

Geoscientist

The Fellowship magazine of The Geological Society of London | www.geolsoc.org.uk | Volume 23 No 8 | September 2013

WELSH ROCKERS

Swansea boys who
mapped the world

SCOTS MISSED

End of Higher
geology looms

[READ GEOLSOC BLOG!
GEOLSOC.WORDPRESS.COM]

YANGTZE INCIDENT

The evolution of Asia's major rivers

CL:AIRE Annual Conference hosted by and in
conjunction with the Geological Society, London

Sustainable Land Management

*Decision support frameworks and tools for the
sustainable development of land*

Thursday 26th September 2013

Morning

Session 1 – SuRF UK (Sustainable Remediation Forum)

- An overview of the SuRF UK Framework
- Case studies
- Ask the experts / debate session

Afternoon

Session 2 – Definition of Waste: Development Industry Code of Practice

- A review of this approach to excavated materials management
- Case studies
- An overview of plans and progress for version 3
- Lessons learnt from the development of similar initiatives overseas
- Ask the experts / debate session

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The Geological Society
Burlington House
Piccadilly
London
W1J 0BG

£120 early bird – non CL:AIRE Member / Geol Soc Fellow [ends 30th August 2013]

£150 non CL:AIRE Member / Geol Soc Fellow

£100 CL:AIRE Member / Geol Soc Fellow

£50 Public Sector

£15 Student (limited spaces)

**This event will be followed in the evening by a panel discussion on
policy implications**

CL:AIRE



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Geological
Society

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■ **ERRATUM** The picture associated with the Founder's Day Dinner and Lecture announcement on page six of last month's issue was used in error. No photographs of Dr Parkinson are known to exist.



Ask the Mountains Their Story

an evening of science and literature

Join us at the Geological Society of London for talks
and readings in celebration of Earth Science Week 2013

Friday 18 October 2013
7 - 8pm, followed by a drinks reception
Doors open 6.30pm
Free Entry

The Geological Society
Burlington House
Piccadilly
London
W1J 0BG

Bryan Lovell, *Geology and Climate Change*


Sarah Day, *Fiction*

Barbara Cooke, *Biography*

Michael McKimm, *Poetry*


This event is free but please register:
E-mail: michael.mckimm@geolsoc.org.uk
Tel: +44 (0)20 7432 0999
www.geolsoc.org.uk/askthemountains

#askthemountains




The Geological Society
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This event is funded by Arts Council England Grants for the Arts with support from The Geological Society of London



Founders' Day

LECTURE & DINNER 2013



THE GEOLOGICAL SOCIETY WAS INAUGURATED ON FRIDAY 13 NOVEMBER 1807 BY THIRTEEN GENTLEMEN OVER DINNER AT THE FREEMASONS' TAVERN, COVENT GARDEN.

TO CELEBRATE THE SOCIETY'S INAUGURATION, WE WILL BE HOLDING OUR ANNUAL FOUNDERS' DAY LECTURE AND DINNER ON WEDNESDAY 13TH NOVEMBER 2013.

Founders' Day Lecture

James Parkinson and the Founding of the Geological Society
Speaker: Dr Cherry Lewis, University of Bristol

At the age of 16, James Parkinson (1755-1824) was apprenticed to his father to learn the 'art and mystery' of being an apothecary. Living all his life in Hoxton, then a village on the outskirts of London, his pioneering work in medicine led to him identifying the Shaking Palsy as a distinct medical condition, which eventually became known as Parkinson's disease. His favourite past time, however, was collecting fossils. This talk will review Parkinson's remarkable life, including his involvement in a plot to kill King George III, how he put the study of fossils on the scientific map of Britain through his three-volume work *Organic Remains of a Former World*, and how his expertise as the country's only 'fossilist' led to him becoming one of the 13 founders of the Geological Society.

Founders' Day Dinner

Venue: Le Meridien, Piccadilly - Dress: Black Tie - Ticket price: £80
After dinner speaker: TBC

Timings:

- 17.30 Tea & coffee served, Burlington House
- 18.00 Lecture by Dr Cherry Lewis
- 19.00 Drinks reception at Le Meridien
- 19.45 Presentation of The Netflix Earth Model Award
- 20.00 Dinner served
- 21.30 After dinner speaker
- 24.00 Carriages

Contact details:
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PROSP EX 2013

Business Design Centre, Islington, London
11 - 12 December 2013

Date For Your Diary

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Format: Two day exhibition with a parallel speaker programme including the highly popular 'Prospects to Go' sessions.

Registration: £130 for PESGB members, £145 for non-members

Exhibition: Over 60 exhibitors from around the North Sea basin including prospectors and non-prospectors

Programme: Over 20 confirmed talks, please see our website for the current timetable

Sponsorship: To find out about sponsorship opportunities, please contact ben@pesgb.org.uk or view our website www.pesgb.org.uk

With thanks to the following sponsors:








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“ THE PUDONG BUSINESS DISTRICT IN SHANGHAI SITTING ON THE DELTA OF THE YANGTZE RIVER. THE DELTA HAS BEEN A REGION OF INTENSE CULTURAL, SOCIAL AND ECONOMIC ACTIVITY SINCE NEOLITHIC TIMES ”

Front cover: Songquan Deng / Shutterstock

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CLUE IN THE NAME

Professor Mary Beard's recent exposure of an online troll - who apologised (by all accounts) because his re-tweeted posts were recognised and someone threatened to tell his mum - throws into relief the whole issue of identity and responsibility in the written word.

Learned and professional societies are all about owning up, standing up and being counted. Your Editorial Board (left) is keen to exhibit the fact that it is composed solely of Fellows of the Society, elected by their peers and possessing - as a lawyer might put it - 'the dignity and responsibility thereto appertaining'. The key word is responsibility, for a postnominal requires a 'nominal'. Anyone claiming a dignity must make themselves known, so their bona fides may, if necessary, be verified. To claim an affiliation under an alias would be illogical - at worst, mendacious - because those whom you assert elected you (and who therefore act as your moral guarantors) would be unable to identify you.

Internet trolling is fostered by anonymity, and is the direct antithesis of everything that affiliation stands for. Whereas anonymity fosters a freedom that quickly becomes licence, affiliation and identification impose the opposite - discipline in thought and word, circumspection, and (not least) politeness.

We are encouraged to embrace all innovation, for all novelty is bound to become the norm. We are enjoined to accept the Romantic notion that individualism and innovation are everything, and tradition nothing. But not everything lives by innovation. Most creative activities are crafts that need to be learnt, and whose traditions need to be upheld against the forces that inevitably assail them. Nobody should ever write anything to which they would not be content to put their name - or their postnominals.

Anonymity in the written word is a bigger evil, perhaps, than the discounting of expert editing in the belief that democratic *ask-the-audience* crowdsourcing will somehow do instead. Try googling the sentence 'I disapprove of what you say but I will defend to the death your right to say it', perhaps French philosopher Voltaire's best-known quote. The Internet will tell you so. Unfortunately, he never said it (it was put in his mouth by Evelyn Beatrice Hall in 1906). Truth is a privilege known only to a few, and is not determined by show of hands. *Nullius in verba* and all that.

If you want anyone to defend to the death your right to say something, better say who you are.

DR TED NIELD EDITOR

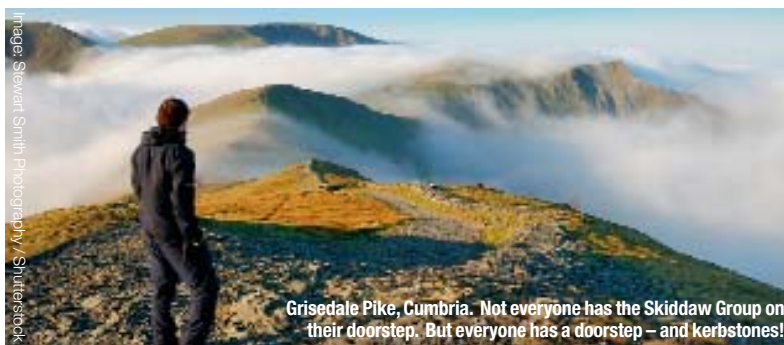


SOCIETY NEWS

ELECTION – FELLOWS

The following names are put forward for election to Fellowship at the OGM, 25 September 2013.

ABBOTT Philip; AGG James Paul; ALI Zahid; ALLAN Sophie Louise; ARCHER Jonathan Jeffrey; ATKINSON Emma; BALL Christopher John; BARKER Robert William Noel; BASHAR Ibrahim Labran; BATA Timothy Peter; BEAVIS Sara Gabrielle; BENGUIGUI Amran; BENNETT Nigel Peter; BERKENHEGER Gavin Ingo; BETHUNE Bruce George; BEYER Claus; BEYNON Steven John; BLANCHE Jamie Rowland Douglas; BOHILL Jennifer; BOYES Jonathan Mark Robin; BRIDDEN Michael Anthony; BROOK Nicholas; BRUMFIELD Guy William; BULL Charles Arthur; BULLEY Ian Martin; BURNS Michael; BURRAGE Mark George; BUTTERWORTH Kristofer; BYRNE Keith Brendan; CARAVANTES GONZALEZ Guillermo; CARMONA CARRILLO Francisco Javier; CAYLEY Glen Terence; CHAMLEY Fraser; CHAN Sei Kin; CHAN Wing Kan Ada; CHAPMAN Robert; CHARLES Jessica; CHATWIN Robert; CHEETHAM Rachel; CHOUDRY Auhlaq Ahmed; CHRISTENSEN Peter Ronald; COBLEY Alexander Owen; CODY Samuel Franklin John; COLE Jonathan Paul; COLE-HAWTHORNE Clare Rebecca; CONYBEARE Dominic; COOK Richard Charles; COSTEMA Thomas; CRAWFORD Lydia Joy; CROSS Ian Marcus; CUFF Christopher; CUNDY Andrew Brian; DARCY Mitchell Keith; DAVEY Jonathan Mark; DAVIES Edward Julian; DAVIES William Ivor; DECLERCQ Julien; DICKSON Euan Michael; DMITRIEVA Evellina; DODD James John; DODD Sarah Catherine; DODDS Peter; DUNHAM Thomas Jack; DUNNE Gabrielle Katie; ELLIS Amy Clare; EMBER Richard; ENWEREM Chinyere Azubuiker; FARO Geoffrey Robert; FELLOWS Susan Alison Fleur; FINNEY Alexander Peter; FISHBURNE Andrew Sam; FISHER William James; FITZGERALD-HUDSON April; FLEMING Edward James; FLOWERS Adrian Paul; FOK Wilson Wai Sun; FOORD Timothy Hugh; FORDHAM Robert David; FOSTER Adrian Mark; FOX Robert Ian; GILES David Arthur; GILMER Amy; GOLDSPIK Matthew; GOODBAND Ross; GOODFELLOW Thomas; GOODMAN Róisín Mary Bridgid Angela; GROCOTT Michael; GRUBER Matthew Paul; GUERRA Ivan; HALL Siobhan; HAMMOND Lee Morgan; HARPER Michael; HARTLEY Matthew Thomas; HASITHA Lokusethu Hewage Don Danuska; HAWKINS Charlotte Elizabeth; HERBERT Paul David; HESP Elizabeth Ann; HOAD Bianca; HOFMANN Christian Marcelo; HOJNOWSKI Michal; HOLZWEBER Barbara Isabella; HUBERT Nicole Aisling; HYETT Timothy; IBEH Christopher Uchechukwu; ILIES Alice; JAMES Ian Gareth; JAMES Nicholas; JAMES Robert Andrew; JANAKA Mudiyansejala Dinusha; JEFFERD Matthew John; JIAGGE Robert; JOHNSON Gayle; JOHNSON Timothy Alexander; JONES Benjamin; JONES Oliver Mark Laurence; JONES Philippa Anne; KEITH Rory Thomas; KELLY Thomas Peter; KENNAUGH Victoria Jane; KITE Graham David; KORIA Krishan; LAMBOURNE Eve Hannah; LANE Mark Robert; LAWRIE Craig Baxter; LEUNG Pak Wing; LEUNG Yuen Hong; LINDE-ARIAS Emilio; LIVESEY Athena; LIVSLEY Ernest Stephen; LO Choi Ying; MACCARTHY Finbarr Joseph; MACFARLANE Verity; MADDEN Robert; MAILEY Jane Christina; MALONEY Paul William; MAPHOSA Bridgette; MARTIN Jane Alexandra; MAWDITT Gary Robert; MCARDLE Peter Bernard; MCCOLLIN Heather Jane; MCGEEVER Siobhan; MCGRATH Conor; MCINTOSH Richard William; MCKENZIE Ian; MELLIN Adrian; MEREDITH John Edwin Charles; MIDDLETON Jay Leslie; MOHAMMAD Omar Adil; MOORE Lydia Danielle; MOREIRA Claire Nicola; MORELAND William Michael; MORRICE Susan Margaret; MOTT Gwen; MURDOCH Heather Gayle; NAIR Radhakrishnan; NEAL Harry Andrew; NEAVE David Axford; NEVE Peter Stephen; NIEBOER Ian; NOBLE Richard Philip; NORCLIFFE James Richard; OLIVER Andrew John; OLIVER Jonathan Oliver; OPUKMO Alfred Wilson; OWEN Edward Llewellyn; PACE Paulo; PEARSON Jonathan; PIERPOINT Nicholas William; PLAMPTON William David; POTTER Rebecca Kate; POWELL Lisa Marie; PRING Mark James; PROSSER Katherine; PYM David Ewan; RAE Lisa; RAFIPAY Charles; RANDLE Charles Henry; RAPHAEL Kern Finbar; REYNOLDS Catherine; REYNOLDS Stephen; RICHARDSON Julie Ruth; RIDING Daniel Frederic; ROBINSON William John; ROORDA James Douwe; RORISON Philip John; ROSE Peter Robert; ROSENBERG David; ROURKE Peter James; ROVARDI Matthew Peter; RULE David Christopher Walter Will; RYAN Paul John; SANKEY Kate Christina; SIBERRY Claire Amanda; SMITH Alexander James; SMITH Stuart; SMYLY Heather; SOUFLERIS Christos; SQUIRES Claire Elizabeth; STEINER Benedikt Maximilian; STEWART Amy Claire; STOREY Duncan Gareth; STOTT Andrew Tuson; SULEIMAN Adamu; SUTTILL Hannah Louise; SWEENEY Mark John; SYDNEY Hannah; SZULC Joanne; TAYLOR Helen; TAYLOR Martin Stephen; TENNANT Stewart David; TESFU Abraham; THOMPSON Benjamin Charles; THORNTON Elizabeth Sarah; TURNER Matthew James; TYRRELL Toby; VILCHEZ PONS Elena; VINCENT Benoit; WAI PING Yiu; WALTERS Abigail Sarah; WARD Christopher James; WARNOCK William; WATKIN Tegid Arwyn; WATSON Jonathan Adam; WEBB Daniel Robert; WEBBER Simon; WEBSTER Jenna; WESLEY Benjamin Joseph; WHEELER Ian Stewart; WHITE Lloyd Thomas; WHITELEY Martin John; WHITTINGHAM Christine WILLIAMS Clive Albert John; WILLIAMS Nathan; WILS Tommy; WILSON Philip Samuel; WTER Julian David; WRAY Wesley Philip; WU Kwok Hoong Brandon; YORIS-VILLASANA Franklin Gerardo.



Grisedale Pike, Cumbria. Not everyone has the Skiddaw Group on their doorstep. But everyone has a doorstep – and kerbstones!

Earth Science Week 2013

Earth Science Week will take place on 7 – 13 October. With a theme of 'Geology Outside'. Jo Mears reports.

The Society wants to encourage greater appreciation of the geology on our doorstep in the UK – whether you live in the city or the countryside. Regional and national events will run throughout the week, culminating in a Great Geology Walk on Saturday 12 – we hope as many people as possible will join us!

Walks can be self-guided, using material made available on our website; or you can participate in one of many walks being organised by Regional Groups. However you choose to join in, we would love to see pictures. Tweet us @geolsoc using #greatgeowalk, or email joanna.mears@geolsoc.org.uk.

► For more information about Earth Science Week events and how to take part, visit www.geolsoc.org.uk/earthscienceweek13



Kerbs and your enthusiasm



Sarah Day writes: as our contribution to Earth Science Week 2013, Geoscientist is setting out to unravel an urban conundrum – with your help!

Across the country, Victorian pavements and kerbstones are dotted with mysterious markings. Whether letters, symbols or shapes,

no-one seems to know what these engravings mean. Following Peter Dolan's June 2013 article (*Geoscientist* 22.05), our crack reporters have been searching for an answer; but not even the Worshipful Company of Paviers (est. 1479) has the answer. Quarry marks? Delivery instructions? Pointers to local services? Clues to a Da Vinci Code-style treasure hunt? We would like to know.

So, as an Earth Science Week 'fringe event', *Geoscientist* is calling on readers to help us build the largest kerbstone markings database the world has yet seen. If you spot a mysterious marking, snap it, use our handy identification guide to tell us about the rock it is carved in, and send us the information! You can find our guide at www.geolsoc.org.uk/kerbsurvey.

Email pictures to sarah.day@geolsoc.org.uk, or tweet us @geoscientistmag using #kerbsurvey. The official data gathering week is 7 – 13 October – but there is no need to wait until then!

Oh, and we promise that if the 'Dan Brown' theory pans out, any proceeds will go to a well known charity of our choice. No 210161.

[LECTURES]

Shell London Lecture Series



Dwarfism in animals on islands

Victoria Herridge
(Natural History Museum)

11 September 2013

The extinct dwarf elephants of the Mediterranean are remarkable. They evolved many times, on many islands, from large mainland species such as the four-metre tall straight-tusked elephant. Some of these dwarf elephant species were just one metre tall as adults. But although scientists know they evolved in response to the island environment, we still don't fully understand why. Victoria has been seeking out sites excavated by Victorian and Edwardian naturalists such as Thomas Spratt, Andrew Leith Adams, Hugh Falconer and Dorothea Bate, and bringing modern methods to bear on their discoveries. In this talk, she will tell the story of those pioneers, how she came to follow in their footsteps, and what her new findings might mean.

- **Programme** – Afternoon talk: 1430 Tea & Coffee: 1500 Lecture begins: 1600 Event ends.
- **Programme** – Evening talk: 1730 Tea & Coffee: 1800 Lecture begins: 1900 Reception.

FURTHER INFORMATION

Please visit www.geolsoc.org.uk/shellondonlectures13. Entry to each lecture is by ticket only. To obtain a ticket please contact us 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: **Naomi Newbold**, The Geological Society, Burlington House, Piccadilly, London W1J 0BG,
T: +44 (0) 20 7432 0981
E: Naomi.newbold@geolsoc.org.uk



In association with
www.shell.com

FUTURE MEETINGS

Dates for meetings of Council and Ordinary General Meetings until April 2014 shall be as follows:

- **2013:** 24 & 25 September (Council residential) – OGM at 1630, 25 September; 27 November
- **2014:** 5 February; 9 April



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>

Flexible postal loans

In order to lower costs for Fellows and Corporate Affiliate companies, the Library is now able to post books and maps using First or Second Class postage. Items can be posted anywhere in the UK and Ireland, and the majority of the Society's holdings are available through this service.

If you would like items urgently, then no problem! We can guarantee items will reach you next day using Royal Mail Special Delivery.

- ▶ For more information about this service email library@geolsoc.org.uk or visit www.geolsoc.org.uk/loans



Society Awards 2014

Fellows of the Society are invited to submit nominations for the Society's Awards for 2014 to the Awards Committee. Full details about how to make nominations may be found at www.geolsoc.org.uk/awards.

Edmund Nickless writes: In order to reward excellence and promote international recognition of Fellows of the Society, we would encourage you to nominate colleagues for awards of other societies such as the American Association of Petroleum Geologists, the American Geophysical Union, the European Geosciences Union and the Geological Society of America.

There are different requirements and criteria for the awards made by these societies; for example, some require candidates to be members. Details can be found at:

- www.aapg.org/business/honors_awards/
- www.agu.org/honorsprogram/
- www.egu.eu/awards-medals/proposal-and-selection-of-candidates/
- www.geosociety.org/awards/aboutAwards.htm

- ▶ Nominations must be received at the Society no later than 4 October 2013

Lambeck's 'return'

An unfortunate omission on President's Day will be rectified in September, reports Dawne Riddle.

Due to a most unfortunate diary malfunction, Prof Kurt Lambeck managed to miss President's Day and the Awards Ceremony, at which he was to receive the Wollaston Medal. We look forward to welcoming him back on Wednesday 25 September, when he will finally deliver his much-

anticipated lecture, *Of Ice and Land, Sea and Strand: Sea Level During Glacial Cycles*.

- ▶ The event will follow the AGM and begin with tea at 1730. The medal presentation talk will follow at 1800 and culminate in a wine reception, finishing around 2000. Entry is free but by ticket only. Please register with naomi.newbould@geolsoc.org.uk

SOCIETYNEWS...

Policy update



The Society has undertaken a wide range of policy activities, from reform of the curriculum to developing the UK's science infrastructure, writes *Florence Bullough*.

The Society often works with other organisations when responding to inquiries and government consultations – we achieve more working together than we do alone. The most recent instance was the response to the House of Lords Science and Technology Committee's inquiry on Scientific Infrastructure. We took part in a discussion with other scientific societies convened by the Science Council, which then informed the Science Council's response. The Society also provided a supplementary response supporting the Science Council's more general one which addressed infrastructure needs specific to our community, and examples of successful collaboration nationally and internationally¹. We also attended a recent stakeholder meeting at the Department of Business Innovation and Skills to discuss the impact of EU membership on UK Research and Development².

Reform of the National Curriculum for England is still underway, but a major milestone has been reached with the publication of the final version of the curriculum for Key Stages 1-3 (students aged 5-14) in July. We were pleased to see that many of the comments which the Geological Society provided on the draft curriculum were taken on board by the Department of Education³.

The Society also responded to a recent call for evidence from the Department for Energy and Climate Change, which is reviewing the process for siting of a geological disposal facility for radioactive waste⁴. And we worked with the Royal Society to hold an event to mark the publication of a major report of the European Academies Science Advisory Council on carbon capture and storage.

From time to time we also attend parliamentary events in London and elsewhere to meet a wider group of decision-makers and promote appreciation of the many ways in which geoscience underpins society. The policy team participated in the 'Science and the Assembly' event in May, with the theme of 'Innovation as a Driver of Growth in the Welsh Economy', held at the Welsh Assembly buildings in Cardiff.

In July, the policy team, along with members of Council and other Fellows, attended the Parliamentary Links Day at Portcullis House, Westminster organised by the Society of Biology, and hosted a table at a lunch held afterwards in the House of Lords. This year's session focused on *Science and Diversity*.

▶ Please see online for references www.geolsoc.org.uk/Geoscientist

THE GEOLOGICAL SOCIETY CLUB

The Geological Society Club, successor to the body that gave birth to the Society in 1807, meets monthly (except over the field season!) at 18.30 for 19.00 in the Athenaeum Club, Pall Mall, or at another venue, to be confirmed nearer the date. Once a year there is also a buffet dinner at Burlington House. New diners are always welcome, especially from among younger Fellows. Dinner costs £55 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.

2013: 25 September (Ath); 16 October; **2014:** 5 February (Burlington House); 5 March (Ath); 14 May; 24 September; 15 October

Fellows wishing to dine should email **Cally Oldershaw** in the first instance, to secure a booking and receive payment instructions.

E: cally.oldershaw@btopenworld.com or **T:** 07796 942361.



CHARTERSHIP NEWS

Accreditation officer *Bill Gaskarth* on a new monthly record for Chartership applications, and new accredited university courses

Email: chartership@geolsoc.org.uk

Chartership applications peak

This month's interview date has elicited a record number of applications - some 44 have been received to date, including two from overseas. Three are for CSci only, one for both CSci and CGeol, and 39 for CGeol. Six of the latter come from senior geologists with 20+ years' professional experience.

We shall therefore use four venues for interviews, and over 50 scrutineers have been called up for duty. This represents about 20% of our total resource of scrutineers. If this trend continues, then we may have to ask scrutineers for their help more than once in a year unless we can recruit more.

We encourage any Chartered Geologist with over four years' professional experience after attaining CGeol status, or who has many years' experience before becoming Chartered, to apply to be a Scrutineer. Invitations to act are governed by the types of expertise claimed by candidates in any one area; so it may well be that some scrutineers are rarely called upon.

Applications for November interviews are also looking healthy. The Central Scotland Regional Group asked for an interview venue in Scotland and advertised this to their members. This has resulted in some 13 confirmed applications for interviews in Glasgow on November 5. We already have another six definite applications for the London venue on November 7, the application deadline for which is not until September 9. Interest is picking up from the oil and gas and mining sectors as well as from senior Fellows who have yet to become Chartered.

▶ Information on scrutineering is available on www.geolsoc.org.uk/scrutineers. For further information, email: Chartership@geolsoc.org.uk or call Bill Gaskarth on 07916 138631

Accreditation news

The University of Derby applied for accreditation of its MSc in Applied Petroleum Geoscience. This application has been successful and so is added to the growing list of vocational MSc programmes now accredited by the Society. Graduates of these accredited programmes are eligible to apply for Chartership after four years' relevant experience, a year earlier than would be the case without accreditation.

Two other MSc courses have been submitted and are presently under review by the Accreditation Committee. The results of these applications will be published in the next issue of *Geoscientist*. It is hoped that more will follow and that the academics associated with all vocational MSc courses will become Chartered. Applications for accreditation of three more company training schemes have also been received and are under review by the Professional Committee.

[GEOFACETS MAP SEARCH & RETRIEVAL]

Navigate your way to the right map with new online tool

An online map-finding tool designed for the oil industry will soon be available to individual Fellows of the Society. Neil Marriott reports.

Many of us remember the first geological map we saw – perhaps of our local area, perhaps frame-mounted on a museum wall, or printed in the pages of our first geology textbook – and were struck by its vivid colours, unexpected patterns and the hint of a story to be told. Many geoscientists still have a fascination for maps of all sorts and will seek them out for pleasure, or in the pursuit of their profession.

For those who use maps in their work, sourcing the right maps, which give the right information, may not be easy. Some may be held by overseas geological surveys, while others may be available commercially. Still others may be held in extensive private collections and map libraries, such as the Geological Society's Map Library in Burlington House (see *Folded or Flat*, by Paul Johnson (Society Map Librarian), *Geoscientist* 22.10, November 2012), or published within the pages of scholarly books and journals. Even if appropriate maps can be found, the search can be time consuming, and it can be difficult to integrate diverse map data with modern working methods or GIS systems.

GEOFACETS

It was with these challenges in mind that Elsevier set about developing Geofacets, a unique map search and retrieval system for the geoscientist. After interviewing oil industry geologists about their use of maps in regional evaluation, and how they identified and retrieved the key data required, they set about developing a system to improve and accelerate the identification of the most useful maps and retrieve valuable articles of particular relevance.

Launched in 2010, Geofacets was initially designed for the oil industry and

Right: Many geoscientists still have a fascination for maps of all sorts and will seek them out for pleasure, or in the pursuit of their profession



enabled geoscientists to identify maps and sections published within Elsevier's Earth science journals. Since then more maps have been added, including those published by the Geological Society in its books and journals featured in the Lyell Collection. Other societies, including SEPM and the Society for Economic Geology have also integrated their map content, and this autumn further maps from the Geological Society of America will be added.

Geofacets is an intuitive online map-based search tool, its key strength being that it enables the extraction of georeferenced geological maps and links to the articles they are published in. These maps can then be imported into a variety of GIS systems and overlain to extract maximum value from the data retrieved. Searches can be made geographically, and refined by map type, key word, basin or date of publication.

To date Geofacets has only been available to corporate or institutional subscribers and has been especially popular with those working in the oil industry where the stakes are high and investments of millions may ride on the accuracy of map-based evaluations of potential new prospects. However, from January 2014 a new version of Geofacets designed specifically for

Fellows of the Geological Society of London will be available.

Geofacets GSL Millennium Edition will provide individual Fellows with the full range of Geofacets functionality and enable the retrieval of the c.20,000 GSL maps published in its books and journals since 2000. Each map search result:

- links to the full text of the article from which is derived (read-only for titles to which a Fellow does not have access rights)
- can be downloaded
- is accompanied by article and metadata information, and the relevant abstract

The price of this new service will be £35 for 2014 and the Society has organised a series of webinars to provide further detailed information and enable you to ask detailed questions. For details of Geofacets-GSL Millennium Edition, this autumn's webinar programme and how to subscribe, please visit www.geolsoc.org.uk. To find out more about how your employer or business can subscribe to the current full version of Geofacets please email Senior Product Manager, Phoebe McMellon at p.mcmellon@elsevier.com or Director of Marketing Regina Javier on r.javier@elsevier.com.

Registration Open

**Imperial College
London**



**The
Geological
Society**

serving science & profession

100 Years and Beyond: Future Petroleum Science & Technology Drivers



Date: 23-24 September 2013

Venue: Imperial College London

This 2-day meeting will celebrate 100 years of petroleum-related science and engineering education at Imperial College. With a list of distinguished speakers, we aim to mark this landmark achievement by looking forward to the next 100 years, with emphasis on discussing key future drivers and related energy supply issues. The meeting will be wide-ranging, with presentations covering global energy trends, future geoscience and engineering technologies, unconventional hydrocarbon resources, carbon sequestration and climate change.

We have an outstanding group of confirmed speakers, including:

- Richard Hardman CBE (past President, Geological Society)
- Lord Oxburgh of Liverpool
- Lord Browne of Madingley
- Professor Scott Tinker (Director, Bureau of Economic Geology, Texas)
- Dr Bruce Levell (VP Emerging Technologies, Shell)
- Malcolm Brown (Senior VP Exploration, BG Group)
- Dr Bryan Lovell OBE (past President, Geological Society)
- Professor Joe Cartwright (University of Oxford)
- Emeritus Professor John Woods (Imperial College & the 2007 Joint Nobel Peace Prize Winner)
- Dr Mike Daly (VP Exploration, BP)

The meeting is jointly convened by Imperial College London and by the Geological Society of London, supported by the American Association of Petroleum Geologists, the Society of Petroleum Engineers, the Petroleum Exploration Society of Great Britain and the European Association of Geoscientists and Engineers.

Further information and registration details:

Further information and registration details can be found at:
www.geolsoc.org.uk/oilcentenary13

or contact Steve Whalley at the Geological Society, using the following email address: steve.whalley@geolsoc.org.uk

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Scottish un-enlightenment

WRITTEN BY RUTH ROBINSON

As the SQA ditches Higher Geology, **Ruth Robinson*** asks: is Scotland experiencing a loss of science breadth and reason?

In 2015, Scotland will discontinue the Higher Geology qualification. What would James Hutton think of this, I wonder? The Scottish Qualification Authority (SQA) decided to close Higher Geology because of poor uptake by pupils. A previous *Geoscientist* article by Chris King and Ben Jones ('Reasons to be cheerful?' *Geoscientist* 21.05, June 2011) presented trends in A Level and Higher Geology that illustrate the low numbers taking Higher Geology recently. However, no new Geology teachers have been trained in Scotland since 1985 and there is a strong argument that low uptake is a direct consequence of poor provision.

However, enthusiasm for geology education is high across Scotland, where support is available. The GeoBus outreach project has involved 15,000 pupils in 120 different schools in Earth science teaching activities since January 2012; 82,000 pupils visit *Our Dynamic Earth* in Edinburgh annually, and a recent (unpublished) survey demonstrates that over 130 teachers are interested in offering the subject at Higher, given support.

This demand is not a sufficient argument for SQA to change their decision. They argue that geology content is now spread across subjects within *Curriculum for Excellence*; but our audit of the mandatory material in National 5 (Key Stage 4) and Higher estimates this to be minimal and disconnected coverage.

We have an opportunity to develop something new. A group including Peter Harrison (Ullapool High School), Joyce Gilbert (Royal Scottish Geographical Society), Stuart Monro (Our Dynamic Earth), John Banks (Maersk Oil Ltd) and I have met the Scottish Government to propose a new Higher in Earth Science. This would cover the solid Earth and Earth systems, the Earth science behind climate and environmental change through time and natural resource challenges, as well as covering core aspects of geology. It would build on the exciting research advances over the last 25 years and



highlight the breadth of potential careers available.

If offered in S6 (Year 13), it is not in competition with other science and Maths Highers typically taken in S5, and Higher Earth Science could build on, and integrate, the learning achieved in other science subjects.

The transitional year between school and university or employment also provides an opportunity to develop independent learning and transferable skills that are generic to other subject areas, including 3D/4D visualisation and understanding concepts of uncertainty. We want our next generation of citizens to have an adequate grasp of the relevance of Earth science in the economy and for smart stewardship, not just an increased stream of Earth science graduates.

So - what *would* Hutton think of modern education systems? He would probably find our secondary science education awfully narrow. Data from the *Trends in International Maths and Science Survey* (2007) shows that Scotland ranks 39th out of 41 OECD countries in terms of the narrowness of its science teaching (SEEAG Report 2012). This could be improved by offering something with breadth, such as Earth science. We await a decision from the Minister for Learning, Science and Scots Language, Dr Alastair Allan, on our proposal.

***Ruth Robinson** is Senior Lecturer in the Department of Earth & Environmental Sciences at the University of St Andrews. She is also Director of the mobile Earth science outreach project, GeoBus



SOAPBOX CALLING!

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

If you can write it entertainingly in **500 words**, the Editor would like to hear from you.

Email your piece, and a self-portrait, to ted.nield@geolsoc.org.uk. Copy can only be accepted electronically. No diagrams, tables or other illustrations please.

Pictures should be of print quality – as a rule of thumb, anything over a few hundred kilobytes should do.

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

“ WE WANT OUR NEXT GENERATION OF CITIZENS TO HAVE AN ADEQUATE GRASP OF THE RELEVANCE OF EARTH SCIENCE IN THE ECONOMY AND FOR SMART STEWARDSHIP, NOT JUST AN INCREASED STREAM OF EARTH SCIENCE GRADUATES ”
Ruth Robinson

The highest and youngest continent on Earth, Asia, is also the home of many of the largest rivers on the planet. Although the Amazon has the greatest water discharge of any river on Earth, the great streams draining the Tibetan Plateau and Himalayan Mountains carry the largest sediment loads. These not only support human activities but also feed the biggest submarine sediment accumulations in the adjacent deep ocean basins of the Indian Ocean and the Western Pacific marginal seas. The submarine fans are of greater scientific and commercial interest; but every grain of sand deposited there had first to be transported by the rivers to the coast. Understanding how the rivers have evolved is essential if we are to decipher the deep sea stratigraphic record.

Because rivers have to flow downhill, it has long been accepted that the development of topography in Asia following the collision between India and Eurasia around 50 million years ago (Ma) would have resulted in a significant reorganisation of the original river systems. In the Palaeogene Central Asia was covered by the shallow seas of the Paratethys, but southern Tibet and those regions now exposed along the southern coast of China were elevated areas, as a result of the deformation and magmatism of a subduction-related arc during the Mesozoic.

The Oligocene extension and deepening of the South China Sea, coupled with the growth of the Tibetan Plateau, resulted in a reversal of the original regional gradient. Likewise, in eastern China extension, starting in the

Oligocene and culminating in the Miocene (probably linked to rollback of the Pacific plate) resulted a series of basins opening and subsidence accelerating in the East China Sea just as the Tibetan Plateau was growing towards the east and north. Together, these processes resulted in a re-tilting of the regional topography towards the Pacific Ocean.

HEADWATER CAPTURE

The region of Southwest China, northern Vietnam and southeastern Tibet is particularly noteworthy in understanding how the rivers have developed during the Cenozoic because it has several large rivers (Irrawaddy, Salween, Mekong, Red and Yangtze) that flow within about 180km of one another, separated by parallel mountain ranges. Early models, which suggested these streams are passive strain markers brought together by deformation of the upper crust, have mostly given way to hypotheses based on the idea that they represent fragmented parts of one larger pre-collisional river system that has been disrupted by topographic growth as it spread from NW to SE - a view championed by Marin Clark, now at the University of Michigan.

The Red River in particular attracted attention as being potentially the ancestral "mother river" of eastern Asia. In this scenario the modern river represents only the main stem of the palaeo-river, with the headwaters having been lost to adjacent major drainage basins; although more recently provenance work has suggested that this basin may not have involved quite as many neighbouring drainages as some of the original models were inclined to believe. ▶

YANGTZE RIVER INCIDENT

Peter Clift* wades into the debate over the origin of Asia's modern drainage pattern





Panoramic picture showing the first bend of the Yangtze River in Yunnan, Southwest China. In this location the Yangtze changes its direction of flow from towards the south back towards the northeast for the first time since starting its journey in Tibet

► Data from the sedimentary basins formed along the India-Eurasia suture zones now suggest that many of the rivers began their life shortly after the collision between these major continental blocks. I and a number of colleagues, most notably Graham Layne now at Memorial University in Newfoundland, used Pb isotope measurements of single grains of potassium feldspar analysed by ion microprobe from the Indus Molasse of Indian Ladakh to show the start of an axial river draining west into the Arabian Sea shortly after around 50Ma. This was supported by later U-Pb dating of detrital zircon sand grains from the same sequences.

Likewise, new data based on U-Pb zircon dating of sandstones within the Central Burma Basin and analysed by Ruth Robinson and colleagues at St. Andrews University, show a convincing link between the Irrawaddy River and the Brahmaputra/Yarlung Tsangpo in Tibet, demonstrating that large rivers had started to drain the suture zone effectively after the time that sea water had been eliminated from within the collision zone. As soon as the colliding continents had started to generate topography, the new rivers began to exploit it; and these streams have probably been in place, draining through the western and eastern syntaxes, since that time.

COMPLICATED

The situation in eastern Asia is however more complicated because the major rivers from Tibet are flowing parallel to the structural grain out of the plateau and are also affected by the gradually expanding nature of Tibetan topography. It is now becoming apparent that the time around the Oligocene-Miocene transition, ~24Ma, is one of major change for the river systems. It may not be a coincidence that this was also a time when the Asian monsoon began to strengthen significantly in South and Southeast Asia, resulting in higher discharge and faster sediment delivery to the continental margins supplied by the major rivers.

In 2006 Nguyen Anh Duc from the Vietnam Petroleum Institute, Jerzy Blusztajn from the Woods Hole Oceanographic Institution and I, then working at the University of Aberdeen, proposed that the Red River had achieved much of its present geometry as a result of losing its drainage connection to what is now the central Yangtze drainage, most notably around the Sichuan Basin in SW China. This model was based on the bulk composition of sediment deposited under

Shaded topography map of eastern Asia showing the courses of the major rivers and their relationship to the high topography of the Tibetan plateau



Pagodas in the old city of Dali, Yunnan, Southwest China close to the headwaters of the Red River



Fisherman on the Red River in northern Vietnam



The Red River of northern Vietnam, proposed to be the ancestral mother river of Eastern Asia





MODIS satellite image of the Yangtze Delta in flood in 2003



The red River in southwest China within its upper reaches close to the proposed capture point with the Yangtze



Outcrop of the Yangtze Gravels at Guizhan, near Nanjing in the lower reaches of the Yangtze River. Volcanic rocks interbedded within the sequence show that these river sediments were deposited before 23 Ma

the modern delta of the Red River.

Nd isotopes were used to identify the bulk provenance of the river and showed the palaeo-river sediments achieving values comparable to the modern river before around 24Ma. Subsequently, application of Pb isotope methods to single grains of potassium feldspar and analysed in the ion microprobe at Edinburgh University allowed us to make a link between the Red River delta and the Yangtze Craton, exposed in central southern China - the loss of drainage occurring before 24Ma, at the start of the Miocene. The same study ruled out any connection between the Red River and the Brahmaputra, as well as with the Mekong or Salween. This limited the size of the palaeo-Red River. Subsequently, Long Van Hoang, now at the Hanoi University of Mining and Geology, used zircon dating of fluvial sedimentary rocks in northern Vietnam to support this general picture of a larger palaeo-Red River extending into central China before the middle Miocene, but not one covering the enormous areas first proposed.

GROWING TOPOGRAPHY

This general picture of drainage reorganisation seemed to be broadly consistent with new data on the uplift history of the plateau. Earlier attempts to look at how the elevation has changed focused on a rapid uplift starting about 8Ma, some workers even favouring rapid uplift extending as late as the Pleistocene (younger than 1.8Ma). Others, including Paul Tapponnier (Earth Observatory of Singapore), favoured a stepwise uplift, starting in the Eocene.

These models have now been tested thanks to the development of stable isotope proxies for plateau elevation and applied to lake deposits and calcretes within continental sediments. These argue that southern Tibet came close to its modern elevation either shortly after - or even before - the collision with India, and that topography grew from this nucleus. Thermochronology work led by Marin Clark in the gorges of eastern Tibet, showed that these valleys were primarily cut after around 11Ma; but that did not preclude an earlier uplift involving a gentle tilting towards the East, which would have been sufficient to reorganise the rivers into the new pattern we see today.

Thus we can envisage a progressive growth of topography, spreading from the collision zone, driving major drainage reorganisation across eastern Asia starting in the Oligocene. ►

▶ ROLE OF THE YANGTZE

Within this overall framework of evolving topography the Yangtze stood out as being anomalous because many geologists considered the river to be of Pleistocene age and certainly not more than a few million years old. This was despite its very central location between several other basins, its origins within the Tibetan Plateau and the fact that many models invoke headwater capture between the Yangtze and its neighbours.

The supposed young age of the Yangtze was based mostly on the observation that large deltaic clinoforms in the region of the modern river mouth only date back as far as the Pleistocene; but this presumed that the river mouth had not moved, despite the widely recognised tendency of such systems to avulse (as has been well documented in the Mississippi).

Furthermore, zircon data collected by Ping Kong and colleagues from the Chinese Academy of Sciences in Beijing from close to the ‘first bend’ (the apparent capture point between the Red and the Yangtze rivers) seem to suggest a re-routing of the river from south to the northeast after only 1.7Ma. Why would the Yangtze River be so young, when the topography of Eastern Asia appears to have been in continuous development through much of the Cenozoic? Where would the water from eastern Tibet have flowed without the Yangtze, prior to the Pleistocene?

This question was of particular interest to my colleague Hongbo Zheng, who living in Nanjing encounters the Yangtze on a daily basis. He observed a series of fluvial sedimentary rocks exposed close to the city that were covered by lava flows. These sequences are known as the Yangtze Gravels and have always been assumed to be of Pleistocene age. However, Zheng and his colleague Fred Jourdan (Curtin University) sampled the flows and using the Ar-Ar method dated them as older than 22Ma!

As a result they were able to conclude that these sediments could act as a monitor of how well formed the Yangtze was during the Early Miocene.

A number of samples were then taken from the sediments beneath the lava flows, and the zircon sand grains dated at Nanjing University using the U-Pb method. At the same time, sediments were taken from the modern Yangtze River and analysed similarly. The range of ages was very wide but can be divided up into families reflecting the

times of orogeny and crustal formation in eastern Asia.

The illustration shows the close similarity between the age populations in the Yangtze Gravels and those in the adjacent modern river. Although there is some variability, even in the modern system (because of seasonal floods, climate change and even anthropogenic disturbance) it is apparent that all the major age populations are present, and in approximately similar proportions, in both the gravels and the modern river. Zheng interpreted this to indicate the gravels were being deposited from a river that was essentially similar to the present-day Yangtze. When the same deposits were compared with other potential rivers, such as the Yellow River, a very poor match was found.

REORGANISATION

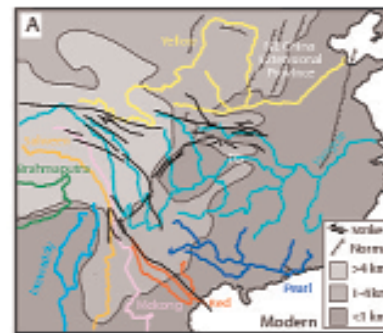
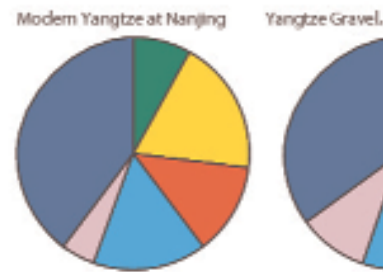
Understanding that the Yangtze River must be at least 22 million years old means that this river, consistent with data from the Red and Irrawaddy Rivers, indicates large-scale re-organisation at the start of the Miocene. The Yangtze appears to have taken up its present course immediately after it was captured from the Red River.

Where was this river flowing if there was no delta in the present location? Zheng has identified thick sequences of clastic sedimentary rocks within the Subei Basin, which lies just to the north of the modern river mouth and which seems to have been one of the primary depocentres for this earlier drainage system. If the river reaching Nanjing was really flowing close to the present course before 23Ma then this implies that the Yangtze must have been passing through the Three Gorges region by that time.

In order to do that it has to flow through the Jiangnan basin, which lies immediately downstream of the gorges. During much of the Paleogene this basin was receiving mudstones and evaporite deposits, which continued until just before 36Ma. It is inconceivable that the lake in which the sediments formed (and which must have occupied the center of the Jiangnan Basin) could have been supplied by the Yangtze River, because the volume of water would have been too great to have permitted the evaporites to have formed. This means that the Yangtze could not have flowed on its modern path until after 36Ma.

This new study places the Yangtze firmly within a coherent pattern of

Pie diagrams showing the simplified age composition of zircon sand grains within Yangtze Gravel sediment taken from close to Nanjing compared to the modern Yangtze River at Nanjing, the modern Yellow River and a composite average of sands from the Yangtze Delta since 3.1 Ma. Taser from Zheng et al. (2013)

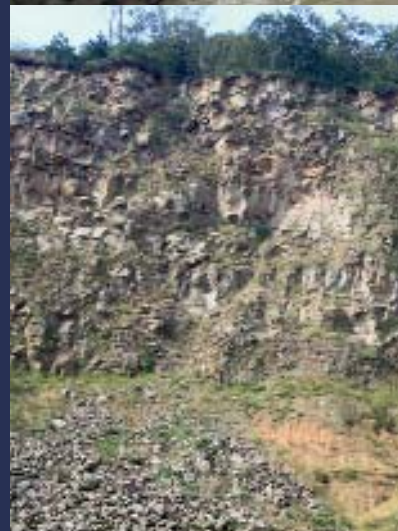


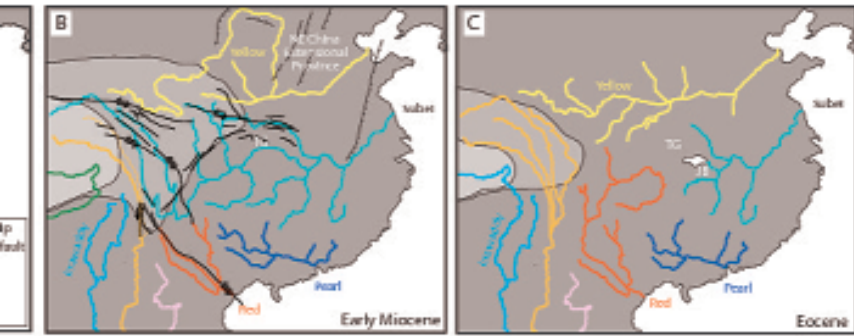
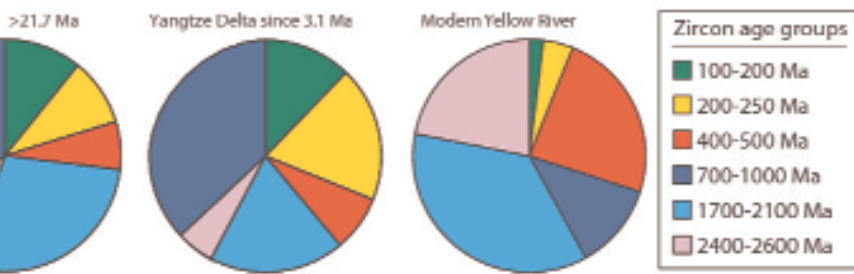
Proposed development of the river systems in Eastern Asia and its relationship to the growing topography of the Tibetan plateau as well as the large-scale faulting that controls both the extrusion of Southeast Asia and the development of basins along the eastern margin of China during the Miocene

The Yangtze River (Jinshajiang) within the Tiger Leaping Gorge within the Jade Dragon Snow Mountain of Yunnan, Southwest China just downstream from the first bend



Volcanic rocks overlying the Yangtze Gravels close to Nanjing





The Three Gorges region that separates the middle from the lower reaches of the Yangtze and which represents an important topographic barrier to flow from Tibet into the East China Sea

drainage development in Eastern Asia. It is a system in which major rivers are directly related to topographic uplift within the general region of the Tibetan Plateau, starting within the Paleogene. Gradual tilting of the continent towards the East forced the drainage systems to evolve.

A number of independent studies now show that the major rivers changed their provenance at around the same time, close to the start of the Miocene. That is not to say that small adjustments have not been made subsequently, not least because river systems tend to evolve through time - especially through headwater erosion leading to moderate degrees of drainage capture.

Nonetheless, the major adjustment we see close to the start of the Miocene reflects a critical time at which high topography was beginning to form in a climate where the monsoon was intensifying and also when extensional basins were opening along the southern and eastern edges of the Asian mainland. There are close two-way inter-relationships between climate, tectonics and erosion in Cenozoic Asia, with the rivers often acting as the mechanism that allows the feedbacks to take place.

The antiquity of the Yangtze is now well placed within our improved understanding of how Asia has deformed and grew since collision with India. ■

* **Peter Clift** is Charles T McCord Jr Professor of Petroleum Geology in the Dept of Geology and Geophysics, Louisiana State University, Baton Rouge E: pclift@lsu.edu

FURTHER READING

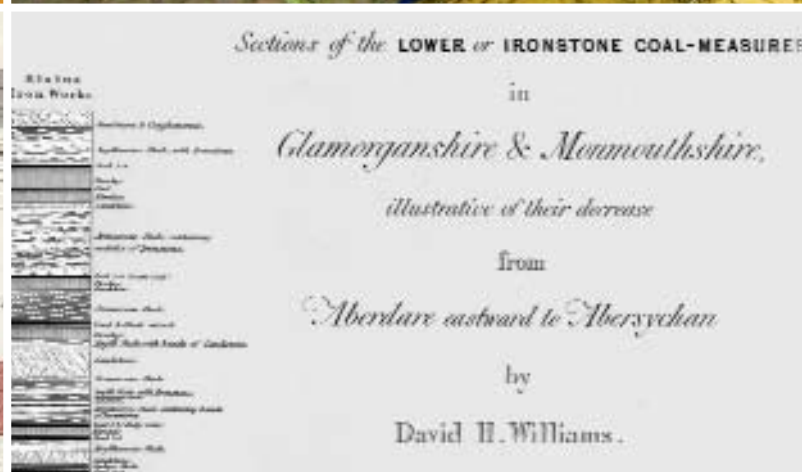
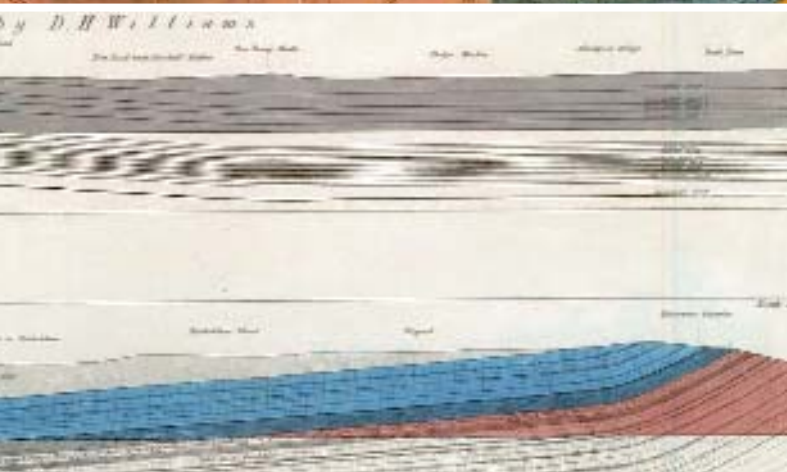
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Image: Terry Malles / Shutterstock.com

WELSH ROOTS

Four Swansea brothers criss-crossed the geological world of the 1840s, mixing with great names in famous places, says **Martin Laverly***



It is 100 years since Alfred Russel Wallace, theoretician of evolution and biogeography and sometime land surveyor and engineer in West Glamorgan, died.

Influential names Hooker and Lyell brought him to fame in 1858; but their earlier appreciation of a Swansea family responsible for pioneering practical geology in Britain, India, and Borneo, had no such effect for the brothers Williams, who have sunk into obscurity.

PRACTICAL MEN

David Williams (1783-1856), a labourer turned land and mineral surveyor, did some work with one of his sons for the great William Edmond Logan (managing a copper works, he mapped the coal around Swansea in search of fuel). This son, David Hiram Williams (1812-1848) has appeared in these pages before (*July 2009, Geoscientist 19.7*) as part of Nina Morgan's series *Distant Thunder*. As the first assistant hired, in 1839, by Henry De la Beche's Ordnance Geological Survey to add to Logan's base, he specialised in preparing measured vertical and horizontal sections, mapping, especially, Coal Measures from Pembrokeshire, into Somerset and right up to Flintshire, before finishing at Coalbrookdale.

To his bosses, De la Beche and John Phillips, he was as valuable as Andrew Crombie Ramsay, and he weaned Henry William Bristow from university into practice. In 1845 the Survey became a civilian rather than military body; Ramsay was promoted (both he and Bristow went on to head the Survey), and De la Beche arranged for Williams to start, in Bengal, what would become the Indian Geological Survey.

Early in 1846, he wrote to Ramsay: "The Island of Ceylon is a pleasant looking place, but Aden is horrible, it is all on volcanic formation mostly scoria I found some Green Sand fossils in a limestone passing through Egypt Malta appears to be oolitic, and Gibraltar, Mountain Limestone."

Within six months he had reconnoitred 420 miles west of Calcutta; by 1848 he had mapped –



Above: Map of the Damoodah and Adji Great Coal Field in the Zillahs of West Burdwan, Monbhoom, and Beerbhoom, Bengal by David Hiram Williams 1847

Left (clockwise from top): Three Cliffs Bay on the Gower Peninsula near Swansea

The Wrekin and Coalbrookdale coalfield, mapped in 1845 (Extract from 1st Series sheet 61NE). One of D H Williams' last assignments for the Geological Survey before leaving for India

Vertical Section Sheet 9 (Extract) Sections of the Lower and Ironstone Coal Measures of Glamorganshire and Monmouthshire by David H Williams

Coal, Limestone, and Old Red Sandstone in the Forest of Dean (Extract from Horizontal Section Sheet 15), by D H Williams

Somerset Coalfield to the west of Frome, mapped in 1843 (Extract from 1st Series sheet 19SE). The Deputy Governor of Bengal was suitably impressed.

topographically as well as geologically - a coalfield "with more reserves than Britain or America", and begun calculations on the economics of building Indian ironworks for the coming railway age. He reported the *Glossopteris* flora, and later noted a distinctive: "conglomerate of quartz and granite boulders some of them 11 feet in diameter, and lots of them longer than an elephant's head!!"

Identified a decade later as glacial: both, a century later, key evidence for plate tectonics, and even later, for the Snowball Earth hypothesis. However, after introducing the Geological Survey's first (and by then ex-) palaeobotanist, Joseph Hooker, to India early in 1848, he concluded: "Geologising in India is dull & torpid with nothing to be seen but Coal Measures and crystalline rocks. No fossils of any kind to be found but the impressions of coal plants"

Hooker wrote of their transport: "Our elephant was an excellent one, when he did not take obstinate fits, and so docile as to pick up pieces of stone if desired and with a jerk of his trunk and throw them over his head for the rider to catch, thus saving the trouble of dismounting. This is geologizing in true oriental style, and no traveller's tale, I assure

you." before he "Bade adieu to Mr. Williams ... whom I hoped to see [again]".

Sadly this reunion never came about because, as Lyell wrote to his own father about Hooker in January, 1849: "no less than 4 of his intimate friends had died, and among them Mr Williams the geologist. ... I pointed out that every one of five geologists whom [the East India Company] had sent out [to India] had been cut off in the prime of life, for want of aid in assistants, elephants, steamers, &c., which alone could enable them safely and effectively to perform their mission; and I protested, with De la Beche, against the best of his practical men (the said Williams) being sent out on a forlorn hope. He has done his business, poor fellow, well, put them in the way of working rich mines of coal, and is now left like his predecessors to die in the ditch..."

After almost three years of uninterrupted good health, D H Williams was: "unfortunately caught by a branch of a tree and fell from his Elephant, and was for some time suspended by the heels - he subsequently fell also from some rocks and hurt his knee and jungle fever followed..."

Thus came Williams's somewhat undignified demise. ►

► His name has remained in print ever since 1845, when the Geological Survey first published acknowledgements on its maps and sections and in its Memoirs. The latest Swansea sheet to bear his name was issued just a year short of the bicentenary of his birth.

ACQUAINTED WITH COAL

A delicate water-colour manuscript 'Chart of Sarawak' drawn by another 'Hiram Williams', was donated to the Society by the Admiralty in 1846. This Hiram (1816-1872) started out as a Land and Mineral Surveyor with his eldest brother, William (1811-1886); like Wallace, their work included title mapping. Late in 1844, the Admiralty instructed Captain Bethune RN to proceed to Borneo and: "take ... [someone] ... who is well acquainted with coal, and can therefore form a correct opinion as to any in the neighbourhood of the spots you visit, both as to its probable extent and its fitness for use in steam vessels..."

Bethune left alone, but Edward Forbes (Geological Survey palaeontologist from 1844) asked De la Beche to identify that 'someone'. Hiram soon arrived in the idiosyncratic settlement of Sarawak on the island of Borneo, where James Brooke was the

Below: Extract from 'Drawn by Mr H Williams Min Sur'. Hiram's drawings, lithographed in London, sold as individual prints, but mainly survive as the illustrations of three books

British ruler of his own, independent state. He examined coal in Labuan and made a plan for exploiting it in Brunei; but the bulk of his time was spent surveying Sarawak on foot and by boat. Brooke facilitated this work, as well as at least one rice-wine-fuelled party, where his group: "finished the evening by treating the Dyaks with a dance in their own style; Williams keeping the [chief] in perfect terror by threatening his bare feet with a tremendous pair of high-lows."

Hiram also drew the scenery. His drawings, lithographed in London, probably sold as individual prints, but mainly survive, with his map, illustrating three books and regularly copied ever since.

Hiram settled in London. For a short time in 1851 he was in a 'Civil and Mineral Engineering, Surveying, &c' Partnership with Ernest Noel (well-connected, later an MP and FGS for 82 years when he died in 1931), before taking the position of Secretary to a number of (mainly) mining companies from an office in the City between 1851 and 1862. He became managing partner of a coal mine near Rotherham in 1861 but the deaths of six men, tipped out of their descending bucket, in 1863 led to his spending his declining years as a gentleman farmer in Oswestry.

SURVEYORS, MANAGERS

In 1816, William, David Hiram, and Hiram Williams were baptised with yet another brother, Lewis (1814-1873). Lewis created a special feeder for an iron works, was praised in court for his use of models to explain the deleterious effects of patching (opencast mining) on nearby underground workings, and helped the Survey without being actually employed by it. He and William briefly opened their own coal mine, but drainage problems brought debt and legal wrangles that lasted for years. For a time he managed a mine in the Forest of Dean (with Hiram acting as Secretary), then moved to Cardiff and died managing the Caerphilly Colliery. William, the least travelled but longest lived brother, died an engineer in Swansea.

This remarkable geological dynasty did not last. Hiram took two wives but fathered no children; David left four daughters; William's son Frederick was recorded as 'geologist', but only in 1851; Lewis' s namesake son continued the trait, working as a mining engineer in Bridgend; but he, and William, died in 1886. ■

*After an IT career based in Cardiff, **Martin Laverly** rekindled his interest in geology, which had led through speleology and (geo)chemistry in Leeds and Oxford, to Sarawak - and Swansea. E: martin@talk21.com



FURTHER READING

- 1 David Bate gives a brief introduction to David Williams's Indian work in a video and downloadable pdf, *David Hiram Williams and the search for coal – from South Wales to Bengal, 1839–1848*, at www.bgs.ac.uk/services/ngdc/archives/awareness/overseas.html
- 2 BGS has now digitised its mapping from 1835-1905, so all D H Williams' work in England and Wales is available to view via www.bgs.ac.uk/data/historical/Maps/home.html
- 3 Frederick J North, Keeper of Geology at the National Museum of Wales, obtained a trove of De la Beche's papers and wrote about them in the Transactions of the Cardiff Naturalist's Society. These are now online from the National Library of Wales at <http://welshjournals.llgc.org.uk/browse/viewpage/llgc-id:1373290/llgc-id:1378036/llgc-id:1378079/get650>. Volume 67, pp31-103 in particular, discuss D H Williams in Further chapters in the history of geology in *South Wales; Sir H T De la Beche and the Geological Survey*.
- 4 For an invaluable catalogue of these papers, involving many of the characters of early and mid 19th Century geology, *The papers of H T De la Beche (1796–1855) in the National Museum of Wales ...* (1988) by Tom Sharpe and P J MacCartney is a fine resource (dip into an online preview at Google books: <http://books.google.co.uk/books?id=WtCV8AISBiMC>).
- 5 Hugh Torrens's *William Edmond Logan's Geological Apprenticeship in Britain 1831-1842 in Geoscience Canada*, v. 26(3), p. 97-110, (1999) is good, but appears to conflate David Hiram and Hiram (a quite understandable slip).

Geoscientist welcomes readers' letters. These are published as promptly as possible in *Geoscientist Online* and a selection printed each month. Please submit your letter (300 words or fewer, by email only please) to ted.nield@geolsoc.org.uk. Letters will be edited. For references cited in these letters, please see the full versions at www.geolsoc.org.uk/letters

JOURNAL CUTS - WHOSE POLICY?



Sir, I am grateful to John Cope and Bernard Leake (*Geoscientist*, June 2013) for raising the issue of Library cuts but two things disturb me: the fact that they waited so long after the event, and the fact that it was answered (July 2013) not by an Officer of the Society but by one of its employees. This follows a trend that has been developing for over a decade, in that many key decisions seem to be made by staff, with the role of committees and perhaps even Council reduced to that of a rubber stamp.

As Cope and Leake point out, the savings achieved pale into insignificance against the money currently being spent to glorify the Council Room – going way beyond structural necessity – or that spent to create the under-used Lyell Room – a resource that is lovely to look at but of little practical use (have you ever tried to spread a map on a round table?).

The Library Advisory Committee, which strongly opposed the journal cuts, was 'suspended' in December and the cuts went ahead. A similar thing happened around 15

years ago. Then, a proposal from the ruling executive to change reception arrangements at BH (retaining the Courtyard entrance, but removing the reception desk and remodelling the general office) was opposed by the House Committee on grounds of expense and security. That committee too was promptly disbanded. The change went ahead, was found to be unworkable, and a proper reception re-instated (in the Piccadilly entrance, during the Bicentenary refurbishment).

The Society is fortunate in having a hard-working and professional staff; we pay them to run the day-to-day business of the Society, to give us advice and to implement decisions on our behalf. Are we content that they now seem to be making the decisions?

Michael Price

Dr Michael Price is a former member of Council, chairman of the former Library Committee, and member of the former Library Advisory Committee.

Dr Jonathan Turner, Council Member, and Chair of the Publication and Information Committee, replies:

The decision on the journal cuts for 2013 was made by Council at its meeting on 28 November 2012, at which I was present. Two lists of journals for possible cancellation were considered by Council, one having been prepared by the Library Advisory Committee and one by the Society's professional librarian with responsibility for managing our journal collections. After discussion, Council found in favour of the latter list.

Regarding the works completed or underway in Burlington House the Society has an obligation under the terms of its lease to maintain the building in a fit and proper state and investment in refurbishment is an investment in the future of the Society, and the security of its location in central London.

On the question of 'who makes the decisions' at the Geological Society we are indeed fortunate to have such hard working and professional staff, and it is the close communication and collaboration between staff, committees and Council that enables the Society to operate so successfully in an increasingly complex environment. Policy and strategy are, of course, set by Council and its reporting committees, but if we wish to continue to progress and develop our services we need staff who are capable of interpreting these policies and intelligently applying their initiative.

GEOCONSERVATION

Sir, David Owen (*Letters*, July 2013) is correct in identifying geoconservation as a key activity for Earth Science within the UK and an endeavour that the Geological Society should indeed support strongly. He also identifies the long and noble history throughout the UK of volunteer organisations, such as the various RIGS groups, in developing local initiatives to preserve and promote the geological heritage in their regions. As Owen puts it, the "quarries, pits, mines and cuttings" watched over by these groups are important training resources for past, present and future generations of Earth Scientists.

But just as importantly, geological outcrops represent prime shop-windows for our science, and many are important milestones in the development of our science.

In recognition of these and other challenges facing the UK's geological heritage and our access to it, the Society has restructured its geoconservation activities.

The new, reconstituted Geoconservation Committee is active in feeding into the Society's External Relations and Science agendas. It will represent the views of the

Fellowship, and redouble our efforts to act on them. For example, we have responded to the Scottish Government's Planning Consultation drawing attention to the significant numbers of un-notified sites from the Geological Conservation Review and the threat this lapse represents.

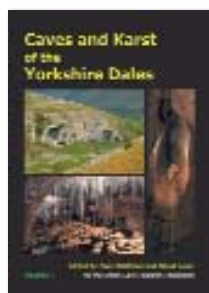
Such interactions with public policy are clearly important for future safeguards throughout the UK. The Society will also continue to play an important role in providing a forum for practitioners in geoconservation across the UK to share good practice, ideas and generally to network. There will be an annual gathering hosted by the Society to provide just these opportunities.

The next one is set for the morning of 10 October. Interested individuals wishing to attend should email

policy@geolsoc.org.uk.

Rob Butler, *Chair Geoconservation Committee*





Caves and Karst of the Yorkshire Dales

This magnificent book on the classic Carboniferous Limestone landscape of North West Yorkshire is a much revised and extended version of one first published nearly 40 years ago. The area covered is largely that of the Yorkshire Dales National Park. So much has happened in Quaternary studies in the last 40 years that a complete rewrite has become necessary. In particular isotope dating of various features (U/Th, C-14, Al/Be, Cl, palaeomagnetism and luminescence methods), using speleothem samples (stalagmites) as well as new geomorphological interpretations, has enabled the authors to correlate many aspects of the Yorkshire Dales and caves with other Quaternary sequences. The relationship to the climatic fluctuations revealed by ocean-floor oxygen isotopes shows that the Yorkshire Dales are much more significant in Britain's Pleistocene history than previously recognised.

Its chapters have been written by 20 specialists, covering basic geology (with updated stratigraphy), glaciation and Quaternary evolution, and karst geomorphology. Discussion of cave geomorphology emphasizes the transition from inception along geological "weaknesses" such as bedding planes, shale partings, joints and faults, to submerged phreatic passages and their development into vadose caves above falling water-tables. Together, these provide a basis for correlating subterranean and surface features.

The volume continues with a discussion of the limestone hydrology. Palaeoclimatic deductions have also been derived from a study of stalagmites. The last five chapters look at Holocene environments, subterranean biology, bats, cave palaeontology and cave archaeology. The last two provide a useful overview of the occupation of Northern England by animals and humans.

These new studies have extended the

timescale for karst development back into the early Pleistocene, with the cover of Upper Carboniferous strata being progressively stripped back to expose the limestone scenery now regarded as fluvio-glacial karst. Reconstruction of the geology in early Pleistocene times yields a concept of the former extent of the Yoredale and Millstone Grit cover, with progressive exposure of the limestone. The history of modification by successive glacial advances and fluvial effects in interglacials can now be interpreted.

This review volume is very well presented with numerous maps, diagrams and photographs, almost all in colour. It should be essential reading for anyone leading the many field classes and excursions to the Ingleton and Malham areas. The book is the first of two, and the second volume will cover individual cave systems such as Gaping Gill and Stump Cross Caverns.

Reviewed by Trevor Ford

CAVES AND KARST OF THE YORKSHIRE DALES

TONY WALTHAM & DAVID LOWE (Eds) March 2013
Published by: British Cave Research Association.
(The Old Methodist Chapel, Great Hucklow, Buxton, SK17 8RG). A4, 265 pages, 165 maps and graphics, 354 photographs. ISBN 978-0-900265-46-4 (Sbk).
List price: £25.00,
www.bcra.org.uk/bookshop/index.html



Earthworks in Europe

This collection of papers from the Second International Seminar on Earthworks in Europe held in 2009 is a timely update on earthworks. Although earthworks activity in western Europe has moved from construction to maintenance, major new earthworks are underway and planned in central European countries. The London venue is reflected by the fact that two out of three papers originate in the UK, but it is good to see papers from Czech Republic (two), as well as France, Ireland, Spain and Slovenia.

The book's 18 papers fall into six categories. There are six on standards

and specifications and then two each on asset management, use of natural and recycled materials, slope stabilisation, monitoring and environmental impact. The coverage of each sub-topic is represented by the one or two countries that have presented.

The papers on standards and specification report on the current position in UK, Czech Republic and Spain and so provide a useful current view. These papers include reports on the impact of Eurocode 7, ISSMGE on pavements and national specifications.

Asset and risk management papers present a very clear picture of management of the earthworks infrastructure, but only in the UK.

The monitoring of earthworks is considered in the context of the climate change on slopes. Changes in weather patterns are affecting operating strengths in the earthwork materials, and identification of the impact of these and their monitoring forms the basis of these useful contributions.

Maximisation of the use of natural materials has always been the requirement for designers, but this need becomes ever more acute; reports from Ireland and Slovenia are particularly valuable here. Use of waste materials in earthworks is very topical, and the Czech report on inclusion of industrial wastes such as colliery spoil, ash and slag in earthworks is useful. The UK report on the use of tyre bales illustrates use of a waste to provide a lightweight fill and resolution of a stability problem.

Finally, the measurement of environmental impact of earthworks represents a new aspect of design and these UK reports provide a clear and useful update on this topic.

The papers presented cover a useful range of topical earthworks issues, providing an important statement of current considerations. The representation from around Europe could have been better, but there were external financial restrictions on such activities at the time. This volume is required reading for those needing to get up to date on a range of earthworks design, construction and maintenance topics.

Reviewed by David Norbury

EARTHWORKS IN EUROPE

T A RADFORD (Ed) Engineering Geology Special Publication No 26. Geological Society, London 2012.
List price: £75.00, Fellows' price: £37.50
www.geolsoc.org.uk/SPE26



Faulting, Fracturing and Igneous Intrusion

This book is misleadingly named as only one of its 14 papers deals with igneous intrusion and faulting. A better title is that given by the editors to their introductory chapter: 'Stress, faulting, fracturing and seismicity: the legacy of Ernest Masson Anderson', especially as the book arose from a conference to mark the 50th anniversary of his death in 1960.

Anderson's classic 1905 paper on 'The dynamics of faulting' is reproduced in facsimile. Anderson brilliantly explained the stresses that produced thrust, wrench, and normal (extensional) faults under isotropic conditions. This book concerns the effects of the ubiquitous anisotropic conditions in the Earth's crust including variable pore-fluid pressures.

Only four of the papers are singly authored (a rapidly dying type!). Gerbault shows that wall failures around circular magma chambers occur in shear rather than tension unless the pore-fluid pressure in the bedrock cancels the effect of gravity. Sibson considers reverse fault rupturing: competition between non-optimal and optimal fault orientations. Lopez deals with Andersonian and Coulomb stresses in Costa Rica and the fault slip and seismic tendency potential. Healy develops the Law of Effective Stress to incorporate anisotropic poroelasticity and the response of faulted rock to changes in pore-fluid pressure.

Sibson *et al.* give an excellent account of Andersonian wrench faulting in the 2010–11 Canterbury, NZ, earthquakes; Bistacchi *et al.* describe non-Andersonian faulting along Alpine phyllosilicate-rich mylonite belts; Tingay *et al.* similarly deal with such faults above evaporites in the Nile delta; King *et al.* consider stress deflections around salt diapirs that pierce overlying Gulf of Mexico deltaic sediments; MacDonald *et al.* model fault reactivation in the Bight Basin in southern Australia, while Tavani *et al.* analyse the stresses during thrust-related folding in the Boltaña anticline, Pyrenees and Van Noten unravels the 3D stress state in

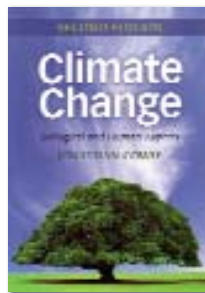
compressional tectonic inversion at the onset of orogeny in the Ardenne Slate Belt. Main *et al.* consider the dilatancy-diffusion hypothesis and the flawed search for earthquake predictability.

Overall, this is an excellent and recommended 2012 account of how Andersonian and other factors control faulting and its orientation, with a good spread of geographical and geological situations and modelling. Had it included the outstanding 2012 paper on 'Granite magma migration and emplacement along thrusts' (Ferré *et al.* Int J Earth Sci [Geol Rundsch] 101, 1673–88) it would even have justified its title!

Reviewed by *Bernard Elgey Leake*

FAULTING, FRACTURING AND IGNEOUS INTRUSION IN THE EARTH'S CRUST

D HEALY, R W H BUTLER, Z K SHIPTON & R H SIBSON (Editors), 2012. GSL Special Publication 367. ISBN 978-1-86239-347-9 (hbk). 253pp **List Price £85.00, Fellows' Price £42.50** www.geolsoc.org.uk/bookshop



Climate Change: Biological and Human Aspects

Read this book and gain a new perspective on climate change. This is above all an interdisciplinary topic, and hard to grasp in all its essentials by those of us brought up in the old-fashioned 'single discipline' mode of instruction. Few people have put together in such a compelling and reader-friendly way the full extent of information about climate change and its effects, ranging all the way from changes with geological time to real or potential impacts on human health and welfare and on plant and animal life.

The United Nations Environment Programme (UNEP) cited the first edition of this book (2007) as one of the top climate-change science books of the 21st Century. This second edition has been fully updated and substantially expanded, with major updates on climate impacts on early societies, and on biological impacts; updated graphs on energy production and consumption; new sections on climate

thresholds, the Kyoto II conference, and the climate policies of Canada, Australia and NZ; and an Appendix with further thoughts for consideration to stimulate discussion.

This is an educational tome, suitable for the scientifically literate layman, high school and undergraduate students, as well as policy makers. Chapter 1 introduces the topic and its differentiation from weather. Chapter 2 is a useful primer on the modern approaches to measuring past climate change. Chapter 3 takes the reader on a useful tour of climate change in the Earth's 4.6 billion-year history. In Chapter 4, Cowie focuses on climate's links to biology, from the Oligocene through the Pleistocene Ice Age and right up to the Holocene.

In Chapter 5 he moves into the Holocene and present climate. Chapter 6 considers current warming and its biological symptoms, ending with a review of possible surprise responses to further global warming. In Chapter 7 we learn about the human ecology of climate change, and the nature and possible manipulation of photosynthesis in the interests of mitigating the problem. In the final Chapter, Cowie documents the development of environmental policy at the international level since the UN Conference on the Human Environment in 1972. He goes on to look at future energy options, and concludes by considering how humans may adapt to further climate change. No matter what we do, Cowie concludes, the biosphere will remain.

This is an invaluable, readable and well-referenced guide to where we are now, how we got here, what is happening now, what may happen next, and what we can do about it.

Reviewed by *Colin Summerhayes*

CLIMATE CHANGE: BIOLOGICAL AND HUMAN ASPECTS

JONATHAN COWIE, 2nd Edition. Published by Cambridge Univ. Press, 2013. ISBN 978-1-107-60356-1. 440 pp. **List price: £34.99** www.cambridge.org

REVIEWS: COPIES AVAILABLE

Please contact ted.nield@geolsoc.org.uk if you would like to supply a review. For a full list go to www.geolsoc.org.uk/reviews

■ **NEW! The Self-Potential Method - theory and applications in environmental geosciences** by Adnre Revil and Abderrahim Jardani. 2013 Cambridge University Press 369pp hbk

■ **NEW Natural Disasters in a Global Environment** by Anthony N Penna and Jennifer S Rivers. Wiley Blackwell 2013 340pp sbk

PEOPLE

Geoscientists in the news and on the move in the UK, Europe and worldwide

CAROUSEL

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

■ KEITH GERDES



Keith Gerdes has been elected President of the European Region of the American Association of Petroleum Geologists (AAPG) for 2013-15. Keith studied Geology and Geophysics at Durham University and obtained his PhD from the University of Swansea in Wales on the plate tectonic evolution of the Red Sea and Gulf of Aden. He presented a 2011 Shell Lecture at the Geological Society and edited SP 329 on *Tethyan Carbonate Petroleum Systems*. He is currently based in the Head Office of Shell International in The Hague.

■ MICHAEL MCKIMM



Michael McKimm, Senior Library Assistant, has published a collection of poems addressing geology, the oil industry and climate change. *Fossil Sunshine* (Worple Press) is the result of a year-long collaboration with Earth scientists in a project funded by Arts Council England. Geoscientist readers are invited to the launch of the collection at the Geological

Society on Friday 18 October at a free event which will include speakers Sarah Day, Barbara Cooke and former Society President Bryan Lovell. To register please email michael.mckimm@geolsoc.org.uk or visit www.geolsoc.org.uk/askthemountains for more information. See also www.worplepress.co.uk/fossil-sunshine/



Teaching award winner

Clarysly Deller wins the first Society-endorsed primary teacher award.

Dawne Riddle writes:
This year, for the first time, the Society endorsed an award to a primary school teacher as part of the scheme promoted by the Primary Science Teachers Trust (Formerly the Astra-Zeneca Science Teachers trust) to recognise outstanding and inspirational teaching of geology within the context of

primary education in the UK school system.
The Society's congratulations go to Clarysly Deller, who won the award for her lesson on fossils and the life of Mary Anning, which incorporated both microscope imagery and a dramatic intervention by 'Mary Anning' herself! Clarysly's father, a long-standing FGS, attended the presentation by Nick Rogers, Chair of the Society's Education Committee (picture).



STICKS AND STONES

T.L.A's (THREE LETTER ACRONYMS.)





HELP YOUR OBITUARIST

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

IN MEMORIAM WWW.GEOLSOC.ORG.UK/OBITUARIES

THE SOCIETY NOTES WITH SADNESS THE PASSING OF:

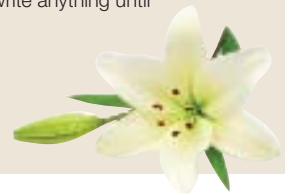
Bestow, Trevor *	Holroyd, J D *	Moffatt, William Stewart *
Blackburn, James Kirk *	Hudson, Neal F C *	Roberts, David G
Bowler, Christopher -	Jacqué, Maurice *	Robson, Geoffrey Robert *
Michael Lance *	Jones, Brian Lloyd *	Thompson, David Barnard
Chapman, W T *	Middleton, John *	Vincent, E A ('David')*
Downing, Richard	Miller, James *	Williams, Colin L *
Allen 'Dick'	Million, Ronald *	

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 shown in bold. Fellows for whom no obituarist has yet been

commissioned are marked with an asterisk (*). The symbol § indicates that biographical material has been lodged with the Society.

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

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



DISTANT THUNDER

Geologist and science writer Nina Morgan discovers that fossil nicknames rule OK!

Although partial skeletons and fragments were reported as early as 1605, plesiosaurs were not officially recognised as a distinct group until much later. The genus was first formally defined by William Conybeare (1787-1857) and Henry de la Beche (1796-1855) in 1821, on the basis of a partial skeleton in the collection of Colonel Thomas Birch. But the most famous – and certainly most controversial – plesiosaur fossil was the nearly complete skeleton found in 1823 by Mary Anning (1799-1847) in Liassic rocks on the coast at Lyme Regis. The fossil of this 'New Fish' – actually a marine reptile – broke all the anatomical rules.

William Buckland (1784-1856), first Reader in Geology at Oxford University, likened it to "a turtle threaded through with the body of a snake". When the preeminent anatomist of the time, the Baron Georges Cuvier (1769-1832) of the Muséum d'Histoire Naturelle in Paris, saw drawings of the Anning specimen, he was, to put it mildly, sceptical. He declared it to be a composite fake, made up by joining the head and neck of a sea snake to the body of an ichthyosaur.

A fanciful report in the February 1865 issue of Charles Dickens's magazine *All the Year Round*, described his indignant response:

"Verily, this is altogether the most monstrous animal that has yet been found amid the ruins of a former world. It had a lizard's head, a crocodile's teeth, a trunk and tail like an ordinary quadruped, a chameleon's ribs, a whale's paddles, whilst its neck was of enormous length, like a serpent tacked on to the body"

But in spite of Cuvier's misgivings, Mary Anning's fossil proved to be genuine. The anatomist and vertebrate palaeontologist Richard Owen (1804-1892), who played a key role in the establishment of London's Natural History Museum,



'Plesiosaurus macrocephalus' found by Mary Anning

went on to name dozens of new species of plesiosaur. One of these was lent by the palaeontologist and politician, Sir Philip Egerton (1806-1881), a keen collector of fossil fish. In a letter dated October 26 1840, Egerton, wrote to Owen to express his delight at seeing his prize in print:

"My dear Owen, I have just completed the perusal of your first report ('British Fossil Reptiles'), which is glorious. I feel perfectly sure that the terms in which that report is spoken of by those with whom I have conversed and who are more competent than I am to value its merits, and the public mention of it at [the British Association Meeting in] Glasgow, in the secretaries' report and elsewhere, must be most gratifying to yourself as they are to me. I can only say that I feel no further regrets at having been the cause of imposing this burden upon you, and shall always consider that, of my humble efforts in furtherance of scientific knowledge, the most important has been that, if not of causing, at all events of accelerating the production of so valuable a report. I am so much

delighted with it that I freely forgive you for christening my Plesiosaur "Old Spooney."

Owen is often characterised in the popular imagination for his attacks on his scientific colleagues. But clearly on this occasion the knives were not out.

ACKNOWLEDGEMENT

Sources for this vignette include: Volume one of *The Life of Richard Owen* by his grandson The Rev. Richard Owen, MA, John Murray, London, 1894; Mary Anning, *The Fossil Finder*, in *All the Year Round*, [conducted by Charles Dickens] February 11, 1865, pp. 60-63; *The Life and Correspondence of William Buckland, D.D., F.R.S.* by his daughter, Mrs Gordon, John Murray, London, 1894; and the website <http://www.plesiosauria.com/>. Thanks also to Dr Adam Stuart Smith, Collections Access Officer (Natural History), Nottingham Natural History Museum, for pointing me towards additional references about plesiosaurs.

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

OBITUARY



PHILIP SIMON DOUGHTY 1937-2013

Distinguished geologist, museologist and trenchant communicator of science

Philip Simon Doughty was a geologist and museologist of distinction.

He graduated in Geology and completed a Master's degree at Nottingham University. While writing his dissertation on Joint directions in the Great Scar Limestone, he married Janet and taught in Keighley.

After a period at Scunthorpe Museum, in 1965 he joined the Ulster Museum's Department of Natural History in Belfast. As the first geology curator, it was an exciting time to be at the Museum. Phil's priority was to rescue the existing geology collections from the effects of decades of neglect.

In 1970 the Museum established a new

Department of Geology, with Phil as Keeper. Through the 1970s, innovative and award-winning geology galleries were opened and remained popular with visitors for three decades. The geology collections were developed by astute purchases and systematic field collecting. The Museum's research reputation was enhanced by collaborative projects such as the Bovedy meteorite in 1969, the 1972 Pollnagollum cave excavations in Fermanagh, and the 1986 Aghnadarragh mammoth discoveries near Lough Neagh.

MISSION

Phil's personal mission to raise the profile of geology, geology collections and museums took him beyond Northern Ireland. He was prominent in the Museum

Assistants Group and helped to found the Geological Curators' Group in 1974. After his ground-breaking survey of museums (The State and Status of Geology in UK Museums, GCG 1981), he served as GCG chairman in the mid-1980s and was awarded its Brighton Medal in 2010. As a Council member of the Museums Association, he became involved with their Information Retrieval Group and helped to pioneer new methods of managing information about museum objects in the 1970s and 1980s.

meant that site conservation and interpretation were constant career threads. He was a founder and chairman of the Geological Society's GeoConservation Commission. In retirement, he wrote hundreds of 'plain-language' site summaries for Northern Ireland's Earth Science Conservation Review (www.habitas.org.uk/escr).

HOLISTIC

Phil had a holistic understanding of the natural world. From the early 1990s, by then Head of the Museum's Sciences Division, he helped to nurture an infant environmental records centre that later became Northern Ireland's Centre for Environmental Data and Recording. He was a member of the Northern Ireland Biodiversity Group which, in 2002, published the national Biodiversity Strategy.

He also supported the work of local and regional voluntary groups, such as the Belfast Geologists' Society, the Belfast Naturalists' Field Club and Earth Science Ireland – all three of which he led as president or chairman at different times.

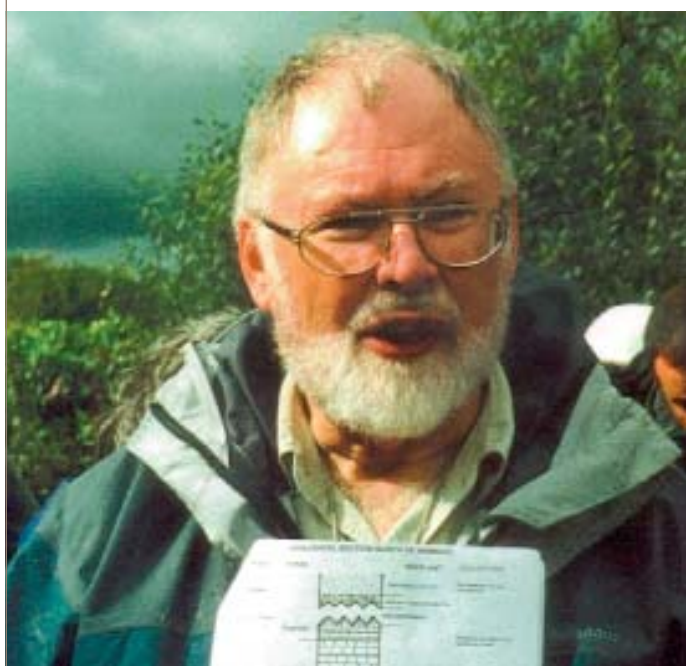
Phil was born in Wombwell, Yorkshire on 5 March 1937, died in Belfast on 14 January 2013 and is survived by three children, James, Sarah and Peter.

“PHIL WAS A MASTER COMMUNICATOR... HIS WORDS TO UNESCO HELPED THE GIANT'S CAUSEWAY TO ACHIEVE WORLD HERITAGE SITE STATUS IN 1986”

Phil was a master communicator. This talent was evident in his many radio and TV broadcasts, and in his writings – most notably his words to UNESCO which helped the Giant's Causeway to achieve World Heritage Site status in 1986. The Dinosaurs Alive! exhibition in 1992 brought giant, robotic dinosaurs to Ireland for the first time – attracting nearly 200,000 paying visitors to the normally free-admission Ulster Museum.

His love of fieldwork

► By Peter Crowther



ENDORSED TRAINING/CPD

Course	Date	Venue and details
Developing Groundwater – the drilling weekend RedR UK, Hydrogeologists without Borders UK	6 December	Venue: Silsoe, Cranfield University. Are you a humanitarian water engineer who needs to know more about developing groundwater? Fees apply (Fellow, student and aid worker discount) – see website for details. Camping. Bring your own tent. Contact: RedR UK, 250a Kennington Lane, London SE11 5RD T: +44 (0)20 7840 6000. E: training@redr.org.uk
Soil & rock logging course First Steps Ltd	14 December	Venue: EM Drilling, Bath. Comprehensive practical, hands-on experience in the description of soil and rock for both engineering and environmental investigations based on Eurocode 7 – BS5930 (“Code of practice for site investigations”). Fees apply (Fellows discount 10%). See website for details Contact: Christine Butenuth, First Steps Ltd. T: 0207 736 6889 E: office@firststeps-geo.co.uk
Lapworth's Logs	27 January	'Lapworth's Logs' are a series of e-courses involving practical exercises of increasing complexity. Contact: info@lapworthslogs.com. Lapworth's Logs is produced by Michael de Freitas and Andrew Thompson.

DIARY OF MEETINGS SEPTEMBER 2013

Meeting	Date	Venue and details
Building strong continents Metamorphic Studies Group	2-4 September	Venue: University of Portsmouth, Portland Building, Portland St, Portsmouth. Evolution of the Crust: growth, stabilization, preservation and recycling. Registration open. Fees apply. See website. Convener: Craig Storey E: craig.storey@port.ac.uk
30th Meeting of the International Association of Sedimentologists IAS	2-5 September	Venue: University of Manchester Conference Centre. See website. Contact: Merren Jones, School of Earth, Atmospheric and Environmental Sciences, Williamson Building, Oxford Road, University of Manchester M13 9PL. T: +44 161 275 3943. E: merren.jones@manchester.ac.uk
BGS Geological Walk East Midlands Regional Group	10 September	Venue: BGS Keyworth. Cheese & wine at 1830. Walk starts at 1900. Speaker: Steve Parry (Speaker)
Tracing visitors to our shores Home Counties North Regional Group	11 September	Venue: Sir Robert McAlpine, Eaton Court, Hemel Hempstead. Speaker: Jane Evans (BGS Isotope lab). Time: 1800 for 1830. Contact: homecountiesnorth@geolsoc.org.uk
Marine Biogeochemistry: Past, Present and Future Marine Studies Group, University of Leeds	11-13 September	Venue: Devonshire Hall, Leeds. Keynote: Prof. Harry Elderfield. Fees (with discounts) apply – see website for details and registration. Contact: Clare Woulds E: c.woulds@leeds.ac.uk
Dwarfism in animals on islands GSL, Shell UK	11 September	Venue: Burlington House. A Shell London Lecture. See advert, p.7 for details. Speaker: Victoria Herridge (Natural History Museum)
Prospectus for UK Marine Sustained Observations, Challenger Soc.	17 September	Venue: Royal Society. Details and registration – see website. Contact: Dr McQuaters-Gollop E: abiqua@sahfos.ac.uk
The Birth of Applied Microscopy: 150 years on from Henry Clifton Sorby Royal Microscopical Soc.	18-19 September	Venue: Halifax Hall, The Endcliffe Village, Sheffield. For details see website. Fees apply. Contact: Cecile Fortin T: 018 6525 4763. E: cecile@rms.org.uk
Scientific and Technical Priorities in Geological Repositories, UK Centre for Astrobiology	19 September	Venue: UK Centre for Astrobiology, Edinburgh. No registration fee. See website for details. W: www.astrobiology.ac.uk/events/georepnetmeeting/
Petroleum Geoscience and Engineering at Imperial College GSL, Imperial College London	23-24 September	Venue: Imperial College. Fees apply (discounts). See website for details and registration. Contact: Steve Whalley, The Geological Society. T: 020 7432 0980 F: 020 7494 0579 E: steve.whalley@geolsoc.org.uk
Geological Society Special Lecture: Of Ice and Land, Sea and Strand: Sea Levels During Glacial Cycles GSL	25 September	Venue: Burlington House. Time: from 1730 (Tea). Reception until 2000. Speaker: Kurt Lambeck (Wollaston Medallist 2013). Contact: Naomi Newbold, The Geological Society, Burlington House T: 020 7432 0981 Fax: 020 7494 0579 E: naomi.newbould@geolsoc.org.uk. Free, but by ticket only
Sustainable land management GSL, CL:AIRE	26 September	Venue: Burlington House. Fees apply (discounts). See advert, p.2. See website for registration and details. Contact: Georgina Worrall, Burlington House T: 020 7434 9944 E: georgina.worrall@geolsoc.org.uk
Environmental Monitoring in the Energy Sector: Exploring parallels between shale gas and nuclear. Royal Society of Chemistry	26 September	Venue: RSC Chemistry Centre, Burlington House, London. Half day event. Free, but registration essential. Time: 1330-1800 Contact: RSC T: 01223 432254 W: www.rsc.org

OBITUARY



ROBERT WILLIAM O'BRIEN KNOX 1942-2013

BGS geologist, journal editor and expert on Palaeogene-Neogene stratigraphy and sedimentology

Robert William O'Brien Knox was born in 1942 near Tadcaster, Yorkshire. His family moved to East Sussex when he was a baby. Robert soon became interested in natural sciences, and returned north in 1961 to study geology at King's College Durham. He gained a first-class honours degree from the University of Newcastle in 1965 and stayed to undertake a PhD on the sedimentology of the Middle Jurassic of Yorkshire, receiving his doctorate in 1971. Robert's first job was as a Demonstrator at the

University of Cambridge between 1968 and 1973, where he taught sedimentary geology. He published his first five papers at Cambridge, and wrote the chapter on sedimentary rocks for the 1978 edition of *Petrology for Students*.

A position at the British Geological Survey (BGS) became available and, in 1973, Robert was appointed as a sedimentologist. Like most specialists, he worked on a variety of projects including the Lower Jurassic Frodingham Ironstone, the Lower Cretaceous Speeton Clay, using ash beds as stratigraphical markers, Mesozoic and Cenozoic

sandstones of the North Sea, and Paleogene/Neogene stratigraphy.

IMPACT

It is on Paleogene and Neogene stratigraphy where Robert made the highest scientific impact. He worked on the sedimentology of the main Paleogene sandstones of the North Sea and their onshore correlatives, and built up a peerless knowledge of these units. Together with Andy Morton, Robert also undertook developmental work in provenance studies using heavy minerals. These minerals are stratigraphical indices, and indicate the transport history and source of sandstones.

Robert became Group Manager for stratigraphy and sedimentology in BGS in 1984 and, during the late 1980s, he worked on a major study of the Middle Jurassic Ravenscar Group of northeast Yorkshire for the Institut Français du Pétrole. The UK hydrocarbons industry commissioned an independent lithostratigraphical nomenclature for the North Sea, and Robert was asked to lead this. He co-edited all seven volumes, and co-authored three, between 1992 and 1994.

The Proceedings of the Yorkshire Geological Society (PYGS) was edited by Robert between 1982 and 1990. Under his expert editorship, the reputation and scope of the PYGS was significantly enhanced. The Yorkshire Geological Society recognised

this major contribution, and his contribution to the geology of northern England and the North Sea, by awarding Robert their Sorby Medal in 1997. He also served on the Geological Society Stratigraphy Commission from 1995.

HEAVY MINERALS

Robert retired in 2002 but continued to be equally committed, pursuing research on the Paleocene-Eocene Thermal Maximum, the Neogene/Quaternary stratigraphy of the United Arab Emirates, Palaeozoic heavy minerals from Arabia, and Paleocene stratigraphy. He was prodigiously productive in retirement, producing 23 of his 94 contributions between 2002 and 2012.

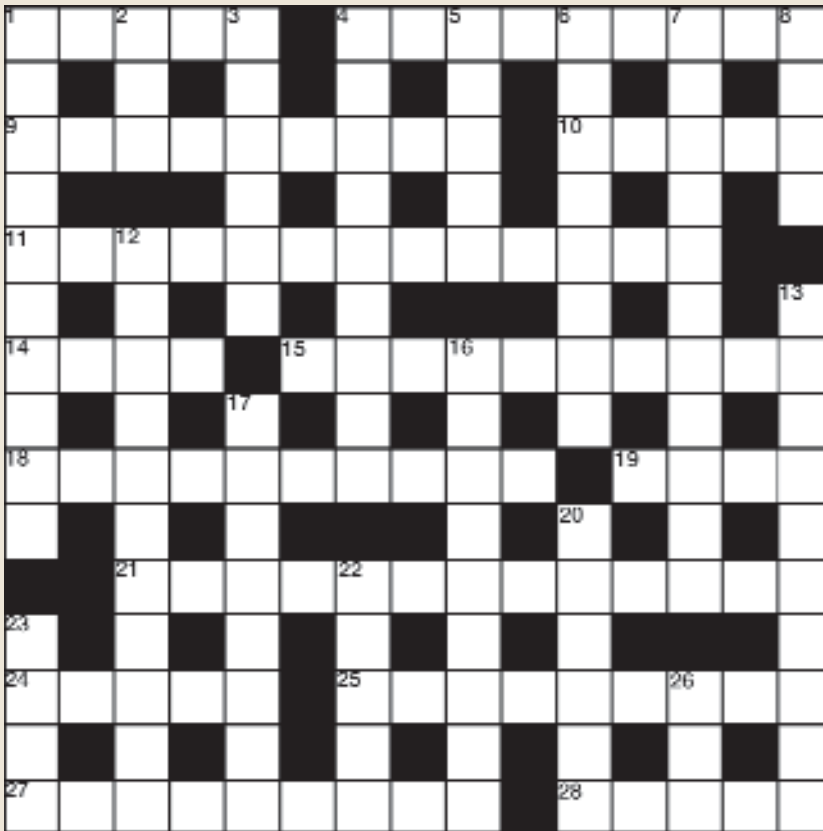
Sadly, Robert died on 18 March 2013, not long after returning from a heavy-mineral sampling trip to the Middle East. He will be remembered for his comprehensive knowledge throughout our subject, and for his myriad specialist skills. Robert was cultured, clear-thinking, a superb team player and a cooperative collaborator. He was deservedly immensely popular for his cheerful and unassuming demeanour, and will be hugely missed.

Robert leaves a wife, Joan, and two sons, Anthony and Richard.

► By James B Riding



CROSSWORD NO. 172 SET BY PLATYPUS



ACROSS

- 1** Hydrocarbon secretion of plants - amber precursor (5)
- 4** Semiconducting element predicted by Mendeleev and first identified in mineral agyrodite (9)
- 9** Offset fault at spreading centres (9)
- 10** Below (5)
- 11** The property of a word that sounds like that which it signifies (14)
- 14** Glen Roy's parallel ones led Darwin astray (4)
- 15** Advertising hoardings, waymarkers, for example (10)
- 18** Electrical insulator, polarized by an applied electric field (10)
- 19** Deposit of metalliferous ore (4)
- 21** Converted or evangelised by followers of Jesus (13)
- 24** Basic principle on which a belief or theory is based (5)
- 25** Height, above OD, for instance (9)
- 27** Negative reactions (9)
- 28** Stalk-like structure found in floral ladyparts (5)

DOWN

- 1** Going backwards, like some kinds of metamorphism (10)
- 2** Marine realm (3)
- 3** Isometric, fluorescent feldspathoid found in underaturated igneous rocks (6)
- 4** Rock tapper (9)
- 5** The alpha male Montague (5)
- 6** By-pass surgery on a meander (8)
- 7** Hard-working (11)
- 8** Carbonate-rich lime mud (4)
- 12** Type of dichroism, seen in the eponymous hydrated amorphous silica (11)
- 13** When one person or group enjoys power over another (10)
- 16** Tendency to emit unwelcome sound (9)
- 17** Erosional product (8)
- 20** Removes confining pressure; as when reservoir rocks are exposed or a sealed well opened (6)
- 22** Niels Stensen by another name, pioneer of geology 1638-1686 (5)
- 23** Sicilian volcano (4)
- 26** *Hedera* - prestigious London showbiz club and resto (3)

WIN A SPECIAL PUBLICATION

The winner of the July Crossword puzzle prize draw was **Chris Ayers-Morgan** of Longfield.

All correct solutions will be placed in the draw, and the winner's name printed in the November issue. The Editor's decision is final and no correspondence will be entered into. **Closing date - 23 September.**

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

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

Name

Membership number

Address for correspondence

Postcode

SOLUTIONS JULY

- ACROSS:**
1 Polje **4** Lifestyle **9** Ergonomic **10** Magma
11 Dodecahedrons **14** Seam **15** Ptarmigans
18 Anthracite **19** Kiwi **21** Observational
24 Ethyl **25** Butterfat **27** Uncharted **28** Shear
- DOWN:**
1 Pseudospar **2** Lag **3** Eunuch **4** Lymphatic
5 Faced **6** Symbolic **7** Yugoslavian **8** Eras
12 Diastrophic **13** Oscillator **16** Retracted
17 Brasilia **20** Miners **22** Robot **23** Peru **26** Foe

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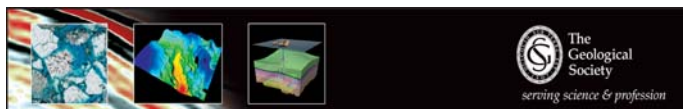
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Call for Abstracts - 14 February 2014

Operations Geology Conference

"The Life-cycle of a well"

26-27 November, 2014

The Geological Society, Burlington House, Piccadilly, London

Convenors:

Nick Pierpoint
BP Group - Chairman

Malcolm Brown
BP Group

Richard Smout
Eon - Secretary

Manoj Gaur
Cairn India

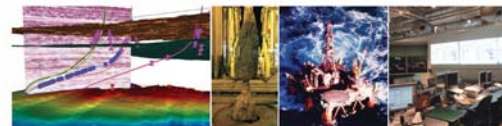
Gordon Holm
Tullow

Kirstin McBeath
BP North Sea

Joanna McKidd
BP North Sea

Pat Spicer
BP Angola

Louise Young
BP Azerbaijan



CALL FOR ABSTRACTS

Following the highly successful Operations Geology Workshop held in Aberdeen in October 2012, the Petroleum Group of the Geological Society are pleased to announce the dates for the next event, which will be held over two days in 2014. This is also the first call for abstracts. Operations Geologists play key integrating roles at all stages of the life cycle of a well. This conference will look at the life cycle of a well and the contributions of Operations Geology at each stage. It is the intention of the convenors that both oral and poster presentations will eventually be prepared for release in a Special Publication of the Geological Society of London. To that end we invite contributions to the programme sufficiently early to make it possible for Authors to gain necessary permissions to present and publish what we trust will be cutting edge material.

- **Well Planning** - hazard identification (due to rocks, fabric, pressure, stress, geometry etc) and avoidance/mitigation, targeted data acquisition for all disciplines for life of field
- **Execution** - real-time techniques, managing the drilling window, the acquisition and use of integrity test data, appropriate isolation of permeable zones in the overburden
- **After Action Review** - NPT analysis and the learning loop, continuous improvement
- **Emerging Technologies** - the next generation of needs and solutions - logging, formation and gas detection/analysis, real-time well bore stability analysis tools, PFFG tools
- **Professional Competence** - the need to strengthen the available processes for training and the vetting of competence for OGs, particularly in safety critical areas

CALL FOR ORAL AND POSTER ABSTRACTS:

Abstracts of up to 300 words and up to three colour figures are requested.

Abstract Deadline 14 February 2014.

Abstracts should be submitted to Nick Pierpoint and Laura Hayward.

For further information, please contact Laura Hayward, Events Administration Assistant;

+44 (0)20 7432 0983 or E-mail: laura.hayward@geolsoc.org.uk

Nick Pierpoint E-mail: Nicholas.Pierpoint@bp-group.com



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2013 Careers in Earth Science

20 November 2013

Our Dynamic Earth, Edinburgh

The **Careers in Earth Science** event is being run by the Earth Science Scotland community, and is co-badged by the Geological Society and the Petroleum Exploration Society of Great Britain. Previous events have attracted around 200 students from across Scotland and northern England.

The day will run from 10am – 5pm and will include:

- Presentations from early career earth scientists from the oil and gas, mining, geotechnical, environmental and research sectors.
- Panel Q&A on careers
- Exhibition by employers and professional bodies
- Higher education fair – promoting MSc and PhD programmes.

Venue

For venue location and travel details – visit *Our Dynamic Earth's* website: www.dynamicearth.co.uk

Registration

This event is free to attend (including lunch and refreshments) but you must pre-register.

To request a place, please email registrations@geolsoc.org.uk

