use of Surpac's geology toolset. Fellows of the Society will receive a 15% discount, please mention this when registering. **Contact:** T: +44 (0)1530 835554 E: sales-eu@gemcomsoftware.com W: www.gemcomsoftware.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.

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• For endorsed courses run by FUGRO Engineering Services, visit [www.fes.co.uk/courses](http://www.fes.co.uk/courses) or **contact** s.poulter@fes.co.uk

## OCTOBER



• **5-6 October.** *The geology of unconventional gas plays.* **Venue:** Burlington House. It is generally recognised that unconventional gas resources will make up a major part of our future energy needs. The aim of this conference however is to specifically address the geoscience issues related to their exploration and exploitation. See website or **contact:** Steve Whalley T: 020 7432 0980 F: 020 7494 0579 E: steve.whalley@geolsoc.org.uk

### South East Regional

• **12 October.** *Climate change and earthworks.* **Venue:** University of Brighton. **Speaker:** Fleur Loveridge. **Time:** 1800 for 1830. **Contact:** Ron Williams T: 01737 553740 E: rew182@btinternet.com



• **13 October.** *Impacts.* **Venue:** Burlington House. **Speaker:** Professor Jay Melosh, Purdue University, USA. **Times:** 1430 for 1500 and 1730 for 1800. A Shell London Lecture. **Contact:** Leila Taleb T: 020 7432 0981 F: 020 7494 0579 E: leila.taleb@geolsoc.org.uk

### Thames Valley Regional

• **14 October.** *Geology of the Thames Basin – the whole picture.* **Venue:** Ascot. In conjunction with the London Basin Forum - a joint one-day Conference that will bring together all the work being currently undertaken and which will illustrate how the geology of the London Basin inter-relates into one big picture. Download flyer from website. **Contact:** Alex Carbray. E: alexcarbray@hotmail.com.



• **19 October.** *Ground Models – How are they constructed? What do they tell you? How are they used?* **Venue:** Burlington House. Seminar and BGS Map Launch. Download Flyer from website. A series of case studies will also be presented to show the use and benefit of ground models on a range of significant projects. The speakers include eminent ground professionals from research, client, contracting and consulting organisations. **Contact:** Paul Emerson, EM Drilling Ltd., Four Winds Farm Buildings, Gloucester Road, Upper Swainswick, Bath BA1 8AE T: +44 (0)1225 855002 F: +44 (0)1225 852795 E: paul@emerson-moore.co.uk.






• **20 October.** *Ineson Lecture 2010 - Research Frontiers and Practical Challenges in Karst Hydrogeology.* **Speaker:** Nico Goldscheider, Professor for Hydrogeology and Geothermics at the Technical University of Munich and Chairman of the IAH Karst Commission. Plus supporting speakers and posters. **Venue:** Burlington House. **Contact:** Alan Edwards E: edwards@slrconsulting.com.



• **21 October.** Sir Alan Muir Wood Memorial Symposium. **Venue:** ICE. Professor Robert Mair, Professor David Muir Wood and Professor John Burland are among the group of distinguished speakers. The subjects covered include new geological case histories, coastal flooding, tunnelling and geotechnical advances. Followed by dinner (separately bookable). **Contact:** Richard Hart T: +44 (0) 1460 259776 E: bts@event-logistics.co.uk.



• **27-28 October.** Finex 2010: Exploration meets the City. **Venue:** Burlington House. Joint meeting with: Institute of Materials Minerals and Mining, Irish Association for Economic Geology, Association of Mining Analysts, AIM Team, London Stock Exchange. This two-day conference will encompass broad financial and technical areas including commodity cycles and major company strategies, the role of the London Stock Exchange, and the factors that drive the price of and demand for gold and other key commodities. Register online at [www.geolsoc.org.uk](http://www.geolsoc.org.uk). **Contact:** Georgina Worrall, The Geological Society, Burlington House, London W1J 0BG. T: 020 7432 0983 F: 020 7494 0579 E: georgina.worrall@geolsoc.org.uk.

# FINEX '10

*FINANCING EXPLORATION:*  
**THE ROLE OF THE UK AND IRELAND IN  
GLOBAL MINERAL EXPLORATION**



**27<sup>th</sup> - 28<sup>th</sup> OCTOBER 2010**  
*THE GEOLOGICAL SOCIETY,  
BURLINGTON HOUSE, LONDON*

Britain and Ireland have long played leading roles in stimulating and financing global metal mining and exploration world-wide. FINEX '10 will examine this pre-eminent status and provide a forum to exchange ideas and visions across the interface between the financial and mining sectors.

All presentations will be delivered by invited speakers identified as leaders in their respective fields of expertise.

Professional sponsoring organizations:

**Institute of Materials, Minerals and Mining**  
**Mineral Deposits Studies Group, Geological Society**  
**Irish Association for Economic Geology**  
**Association of Mining Analysts**  
**AIM Team, London Stock Exchange**

# FOUNDERS' DAY LECTURE AND DINNER

Thursday 11 November 2010

*Tickets are limited*

**FROM PAVILAND  
TO PAKEFIELD:  
700,000 YEARS  
OF HOMO  
BRITANNICUS**

**SPEAKER:**  
**Chris Stringer**  
Natural History Museum

The search for human origins has always been, and continues to be, fraught with issues of identity, race, religion and nationality. This, combined with a palaeontological record that is extremely fragmentary and difficult to interpret, makes palaeoanthropology one of the most hotly debated issues in science. Professor Chris Stringer will trace our attempts to make sense of the origins of Homo britannicus, from Dean Buckland's "Red Lady" to the present day.


And afterwards at  
Le Meridien, Piccadilly

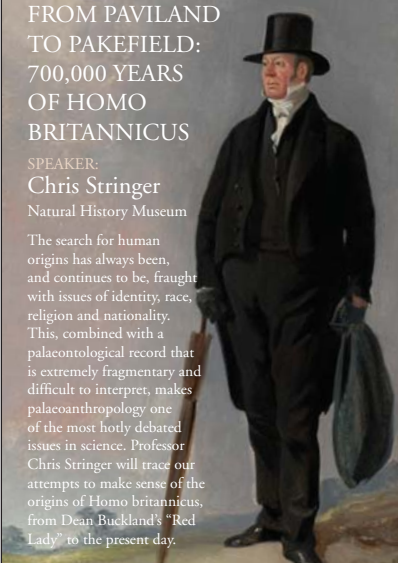
Dress: Black Tie

Ticket price: £70

After dinner speaker, Dick Selley  
(Imperial College, London)

*Dining with dinosaurs*






**CONTACT DETAILS**  
For further details contact: Alys Hilbourne,  
The Geological Society, Burlington House, Piccadilly, London, W1J 0BG  
Tel: 020 7432 0981; Email: alys.hilbourne@geolsoc.org.uk Web: www.geolsoc.org.uk/founders10

# PAST CARBON ISOTOPIC EVENTS AND FUTURE ECOLOGIES:

PALAEOANALOGUE CIEs AND CURRENT BIOSPHERE & ECOLOGICAL  
CHANGE AS GUIDES TO THE 22ND CENTURY AND BEYOND



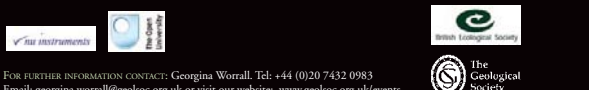
## 2nd and 3rd November 2010 The Geological Society, Burlington House

The biosphere and many of its ecosystems are currently changing due to global warming in a manner unprecedented for many million years. Research shows that abrupt environmental perturbations of the late Palaeocene to early Eocene some 55 million years ago, and also of some earlier periods, might be used as biospheric and ecological palaeoanalogues for present-day and future global change.

This two-day discussion meeting sees invited presentations from internationally renowned geoscientists and ecologists in environmental and palaeoenvironmental change. The meeting will bring together scientists and policymakers from a range of disciplines to explore how current geological and ecological synergies illuminate our understanding of what planet Earth might be like 100 years or more in the future.

**CONVENORS:**  
Jonathan Cowie  
Communication Science Communication:  
science.com.communication.org  
Dr Anthony Cohen  
The Open University

**INVITED SPEAKERS INCLUDE:**  
Dr Manuel Barange  
Plymouth Marine Laboratory  
Dr Peter Mayhew  
University of York  
Dr Andy Ridgwell  
University of Bristol  
Professor Jim Zachos  
University of California, Santa Cruz



FOR FURTHER INFORMATION CONTACT: Georgina Worrall. Tel: +44 (0)20 7432 0983  
Email: georgina.worrall@geolsoc.org.uk or visit our website: www.geolsoc.org.uk/events

# The Geological Society CAREERS DAY 2010



## Wednesday 10 November 2010 East Midlands Conference Centre, Nottingham

Careers Day is for geosciences undergraduates and postgraduates to find out about the latest career developments and opportunities.

The day will run from 10am - 3.30pm followed by a beer reception, and will include presentations and an exhibition fair.

**REGISTRATION**  
There is a £10 registration fee to attend this event. This fee covers all delegate material, refreshments, lunch and a beer at the reception. Alternatively, you can bring your own lunch and refreshments and we will waive your registration fee.

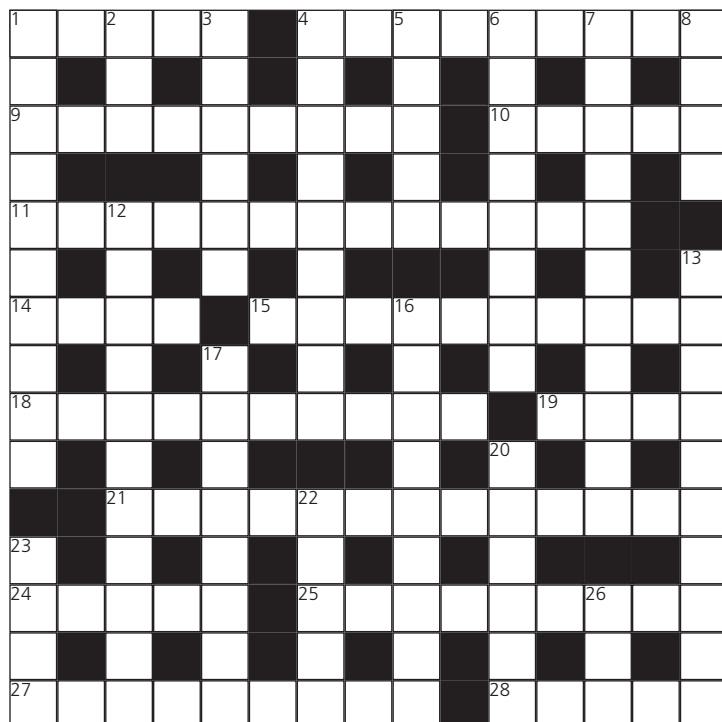
For further information and to register your attendance, please contact Leila Taleb: Email: leila.taleb@geolsoc.org.uk  
Tel: 020 7434 9944 Website: www.geolsoc.org.uk/events



*serving science and profession*



## Crossword no. 140 set by Platypus



## Solutions: August

**Across:** 1 Embed 4 Cosmology 9 Carbonate 10 Evert 11 Remanié Fossils 14 Maui 15 Timekeeper 18 Nottingham 19 Zinc 21 Infuriatingly 24 Irons 25 Brigadier 27 Absorbing 28 Dales

**Down:** 1 Escarpment 2 Bar 3 Drowns 4 Cratering 5 Steno 6 Overstep 7 Overlapping 8 Yeti 12 Mountainous 13 Brickyards 16 Emanating 17 Diffuser 20 Lizard 22 Rabbi 23 Pisa 26 ILL

## Across

- 1 Dissolution topography named for a region in the Dinaric Alps (4)  
 4 Loss of volatile phases in volcanic rock or early planet (9)  
 9 Winners of Society gongs, for example (9)  
 10 Having two linked carbon atoms (5)  
 11 Early 20th Century cultural movement originating in Germany, involving extreme subjectivity (14)  
 14 Adopts a recumbent or, perhaps in deformed regions, semirecumbent, posture (4)  
 15 Made to point a different way, compasswise (10)  
 18 Semiconducting device (10)  
 19 Steam or coking? (4)  
 21 In a manner that makes light of holy scripture (13)  
 24 Scale - a mountain for example (5)  
 25 Typical of US (9)  
 27 Abolition - reduction to nothing, as in marriage (9)  
 28 As likely as not, these Siberian aboriginal folk heard the Tunguska explosion in their native habitat near the Lena river, Siberia (5)

## Down

- 1 Potassic rock, best known for containing diamonds (10)  
 2 Retinal cell that perceives the world in black and white (3)  
 3 Moved towards the vertical from the original horizontal (6)  
 4 Lynmouth, Aberfan and the Tay Bridge all have one of these named for them (9)  
 5 Enthusiasm (5)  
 6 Sample taken for study (8)  
 7 Burials (11)  
 8 Respiratory organ of aquatic organisms (4)  
 12 Everything before the "explosion" (11)  
 13 From 18 onwards (5,5)  
 16 President Teddybear (9)  
 17 Formerly known as the city of Constantine (8)  
 20 53 - sublimes! (6)  
 22 To twitter foolishly (5)  
 23 The first centralised university entrance organization in the world (1,1,1,1)  
 26 Apparently choppy English river flowing west from the Mendip Hills to the Bristol Channel near Weston-super-Mare. (3)

## Win a Special Publication of your choice!

The winner of the August Crossword prize draw was Prof. Gerry Slavin of Matlock.

All correct solutions will be placed in the draw, and the winner's name printed in the December issue. The Editor's decision is final and no correspondence will be entered into. Closing date – November 1.

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

Please return your completed crossword to Burlington House, marking your envelope "Crossword". Do not enclose any other matter with your solution. Overseas Fellows are encouraged to enter by scanning the signed form and emailing it as a PDF to [ted.nield@geolsoc.org.uk](mailto:ted.nield@geolsoc.org.uk).

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Membership Number .....

Address for correspondence .....

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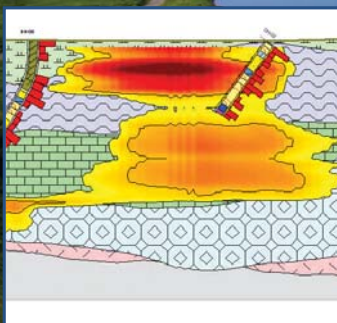
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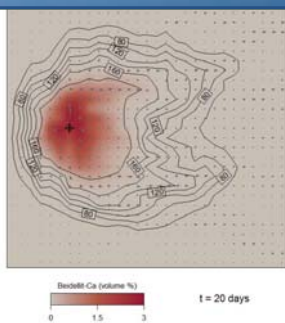
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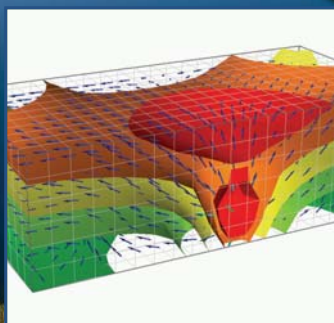
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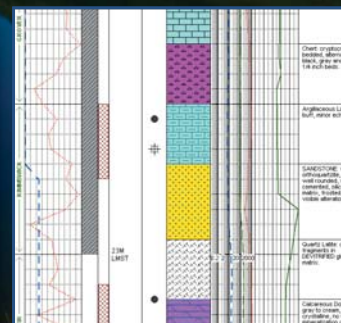
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