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The Fellowship Magazine of the Geological Society of London

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Fermor & Son

Patrick, on Lewis – the geologist
father he barely knew

SCIENCE IN THE CITY

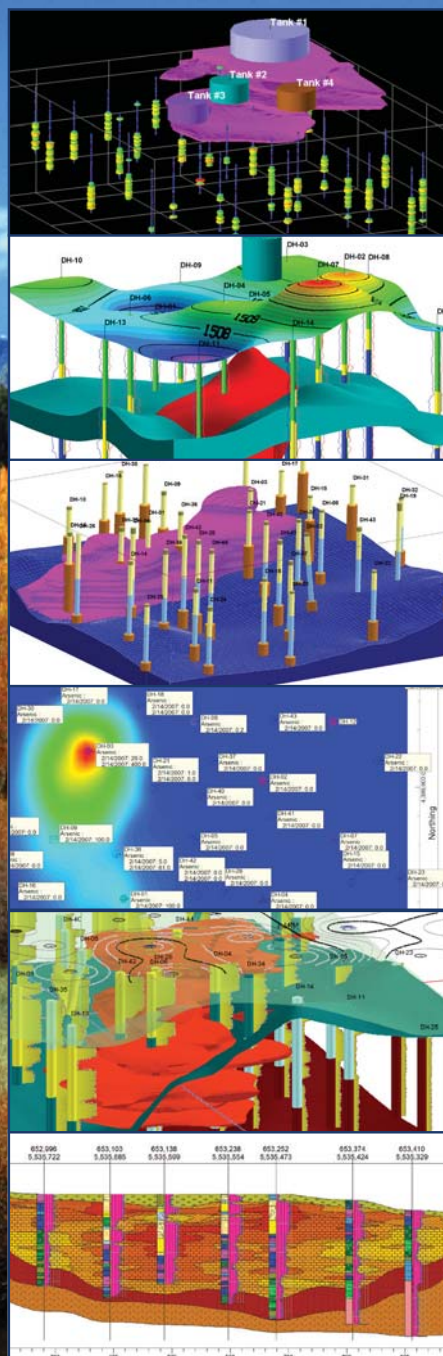
Nina Morgan on the joy of
Oxford gravestones

THE SUSTAINABLE GEOLOGIST

Mike Daly on how chartership
stimulates creativity

SMITH'S RESTING-PLACE

Online Special – Visiting
St Peter's, Northampton



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- Native SQL database support
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- 3D faulting for block and surface models
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- Geobody filter for block models
- Large fonts



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Son of geologist Sir Lewis Leigh Fermor, 'Paddy' achieved fame as an adventurer, war hero and writer. Yet his father remained almost a stranger to him

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Call for Abstracts – 29 February 2016

Mesozoic Resource Potential in the Southern Permian Basin

7-9 September 2016
Burlington House, Piccadilly, London



The Southern Permian Basin covers a large geographic area of northern Europe including the UK, Netherlands, Germany, Poland, Denmark and Sweden. For many operators it has, and continues to be, a heartland for hydrocarbon production from Permian reservoirs. However, in this mature basin many opportunities remain within the overburden and particularly within the Mesozoic succession associated with heterolithic source rock, reservoir and seal facies and complex tectonics. Interest in this interval has also increased due to its geothermal energy and unconventional hydrocarbon potential. In this conference, we aim to bring together academics and industry workers from across the region to share ideas on the following themes:


- Regional cross-border stratigraphic correlation
- Sedimentology including reservoir/seal extent, facies and diagenesis
- Structural evolution and styles
- Regional and local-scale hydrocarbon generation and charge
- Examples of geothermal developments in the basin
- Hydrocarbon field-scale observations (including geophysical, petrophysical and production data) and further exploration, hydrocarbon/geothermal development within the Mesozoic

There will be two days of oral and poster contributions from the 8th to 9th of September 2016 including regional overviewlectures, the Triassic, Jurassic and Cretaceous.

Confirmed Keynotes:
Prof. Ralf Littke (WIRTH Aachen University)
Dr. Mark Galsukh (Shell)
Prof. Grzegorz Pankowski / **Prof. Piotr Kozłowski** (Polish Geological Institute/Polish Academy of Sciences)
Prof. Jonas Kley (Living-August-Universität Göttingen)

Call for Abstracts:
 Please submit abstracts for oral and poster contributions that cover any of the above themes to: books.gilwell@geolsoc.org.uk and richard@geolsoc.org.uk on or before 29 February 2016.

For further information please contact:
 Laura Griffiths, The Geological Society, Burlington House, Piccadilly, London W1J 0BT; T: 020 7534 5044


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Confirmed Speakers:
Ben Kilburn (Shell International and Petroleum Group)
Peter Kulis (WIRTH Aachen University)
Stanislav Mazur (Gazprom UK)
Tony McFie (Shell UK)
Herman Wijnhoff (BP)
Rene v. Ojik (Shell International Geological Development)
Robert Schinner (GDF SUEZ)

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Martian Gullies and their Earth Analogues

26-27 June 2016
The Geological Society, Burlington House



This meeting follows on from the original meeting on Martian gullies held in 2008 at IPI in Houston, Texas. This happened 8 years after Mars' first discovery and opened a new phase for researchers studying gullies through on-site working, fieldwork studies of Earth, analogue and laboratory simulation studies.

The aim of the second workshop would be not only to bring together the gullies of Mars but also to bring together the gullies of Earth, but also to add a wider perspective for including analogues from those studying planetary environments on Earth, such as geomorphology, sedimentology, glaciology, hydrology, meteorology, and geology and mineralogy/petrology.

We would particularly encourage all Scientists working on other areas which could be considered as informative analogues for water on the Martian surface. These wider perspectives add both depth and content, allowing researchers not traditionally attached to gully research to add their outside expertise to the ongoing debate.

Confirmed Speakers:
Sarah Colwell (Texas Tech University)
Andrew Carr (University of Texas)
Paul Gertzel (University of Southampton)
Adam Johnson (EPN)

Further Information:
 For further information about the conference please contact:
Mark Houlden (Geological Society)
 The Geological Society, Burlington House, Piccadilly, London W1J 0BT.
 T: 020 7534 5044
 E: mark.houlden@geolsoc.org.uk
 Web: www.geolsoc.org.uk/abstracts
 Twitter: [@geolsoc](https://twitter.com/geolsoc)
 Facebook: www.facebook.com/geolsoc

Call for Oral and Poster Abstracts:
 We welcome oral and poster abstract contributions for this meeting, reviewing the ground-based study of gully formation on Mars, and their Earth analogues. This, if you would like to be considered for a poster presentation or a poster presentation, please send an abstract of no more than 400 words to books.gilwell@geolsoc.org.uk on or before 29 January 2016.

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The Geological Society,
Burlington House, Piccadilly,
London W1J 0BG
T +44 (0)20 7434 9944
F +44 (0)20 7439 8975
E enquiries@geolsoc.org.uk
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Publishing House

The Geological Society
Publishing House, Unit 7,
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T 01225 445046
F 01225 442836

Library

T +44 (0)20 7432 0999
F +44 (0)20 7439 3470
E library@geolsoc.org.uk

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Professor Peter Styles

EDITOR

Dr Ted Nield

E ted.nield@geolsoc.org.uk

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ADVERTISING SALES

Ollie Kirkman

T 01727 739 184
E ollie@centuryonepublishing.uk

ART EDITOR

Heena Gudka

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“ODDLY, IN OCTOBER, THE BIGGEST PR GAFFE COMMITTED IN THE NAME OF FRACKING CAME COURTESY OF ITS FRIENDS”

Front cover image: © Photo by Steve Pyke/Getty Images

FROM THE EDITOR'S DESK:

Fracking – not for girls?

Everyone delivering a geological address to a general audience can expect to get a question about fracking. I usually answer in two parts: Is it safe? And if safe, is it wise?

Like driving, fracking can be either safe or unsafe - depending on regulation, workmanship, inspection and enforcement. The second question is more nuanced. If the looming energy gap is your main worry, then it is wise; if climate change is your main concern, probably not.

But PR is a rough game. Safety concerns are stoked up by 'green' lobbyists because what they really fear is that a new source of hydrocarbons might delay the switch to 'clean' energy. Opposition to radwaste repositories employs the same tactic, the real fear being that a disposal problem solved is no longer an effective weapon against nuclear power.

This PR approach – known as 'shroud-waving' – frequently becomes desperate. In October, Friends of the Earth attempted to claim that sand (used in fracking fluids) is carcinogenic, and were publicly ridiculed by, among others, Clive Mitchell (BGS) and Professor Paul Younger (Glasgow University). But oddly, the biggest gaffe committed in the name of fracking that month came courtesy of its friends.

In October UK Onshore Oil & Gas (UKOOG), understandably eager to tackle fracking's image problem, appointed as its

chair Averil Macdonald OBE - 'one of the UK's leading experts in communicating science to the public', Emeritus Professor of Science Engagement at Reading University, board member of Women in Science and Engineering, etc. etc.

How unfortunate then that, in seeking to address the statistic that fewer women than men support fracking (31.5% v 58%, according to Nottingham University), Professor MacDonald landed UKOOG in deep PR doo-doo over the apparent sexism of her explanations. Women, she said, were less well informed about science, less likely (in any case) to be persuaded by facts than 'gut feeling', and as mothers, more concerned about children – thus appearing to insult all women, and especially non-mothers (of both sexes).

So, instead of reaching out to females about fracking, UKOOG were roasted alive for reinforcing gender stereotypes. Their message was lost, the organisation made to look foolish, and any future PR hills they choose to climb made steeper. As charm offensives go, this was charmless and offensive.

Moral? Don't do media relations on the cheap; apparent sexist claptrap is not excused just because a woman utters it; think twice before presenting controversial and easily misinterpreted facts and figures; and then if you feel you must do it, consult a proper PR person qualified by experience. Who will say 'don't'.

Oh, and 'handing children loaded guns is a bad idea'.

DR TED NIELD, EDITOR - ted.nield@geolsoc.org.uk @TedNield @geoscientistmag

SOCIETY NEWS

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



The sustainable geoscientist

Mike Daly* argues that professional validation, far from being a straitjacket, fosters creative responses.

"Events dear boy, events" was reputedly Harold Macmillan's reply to a journalist's question about what is most likely to throw governments off course. This doesn't just apply to governments; individuals also experience events. Life has a habit of throwing them up - when we least expect them. It is then that we realise the importance of support from friends, colleagues and institutions. We also face the reality of how well we have developed ourselves to deal with the environment in which we operate, and the threats it sometimes presents.

Core

It is not a coincidence that these two key characteristics are at the core of being a Chartered Geologist (CGeol). Professional support and recognition throughout a career provide the validation that sustains us. That support is conditional on continued professional development that keeps us abreast of changes, both inside and outwith our science.

Reflecting on my own career, I spent my first 10 years as a field geologist in Africa. I loved the individuality and productivity of that role. But with time, I realised that I was learning a lot about Africa but becoming detached from the geoscience that had led me there. A friend drew me back to British academia, ultimately equipping me for a role as a structural geologist and, later, an executive in BP. This was crucial early-career validation and a very deep dive in continued professional development. I wasn't a CGeol, but inadvertently I followed the path laid out to become a CGeol today.

So why is being a CGeol debated so much in the UK, particularly by non-Engineering related geologists? Very thoughtful people argue that being a CGeol is a constraint on creativity, an unnecessary formality of

little use to many geoscientists.

During my 40 years as an active geoscientist much has changed inside our science and in the technology that underpins it. Outside our science things have also changed, especially in the world of regulation, governance and legal compliance. This latter, complex and un-scientific world, envelops geoscientists whether they like it or not - scrutinising the integrity of the science they publish; the use of confidential data they hold, and the impact of the decisions they make.

Intrusive

Such changes can be felt as intrusive, controlling and a constraint on creativity and risk-taking. However, the objective is not that. Rather, it is to ensure risk-taking and creativity happen in a context as full of knowledge and understanding of the potential consequences as possible. My industry, oil and gas, delights in stories of heroic risk-taking that came off. What it rarely speaks about are the failures that, in hindsight, could have been avoided. Such cases are often a failure of discipline and process, far more than the romantic notion of a geoscientist's 'gut feel'.

Similarly, the rigour of being a CGeol is not to constrain or stifle but rather to enable and support through professional validation and personal development. I believe that this is an increasingly essential component of being a geoscientist in 21st Century. In an ever more litigious world, powerful legal systems can be unable or unwilling to value experience; they require formal evidence of professional competence. The validation of being a CGeol provides that evidence. And having that CGeol status may one day give you crucial support when "events" come along to throw you off course.

*** Mike Daly** joined Tullow in 2014 as a non-executive director, after a 28-year career with BP, from which he retired as Head of Exploration in 2013



LONDON LECTURE SERIES

Landscape Dynamics, Erosion and Sedimentation

Speaker: Angela Strank **Date:** 9 December

Programme

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

Further Information

Please visit www.geolsoc.org.uk/gslondon

lectures15. Entry to each lecture is by ticket only.

To obtain a ticket please contact the Society 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: **Annie Sewell**, The Geological Society, Burlington House, Piccadilly, London W1J 0BG, T: +44 (0)20 7432 0981 E: Annie.Sewell@geolsoc.org.uk

FUTURE MEETINGS

Dates for meetings of Council and Ordinary General Meetings until April 2016 shall be as follows:

Ordinary General Meetings:

- ◆ 2016: 3 February
- ◆ 2016: 6 April

Meetings of Council:

- ◆ 2016: 3 February
- ◆ 2016: 6 April





'Albert the Good' - mover and shaker behind the Great Exhibition

Royal Commission for the Exhibition of 1851

For reasons currently lost in the mists of time, the President of the Geological Society is an ex-officio Commissioner on the (remarkably) still-extant Royal Commission for the Exhibition of 1851, established by Prince Albert to stage the Great Exhibition in the Crystal Palace.

➤ The Commission offers various research grants, details of which are on the website at: www.geolsoc.org.uk/Education-and-Careers/Grants/The-Great-Exhibition

Research Funds



Applications are invited for the 2016 round of the Society research funds. Please complete the appropriate form which can be downloaded from the Society Awards and Research Grants page at www.geolsoc.org.uk/grants where you will also find information about the Society's and other funds administered by the Society. The average award has been about £1000.

The Research Grants committee meets once annually. Applications must reach the Society no later than **1 February 2016** and must be supported by two Fellows of the Society who must each complete a supporting statement form. Only complete applications on the appropriate form will be considered.

➤ Please send to the Awards Secretary at the Geological Society.

Council nominations – reminder

Fellows received a nomination form with the October issue of *Geoscientist* for the election of new Council members for 2016/2017. Details of the process were on the form and are also in the Governance section of the website. The closing date for the receipt of nominations is 8 January 2016 and nominations will NOT be valid unless

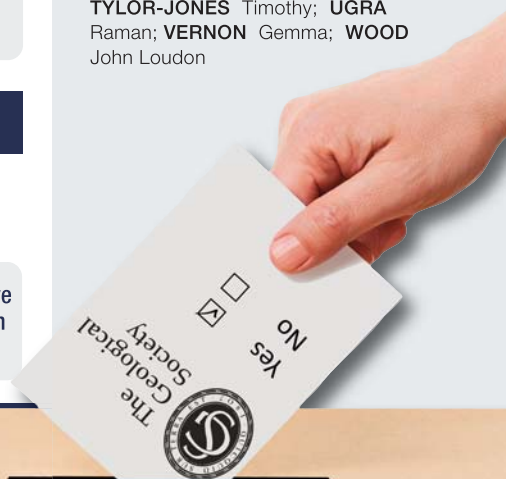
they are fully completed, signed and accompanied by a statement by the nominees.

➤ Please return to **Mrs Natalyn Ala, c/o Executive Secretary, The Geological Society, Burlington House, Piccadilly, London W1J 0BG**

FELLOWSHIP ELECTION

The following names are put forward for election to Fellowship at the OGM on 3 February 2016:

ACTON Steve; **AL TOFAIF** Saeed; **ASHMORE** Rosemary Aileen; **BALDING** Greg; **BATHAM** James; **BEECH** Ryan; **BELL** Andrew; **BENNETT** Jacob Naden; **BICKNELL** Sam; **BROADBENT** Sarah Jayne; **CHAN** Shing Chung; **CHAPMAN** John; **CLIFFORD** James Anthony; **COFFIN** Nicola; **COX** Robert David; **DAVIDSON** Adam; **DAVIES** Richard; **DRIVER** Edward Daniel Ashton; **EMULEOMO** Ayodeji; **EVANS** Daniel; **EVANS** Sian; **EVEREST** Georgina Clare; **FELTS** Elizabeth; **GARNER** Corinne; **GHARU** Shiv; **GILLIGAN** Amy; **GLENDINNING** Susan; **GRAHAM** Alistair; **HALLETT** Mathew; **HEARING** Thomas William; **HIRST** Jennifer Elizabeth; **HODGSON** Jonathan; **INGLEBY** Ruth; **JACKSON** Alison Kim; **JOHNSTON** Brian; **JOLLANDS** Edward David; **JONES** Jessica Elizabeth; **JOTHAM** Steven; **JUROVSKAJA** Darina; **KNIGHT** Faye; **LAJUMOKE** Folarin Oluwagbemiga; **LANE** Rhian; **LAURS** Brendan; **LEE** Seungjong; **LEE** Wing Yan; **LENTON** Timothy Michael; **LIUZZO SCORPO** Alberto; **LORENZ** Lars; **MCPHAIL** Holly; **MOULSLEY** Ariana; **OAKLEY** Matthew Ross; **OAKLEY** Samuel William; **ORAM** Christopher Leonard; **PAWLIKOWSKI** Piotr; **PEARSON** Natalie; **PIGA** Emanuela; **PLUNKETT** Hannah; **POINTING** Matthew; **RADY** Timothy; **REEVE** Sara; **ROACH** Ceri; **ROBB** Jane Elizabeth; **ROBERSTON** Hannah; **RODEN** Leanne; **ROGERS** Joe Alexander; **ROLLETT** Eleanor; **RUDKIN** Timothy; **RUTLAND** Lucy Victoria; **SA** Virgilio; **SAGHIR** Reem; **SANDISON** Robert Benjamin; **SMEDLEY** Jennifer; **STEAGGLES** Hannah Clare; **SWEETMAN** Hannah; **SWEETMAN** Veronica; **TANG** Yee Sum Carmen; **THOMPSON** Martin; **TIDY** Matthew James; **TOWNSEND** Helen Ruth Lily; **TROTH** Ian; **TROY** Sean; **TSIGKAS** Konstantinos; **TYLOR-JONES** Timothy; **UGRA** Raman; **VERNON** Gemma; **WOOD** John Loudon



SOCIETY NEWS...

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. Once a year there is also a special dinner at Burlington House. New diners are always welcome, especially from among younger Fellows. Dinner costs £57 for a four-course

meal, including coffee and port. There is a cash bar for the purchase of aperitifs and wine.

➤ Fellows wishing to dine or requesting further information about the Geological Society Club, please email Caroline Seymour on carolineseymour554@hotmail.com

Undergraduate Fieldwork Bursaries



Through the generosity of Novas Consulting Ltd (now part of the Hannon Westwood group) research grants up to £1500 will be available to fund up to 6 bursaries for field mapping projects linked to studies of stratigraphy, structure or sedimentary geology/processes. Topics with a relation to petroleum geology will be

particularly favoured. Proposals for work in other topics will not be considered. Preference will be given to Candidate Fellows of the Society.

➤ To browse our collection of books, maps and DVDs visit www.geolsoc.org.uk/geogifts

Christmas is coming

Jenny Davey has some gift ideas for the rockhound in your life.

With the festive season almost upon us, the Geological Society Publishing House would like to remind you the last date for ordering in time for Christmas is **7 December 2015**, for UK and upgraded overseas deliveries (when choosing DHL or Air Parcel at checkout). Our great gift ideas start from as little as £7!

➤ To browse our collection of books, maps and DVDs visit www.geolsoc.org.uk/geogifts



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➤ 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/info>

What makes the best geologist?

John Arthurs ponders H H* Read's dictum and wonders if the answer lies not so much in numbers of rocks but quality of mentors



Everyone will have their own answer to this question. Many would refer to H H Read's well-known dictum, that "The best geologist is the one who has seen the most rocks." I'm sure we'd all agree that experience is necessary, but is it sufficient?

I wholeheartedly support Mike Harris's call for more summer jobs for students at mines or exploration camps (Soapbox, July 2015). It speaks to the idea that experiential learning is the most important developmental mechanism for good geological practice. Fieldwork is also an important differentia in early career – a good geologist enjoys working in the field. But again, is that a sufficient criterion?

Chartership

In 1990 The Geological Society awarded the first of its charterships. Criteria for validation clearly state what competencies are required (see

www.geolsoc.org.uk/chartership).

Applicants must demonstrate proficiency at scientific thinking skills, communications and professionalism. I have no argument with that but I believe something even more is needed. I suggest that that something is – guidance and support from colleagues, or mentoring.

The question about what makes the best geologist is not simply about how well an individual applicant meets the criteria, but also about how he or she got to where they are now. When we wrestle with this question we will almost certainly reflect on the best geologists whom we have known personally. I am immensely grateful to my mentors in the past and I'm sure all *Geoscientist* readers are similarly grateful. I believe that mentors are as important to an individual's professional career as are lecturers and supervisors to professional

training programmes – perhaps even more so.

The term mentor is used here in the widest possible way. In addition to traditional sponsorship mentors, also included are advisers, coaches, trainers and role models who provide support at a personal level. Perhaps the term developmental relationships or 'developers' might be preferable. One thing they all have in common is that mentoring is an altruistic activity. A mentor should never take credit for a pupil's achievements.

Social science research in executive coaching and mentoring has consistently shown, over the past 30 years, that both 'mentees' and mentors not only receive higher salaries and climb the career ladder faster, but are also more satisfied with their careers overall. Research shows that if both mentors and 'mentees' have some basic training in coaching skills, outcomes are more likely to be successful.

It is a sad fact that only 21% of the Fellowship is currently chartered. One way to encourage applications and to increase the numbers would be for many more CGeols to volunteer as mentors. A little reading and basic training will provide basic coaching skills, show how to structure meetings and reduce fears of dysfunctional relationships.

I commend The Society's website page on mentoring (www.geolsoc.org.uk/mentoring).

To be a mentor can be a very satisfying experience, albeit a vicarious one. For the 'mentee', it could be an essential professional relationship. Perhaps Read's dictum could be rephrased as "The best geologist is the one who has had the best mentors."

▶ John Arthurs CGeol, EurGeol, PGeo, MSc, DIC, DMS, MIMMM., also includes 'Dip Exec. Coaching' among his postnominals. E: jwarthurs@ntlworld.com

*Dr Christine Butenuth (originator of www.settingupyournbusiness.co.uk) and Dr Michael de Freitas, First Steps Ltd

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 – please take photographs on the largest setting on your camera, with a plain background.

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

“A GOOD GEOLOGIST ENJOYS WORKING IN THE FIELD – BUT IS THAT A SUFFICIENT CRITERION?”
John Arthurs

TIME FOR GIFTS

“ HIS BOOKS CONTAIN RARE BUT TOUCHING GLIMPSES OF LEWIS, ILLUMINATING THE PECULIAR UPBRINGING THAT COLONIAL SERVICE IMPOSED ”



Ted Nield* on the life, times and legacy of geologist Sir Lewis Leigh Fermor, as seen through the eyes of his more famous son

“ *h*aving made the most solemn oaths to me [he] has quite cheerfully broke them all – you can never guess just what a blighter and a mongrel that man is – he even astonishes me – and I thought I knew him pretty thoroughly ... there is one thing I regret and that is that I didn’t leave him straight away the first time I longed to – which was three days after my wedding day. He is impossible.”

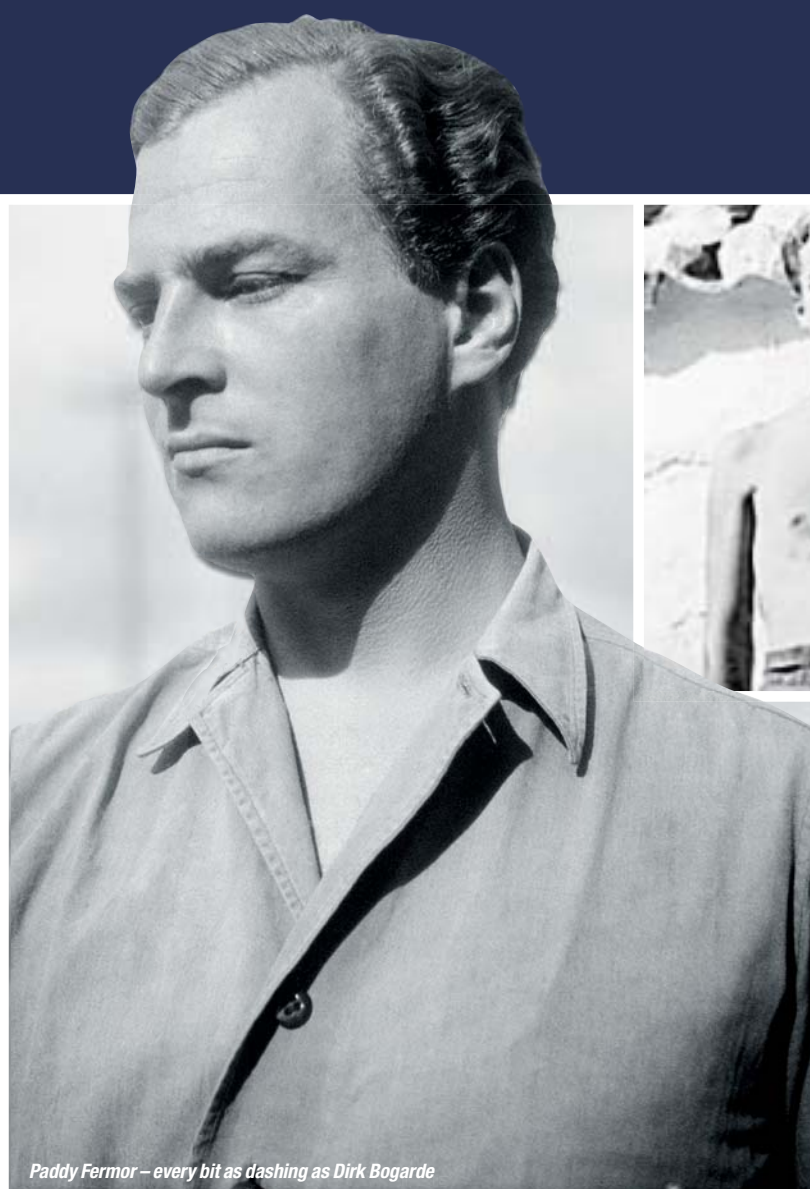
So wrote Muriel Æileen Fermor (*née* Ambler, 1890-1997) on 1 February 1923 to her mother – convinced that her austere geologist husband Lewis Leigh Fermor (1880-1954) had been cheating on her in far-away Calcutta, where he was then Acting Director of the Geological Survey of India. (He became Director in 1932.) Their desultory marriage – already a separation in all but name – had but another two years to run. They were

divorced in May 1925.

The marriage resulted in two children, Vanessa Opal (b. Calcutta, 1911) and Patrick Michael (b. Endsleigh Gardens, St Pancras, 1915). It is perhaps fortunate that ‘Paddy’ was born in England, away from Lewis, else he might also have copped a mineral for a middle name. After the *Lusitania* was sunk, Æileen decided to leave the baby in England rather than risk losing both her children. Thus Paddy was farmed out to friends and grew up hardly knowing his father at all.

For this reason, little of what we know of Lewis comes to us via him – despite the fact that Paddy grew up to be a great (and largely autobiographical) writer. However, his books do contain rare, but often highly touching glimpses of Lewis, illuminating the peculiar upbringing that colonial service often imposed upon the children of its staff.

Above: Patrick Leigh Fermor, adventurer, war hero, writer of genius and national treasure



Paddy Fermor – every bit as dashing as Dirk Bogarde



Paddy Fermor, photographed during his epic walk



General Heinrich Kreipe, the German commandant in Crete, abducted by Paddy Fermor while working undercover for SOE

Sacked

By the time Paddy was 19, having been sacked from just about every school he was ever sent to and very far from achieving either his father's ambitions (that he should study at science-strong Rugby, Haileybury or Oundle) or his mother's (that he should go to Eton and join the ruling class) young Fermor was becoming tired of idling away his adolescence in Metropolitan dissipation. Aware he ought to become a writer but knowing he lacked material, he conceived the romantic idea of taking his meagre allowance and walking, alone, across Europe to Istanbul (or 'Constantinople', as he resolutely persisted in calling it), like a mendicant scholar of old.

The idea came to him in a flash, was the making of him, and met with (by today's standards) shockingly little parental or other opposition. It was to prove the first in a lifetime of adventures, culminating

most famously in his wartime work with the Special Operations Executive (SOE) in Crete, and his kidnap of the island's commander-in-chief, General Kreipe – described in William Stanley Moss's book *Ill Met by Moonlight* (1950) and the Powell & Pressburger film of the same name (1957), in which Paddy was dashinglly portrayed by Dirk Bogarde.

The epic walk was described in three of the greatest travel books ever written in English (each, as they were published up to five decades later, a truly prodigious act of recall), marking the beginning of Paddy's remarkable career as traveller, linguist, Hellenophile, polymath, autodidact, author, war hero and all-round national treasure. But when he set out for the Hook of Holland, just before Christmas on 8 December 1933, nobody would have believed that, one day, like his father, he too would become a Knight of the Realm – still less that his fame would completely

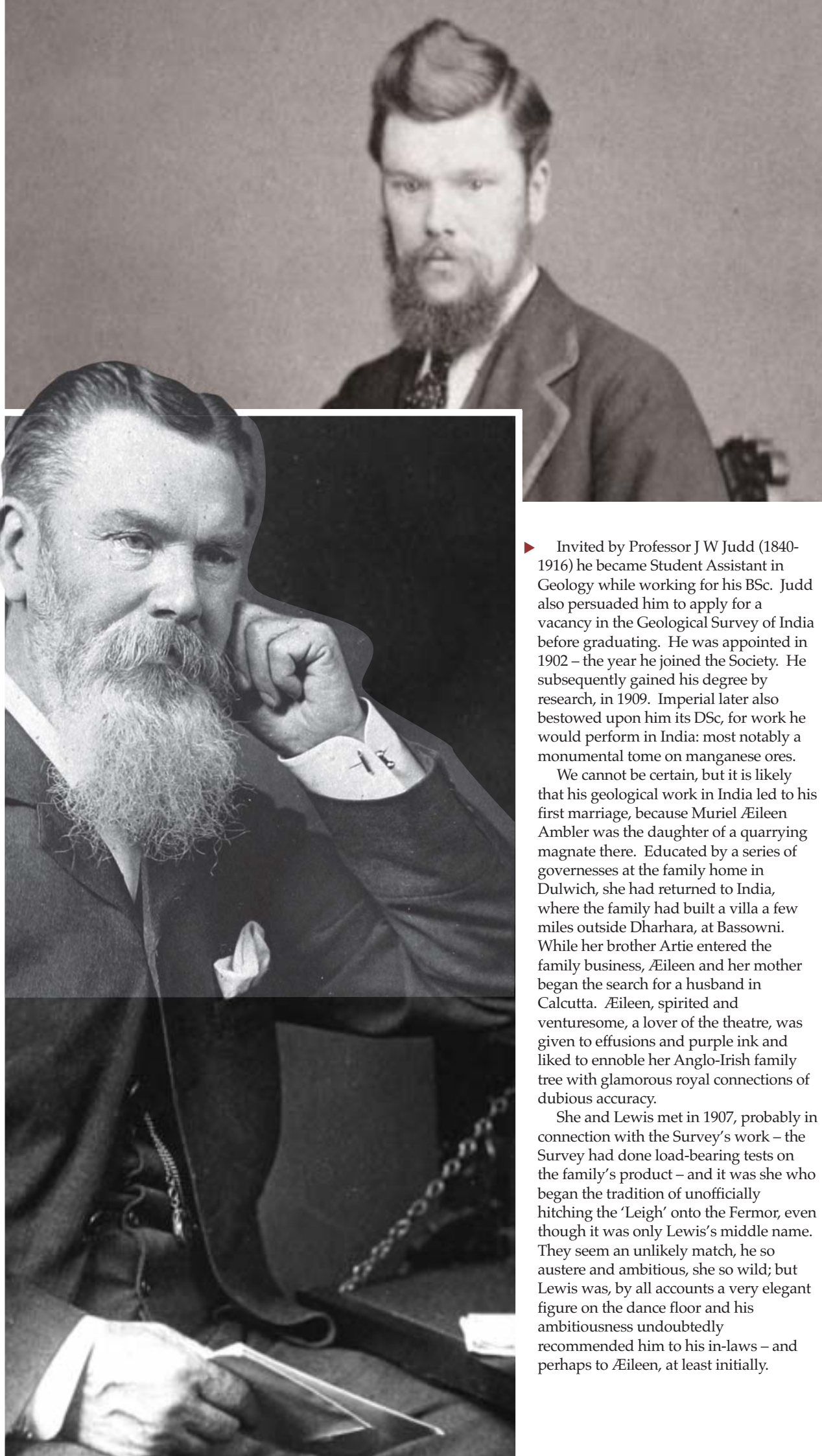
eclipse that of his worthy forebear.

However, the eclipse is not quite total. The Society, at least, remembers Sir Lewis Leigh Fermor, through the gift of a substantial bequest that supports the Fermor Fund and the Fermor Meeting. But who was he, and what did he do?

Peckham

Lewis Leigh Fermor (his middle name, given in honour of a family friend, was perpetuated through his children - but there is no hyphen) was born in Peckham on 18 September 1880, eldest of six. His father was a bank clerk. Adept at winning scholarships, after an initial 4d/week education at Goodrich Road Board School, Lewis moved to Wilson's Grammar School, Camberwell, and the Royal School of Mines, studying metallurgy (with a view to a job in the Royal Mint). ►

John Wesley Judd (18 February 1840 – 3 March 1916). Born in Portsmouth and educated at the Royal School of Mines, where he later became Professor of Geology. He was President of the Geological Society between 1886 and 1888 and awarded the Wollaston Medal in 1891. Large black and white photograph by Maull & Fox, [1890-1906]. From the Society Archive



► Invited by Professor J W Judd (1840-1916) he became Student Assistant in Geology while working for his BSc. Judd also persuaded him to apply for a vacancy in the Geological Survey of India before graduating. He was appointed in 1902 – the year he joined the Society. He subsequently gained his degree by research, in 1909. Imperial later also bestowed upon him its DSc, for work he would perform in India: most notably a monumental tome on manganese ores.

We cannot be certain, but it is likely that his geological work in India led to his first marriage, because Muriel Æileen Ambler was the daughter of a quarrying magnate there. Educated by a series of governesses at the family home in Dulwich, she had returned to India, where the family had built a villa a few miles outside Dharhara, at Bassowni. While her brother Artie entered the family business, Æileen and her mother began the search for a husband in Calcutta. Æileen, spirited and venturesome, a lover of the theatre, was given to effusions and purple ink and liked to ennoble her Anglo-Irish family tree with glamorous royal connections of dubious accuracy.

She and Lewis met in 1907, probably in connection with the Survey's work – the Survey had done load-bearing tests on the family's product – and it was she who began the tradition of unofficially hitching the 'Leigh' onto the Fermor, even though it was only Lewis's middle name. They seem an unlikely match, he so austere and ambitious, she so wild; but Lewis was, by all accounts a very elegant figure on the dance floor and his ambitiousness undoubtedly recommended him to his in-laws – and perhaps to Æileen, at least initially.

Furlough

Colonial service staff received furloughs once every six years, so little Paddy was six when he first met his father.

Embarrassed at being unable to impress this remote figure, Paddy camouflaged his youthful slowness, according to his biographer Artemis Cooper, by memorising long passages of literature by heart. Thus began his voracious love of books, and the first flexing of his prodigious memory.

Æileen never returned to India after World War 1, and (curiously for one so addicted to travel) Paddy never visited his father there. In 1924, Lewis once again came back to England, travelling with his family to Zweisimmen (near Gstaad). Paddy at that time had no school to go back to (having just been sacked again), so when sister Vanessa departed with her mother for England, Paddy stayed on with his father, who was joining a geological conference in Milan.

This was the first time Paddy and Lewis spent any time together, and sadly they were never to be as close again. Two particular memories turn up in Paddy's writing about this special week. In the train to Lake Como, Lewis proudly demonstrated a knife he had just bought, by peeling an apple without breaking the skin. This he did, and tossed both - peel and knife - out of the window. Paddy became helpless with laughter. His annoyed father banished him to another carriage, where Paddy then tried to open the window - by pulling the communication cord.

Arriving in the Dolomites Lewis dressed for the field, where he collected specimens both geological and botanical. Paddy remembers cringing with embarrassment when he saw his father in this bizarre attire - his Norfolk jacket and 'vast semi-circular cap, I think originally destined for Tibetan travel, like a bisected pumpkin of fur, armed with a peak, and with fur-lined ear-flaps that were joined (when not tied under the chin, which was worse still) by a disturbing bow on the summit.'

Worst of all, there was the geological hammer at his belt, bearing an arrow, marking it as government property. Lewis had joked to Paddy that only members of the civil service and convicts carried such hammers. Far from being amused however, and horrified by the thought that people might think his father a convict, nine-year-old Paddy tried (under the guise of adjusting it for comfort) to turn the hammer around so

that the arrow could not be seen.

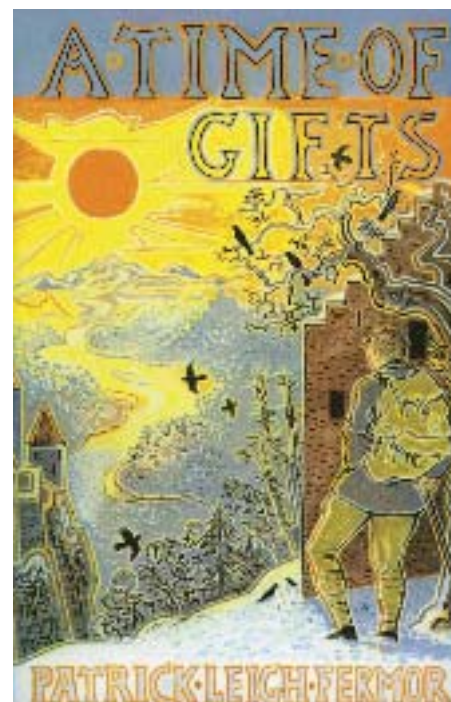
This was to be the last time that father and son were to spend any extended time in one another's company. As Cooper observes, Paddy was to grow up feeling ill at ease with his father, and the suspicion that he was a disappointment to him. On the other side, his mother was contrastingly jealous, seeing him as *her*, rather than Lewis's son (though she too, despite her possessiveness, blew hot and cold, turning clingy one minute and distant and uncaring the next).

Expedition

Lewis had not been pleased to receive his gadabout son's London tailoring bills (though he helped to settle them). So it is possible that Paddy's proposed expedition may have seemed to him like a washing of hands. The hope that his son might become a scientist had died years before. Lewis (no doubt in desperation, because mathematics was one of Paddy's many weak suits) had even suggested his son might consider accountancy, so at a loss was the family to know what to do with him. At least this mad expedition was a goal, and his son's own idea. His reply to news of the departure included a birthday gift of five pounds. (This was not the only birthday on which Paddy would have occasion to thank a geologist. On turning 21, two years into his trek, he learned that Sir Henry Hubert Hayden, one of Lewis's predecessors as Director (1910-21) had bestowed a gift of £300 on him.)

Paddy would arrange for letters to be sent to him *poste restante* at various points along his projected route. Most important were those containing pound notes, but occasionally he found letters from his mother, often whimsical and amusing, and occasionally, more formal missives from Lewis: 'full of geological advice'.

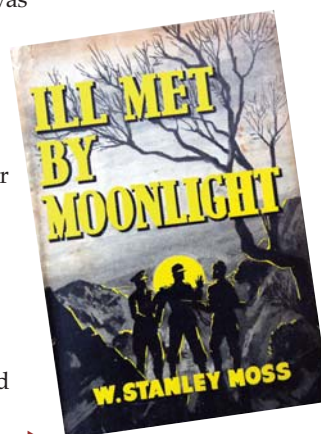
At the time when her favoured child was departing for Europe, Æileen herself was having a hard time. Divorced eight years, and suffering that diminution in her status, news had come through that Lewis was marrying again - to a certain Frances Mary Case. Within a year, Lewis was knighted, and thus her supplanter became 'Lady Fermor'. Artemis Cooper speculates that this might have been a severe blow to the social-climbing Æileen; though in the days when directors of the British Empire's geological surveys were habitually knighted, she surely realised what she was giving up - though this may not have made it any easier to bear. ►



Above: The dust cover of *A Time of Gifts* (John Murray), designed by John Craxton

Below: Cover of William Stanley Moss's 1950 book (George Harrop & Co.). Moss and Fermor had come to an agreement that Moss would be the one to write up the Kreipe abduction story. The book was published some time after it was written, because of difficulties surrounding the secrecy of Special Operations Executive missions

“OCCASIONALLY HE FOUND LETTERS FROM HIS MOTHER, WHIMSICAL AND AMUSING, AND MORE FORMAL MISSIVES FROM LEWIS 'FULL OF GEOLOGICAL ADVICE'”



► Archaean

Fermor's main geological interest was (as reflected in the terms of the Fermor bequest) the rocks of the Archaeana. Sir Thomas Holland had asked him to report on the manganese ore deposits of India, little expecting that Fermor (renowned for meticulous attention to detail) would take until 1909 to publish, nor that his report would run to nearly 1300 pages. Not only did this work earn Fermor great renown (and his FRS), it also revealed six new manganese minerals.

The experience gained in this work led to his being placed in charge, in 1911, of a systematic survey of the Archaeana rocks of the Central Provinces (Madhya Pradesh), much of which he surveyed personally, at four inches to the mile. War interrupted this work, and Fermor finished his part of it in 1926.

His economic work continued – on copper, coal, iron ore, and mica, which led to an avalanche of publications in the *Annual Reviews of the Mineral Production of India* between 1921 and 1934. He also worked on the Deccan Traps, and even on meteorites (though his ideas about the origin of chondrules were incorrect – he thought they were formerly garnets). Finally, before

retiring to Bristol and then Surrey, he began a memoir entitled *'An attempt at the correlation of the ancient schistose formations of Peninsular India'*. Sadly, this herculean project was destined never to advance beyond the opening general discussion (published 1940) and remained incomplete on his death.

Funeral

His retirement in 1935, a year after being elected FRS, marked the beginning of a closer association with the Geological Society. He had already won its Bigsby Medal (1921), and he now joined Council (in 1943), and served as Vice President from 1945 to 1947.

When Paddy learned that his father was dying, in 1954, he paid a final visit to him, in his new home near Woking. This at last was a home with the space to display his collection of early English glassware, as well as the fine Persian rugs he had collected. It was the first proper home that Lewis had ever owned – aptly named 'Gondwana' – and here he had hoped to finish his Archaeana memoir. These hopes were dashed only a few months after moving in, when his final illness struck.

'We had only met twice during the last six years and corresponded as little' Paddy wrote. Hollow cheeked, and a

sickly colour, 'his enormous and luminous eyes, talking very slowly and almost inaudibly... The only consoling thing is that he has no idea he is dying. "Such a bore, being all cooped up when all the flowers are out"'. He died on 24 May. "What a strange business Daddy's funeral was, a sort of nightmare' Paddy wrote to Vanessa. 'I am so glad you were there too – I don't think I could have taken it if there hadn't been your eye to catch now and then'.

In 1976, having just been declared clear of cancer himself, Paddy finally decided to visit India. After Christmas in Benares he went to Calcutta and found his way 'rather timidly' to the offices of the Survey. To his surprise, he found that 'They seem to worship Daddy's memory'. Indeed, Dr S V P Iyengar (1921-2012), Deputy Director General and a former pupil of H H Read and Robert Shackleton, described Lewis as 'the most imaginative, helpful and constructive [figure, who] ... contributed more than anyone else, and all his prophecies and conclusions have been proved right' – a slight exaggeration, considering the chondrule theory, but understandable. As Cooper observes, such was the bitterness about Lewis that Paddy and his sister had absorbed from their



Paddy Fermor in 1967



Picture of Sir Lewis Leigh Fermor, at his desk in the Geological Survey of India, Calcutta. From the Geological Society's photograph collection

mother, it was 'strange' for them to 'discover him both loved and admired'.

Bequest

The story of the Fermor bequest began in 1961, and in all took nearly 20 years. Lady Fermor wanted to make over a sum to be held in trust, the income being used to pay her a pension during her lifetime; but this was later shown to be impossible because of the Estate Duty that she would have to pay. Then, in October 1969, a letter from her solicitors arrived at Burlington House announcing her wish to make 'a substantial bequest'. In March 1979, Lady Fermor presented the Society with a cheque for £1000 to establish the Fermor Lecture, held every three years, the first in October/November 1980. She was (eventually) granted Honorary Fellowship, and invited to attend the Fermor Lectures, which she did - enjoying the luxury of a free night in the 'Fellows' Bedroom'.

Lady Fermor died in November 1990, leaving the Society the residue of her estate minus some bequests to others. It is not known if the Society blushed about having made her sleep in the cellar when it found out that this residue amounted to £500,000-£600,000. It was, and remains, the Society's biggest fund. ♦

► FOR MORE FERMOR

Patrick Leigh Fermor – The quotations from writings by Paddy Fermor are taken variously from *A Time of Gifts: On Foot to Constantinople: from the Hook of Holland to the Middle Danube* (John Murray, 1977), *Between the Woods and the Water* (Murray, 1986), these being the first two books in the eventual trilogy about his youthful adventure. The third volume, published posthumously, was entitled *The Broken Road: from the Iron Gates to Mount Athos* (Murray, 2013). I also quote from letters excerpted in the biography, by Artemis Cooper, entitled *Patrick Leigh Fermor – an adventure* (Murray, 2012). Any and all come highly recommended as Christmas Gifts! For more information, see also www.patrickleighfermor.org.

Lewis Leigh Fermor - A bibliography of Sir Lewis Leigh Fermor's main geological work and links to obituaries can be found at the end of Victoria Woodcock's description of the Society's Fermor Collection www.aim25.ac.uk/cgi-bin/vcdf/detail?coll_id=19551&inst_id=129&nv1=search&nv2=basic. This work was encapsulated in an exhibition, curated by Victoria, whose online resource may be accessed at: www.geolsoc.org.uk/Library-and-Information-Services/Exhibitions/Sir-Lewis-Leigh-Fermors-Diary-Life-in-Colonial-India

Fermor Meeting - The triennial Fermor Meeting is well resourced, but sometimes struggles to attract suitable topics - the terms of the bequest being so specific. *The meeting Meteorites - Flux with Time and Impact Effects*, 1998, which led to Special Publication #140, was a fine example of the sort of creative thinking needed. At the time, I assumed that the subject had succeeded in gaining Fermor support because meteorites are very old. However it was a pleasure to find, while researching this piece, that the great Lewis had also published – albeit erroneously – on meteorites.

► ACKNOWLEDGEMENT

I am grateful to **Caroline Lam**, Society Archivist, and Assistant Librarian **Wendy Cawthorne** for their invaluable help in preparing this article.

* **Ted Nield** is the Editor of **Geoscientist**. His latest book, *Underlands – a journey through Britain's lost landscape* is published by Granta Books.



Patrick Leigh Fermor's headstone, unveiled during a short service at Dumbleton on 8 November, his name day in Greece, feast of the Archangel Michael. The Greek inscription reads: 'HE WAS OF THAT EXCELLENCE WHICH IS OF GREECE', taken from a poem by Cavafy

SCIENCE

IN THE CITY



HERE LIES ALL THAT
WAS MORTAL OF
FLORENCE MARY SEYMOUR.

Fieldwork can be made to come alive in the unlikely but convenient surroundings of city centre cemeteries, **says Nina Morgan***

Fieldwork is expensive, difficult to arrange, requiring extra effort and dedication on the part of teaching staff – and given the availability of computers and satellite imagery to illustrate geology virtually anywhere in the world – ultimately, some would argue, unnecessary. These are just a few of the arguments used to justify reducing, or even eliminating, the requirement for geology students to experience life in the field.

Many practising geologists – especially those aged over 40 – will readily admit that the opportunity to study and do fieldwork in the great outdoors was one of the factors that drew them to study geology in the first place. But, as Jonathan Paul argued in his Soapbox article *Adapt or Die!* (*Geoscientist* April 2014) fieldwork opportunities no longer serve as a draw for geology students today.

"Many students nowadays," Paul notes, "do not find the prospect of fieldwork attractive, equating it with manual labour and preferring to stay at home. The folly of using fieldwork as a bait [to recruit geology undergraduates] becomes clearer when we consider the ubiquity of computers in most professional geoscience jobs."

Paul's article sparked off a vociferous and often heated debate in defence of fieldwork that has raged in this magazine's Soapbox section and Letters pages ever since (see for example, Mike Streule and Lorraine Craig (Soapbox, *Geoscientist* 25.1 February 2015) and Mike Harris (Soapbox *Geoscientist* 6 July 2015)). The arguments for the value of fieldwork were neatly summarised in a letter from Willie Towers, published in *Geoscientist* Online in May 2014:

"Rocks do not occur in computers, GIS or 3D visualisation models but out there in the real world. If geology does not

continue to teach basic field observation and mapping skills, it will slowly die. Geoscientists, whether they choose academia or industry careers or somewhere in the middle, need the basic grounding in the basic disciplines of petrology, sedimentology and palaeontology to name but three... I value the processing power of new technologies, but we must have the grounding to interpret what they are actually telling us."

Urban geology

Although, admittedly not a substitute for fieldwork in exotic locations like the Himalayas, the California deserts or even the Scottish Highlands, the growing field of urban geology – the geology of the built environment – provides one solution for overcoming the expense and difficulties of introducing students to the principles of geology fieldwork. Championed by geologists at University College London (UCL) including, initially, Eric Robinson and now Ruth Siddall and her colleagues, urban geology is based on the idea that the town centres and burial grounds can serve as extensive outdoor museums – free to access, open to all, and ripe for introducing geology to the world at large.

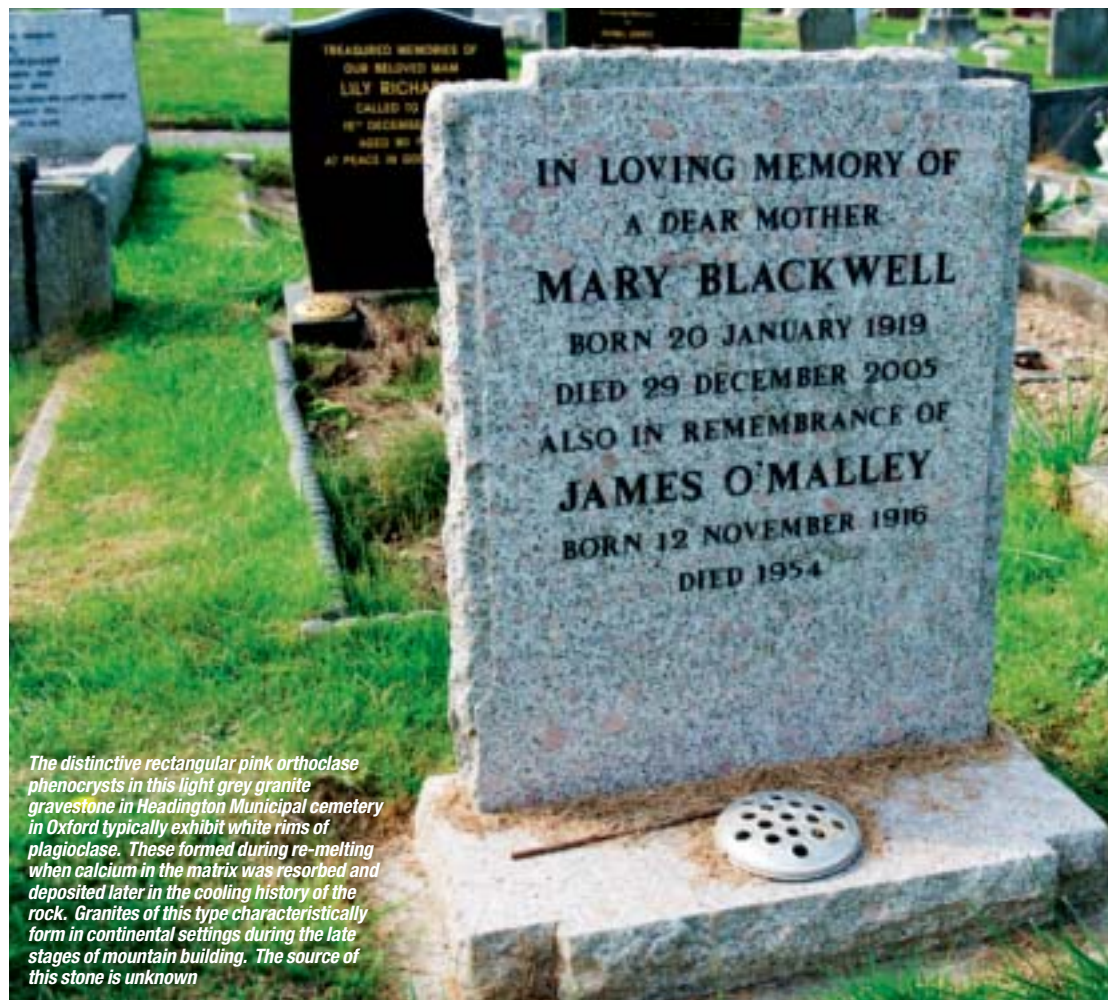
"The urban geologist is exposed to an enormous variety of rock types – far more than the committed field geologist could ever see in outcrop in the field," writes Siddall on her website (www.ucl.ac.uk/~ucfbrxs/Homepage/UrbanGeology.htm). Although she admits that there is no substitute for exploring rocks *in situ* to obtain an understanding of the three-dimensional geometries of outcrops, there is, she says "much [that] can be learned about petrography, petrology, palaeontology and the environment of formation of many rocks on the average High Street." ►



Top Right: General view of gravestones in Holywell Cemetery in Oxford

All other images: This Celtic cross located in Holywell Cemetery in Oxford is a monument to Florence Mary Seymour Scott, author of a number of novels published in the late 19th and early 20th Centuries. It is composed of two types of granite. The Celtic cross itself is a medium-coarse grained granite with a slight foliation. Rich in quartz, plagioclase and mica (thus alumina-rich) is probably an S-type granite derived from a sedimentary protolith. It may have come from Galway, Ireland. The plinth, in contrast, is composed of a coarse granite with large plagioclase crystals up to 7.5cm long which probably came from Cornwall

“URBAN GEOLOGY PROVIDES ONE SOLUTION TO THE EXPENSE OF INTRODUCING STUDENTS TO GEOLOGY FIELDWORK”



The distinctive rectangular pink orthoclase phenocrysts in this light grey granite gravestone in Headington Municipal cemetery in Oxford typically exhibit white rims of plagioclase. These formed during re-melting when calcium in the matrix was resorbed and deposited later in the cooling history of the rock. Granites of this type characteristically form in continental settings during the late stages of mountain building. The source of this stone is unknown



► Burial treasure

The same can be said about the average urban cemetery – a 'field area' often promoted by Robinson, and one that Phil Powell, retired curator of geology at the University Museum of Natural History in Oxford, and I became familiar with three years ago when we received a large and bulging envelope from Eric containing material from Oxford cemeteries, with a request to 'Do something with this!' We decided to comply – and thus began a three-year-long journey of exploration.

As we discovered, scientifically, cemeteries have a lot to offer. For a start, gravestones are made from a wide variety of rock types formed in a range of geological settings and erected at known times. As a result, they can serve as useful samples for studying the effects of weathering on various types of stone, a topic of great interest to engineering geologists and building stone specialists, architects and conservators. A number of studies of rock weathering using gravestones are currently underway (see www.scottishgraveyards.org.uk/resources9.shtml).

For geologists – whether amateur or professional – gravestones can serve as giant 'hand specimens' revealing features that might be more

difficult to examine in their 'native habitat'. They thus provide a very useful way to introduce rocks to students and the public at large, as well as to expand and refresh the knowledge of practising and professional geologists.

A number of very useful guides designed to introduce gravestone geology to those new to the subject are available on the Internet [see for example *Graveyard Geology*, a guide to rocks in graveyards and cemeteries by Wendy Kirk of UCL and David Cook of the Aldersbrook Geological Society, a pdf file which can be found and downloaded using the search terms 'Graveyard Geology University College London']. But experienced geologists too will also find much of interest too.

As a geologist who began my working life in the oil industry, specialising in sedimentology and basin analysis, I was amazed to discover the variety of sedimentary features – ranging from cross-bedding to bioturbation and load structures – that could be often, and easily, be studied in gravestones made of sandstone, limestone and even slate. Meanwhile, Phil, who has a strong interest in local Oxfordshire geology and fossils, was fascinated to be able to recognise examples of local

formations in many of the older gravestones.

Biggest surprise

For both of us, one of the biggest surprises was the wide range of granites and metamorphic rocks used for gravestones, particularly in modern cemeteries – and the opportunities they provided to jog the memory about areas of geology that neither of us had studied for many years. "The large polished surfaces of many of the gravestones make it possible to examine the granitic and metamorphic textures very easily," says Professor John Dewey, now based at University College Oxford, who helped us to interpret many of the granites and metamorphic rocks we came across. "They are also excellent places to examine features such as gneissosity, foliation, flow structures, and of course, mineralogy – all of which can provide clues about the geological history of the rock." Take a stroll round your local cemetery. You'll be amazed to discover what you can see! ♦

**Nina Morgan and Phil Powell's book on the geology of Oxford gravestones is reviewed on page 22.*



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Chartership benefits

Sir, We agree with Rob Wallace's comments (*Geoscientist* 25.8) regarding the practical benefit of Chartership.

At the last Operations Geology conference in November 2014 presentations were made on the topic of competency in the field of operations geoscience in the oil industry.

In the associated discussions similar views with respect to Chartership were expressed and a clear need for a robust and focused process emerged.

After a show of hands at the conference a clear mandate was given to pursue this idea and a UK Operational Geoscience Competency Initiative has since been started. A small group of experienced industry professionals has outlined a roadmap for ongoing work with the aim of creating a recognised industry wide competency management system (CMS) with accreditation. In the future a more broadly based steering group, including operators, service contractors and industry experts, will be formed to work the detail and implement the system.

There are obvious cost and efficiency

benefits of having one recognised system.

For operating companies it will give clarity on the competency of individuals who work for them or who are about to hire directly or take on contract. It is intended that there will a process of certification identifying an individual's level of competency from basic awareness to expert. This 'ticket' will need to be reviewed every three to four years with a commitment to ongoing training and maintaining a personal development plan.

The CMS will not only benefit the industry as a whole but will also benefit, operations and wellsite geologists, pore pressure and geomechanics specialists and other professionals involved in operational geology. It will raise the profile of the discipline and bring us into line with other professions such as civil engineers, doctors and accountants who all have robust competency management systems.

TIM HERRETT

On behalf of the Steering Group:
Bob Fagg, Pat Spicer, Christine Telford,
Martin Gardner.

Sir, In response to Rob Wallace's letter 'Chartership - what's the use?' in September (*Geoscientist* 25.8), I would say this. Most mining companies particularly in Canada will not employ you as a consultant unless you have such qualifications. I can only think that Mr Wallace has never had to sign any geological documents of legal or financial significance. The company that I worked for expected and encouraged their geologists to join the South African Council for Natural Scientific Professions (SACNASP). One could not sign off Ore Reserves for a listing on the Stock Exchange without being a member.

After Bre-X, many stock exchanges tightened up their signatory requirements for many geological documents presented by companies trying to raise money - notably the Australian and Canadian

exchanges, because they have to largest number of small companies trading in the mining industry.

Documents include not only ore reserves but exploration programs, requests to become a mining exploration company as well as financial and personnel documents. The report signatory should not in most cases be an employee. I could not have carried out my geological consultancy reporting without my South African registration. All such reports, such as NI43-101 for use on a Canadian Stock Exchange, are lodged on the SEDAR data base and accessible to anyone, free. A very strict format is laid down for completion of such reports. In general I think that registration in one country is accepted by the others.

BRIAN KING



Mediocrity rules!

Sir, May I warmly applaud Lewis McCaffrey for giving us 'grunts' a helping hand with our self-esteem (Soapbox, *Geoscientist* 25.9). We are often weighed down by the heavy feet of so-called giants standing on our shoulders and now we are recognised at last for the mediocre but mandatory (for science) majority that we must be. I can now read those glowing obituaries with respect but without shame or envy. Let us make the most of our mediocrity!

CHRIS GARLAND

Sir, How refreshing to read Lewis McCaffrey's Soapbox piece in praise of mediocrity. Loved it. In previous professional incarnations, I have had the pleasure of reading through all kinds of Fantasy CV and Chartership stories and have had to grin and pretend to be impressed with colleagues' tales of when they became Chartered Geologist, Chartered Scientist AND Chartered Engineer in the space of a month, like boy scouts collecting an armful of badges. But all this is inevitable in a society (and Society!) of education 'inflation', where everyone is supposed to be award-winning and high-achieving and to come second is considered to be 'first among losers'...

STEVE DULSON

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The Geology of Oxford Gravestones



This lavishly illustrated compendium of gravestones in six Oxford graveyards combines two of my favourite things – beautiful rocks and dead people – so it was always going to be a winner with me. Written by Nina Morgan (who writes the Distant Thunder column in this magazine) and Philip Powell (former curator at the Oxford University Museum of Natural History and the author of *The Geology of Oxfordshire*), it combines good writing with in-depth and accurate geological explanations of the textures and structures on display on these delightful memorials.

The book, dedicated to Eric Robinson, doyen of the genre, deals with the Church of St Thomas the Martyr, St Sepulchre's Cemetery, Holywell Cemetery, the Church of St Mary and St John, Headington Municipal Cemetery and St Andrew's Church Headington. It commences with a short introduction, a handy location map, and a stratigraphic column indicating the ages of rocks represented. Then comes a gazetteer, cemetery by cemetery, of the more interesting tombs, a glossary and index. Each tomb is shown in more than one aspect, including close-ups where required to show features. Each rock type is diagnosed, with sections on 'composition' and 'what to look for'.

One of the delights of Oxford is the fact that its cemeteries contain more interesting dead people per square foot than the average British city. So the eponymous occupants are also given brief life-histories, adding human interest. Opening the book more or less at random, I come upon, for example, composer and Professor of Music at Oxford, John Stainer.

This worthy gent, perhaps still wearing his pince-nez, is (we learn

under 'Composition'), currently decomposing beneath a Celtic wheel-cross in Peterhead Granite. Very fine it is too, a fitting place of pilgrimage for all those choral society members forced to sing his oratorio 'The Crucifixion'. Now, should any of them bring a hand lens with them, they can admire its K-feldspars and silvery micas too.

But the reason for choosing the gravestones is primarily geological, so it's not only academics and other toffs who get mentioned. The diversity of rock-types is also impressive, ranging from Precambrian to Lower Cretaceous. Nor do the authors shy from the odd terracotta memorial. Mike Tomlinson's beautiful photographs amply complement the text and together they make a fitting tribute to some superb examples of the stonemason's art.

Reviewed by **Ted Nield**

THE GEOLOGY OF OXFORD GRAVESTONES BY NINA MORGAN & PHILIP POWELL

Geologica Press 2015 October 2015 720pp
ISBN 978-1-919158-53-1 SoftBack Book
List price: £14.99 140pp Copies available from the authors. See www.gravestonegeology.uk for information on how to purchase.

Evolution - The whole story



When I received *Evolution: the Whole Story*, I was initially struck by its superb visual impact. The quality of the pictures and photographs is most impressive

and encourages one to read further. The timelines and illustrations are excellent in enhancing the text, and effectively link one's understanding of the geological timeline to the process of evolution. Similarly, the text in the book is gripping in its description of how the Earth came into being and how life commenced, has been challenged, has changed and continued. From the moment I started the Introduction, I found myself learning about geological

history. It is hard to categorise this as a textbook, as the writing is so approachable and user-friendly. One almost feels that one is learning by accident!

The book takes the reader from the very start of Earth history and reveals life emerging from simple beginnings. Although the details of each species would not be sufficient to fully research them individually, as a narrative of the whole story, it brings evolution to life. *Evolution: the Whole Story* is most valuable in the way that it links the various stories of life together. It is a useful resource, for those who are familiar with evolution as a scientific theory, and wish to link this with geological history.

An understanding of the process of evolution would be a must to get the best use out of the book, though the basics are explained clearly, and there is a clear and concise glossary at the end for those needing guidance with the evo-jargon.

If I have one complaint, it would be about tendentious use of language: sometimes it falls into the trap of discussing features as though they were 'designed', and that variations are 'chosen' by individuals in order to make life easier for the species! For example, the chapter 'Mosses and Ferns', the author states: "As a partial solution, bryophytes evolved the process of reproduction that takes place in two phases...." (p. 67). I feel that this makes the evolutionary process seem deliberate and conscious, which is clearly inappropriate.

My overall impression of *Evolution: the Whole Story* is highly favourable and I know that I will continue to derive much use and pleasure from it. In the words of Alice Roberts, who provided the forward: "We're all tiny twigs on the great Tree of Life." This book certainly puts us in our place!

Reviewed by **Sarah Pipkin**

EVOLUTION: THE WHOLE STORY

Edited by Steve Parker, 2015. Published by: Thames and Hudson SoftBack Book, 575pp ISBN 978-0-500-29173-3 List price: £19.95



Gas generation and Migration in Deep Geological Radioactive Waste Repositories



Understanding the behaviour of gases within the environment of a proposed deep geological radioactive waste disposal site is a fundamental factor in underpinning a robust repository

safety case. This knowledge is of particular importance in assessing the performance of crystalline rocks, indurated mudrocks and plastic clays (the 'far field') that may be considered as suitable host formations for the waste. Additionally, understanding the long term behaviour of the engineered clay (bentonite) buffer and cement-based backfill media used to encapsulate and surround the primary waste containers (the 'near-field') is pivotal.

This Special Publication summarises the recent research studies addressing these issues that were undertaken primarily within the EU Euratom programme FORGE ('Fate Of Repository GasEs') project. The project examined these issues as five inter-related work packages, establishing new quantitative experimental data and modelling parameters through a series of laboratory and field-scale experiments conducted at several underground research facilities located throughout Europe.

The outcomes of the work packages are presented as 17 papers covering key topics on gas generation (including the definition of long-term metal corrosion rates under repository conditions), processes and mechanisms controlling gas migration in clay and cement-based engineered barriers and undisturbed host rock, the effects of elevated gas pressures on the movement of groundwater and aqueous-borne contaminants, the role of gas in the 'near field' and excavated/disturbed host rock formations, and the identification of any potential coupling effects (feedback factors) that could compromise repository performance. The FORGE project did not study salt host rocks or salt-based backfill materials, however a single paper is

presented reviewing the current understanding of gas transport processes within evaporitic formations.

The volume provides an excellent synthesis of the current research within this important area. All papers are well written and edited, concisely laid-out with clear and appropriate figures, photographs and data-tables. The inclusion of numerous colour figures and photographs enhances the understanding of the accompanying text.

The insights presented will be directly relevant to both research students and geoscientists in the field and practising radioactive waste management professionals undertaking potential repository design and performance evaluation, risk assessment and safety case development.

Reviewed by **Mark Griffin**

GAS GENERATION AND MIGRATION IN DEEP GEOLOGICAL RADIOACTIVE WASTE REPOSITORIES

by R P Shaw. Geological Society of London Special Publication No 415. 2015. Geological Society of London. ISBN: 978-1-86239-722-4 ISSN 0305-8719 HardBack Book 264pp List price: £100.00 www.geolsoc.org.uk

Evolution of a Breckland Landscape



In many journals there is a restriction on space so that published evidence is limited. Here it has been possible to record the meticulous details of recent fieldwork and to make them readily available to future researchers. These details are followed up with careful discussions leading to interpretations that fit comfortably.

Surprisingly, given the title, Professor West doesn't start out by explaining what is meant by 'Breckland': an area of SW Norfolk and NW Suffolk typified by drought-prone alkaline and acid sandy soil supporting sparse grass, gorse, bracken and rows of Scots pine. But this doesn't detract from the book's value as, to a large extent, the characteristics of this landscape type will be absorbed

from the text supported by 40 pages of photographs.

The author shows that the presence of the Chalk close to surface was fundamental to the evolution of the Breckland, with its unique characteristics. He also reminds us of the properties of different chalk lithologies in terms of weathering and hydrology and he relates these differences to the erosion and other processes that produced some of the larger features here, such as scarps and dry valleys. In piecing together of the evidence in respect of post-Anglian history he shows that a Wolstonian ice-dammed lake was very significant in the study area.

As many landscape features are subtle and their clarity fluctuates, the aerial photos are especially helpful in demonstrating the existence and appearance of the poorly understood and somewhat neglected ground patterns (eg polygons, stripes) and other features (eg pingoes). West describes the geometries of these features and the arrangements of lithologies within the features. From this he outlines how the lithologies control soil characteristics (acidity/alkalinity and water retention) and in turn what we see, zones of different vegetation. Importantly, he relates the origin of the features to the effects of permafrost, topography and run-off. West also considers if subtle features formed in the cold Wolstonian period could have and survived and been over-printed or added to when subjected to the later next (the Devensian) cold period.

Richard West will be 90 next year and this book gives testament to his enduring enthusiasm and remarkable abilities. The book is more than the detailed geology of a particular area; it provides interpretations of mid to late Pleistocene geology without the need for the debated 'River Bytham'. It also expands our knowledge on periglacial processes and on the poorly known Wolstonian Period in the UK.

One little irritation - the figures sometimes require flipping from one key to another.

Reviewed by **Howard Mottram**

EVOLUTION OF A BRECKLAND LANDSCAPE: CHALKLAND UNDER A COLD CLIMATE IN THE AREA OF BEACHAMWELL, NORFOLK

by RICHARD WEST, 2015. Published by: The Suffolk Naturalists Society 110pp SoftBack Book List price: £10.00 www.sns.org.uk

PEOPLE NEWS

CAROUSEL

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

◆ Derek Briggs



(Yale University) has been awarded the 2015 Paleontological Society Medal, the most prestigious honour bestowed by the Society, in recognition of his contributions 'to the advancement of knowledge in paleontology'. Derek collected the medal at the Geological Society of America meetings in Baltimore, in November.

IN MEMORIAM

WWW.GEOLSOC.ORG.UK/OBITUARIES

THE SOCIETY NOTES WITH SADNESS THE PASSING OF:

Barker, R W N *
Chadwick, Brian * §
Flood, Raymond Edward *
Gorsline, Donn *
Grinly, David *
Haddow, Douglas *
McNicholas, J B *

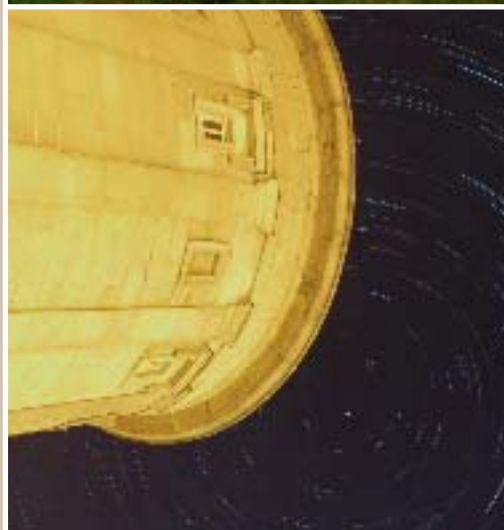
In the interests of recording its Fellows' work for posterity, the Society publishes obituaries online, and in *Geoscientist*. The most recent additions to the list are shown in bold. Fellows for whom no obituarist has yet been commissioned are marked with an asterisk (*). The symbol § indicates that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

Photo Competition Winners

Winning photo competition pictures featured in new 2016 Geological Society Calendar. Get yours today!



Sarah Fray (Executive Secretary, centre) with four competition winners: (L-R) Caitlin Broadbent, Steve McAusland, Anna Saich and Louise Squire, holding calendars open at their winning photos

Sarah Day writes: In October, as part of Earth Science Week 2015, the Society announced the winners of the '100 Great Geosites' photography competition. The 13 winning images all feature in a new 100 Great Geosites 2016 calendar, on sale now!

The top three prizes went to: Gijs de Reijke for The

Cuillin Hills; Brent Bouwsema for Callanish Stones; and Phil Hadland for his picture of the Rotunda Museum, Scarborough. Nine other photographers' pictures have been included in the 2016 calendar, as well as featuring in an exhibition at the Society throughout Earth Science Week.

The 100 Great Geosites

2016 calendar is on sale, for £7.25 (incl. VAT), in the Society's online bookshop, or in person from Burlington House. Order by 14 December to receive yours in time for Christmas!



To buy, go to:
<http://www.geolsoc.org.uk/MCAL16>



DISTANT THUNDER

Monstrous fun!

Geologist and science writer Nina Morgan* has some suggestions for your New Year's bash.

Looking for an original idea to see out the old and bring in the New Year? On the last day of 1853 the English sculptor and natural history artist, Benjamin Waterhouse Hawkins [1807–1894] – famous for his work on the life-sized dinosaur models in Crystal Palace Park in South London – faced just such a dilemma. His solution? Invite 28 of your closest colleagues to dine inside a dinosaur.

Pop-up

The venue – or as Hawkins describes it, the *salle à manger* – was the interior of a mould of an Iguanodon that Hawkins created as part of a display illustrating the Wealden Formation, otherwise known as the 'metropolis of the Dinosaurian order'. The Iguanodon itself was modelled on measurements taken from a specimen found by a Mr Holmes, a surgeon at Horsham in Surrey,

chosen, Hawkins explained, because Holmes "bestowed much care and attention on the development of the great fossils found in his neighbourhood, among which are the largest known specimens of the bones of Iguanodon, having the greater value of being found altogether, evidently belonging to one individual."

The novelty of the venue clearly impressed the local press. Contemporary newspaper reports comment that "Often as we have recorded the proceedings of meetings and banquets convened for the purpose of giving expression of the feelings of respect and esteem for eminent and scientific men, we have never yet been called upon to record a dinner given under such circumstances ... There was something so grotesque and monstrous in the illustrations which accompanied the card: 'Mr. B. Waterhouse Hawkins requests the honour of ____'s company at dinner in the Iguanodon at 4 P.M.' which excited the curiosity and interest of some of the leading scientific

men of the country, and which induced them to be present at so novel a banquet." The invitations, it is reported, were inscribed on the wing-bone of Pterodactyl.

Top table

Top of the guest list was anatomist and palaeontologist Professor Richard Owen [1804–1892], who had provided the anatomical expertise and supervised the construction of Hawkins's life-sized cement models. Owen, the newspaper noted, was one of 21 guests who were "accommodated in the interior of the creature", a seating arrangement Hawkins believed would best illustrate the great size of these animals. The remaining worthies were seated at a side table on a platform nearby raised to the same level.

While it may not be possible these days to invite your colleagues to welcome in the New Year by dining inside a dinosaur, surely a natural history museum near you is home to some large mounted specimens. Tea alongside a Tyrannosaurus, anyone?

Best wishes for the holiday season to all.

Acknowledgement

Sources for this vignette include: On visual education as applied to geology, by Benjamin Waterhouse Hawkins, *Journal of the Society of Arts*, vol 2, 1854, pp. 444–449; *The Life of Richard Owen* by The Rev. Richard Owen, published in 1894 and available for download from: <https://archive.org/details/cu31924024760294>; The Victorian 'Geological Illustrations' of Crystal Palace Park, by Peter Doyle and Eric Robinson, *Proc. Geologists Association*, vol 104, 1992, pp. 181–194; *The Heyday of Natural History 1820–1870* by Lynn Barber, published by Jonathan Cape, 1980, and the Wikipedia entry for The Crystal Palace.

***Nina Morgan is a geologist and science writer based near Oxford. Her latest book, *The Geology of Oxford Gravestones* (see pp 16 and 22), is available via www.gravestonegeology.uk**



OBITUARY BRIAN JOHN BLUCK 1935 - 2015

Born in Pyle (Vale of Glamorgan), Brian Bluck attended Bridgend County Grammar School and Cardiff Technical College before proceeding to University College, Swansea to read Geology where the inspirational teaching of T R (Dick) Owen, together with a childhood spent in a South Wales Coalfield village, triggered Brian's interest in Upper Carboniferous rocks.

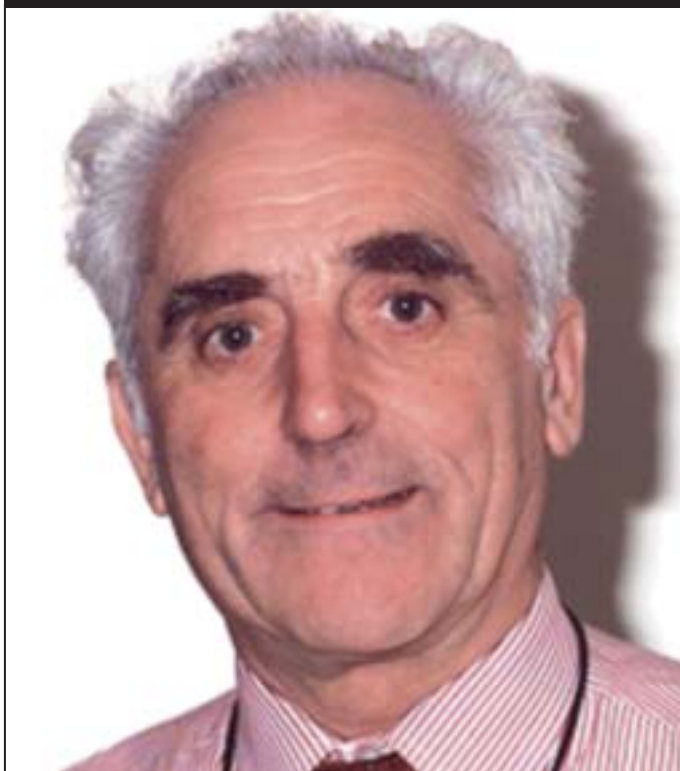
After gaining his BSc (1958) he embarked on a PhD on the sedimentology and detailed stratigraphy of Lower Coal Measures sequences in the NE part of the South Wales Coalfield. Gilbert Kelling and Dick Owen co-supervised Brian who (in 1961) gained the first PhD in Sedimentology from that College.

Illinois

Prof. Frank Rhodes encouraged Brian to apply, successfully, for a postdoctoral position at the University of Illinois (Urbana). Returning to Swansea as a Post-Doctoral Research Fellow, Brian helped build a major research programme on the geological and sedimentological evolution of the South Wales Coalfield, established by Dick Owen and Gilbert Kelling, which issued a stream of publications and doctoral theses over the following 15 years.

In 1963 Brian was appointed Assistant Lecturer at the University of Glasgow, then successively Lecturer (1965), Senior Lecturer and Reader, becoming Professor in 1989. He was awarded a DSc by Glasgow in 1985 and was made Emeritus

Distinguished sedimentologist, expert on alluvial fan processes, and inspirational teacher



Professor in Sedimentation and Tectonics upon retirement.

“THE INSPIRATIONAL TEACHING OF T R OWEN TRIGGERED BRIAN'S INTEREST IN UPPER CARBONIFEROUS ROCKS”

In the course of this long academic career, Brian's research interests encompassed subjects such as tectonics and basin evolution, topics stemming from his long term interest in conglomerates, mainly those in the Scottish Old

Red Sandstone; the evolution of the Midland Valley of Scotland and the long, complex history of the Highland Boundary Fault. He was an expert field geologist, meticulous in his mapping and data collection.

Terranes

Brian was innovative in his collaboration with geochemists (such as those from the SUERC, formerly the East Kilbride Reactor Centre). This enabled him to use isotopic dating techniques on clasts to refine provenance patterns in the Midland Valley Palaeozoics. For him, these data, together with his re-interpretation of the Ballantrae Complex,

demonstrated that the Palaeozoic history of Scotland involved amalgamation of many small terranes brought together by strike-slip faulting.

De Beers invited him to elucidate the development of the Kaapvaal Craton, South Africa, and to determine how its behaviour through time impacted on the Orange River sediment system and the associated transportation and distribution of diamonds. These studies greatly enhanced understanding of drainage evolution in southern Africa.

Brian received several awards: Geological Society of London Lyell Fund (1981); Royal Society of Edinburgh Keith Medal (1981); Saltire Society of Scotland Award (1991); and Edinburgh Geological Society Clough Medal (1999/2000). He was on the editorial boards of the Journal of Sedimentary Petrology, Scottish Journal of Geology, Transactions of the Royal Society of Edinburgh, and was elected FRSE in 1981.

Inspirational

Brian, an inspirational teacher and sympathetic mentor, died quietly at home in Old Kilpatrick on 19 June, 2015. He is survived by his wife Mary, daughter Emma, son Tim and four grandchildren. He will be greatly missed by the many geologists influenced by his teaching, research and infectious enthusiasm.

► By Brian Williams, with thanks to Mary Bluck, Tim Dempster & Gilbert Kelling A longer version of this obituary is available online. *Editor*

**[CAN'T FIND YOUR MEETING? VISIT
WWW.GEOLSOC.ORG.UK/LISTINGS
FULL, ACCURATE, UP-TO-DATE]**

DIARY OF MEETINGS EVENTS 2015-2016

MEETING	DATE	VENUE AND DETAILS
Poster and Presentation Competition Central Scotland Regional	1 December	Venue: IET Teacher Building, St Enoch Square, Glasgow G1 4DB. Time: 17.00-20.00. Contact: Scott Robinson E: s.robinson@dundee.ac.uk
Flood Resilient Communities: Evaluating Defra Flood Resilience Community Pathfinder CIWEM	2 December	Venue: Brunei Gallery, SOAS, Thornhaugh Street, London WC1H 0XG. Time: 09.00-17.00. Contact Sophie Dunajko E: events@ciwem.org
Asbestos in Soils Northwest Regional	4 December	Venue: The Centre, Birchwood. Speaker: Lucy Thomas (RSK). Time: Check website. Contact Nik Reynolds E: geologicalsociety.northwest@gmail.com.
Global Summit On Petroliferous Basins OMICS	7 December	Venue: Double Tree by Hilton, Philadelphia Airport. See website: www.petroliferousbasins.global-summit.com/index.php . Contact Sara Clark E: petroliferousbasins@omicsgroup.com.
Biological and Climatic Impacts of Ocean Trace Element Chemistry Royal Society	7-8 December	Venue: Royal Society, London. Time: 09.00-17.00. See website: royalsociety.org/events/2015/12/ocean-chemistry/ . Contact Naomi Asantewa-Sechereh E: discussion.meeting@royalsociety.org
December London Lecture Geological Society	9 December	Venue: Burlington House. Times: 15.00 & 18.00. See P. ?? for details. Contact: Sarah Woodcock E: sarah.woodcock@geolsoc.org.uk
Sinkholes - What, Why, Where? Southern Wales Regional	9 December	Venue: LT 1.40, School of Earth and Ocean Sciences, Cardiff University. Speaker: Dr Clive Edmonds (Peter Brett Associates). Time: Evening meeting. See website. Contact: E: swales.rg@geolsoc.org.uk
JANUARY Annual Meeting - London 2016 Tectonic Studies Group	6-8 January	Conference with field trips preceding, January 4-5. Conference venue: Gustave Tuck Lecture Theatre, University College London. Fees & concessions apply. See website for details and registration. Contact Donna Fitzgerald E: donna.fitzgerald@geolsoc.org.uk.
Annual Discussion Meeting QRA	6-8 January	Conference. Venue: Dept of Geography, Royal Holloway, University of London. See website for details and registration: www.qra.org.uk/events/?id=19 . Contact: Danielle Schreve E: Danielle.schreve@rhul.ac.uk
Insights into the hydrogeology of the Carboniferous Limestone of South Wales Southern Wales Regional	20 January	Evening meeting. Venue: LT1.40, School of Earth and Ocean Sciences, Cardiff University. Speaker: Mike Streetly (ESI). Contact: E: swales.rg@geolsoc.org.uk
William Smith and the future of Geological Maps, North West Regional	21 January	Venue: Manchester University. Time: 18.30. Speaker: Dr David Schofield. Contact: Nik Reynolds E: geologicalsociety.northwest@gmail.com

STICKS AND STONES

www.stonechatproductions.co.uk



OBITUARY

MIKE EDMUNDS 1941-2015

Wyndham Michael Edmunds was born in Wolverhampton on 31 July 1941, elder son of Wyndham Baker Edmunds, bank cashier, and Irene Luffman, a teacher. Attending the local grammar school, he studied languages at A Level, but decided he wanted to read geology and attended Liverpool University, which offered an 'arts to science' conversion course. On graduation (1963), with Michael Atherton as his supervisor, he stayed to work on the contact metamorphism associated with the Ardara Pluton (Donegal).

IGS

In 1966 he applied to the Institute of Geological Sciences (now British Geological Survey). Offered a position in the newly reorganised Hydrogeological Department, he became one of a small group that was to shape the development of hydrogeology in the UK over the next three decades. Mike was given the task of setting up a hydrochemical laboratory, and over subsequent years applied a growing range of chemical and isotopic techniques to build up an understanding of the processes controlling the composition and evolution of groundwater quality in British aquifers. From 1967-74 he was a member of a team working in Libya, stimulating a lifelong interest in semi-arid

Hydrogeologist who shaped the development of hydrogeology in the UK over thirty years



regions, where he pioneered the use of geochemical tracers to resolve groundwater recharge rates.

“HE WAS TO SHAPE THE DEVELOPMENT OF HYDROGEOLOGY IN THE UK OVER THE NEXT THREE DECADES”

In 1970 he attended a symposium in Tokyo to present the early results of his work. There he was present at the birth of the

Working Group on Water / Rock Interaction, which was to have a strong influence on him. Membership gave him the opportunity to meet and work with numerous international hydrochemists, and he became Chairman (1989-2001).

Mike's achievements were soon recognised and in 1986 he was promoted to an 'individual merit' position, allowing him to concentrate on research, free from administrative duties. He was a great networker and was able to build large multinational projects with European co-workers where his early linguistic

background was a tremendous advantage.

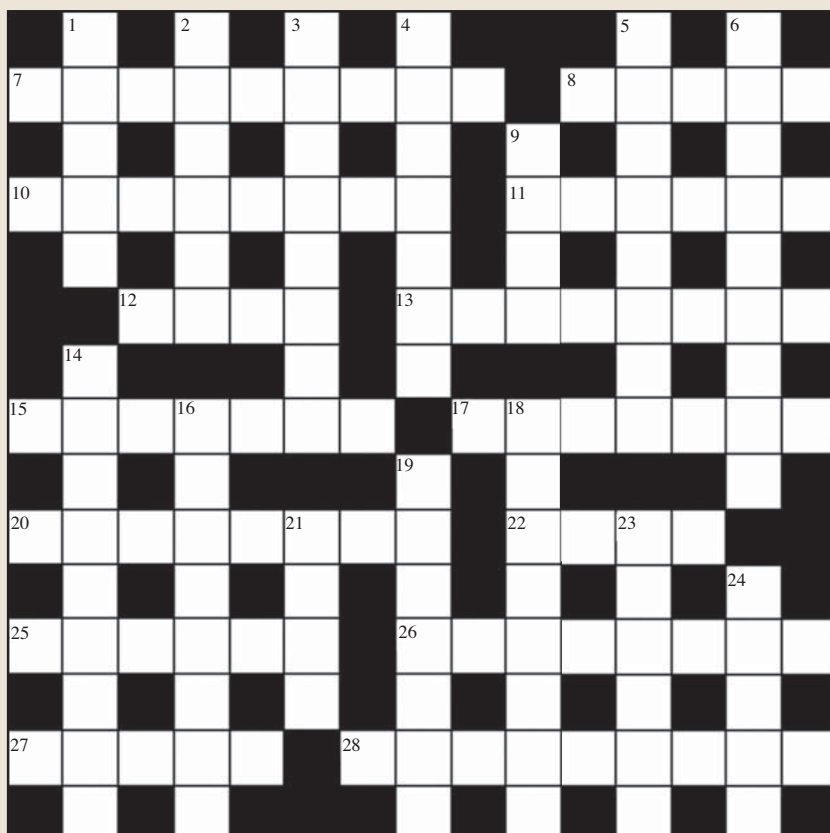
Medals

Mike retired from the Survey in 2001 but continued his scientific career with an appointment as Visiting Professor and Director of the Water Centre at Oxford University. Here he worked to develop a new Masters programme in Water Science, Policy and Management. Interdisciplinary in design, it celebrated 10 years in 2014 with 220 alumni from 50 countries. His outstanding achievements were recognised by the award of the Whitaker Medal by the Hydrogeological Group in 1999. He became the first British recipient of the Meinzer Award (Geological Society of America, 2009) and in 2010 the International Association of Geochemistry awarded him the first Vernadsky Medal.

At Liverpool he had met and married a fellow student, Kathleen Reid, who was studying at Calder College, and from 1966 they lived in Maidenhead, moving to Blewbury in Oxfordshire in 1978. Here he was active in village life, a keen singer, an enthusiastic cactus collector and a devoted father to his four children and six grandchildren. Mike was a modest, caring man who felt deeply about the inequalities in the world and for 20 years was a trustee of the charity Wells for India.

► By John Mather

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.

CROSSWORD NO.198 SET BY PLATYPUS**ACROSS**

- 7** Archaeological term for a spotted dolerite from Wales used in the construction of Stonehenge (9)
- 8** 'Cabinet Office Briefing Room A' gave its name to this disastrous committee (5)
- 10** Flora typical of the Southern lobe of Pangaea (8)
- 11** Latin space (6)
- 12** World's largest continental plate (4)
- 13** Massive Upper Barremian to Lower Aptian limestone, creating characteristic cliffs across large swathes of Southern Europe (8)
- 15** Water-bearing rock (7)
- 17** Darwin's favourite birds (7)
- 20** Longest straight line enclosed by a circle (8)
- 22** Gerard Hoffnug's instrument (4)
- 25** Having undergone a phase transition from solid to liquid (6)
- 26** Mountainous region between the Black and Caspian seas (8)
- 27** Base unit of length in the SI system (5)
- 28** Carbonate rock (9)

DOWN

- 1** Noble gas, used in radiometric dating (5)
- 2** Tangential or parenthetical remarks (6)
- 3** Foliation, formed by low grade metamorphism, causing rock to split preferentially along planes (8)
- 4** The smallest unit in lithostratigraphy (7)
- 5** Much given to eruption (8)
- 6** Cut off short (9)
- 9** A thinly bedded sandstone, much used for paving (4)
- 14** Instants in the year when the Sun's apparent longitude is 0° or 180° (9)
- 16** Poorly sorted mineralogically diverse sediment, for example, really needs to grow up (8)
- 18** Forced in, like a dyke, for example (8)
- 19** Latin arms (7)
- 21** Seal an excavation to render it watertight (4)
- 23** Modified or specialized leaves, often associated with reproductive structures (6)
- 24** Nebraskan city that gave its name to a Normandy beach (5)

WIN A SPECIAL PUBLICATION!

The winner of the September Crossword puzzle prize draw was **Richard Smout of Aboyn, Aberdeenshire..**

All correct solutions will be placed in the draw, and the winner's name printed in the March 2016 issue. The Editor's decision is final and no correspondence will be entered into. **Closing date - January 20.**

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 OCTOBER**ACROSS:**

1 Geniculate **2** Talc **3** Investment **10** EtnA
12 Coincidental **15** Protozoan **17** Ocean
18 Cacti **19** Eglantine **20** Neurasthenia **24** Roil
25 Arbitrates **26** Saga **27** Ascendancy

DOWN:

1 Grit **2** Neve **3** Cosmopolitan **4** Lumen
5 Tensional **7** Antithesis **8** Challenge
11 Reconnoitred **13** Epicentres **14** Concluding
16 Overturns **21** Elide **22** Eton **23** Isle



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Registration Now Open

Rifts III: Catching the wave

Just when you thought it was safe to go back in the water...

22-24 March 2016

Geological Society of London, Burlington House, London, UK



Given the significant advances in the science of rifts and rifted margins and the increasing availability of new regional seismic and well data, it seems appropriate to revisit the rapidly evolving subject matter and concepts. The objectives of the conference are to challenge paradigms and consider the applicability of new ideas to the latest sub-surface datasets. Contrasting and contradictory models have emerged in the last 5 years from both industry and academia regarding the evolution of rifted margins. Geological 'laboratories' such as the Alps, Africa, East Africa, the South Atlantic and the Labrador-Iberia conjugate margin are yielding new models for rift evolution with implications for heat flow and creation of accommodation space. The technical program will be designed to address many of the critical parameters raised in these areas e.g. rift architectures, break-up models, continent-ocean boundaries, subsidence patterns, facies distribution and heat flow. The three-day conference will be constructed around six half-day sessions and four broad themes of oral presentation that will prioritize the scales of investigation and reveal the direct applicability of the emerging theories. Many rift model paradigms underpin our understanding and exploration of rifted continental margins and new exploration concepts need to be consistently applied. However, numerous aspects of crustal evolution and lithospheric extension remain contentious, and new sub-surface datasets have highlighted important apparent conjugate perspectives. Heat flow, subsidence and passive margin formation appear to be subject to both temporal and spatial anomalies related to rift processes. The future success rates of exploration of deep-water continental margins will require the deployment of new insights rapidly and effectively.

For further information and registration please contact:
Laura Griffiths T: 020 7432 0860 email: laura.griffiths@geolsoc.org.uk
or visit the conference webpage: www.geolsoc.org.uk/PG-Rifts-III



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William Smith Meeting 2016

Glaciated Margins

The Sedimentary & Geophysical Archive

2-3 June 2016

Geological Society, Burlington House, London







Confirmed speakers:
Prof. John Houghton (Oxford)
Prof. Ian Stewart (Oxford)
Prof. Jonathan (Oxford)
Prof. Chris Clark (Oxford)

Organisers:
Prof. John Houghton (Oxford)
Prof. Ian Stewart (Oxford)
Prof. Jonathan (Oxford)
Prof. Chris Clark (Oxford)

Further information:
For further information about the conference, please contact:
Prof. John Houghton (Oxford)
Prof. Ian Stewart (Oxford)
Prof. Jonathan (Oxford)
Prof. Chris Clark (Oxford)

The meeting evidence for the growth and evolution of ice sheets on continental margins has major implications for characterising the cryosphere in the past, present and future. Glaciated margins provide unique archives of past ice mass change on timescales that cannot be captured by observations of the cryosphere today. They also serve as analogues for modern-day glacial depositional environments, and are integral to understanding major processes, such as the magnitude of ancient glaciations, the location of proglacial, glaciolacustrine, glaciomarine and glacial deposits and the distribution of glaciomarine deposits.

We seek to attract scientists from multiple disciplines – geophysics, sedimentology, glaciology, geology and geophysics – with an interest in tackling these issues. The meeting will explore the latest research on glaciated margin environments based around four central themes:


- The Arctic and the Northern Hemisphere
- Antarctica and the Southern Hemisphere
- The deep time archive
- Resource potential: Lake studies and glaciomarine


Field trip (optional):
4-5 June 2016: post-conference field trip to study classic glaciomarine environments of Norfolk, Dorset to follow.

Call for Abstracts

We welcome oral and poster abstract submissions for this meeting. To be considered for a slot in the programme, a poster presentation, please email an abstract of no more than 400 words to laura.griffiths@geolsoc.org.uk by 15 January 2016.

Poster Abstracts:
We welcome oral and poster abstract submissions for this conference. To be considered for a slot in the programme, a poster presentation, please email an abstract of no more than 400 words to laura.griffiths@geolsoc.org.uk by 15 January 2016.





Groundwater in Fractured Bedrock Environments: Managing Catchment and Subsurface Resources

10 June 2016

Queen's University, Belfast, Northern Ireland



Convenors:
Dr. David O'Donnell (Queen's University Belfast)
Prof. Alan MacDonald (Oxford)
Dr. Alan O'Donnell (Queen's University Belfast)
Mike Young (The Geological Society)

Further information:
For further information about the conference, please contact:
Dr. David O'Donnell (Queen's University Belfast)
Prof. Alan MacDonald (Oxford)
Dr. Alan O'Donnell (Queen's University Belfast)
Mike Young (The Geological Society)


Across the UK & Ireland, fractured bedrock aquifers have been traditionally regarded as low productivity aquifers, with only limited relevance to regional groundwater resources. But it has been increasingly recognised that these complex bedrock aquifers can play an important role in catchment management and subsurface storage systems.


In shallow to intermediate depth, fractured bedrock aquifers help to sustain surface water flow and groundwater resources, provide local groundwater supplies and impact on contaminant transport as a catchment scale. At greater depths, understanding the processes and mechanisms that regulate these complex bedrock environments can be crucial for the structural evaluation of subsurface storage and storage systems, such as deep geothermal or nuclear thermal energy storage systems and natural gas storage facilities, as well as the evaluation of natural resources such as groundwater resources and gas storage.

Working together, a robust understanding of fractured bedrock environments is required to ensure the sustainable and secure management of these complex bedrock environments and the subsurface storage systems.

Conference topics:
The conference will focus on the latest research in fractured bedrock environments and the management of these complex bedrock environments and the subsurface storage systems.

Call for Abstracts:
We welcome oral and poster abstract submissions for this conference. To be considered for a slot in the programme, a poster presentation, please email an abstract of no more than 400 words to laura.griffiths@geolsoc.org.uk by 15 January 2016.



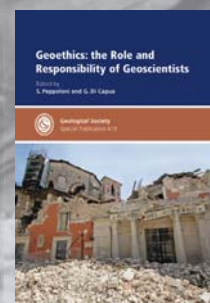
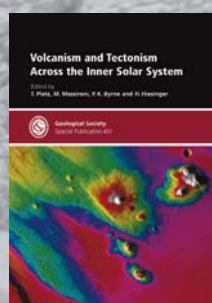
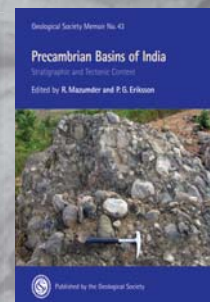
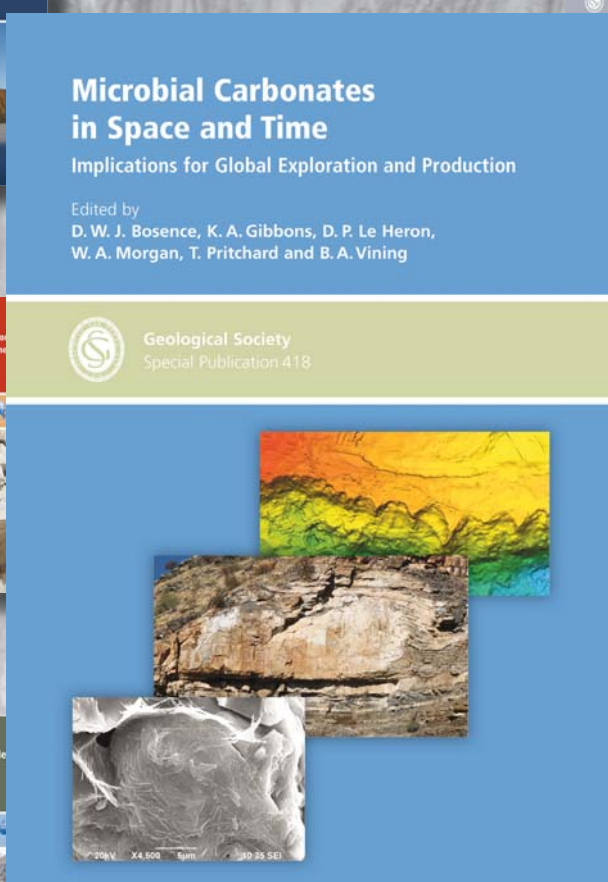
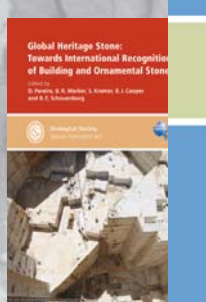
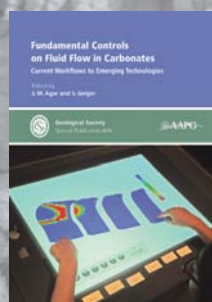
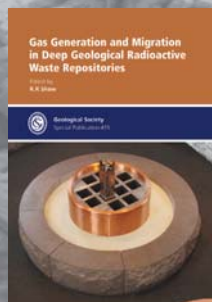

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