

GEOSCIENTIST

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The Fellowship Magazine of the Geological Society of London

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ITHACA UNBOUND?

Finding Odysseus' true home - we report on the latest progress

FOSSIL RUSH

Nina Morgan on a generous offer that went wrong

DALESMAN DON

Douglas Palmer celebrates Adam Sedgwick

ONLINE SPECIAL

Bryozoan Bonanza - Sedgwick Museum's biggest gift

Marine Minerals:

A New Resource for the 21st Century

31 October – 1 November 2018

The Geological Society, Burlington House, London



Convenors

David Cronan (Imperial College London)
Robert Gatliff (BGS)
Bramley Murton (NOC)

Call for abstracts

We welcome oral and poster abstract contributions for this meeting. To be considered for a slot in the programme or a poster presentation, please send an abstract of no more than 500 words to georgina.worrall@geolsoc.org.uk, no later than **Friday 29 June 2018**.

Further information

For further information please contact:
Georgina Worrall, Conference Office,
The Geological Society,
Burlington House, Piccadilly,
London W1J 0BG

T: 0207 434 9944

E: georgina.worrall@geolsoc.org.uk

Web:

www.geolsoc.org.uk/marineminerals18

 Follow this event on Twitter:
[#marineminerals18](https://twitter.com/marineminerals18)

Event partner: Marine Studies Group

Marine minerals activities are gathering pace. More and more entities are seeking licences from the International Seabed Authority (ISA) for manganese nodule exploration and mining in the North Pacific and for hydrothermal minerals exploration and mining on mid-ocean ridges worldwide. The U.K. has an important role in marine minerals activities through its sponsorship of several exploration licences with the ISA and active marine minerals research by the NOC, BGS and Universities in U.K. waters and the North Atlantic and Pacific Oceans. Central themes of the Conference will include research on these increasingly important mineral deposits and their resource potential, together with mining and environmental considerations.

Expected highlights

In addition to featuring current U.K. work on marine minerals, expected highlights of the conference include the latest research and development on:

- Metalliferous brines and sediments in the Red Sea and island arcs
- Arctic Ocean, NW Pacific and NE Atlantic ferromanganese crusts
- Indian Ocean ferromanganese nodules and crusts
- Hydrothermal minerals on the Mid Atlantic Ridge including in the Norwegian EEZ
- Ferromanganese nodules in the Cook Islands EEZ and central Pacific
- Placer minerals in the EEZs

There will also be a keynote comparative evaluation of the resource potential of marine and land based mineral deposits by Dr James Hein of the USGS. It is additionally hoped to include an update on International Seabed Authority activities in regard to marine mining.

Geoscientist is the Fellowship magazine of the Geological Society of London

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
 (Not for Editorial - Please contact the Editor)

Publishing House

The Geological Society Publishing House, Unit 7, Brassmill Enterprise Centre, Brassmill Lane, Bath BA1 3JN
T 01225 445046
F 01225 442836

Library

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

EDITOR-IN-CHIEF

Professor Peter Styles

EDITOR

Dr Ted Nield
E ted.nield@geolsoc.org.uk

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Alban Row, 27-31 Verulam Road, St Albans, Herts, AL3 4DG

T 01727 893 894
F 01727 893 895
E enquiries@centuryonepublishing.uk
W www.centuryonepublishing.uk

ADVERTISING SALES

Alex Kilen
T 01727 739 182
E alex@centuryonepublishing.uk

ART EDITOR

Heena Gudka

DESIGN & PRODUCTION

Ryan Gaston

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Was the Paliki Peninsula once an island? We bring you the latest

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ONLINE SPECIAL

BRYDONE'S BRYOZOAN BONANZA
 DOUGLAS PALMER CONTINUES HIS CELEBRATION OF SEDGWICK'S ACCESSION TO THE WOODWARDIAN CHAIR 200 YEARS AGO BY DOCUMENTING THE SEDGWICK MUSEUM'S BIGGEST SINGLE SPECIMEN DONATION – FROM REGINALD MARR BRYDONE FGS (1873-1943)



GASS 2018

Geologists' Association Student Symposium

Geoscience challenges in the 21st century: What difference will your research make?

25th of May 2018

Burlington House, Piccadilly, London, W1J0BG

Prizes will be awarded for the best oral and poster presentations.

Confirmed keynote speaker: **Professor Iain Stewart** (Director of the Sustainable Earth Institute, Plymouth University)

Registration opens **January 2018**

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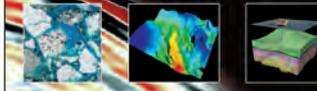
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Petroleum Group

At the forefront of petroleum geoscience...



The Petroleum Group (PG) is the Geological Society's specialist group dedicated to petroleum exploration and production. Our purpose is to advance the study and understanding of petroleum geoscience and to represent the Society with respect to petroleum exploration matters.

This is achieved through convening and supporting a series of conferences, workshops and publications at the cutting edge of the science; bringing together industry and academia.

To view a list of our upcoming conferences please visit our website: www.geolsoc.org.uk/petroleum. Here you can also access past meeting resources and meet the 2018 Committee members.



A Message from the Chair

Lucy Williams, Chairman

I assumed the role as Chairman in January and very much look forward to working with the Committee over the next two years. We have a great line up of conferences for 2018 (Year of Resources), covering such topics as: Big Data; Eastern Mediterranean; Maximising Economic Recovery and Ensuring the Future of the UKCS; Interplay of Heat Flow, Subsidence and Continental Breakup; Fractured Reservoirs and Operations Geoscience. We also look forward to showcasing postgraduates, joint industry research by once again hosting the Collaboration Conference in association with PETEX in November.

At our annual dinner in June we award our two medals: the Petroleum Group Medal and Young Geoscientist medal. Table Bookings are open. For more info contact Sarah Woodcock (sarah.woodcock@geolsoc.org.uk) You can get involved with the Group by applying to join the committee, submitting a proposal for and/or convening a conference, submitting a paper and nominating for our medals.

Getting involved

Any Fellow of the Geological Society can join the Petroleum Group and subscribe to the PG E-newsletter by emailing Sarah Woodcock (sarah.woodcock@geolsoc.org.uk). You can also keep up to date with conferences and other PG activities by clicking "like" on our Facebook page or by following us on Twitter.

Any Petroleum Group member can take a more active role by applying to join the Committee – applications to join the 2019 committee are accepted until 13th September 2018 and the nomination form is available on the webpage. The Committee is formed of around 20 members who will be expected to convene a cutting-edge petroleum geoscience conference during their three year term of service.

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For further information:

Sarah Woodcock,
The Geological Society,
Burlington House,
Piccadilly,
London W1J 0BG
Tel: +44 (0)20 7434 9944
Email: sarah.woodcock@geolsoc.org.uk

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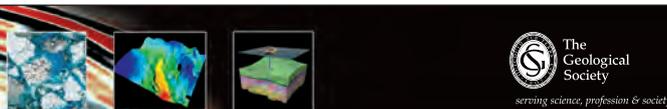
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Saudi Aramco

Raffaele Di Cui
Delta Energy Ltd

Steve Laubach
University of Texas at Austin

Robert Trice
Hurricane Energy

Call for Abstracts – Deadline: 31 May 2018

The Geology of Fractured Reservoirs

24-25 October 2018

The Geological Society, Burlington House, Piccadilly, London



A large proportion of the world's oil and gas is produced from fractured reservoirs, with new discoveries continuing to be made and put into development. This conference will explore the many ways in which the geology of fractures is fundamental to the understanding of fluid flow in the subsurface, and hence to predicting and monitoring reservoir performance.

Fractured reservoirs are those in which fractures have caused a significant increase in total permeability. Carbonate reservoirs, tight sandstone reservoirs, basement reservoirs and shale reservoirs are all commonly fractured, and present significant challenges to petroleum geologists. The focus of these challenges, but not their significance, changes throughout a field's life-cycle from exploration to production. Many geothermal reservoirs are also fractured, and share common challenges. This meeting will highlight how multidisciplinary work is essential to develop an applicable understanding of the behaviour of fractured reservoirs.

Themed sessions to include:

- Fracture properties at micro and well scale – detection and characterisation
- Fracture properties at reservoir to basin scale – from outcrops to seismic to regional models
- The flow behaviour of fracture systems – the interaction of fluids, rocks and stress
- The integration of data, disciplines and insights – advancing our knowledge of fractured reservoirs

Call for Abstracts:

Please submit paper and poster contributions to sarah.woodcock@geolsoc.org.uk by 31 May 2018.

For further information please contact:

Sarah Woodcock, The Geological Society, Burlington House, Piccadilly, London W1J 0BG.
Tel: +44 (0)20 7434 9944

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Event Sponsors:



Call for Abstracts – Deadline: 11 May 2018

Interplay of heatflow, subsidence and continental break-up: a case study workshop

8-9 October 2018

The Geological Society, Burlington House, Piccadilly, London



In the past decade significant advances have been made in the understanding of the evolution of rifted margins. It has nonetheless proven difficult to match models of heatflow and subsidence during and after continental break-up with well data, seismic observations and field studies.

The aim of the meeting is to bring academia and industry together, particularly structural geologists and petroleum systems analysts with the aim of defining a common understanding of the data, models and challenges faced by the different disciplines interpreting and predicting structural evolution, heatflow and subsidence.

The workshop will take the form of keynote presentations followed by case studies in the following themes:

- Mechanisms of rifting and continental break-up
- Observations from borehole and high quality deep seismic data
- Challenges faced by petroleum systems analysts in applying models to real data.

The committee now invite submissions of case studies to supplement these themes and are particularly interested in examples where the current models do not adequately describe the observed data or examples where there are observed spatial and temporal variations in heat flow and subsidence along a continental margin. The case studies need to be data driven either seismic, wells or both. The workshop will also have dedicated break-out session where participants can discuss the issues outlined in the case studies, discuss potential solutions and then report back to the main meeting. We anticipate this workshop will be the impetus for cross-disciplinary research, follow-up workshops and a later conference.

The committee look forward to you joining us on the 8-9 October 2018 to participate in what promises to be an exciting and stimulating workshop.

Call for Abstracts:

Please submit paper contribution to sarah.woodcock@geolsoc.org.uk by 11 May 2018.

For further information and registration please contact:

Sarah Woodcock, The Geological Society, Burlington House, Piccadilly, London W1J 0BG.
T: +44 (0)20 7434 9944 or email: sarah.woodcock@geolsoc.org.uk

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“ Οἴη περ φύλλων γενεῆ
τοίη δὲ καὶ ἀνδρῶν* ”

FROM THE EDITOR'S DESK:

Lineage of leaves

Hearing James Diggle, Professor of Latin and Greek at Cambridge, recite the first passage of Homer's *Odyssey* in the original, was one of the most memorable moments in my 20 years at Burlington House. He was introducing a London Lecture, by John Underhill in 2008, on what has become known as the 'Bittlestone Theory' (propounded in the 2005 book, *Odysseus Unbound*) that the Paliki Peninsula (the westernmost tip of Kefalonia), was once an island itself, separated by a narrow marine channel that became infilled sometime after the late Bronze Age.

The theory had already caught my eye. My father was an enthusiast for things Attic, and even practised declaiming it as I lay in my cradle (reasoning that the voice was what mattered to an infant, not what it said). Later, he read to me from both *Iliad* and *Odyssey* (in translation!), and bought me books with titles like *Tales from Homer*; so when, in my teens, I finally read E V Rieu's prose versions of these two founding documents of western culture, they were already very familiar.

Like most people, I just assumed that Ithaca was modern Ithaki, and in 1974 came across a collection of essays (by W B Stanford and J V Luce of Trinity College, Dublin) entitled *The Quest for Ulysses*, in which Professor Luce (rather flabbily) talked himself into the same

conclusion, despite many discrepancies, while at the same time managing to praise Homer's realism! This rang false. Like Luce, and Schliemann, I wanted to believe old Homer was an accurate topographer. His audience would have known their world; but if he had really meant Ithaki, crucial passages made no sense.

After reading *Odysseus Unbound*, 30 years later, I encouraged John Underhill to write about the project for *Geoscientist*, and several articles on the subject subsequently appeared - as well as a memorable day-trip in 2006, when John and Robert met me off the Zakynthos ferry, and showed me around (picture). Since then, much more research has been published - including a PhD thesis; and this month, John Underhill and our very own Peter Styles (who became involved subsequently on the geophysical side) bring us up to date.

Alas, Robert Bittlestone, the dynamic and brilliant inspiration behind it all, died in 2015, tragically early. However, *Odysseus Unbound* lives on. So far, geological evidence has done nothing but lend his exciting idea support. I am proud that this magazine has played a part in bringing it to wider notice, and delighted that this update should appear in my penultimate issue as Editor.

* "As the lineage of the leaves so too is that of man." Homer. *Iliad VI*, 146

Robert Bittlestone (left) & Ted Nield in Kefalonia, 2006. Photo: John Underhill

SOCIETY NEWS

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



President's Awards, 2018

Dawne Riddle writes: Every year, in addition to its medals and funds, the Society makes awards to promising young geoscientists who have been nominated by their universities (or other employers). These awards lie entirely within the gift of the President, but are included in the Awards Ceremony on

President's Day (June 6).

The President's Awards for 2018 are made to David King (University College, London), Oliver Rose (CH2M, now Jacobs) and Jack Williams (University of Cardiff). Congratulations to all three.

Notification of Officers for 2018/2019

At the AGM Fellows will be asked to elect the following members of Council as Officers for 2018/19:

President: Prof Nicholas Rogers **Vice-Presidents:** Mr Keith Seymour, Mr John Talbot **Secretaries:** Dr Colin North; Dr Katherine Royse; Dr Alexander Whittaker **Secretary, Foreign & External Affairs:** Dr Sarah Gordon **Treasurer:** Mr Graham Goffey

President's Day

President's Day at Burlington House on 6 June will begin with the Annual General Meeting at 11.00am followed by a buffet lunch with the award winners (members with ticket only – £27.50 per head). As in previous years, the recipients of the major medals have been invited to give a short talk on their subject, and the Awards Ceremony will be followed by presentations by the Lyell, Murchison, William Smith and Wollaston medallists (details on the website: www.geolsoc.org.uk/GSL-Presidents-Day-2018). The timetable for

President's Day and the agenda for the AGM are below. To obtain

luncheon tickets please send cheques (made payable to The Geological Society) to Stephanie Jones at Burlington House or email stephanie.jones@geolsoc.org.uk.

Please also contact Stephanie if you wish to attend the afternoon events for which there is no charge.

★ HAPPY ★
President's
★ day! ★

Advisory ballot results

The advisory ballot for Council closed on 31 March.

The election was conducted by Electoral Reform Services. A total of 2062 valid votes were cast for the seven vacancies on Council. The results are as follows:

Robin Strachan	1593 (77.3%)
Helen Smyth	1386 (67.2%)
Andrew Bloodworth	1110 (53.8%)
Bryne Ngwenya	1098 (53.2%)
Chris King	1079 (52.3%)
Thomas Backhouse	1046 (50.7%)
James Griffiths	912 (44.2%)

Nigel Platt	907 (44.0%)
Max Coleman	895 (43.4%)

The seven candidates receiving the most votes (above the line) will go forward to the Annual General Meeting on 6 June 2018 for election as Council members. At over 17%, this is the highest turnout for a Society election in living memory.

Previous ballots have struggled to reach 10%. The Society interprets this near doubling in participation as a vindication of its decision to move its voting procedure to Electoral Reform Services (ERS), and the simplification of the online voting process which this has entailed. *Dawne Riddle*



Timetable

11.00	Annual General Meeting (members only)
12.30	Lunch with the Award winners (members with tickets only)
14.00	Awards Ceremony
15.15	Talks by Lyell, Murchison and William Smith medallists
16.30	Tea
17.00	Talk by Wollaston Medallist
17.30	President's closing remarks
17.40–19.30	Drinks reception

AGM Agenda

- ◆ Apologies
- ◆ Minutes of the Annual General Meeting held on 7 June 2017
- ◆ Appointment of Scrutineers for the ballots for Council and Officers
- ◆ Ballot for Council
- ◆ Annual Report and Accounts for 2017
 - ◆ President's Report
 - ◆ Secretaries' Reports
 - ◆ Treasurer's Report
- ◆ Comments from Fellows
- ◆ Report of Scrutineers on the ballot for Council
- ◆ Ballot for Officers
- ◆ Fellowship subscriptions for 2019
- ◆ Deaths
- ◆ Appointment of Auditors
- ◆ Report of Scrutineers on the ballot for Officers
- ◆ Any other business
- ◆ Provisional date of next Annual General Meeting – 5 June 2019



PUBLIC LECTURE SERIES

Could we ever know how dinosaurs thought or behaved?

Speaker: Dr David Norman, Cambridge University
Date: Wednesday 23 May 2018

Programme

- ◆ **Afternoon talk:** 14:30pm Tea & Coffee: 15:00 Lecture begins: 16:00 Event ends
- ◆ **Evening talk:** 17:30 Tea & Coffee: 18:00 Lecture begins: 19:00 Reception.

Further Information

Please visit www.geolsoc.org.uk/gslondonlectures18. 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: **Sarah Woodcock**, The Geological Society, Burlington House, Piccadilly, London W1J 0BG,
T: +44 (0) 20 7432 0981 E: receptionist@geolsoc.org.uk

Chartership news

Bill Gaskarth writes: The Society is to hold a wine reception for Fellows on 1 May in central Manchester.

Prior to this there will be a Scrutineers' Training event at the same location between 14.00 and 17.00. All Scrutineers in the area and any CGeols/CScis who might be interested are invited to attend either or both events. Anyone wishing to attend the Scrutineering event please contact the Chartership Officer (Chartership@geolsoc.org.uk) so that we might gauge numbers.

Society Discussion Group

Programme: 2018

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

- ◆ Thursday 14 June – Athenaeum
- ◆ Wednesday 12 September - Gay Hussar
- ◆ Wednesday 24 October – Bumpkins
- ◆ Wednesday 5 December – Athenaeum

► Please contact Sarah Woodcock for more information and to make a reservation.
E: sarah.woodcock@geolsoc.org.uk

Annual Fellowship subscriptions, 2019



Since 2015 the annual increase in Fellowship Fees has been set with reference to the prevailing annual rate of Consumer Price Index (CPI) inflation when proposals are considered for the following year in March and April.

The rate of CPI for January 2018 was 3.0%. Inflation has been rising slowly but steadily since mid-2017 and current economic predictions are for this to continue and that the costs of providing services to Fellows in 2019 will reflect this. It is an established principle that the fee should cover the cost of services provided.

At its meeting on 18 April Council agreed to recommend to the Fellowship for approval at the Annual General Meeting the subscription rates for 2019 shown below which equate to an average increase of 3.0% (a maximum increase of £6 on 2018 rates). In addition, it is proposed to amend the Joint Fellowship Supplement, which has previously been a flat rate for the second payer irrespective of membership class, so that a discount of 35% across all classes is applied to both payers instead.

	2018 £	2019 £
Junior Candidate Fellow	10.00	10.00
Candidate Fellow	15.00	15.00
Candidate Fellow full course fee	15.00	00.00
27 and under	72.00	74.00
28-33	134.00	138.00
34-59	204.00	210.00
34-59 (Overseas)	156.00	161.00
60-69	102.00	105.00
60-64	134.00	138.00
65-69	102.00	105.00
70+	70.00	72.00
Honorary Fellow	00.00	00.00
Life Fellow	00.00	00.00
Senior Fellow	00.00	00.00
Concessions	72.00	74.00
Concessions (ERET)	00.00	00.00
Special Free Rate	00.00	00.00
Joint Fellow Non-Payer	00.00	00.00
Full time postgraduate MSc	29.00	30.00
Full time postgraduate PhD	42.00	43.00
RAS 25% discount	153.00	158.00
BP-funded postgraduate	42.00	43.00
Unemployed	00.00	00.00
Supplement (to payer) for Joint Fellowship	60.00	-
Joint Fellow discount	-	35%
CGeol supplement payers	49.00	50.00

Diversity in Geosciences UK launch

George Jameson* reports on the latest developments.

The International Association for Geoscience Diversity (IAGD) was founded in 2008, initially as an advisory group with a mandate to encourage accessible geoscience education, improving access, accommodation and inclusion for students, faculty and geoscientists with disabilities.

In January 2013, with the expansion of the group into the global geoscience community, IAGD was officially constituted. It is headquartered in Cincinnati, Ohio, USA and is composed of higher education faculty, staff and students, geoscience industry representatives, disability education researchers and anyone interested in fostering an inclusive, accessible scientific community.

Inception

Since its inception, the IAGD's reach has evolved from a predominantly North American focused organisation to being represented in over 25 countries worldwide.

This year marks another milestone with the IAGD establishing its first chapter outside of North America.

Alison Stokes (Plymouth University) and Jacqui Houghton

(University of Leeds) have led on setting up a dedicated UK Chapter, to be known as Diversity in Geoscience UK (DiG-UK). DiG-UK will expand the mission and vision of the IAGD to reflect the values of the IAGD, while focusing specifically on the needs, values and resources of the UK, and seeking in due course to broaden its responsibility beyond disability to cover wider aspects of diversity.

Inaugural

DiG-UK are hosting an inaugural meeting / launch event at the Geological Society of London on Monday, 4 June 2018. The launch event will focus on networking and building a community through a series of interactive workshops, discussions and presentations. Participation is welcomed and encouraged from across the entire breadth of the geoscience community and beyond!

➤ To register, visit W: bit.ly/2Eil64E

*George Jameson is Communications Officer with the Society.

Latest news from the Publishing House

Jenny Blythe has the latest from the Geological Society Publishing House

Dozens of giant footprints discovered on Skye are providing rare evidence of dinosaur evolution in the Middle Jurassic epoch.

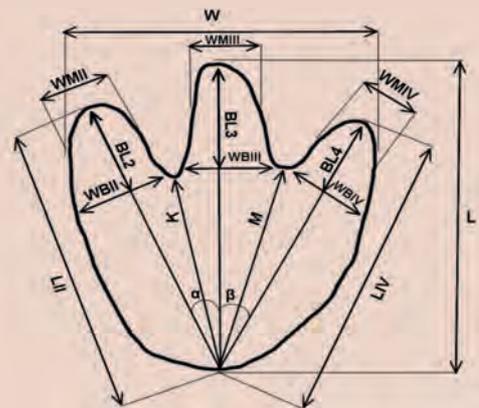
A sauropod-dominated tracksite from Rubha nam Brathairean (Brothers' Point), Isle of Skye, Scotland.

By Paige E. dePolo, Stephen L. Brusatte, Thomas J. Challands, Davide Foffa, Dugald A. Ross, Mark Wilkinson and Hong-yu Yi

Middle Jurassic dinosaur fossils are exceedingly rare, but new discoveries from the Isle of Skye, Scotland, are beginning to fill this gap. We here describe a new dinosaur tracksite found in the Lealt Shale Formation (Bathonian) of the Great Estuarine Group at Rubha nam Brathairean (Brothers' Point) on Skye. The site preserves an abundance of small sauropod manus and pes prints and several isolated and broken medium-to-large tridactyl footprints. The main site occurs on a single horizon of shaley limestone that formed in a lagoonal environment. The sauropod tracks are tentatively assigned to the ichnotaxon *Breviparopus* due to the narrow gauge of the trackways, the digital characteristics of the pes, and the ratio of heteropody observed between the manus and the pes. A theropod trackmaker is inferred for some of the tridactyl impressions with several indicative of the ichnotaxon *Eubrontes*. This new site strengthens the inference, originally based on a previously discovered locality near Duntulm Castle (Duntulm Formation) in northern Skye, that sauropods habitually spent time in lagoons during the Middle Jurassic.

➤ Available in the Lyell Collection:

<http://sjg.lyellcollection.org/content/early/2018/04/02/sjg2017-016>



Time to bang some Eds?

Why do journals still have different formats for references? ask **Jim Riding** and **John Powell***



When writing a paper or technical report, are you ever frustrated over formatting references and text? This problem must be all too familiar to many *Geoscientist* readers. We find it incredible that, in 2018, there is not an international industry standard format for listing previously published items in bibliographies/reference lists and within text.

In less joined-up times, it was perhaps understandable that journals wished to be distinctive. Prior to the 1980s, each manuscript was typed individually, so this was really not a major issue. But these days, when you can easily store a list of frequently-used references in a MS Word file, why does one have to agonise over the (frankly irrelevant) minutiae of, for example, ensuring that the volume numbers are in bold, or moving the year from after the authors' names to the end?

True, most journals have broadly similar reference formats. However, substantial differences stubbornly remain. Laboriously customising references and text formats can waste a lot of time. Digital 'reference management systems' are available, but why are these even needed?

For example, should one put 'and' or an ampersand before the final co-author's name? Sometimes it's neither! Some journals abbreviate journal titles while others don't. Certain periodicals italicise them, and some prefer Roman font. Punctuation and spacing after the year of publication varies, as it does before and after the volume number. 'Editors' or 'Eds'? What about DOI numbers?

These are some principal differences but, almost incredibly, there are others. Furthermore, other idiosyncrasies apply to formatting the running text. Should you italicise 'et al.'? Is ca, c. or ~ preferred? Is it 'Figure/Figures' or 'Fig./Figs'? 'Personal communication' in full, or 'pers. comm.'?

This multiplicity frankly makes no sense. No single journal or publisher surely has a monopoly on wisdom here. The minor

differences that persist are unequivocally cosmetic. This palpable fact, however, is not obvious if one peruses certain 'instructions for authors', which may leave one with the strong impression that one false comma in a single reference will result in out-of-hand rejection. Perhaps we are being a tad dramatic, hyperbolic and paranoid here, but we feel sure many readers will agree.

This is not a plea for reference anarchy; we fully realise that they must be 100% accurate and totally consistent - perhaps following American Psychological Association (APA) guidelines. We understand the important technical niceties of referencing, for example that one should always use an 'en dash', and not an 'em dash' or a hyphen between numbers in a page range.

We would simply welcome an end to the somewhat arcane reference and in-text formatting differences. Editors and publishers should get together and agree a simple, readily understandable format that does away with minor cosmetic differences – similar to lexicographic conventions for SI units.

If this situation came about, perhaps authors would be able to focus more on the science and their writing style. Maybe geoscience journals could lead the way? Over to you Editors – or should that be 'Eds.'?



* **Drs Jim Riding** (jbr@bgs.ac.uk) and John Powell work at British Geological Survey, Keyworth, Nottingham NG12 5GG UK.

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

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“WE FIND IT INCREDIBLE THAT, IN 2018, THERE IS NOT AN INTERNATIONAL INDUSTRY STANDARD FORMAT FOR LISTING PREVIOUSLY PUBLISHED ITEMS”

JIM RIDING & JOHN POWELL

ITHACA –

THE STORY CONTINUES



**John Underhill,
Peter Styles,
Kosmas
Pavlopoulos
and George
Apostolopoulos***
report on the latest
progress towards
discovering
Odysseus's home

If you are writing a very long and intricate historical narrative, it is hard enough to have to invent characters and their exploits without also having to invent the world they inhabit. It is far easier, indeed, to present the geography of the real world as their stage. Perhaps therefore we should not be surprised if Homer's descriptions of the places that Odysseus visits on his arduous travels, and of his homeland, the fabled 'rocky Ithaca' - relate to landscapes still recognisable today.

But although both *Iliad* and *Odyssey* present many geographical clues, they have been hotly debated for decades. Heinrich Schliemann, the German businessman turned archaeologist, ardently believed that Homer was describing real places. He effectively used the *Iliad* as his *Baedeker*, claiming

that he had discovered Troy. While, over the centuries, many suggestions as to the true location of Homeric Ithaca have been made - including some hundreds of miles away in the Balkans. Various Peloponnese islands - Ithaki, Lefkada, Kefalonia - as well as Sicily and even the Spanish Coast near Cadiz, have all been proposed.

Kefalonia (or parts of it) have figured strongly, with authors often selecting the northern peninsula, near the modern village of Fiskardo, as their preference - including recently Brckovic (*Odysseus's Ithaca - The Discovery* 2001) and Goekoop (*Where on Earth is Ithaca?* 2010). Others have pointed to SE Kefalonia, where Mycenaean tombs have been discovered near Tzanata.

This is how Homer describes Odysseus's home (emphases by James Diggle):

“ AROUND ARE MANY ISLANDS, CLOSE TO EACH OTHER, DOULICHION AND SAME AND WOODED ZACYNTHOS. ITHACA ITSELF LIES LOW, FURTHEST TO SEA TOWARDS DUSK; THE REST, APART, FACE DAWN AND SUN ”

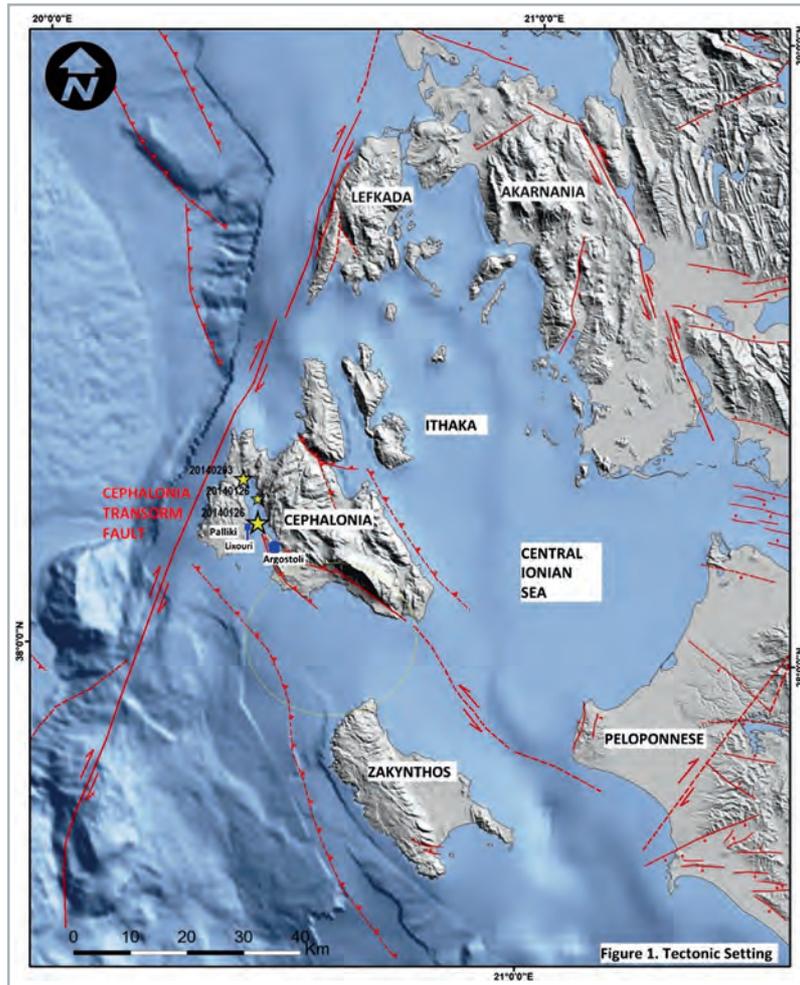


Fig. 1: Location of the major geological and tectonic features associated with Kefalonia and the surrounding islands (from Valkaniotis 2014)

εἴμ' Ὀδυσσεὺς Λαερτιάδης, ὃς πᾶσι δόλοισιν ἀνθρώποισι μέλω, καὶ μεν κλέος οὐρανὸν ἵκει. ναιετάω δ' Ἰθάκην ἐνδείλον· ἐν δ' ὄρος αὐτῆ Νήριτον εἰνοσίφυλλον, ἀριπρεπές· ἀμφὶ δὲ νῆσοι πολλαὶ ναιετάουσι μάλα σχεδὸν ἀλλήλησι, Δουλίχιόν τε Σάμη τε καὶ ὑλήεσσα Ζάκυνθος. αὐτὴ δὲ χθαμαλὴ πανυπερτάτη εἰν ἀλὶ κείται πρὸς ζόφον, αἰ δέ τ' ἀνευθε πρὸς ἡῶ τ' ἠέλιόν τε,

I am Odysseus, Laertes' son, world-famed For stratagems: my name has reached the heavens. Bright Ithaca is my home: it has a mountain, Leaf-quivering Neriton, far visible. Around are many islands, close to each other, Doulichion and Same and wooded Zacynthos. Ithaca itself lies low, furthest to sea Towards dusk; the rest, apart, face dawn and sun.

(*Odyssey* 9.19-26, *Transl.* J Diggle)

The fourth word in the penultimate line - πανυπερτάτη (panhupertate), meaning 'furthest of all' - clearly indicates that Ithaca is the most westerly of the islands in that region. Some other translations render it thus: 'last of all in the sea to westward' (W H D Rouse); 'nearer the west than its neighbours' (T E Lawrence); 'farthest out to sea, rearing into the western dusk' (Robert Fagles).

Modern-day Ithaki (unsurprisingly) claims to be ancient Ithaca. But it is manifestly not the 'furthest west'; that honour belongs to Kefalonia and, particularly, its western peninsula Paliki, which is also much less mountainous than Ithaki (i.e., 'lies low' - Figure 1).

Bittlestone

In 2003, the former classical scholar, economist and business adviser Robert Bittlestone, together with James Diggle

(Professor of Greek and Latin, Cambridge University) and Professor John Underhill (Chief Scientist, Heriot-Watt University, Edinburgh) first noted that Paliki, the western peninsula of Kefalonia mentioned above, would fit Homer's description *had it once been an island*, geographically separated from the rest of Kefalonia. It would then be west-facing ('towards dusk'), while the surrounding islands face east ('towards dawn'), as well as the 'furthest out to sea', and 'low-lying'.

In their 2005 book *Odysseus Unbound: The Search for Homer's Ithaca* (Cambridge UP) they also highlighted descriptions of Kefalonia by Greek writer Strabo, in his 17-volume *Geography*. That seminal tome was composed sometime in the first two decades of the Christian (Roman) era and describes the known world, employing an astute combination of personal ▶

Fig. 2: Conventionally accepted configuration of the plate boundaries near Kefalonia and important localities (from Briole et al 2015)

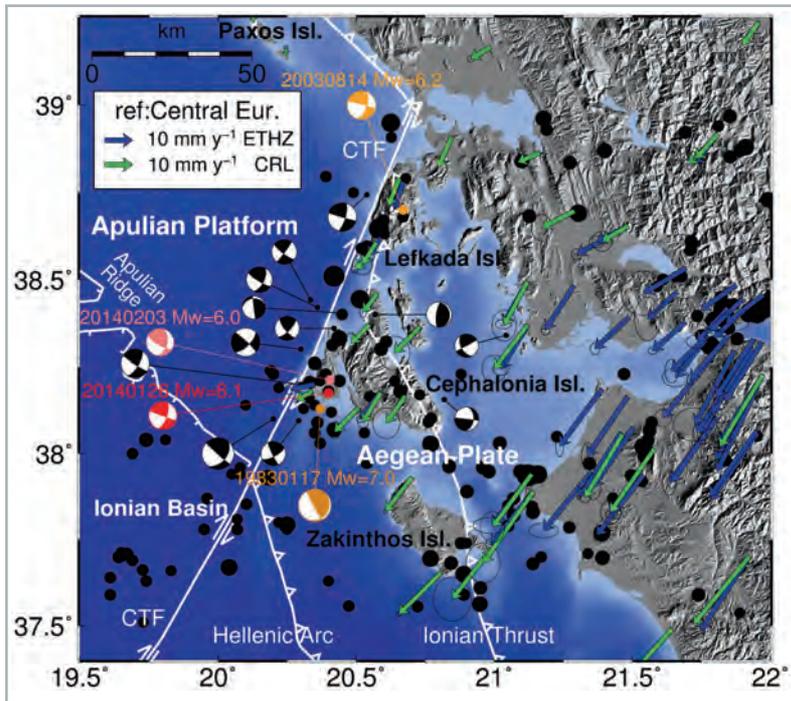
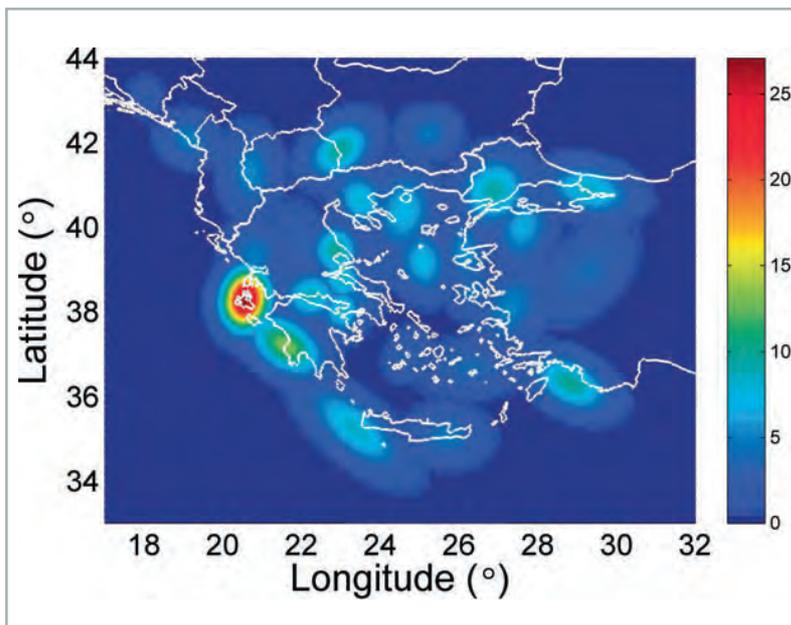


Fig. 3: Aerial View looking NE across Thinia over the buried site where 'Strabo's Channel' would have run. The valley is 6kms in length, up to 2km wide and rises to a height of c.180m at its saddle and watershed



Fig. 9: Clustering Analysis of Aegean Seismicity showing that the Kefalonia region has the highest significant clustering in the context of the extremely active regional seismic activity (from Weatherill and Burton 2009)



► observation and travellers' reports.

Describing Kefalonia, Strabo wrote: *Cephalonia lies opposite Acarnania, at a distance of about fifty stadia from Leucas (some say forty), and about one hundred and eighty from Chelonatas. It has a perimeter of about three hundred stadia, is long, extending towards Eurus [east or south-east], and is mountainous. The largest mountain upon it is Aenus, whereon is the temple of Zeus Aenesius; and where the island is narrowest it forms an isthmus so low-lying that it is often submerged from sea to sea. Both Paleis and Kranioi are on the gulf near the narrows.*

This 2000-year-old description contains some surprisingly precise and accurate measurements, which inspire confidence in the veracity of Strabo's reference to a low-lying narrow isthmus near Paleis and Kranioi that is often (but by implication, not always) covered by the sea from end to end.

The location of the two settlements is not in doubt, since their remains are still visible on Paliki and near Argostoli today. Strabo therefore provides an independent reference to a marine channel, in just the right place to make an island of the Paliki peninsula – a place now occupied by the isthmus, and specifically, the valley of Thinia. Bittlestone *et al.* also identified a series of locations on Paliki as candidates for key Ithaca sites, mentioned in the *Odyssey*, that seemed to fit Homer's descriptions. But the hypothesis faced a major obstacle. Today, the valley lies well above sea-level (up to 180m) - which inevitably prompted some scepticism (Figure 3).

Fugro

Their work led to Fugro's supporting research to resolve this conundrum by deploying geotechnical teams and sponsoring a NERC PhD project by Dr Kirsten Hunter (2013), which enabled key geological and geophysical tests to put flesh on the theory's bones.

These investigations showed evidence of marine sediments on the coast and near offshore in the last Post-Glacial period, while seismic analysis demonstrated that the Thinia valley had indeed been a marine channel in the Quaternary, some 400,000 years ago.

More recently, significant evidence has emerged that the southern end of the Thinia valley became blocked by a massive translational and rotational mass movement of a single block measuring c. 4km by 1km - most likely following

a major tectonic event - with smaller landslides infilling the valley's northern end. Such a large rotational slump (Figure 4 - online) may well account for the 180m rise in elevation we see today.

Analogous situations are indeed common in seismically active regions. A notable example is the collapse and rotational translation of a hillside at Hebgen Lake in Montana, USA that dammed outflow and created 'Quake Lake' (Figure 5 - online). The shape, scale and form of the feature is precisely analogous to the situation in the Thinia valley - right down to a toe of displaced material, running up the hillside to the right, and the damming of a river to create a lake. Figure 6 shows a mass movement feature of similar scale, created by the Christchurch Earthquake (7.8ML) in 2011 on the New Zealand Alpine Fault - an area of similar tectonic complexity to the Kefalonian region.

The two key questions are, therefore:

1. Did sea level rise sufficiently after the last Ice Age to flood the Thinia valley again - and, critically, when? Was it before the Late Bronze Age, c.3200 years ago, usually considered the time of Odysseus?
2. When did the tectonic event - and its resultant huge translational slump - occur? Was this after the Late Bronze Age? Perhaps even, given Strabo's description, within the last 2000 years?

If the answer to both these questions is 'yes' then the case for Paliki as Homer's Ithaca becomes compelling. But first, a slight digression.

Kefalonia transformed

The current consensus is that the Kefalonia Transform Fault - the major tectonic boundary which shifts the Hellenic Arc Subduction Zone (African Plate beneath Aegean Plate) some 200km northwards until it is converted into the continental collision zone between the Apulian platform and NW Greece (Adriatic against Eurasian Plate) - lies west of Kefalonia. It is usually drawn thus - see Figures 1 and 2.

The Kefalonia Transform Fault probably eventually becomes the North Anatolian Fault - one of the major trans-continental fracture zones of the world, at least equivalent to the New Zealand Alpine Fault on which we have already seen huge disturbances and uplift. However, the largest Kefalonian (indeed the largest recorded Greek) earthquake

event (M7.2, 1953) had its epicentre on Kefalonia, probably on the Ionian thrust, an oblique convergence with a left-lateral component (Figures 1 and 2).

The *Odysseus Unbound* team have recently (summer 2017) undertaken new surveys to compile new geophysical maps, integrating the data with earlier data from FUGRO, which was presented in Hunter (2013). The new gravity/magnetic/resistivity and geomorphological images of the Thinia valley and adjoining regions are shown in Figure 7, which shows LIDAR derived images of slope (a) and aspect (b) (Pavlopoulos 2017) and geophysical images of apparent resistivity (c) and magnetic anomaly (d) (Apostolopoulos 2017). All these images show sets of NNE-striking features along the southern Thinia valley, and also that these are segmented and offset to the NNW - indicative of right lateral (dextral) shear.

(Figure 8 - online) also shows that the Kefalonia Transform Fault is either

distributed in deformation across the western part of Kefalonia, the Paliki peninsula, or even that it runs east of Paliki through the Thinia valley before skimming Lefkada.

The conspicuous topographic discontinuities seen in Figure 7 and, more significantly, the series of *en echelon* offset features, are exactly what we would expect if a significant amount of transcurrent dextral shear had taken place along a distributed major transform or transform-related boundary. It seems evident therefore that the KTF is not a single structure but a wide distributed zone as it crosses continental Kefalonia, including splays off the main structure.

This interpretation would define the Kefalonia Transform Fault as a major trans-continental shear zone akin to the Dead Sea Shear, the North Anatolian Fault, the San Andreas Fault and the New Zealand Alpine Fault, where enormous mass translations have significantly changed the

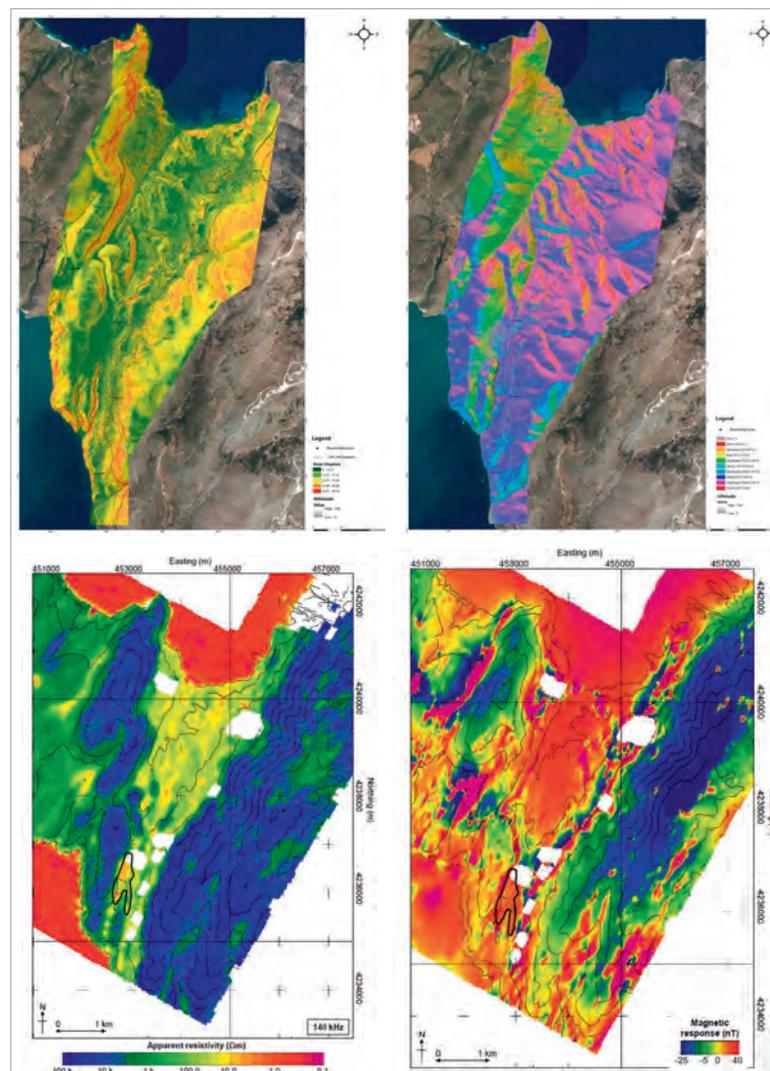


Fig. 7: TEM-derived and geophysical images of the Thinia valley revealing the presence of *en echelon* features indicative of right lateral (dextral) shear through the area in the same orientation and sense as the Kefalonia Transform Fault

► topographic profile (Figure 6).

Figure 9 confirms the importance of Kefalonian seismicity. The clustering analysis of earthquakes in the Aegean shows the very highest significance around Kefalonia. Figure 10 (online) shows the concentration of significant geological disturbance on the Lixouri and Thinia peninsulas.

Intense deformation

There seems to be very strong evidence that the Thinia valley is the site of intense geological deformation and that significant major modification of the topographic profile is not implausible, even in the relatively short period since Homeric times.

The elevation of over 100 metres along the postulated route of a marine channel across the isthmus separating Paliki from Kefalonia remains a problem for even a narrow seaway. However, recent electrical resistivity geophysical surveys in the southern region (Figure 11- online) show significant thicknesses of very poorly consolidated materials more than 60m thick, which extend even further (well below 120m). Further, a traverse across the frontal (toe) zone of the landslide material that covers the western hillside (Figures 12, 13) suggests that it may have infilled a

deep, albeit possibly narrow, channel.

So, let us return to our two key questions about timing and mechanism.

Sea level

Previous offshore seismic interpretation (Hunter 2013) has demonstrated the presence of onlapping sediment fill, related to the last glacial lowstand (22,500 B.P.) when sea levels were c.125m lower than they are now. Figures 14 and 15 (online) show this northwards-directed onlapping deposition, which records Late Quaternary and Holocene post-glacial transgression and infill.

But to show that the Thinia valley was marine during Homer's time, we must demonstrate that seawater reached the head of the Gulf of Livadi more than 3200 years ago, and identify and date the subsequent landslide deposits that closed the channel and turned Paliki from an island into a peninsula.

Although biostratigraphic sampling of boreholes drilled in the Thinia valley demonstrate that there was a marine channel 400,000 BP, evidence of its continued existence within the past 5000 to 10,000 years BP is essential to make the case. We plan further onshore and offshore sampling and biostratigraphic and microfossil analysis to resolve this.

Closure

Fortunately, a relatively simple resolution is possible. There is what appears to be a historically recent settlement on the western (Paliki) side of the southern entrance to the Thinia valley, whose walls end abruptly at the edge of landslide material (Figure 12, foreground).

The satellite image appears to show that the toe of this landslide overruns and covers the southern part of this settlement which, if this occurred in, say, the last 2000 years, would suggest that it happened during the last two millennia - and so provide a robust dating mechanism for establishing the chronology of the seismic and ground uplift event(s). We plan further high-resolution geophysical investigations in the Thinia valley, to determine firmly whether the landslide did indeed cover relatively recent walls or other artefacts.

Evidence suggesting that these walls were simply built 'up to' landfill material would not invalidate the hypothesis, but would mean that other dating mechanisms would need to be considered. For example, a small palaeo-lake bed, (Lake Katochori), sits on top of the landslide material onlapping the rockfall debris - clearly indicating that it formed on top of the landslide, which had cut off an earlier stream. Sampling and



Fig. 12: View looking west across Lake Katochori at the southern end of the Thinia Valley showing the triangular, wooded area (circled) where the toe of rockfall and landslide material covers the hillside on which walls, apparently historically recent, have been discovered



Fig. 6: The 7.8 Magnitude, 2011 Kaikoura earthquake caused major landslides blocking valleys and damming lakes very much in the manner suggested for the Thinia valley

dating the deepest lake bed material would offer an alternative ‘upper’ time constraint, since the existence of the lake was the basis for a later Venetian settlement.

Remains of apparent Bronze Age structures on Paliki suggest that the area was important at this time. Preliminary geophysical surveys have revealed sub-surface structures in some areas, suggesting construction activity in ancient times. Further detailed investigations are planned, to define the optimal sites where excavation might reveal the layout of buildings and valued possessions, aiding understanding of the relative sophistication of the civilisation on Paliki and whether it was Late Bronze Age (c.1200 BC), earlier, or later.

Conclusions

Geological investigations carried out after the recent major earthquake on Kefalonia (2014), together with our own geophysical surveys, provide new insights into the intriguing question as to whether Homer was describing the Paliki peninsula as the site of Odysseus’ Ithaca.

It seems likely that the major plate boundary, the Kefalonia Transform Fault, which has traditionally been drawn as running west of Kefalonia, may be more diffuse, affect a wider region than previously

envisaged, and be the ultimate driver for co-seismic landslides and rockfalls. Its immediate impact in the Thinia valley and Gulf of Livadi is to cause dextral fault offset seen on seismic data and topographic features. This is consistent with earthquake fault-plane solutions and the sense of movement along the major plate boundary between Europe and Africa.

Electrical resistivity data indicate great thicknesses (>60m) of poorly consolidated (landslide) material overlapping an archaeological site associated with what seems to be a relatively recent historic settlement, and may suggest that a deep channel (‘Strabo’s Channel’) once existed there.

Further geophysical investigations should provide clues as to whether the landslide over-ran the settlement – strongly indicating a post-Homeric age for this intense geological and geomorphological activity and strengthening significantly the case for a narrow seaway separating Paliki from the rest of Kefalonia.

Although much remains to be done, geological support for the intriguing possibility that the site of Homer’s Ithaca might eventually be reconciled with Homer’s geographical descriptions on the Paliki peninsula, is getting stronger.

To be continued! ♦

Peter Styles is Emeritus Professor in Applied and Environmental Geophysics at the University of Keele, Staffordshire, England.
E: p.styles@keele.ac.uk

Professor John Underhill is Chair of Exploration Geoscience & Chief Scientist, Heriot-Watt University, Edinburgh, Scotland. E: j.r.underhill@hw.ac.uk.

Kosmas Pavlopoulos is Professor of Geology-Geomorphology, Paris Sorbonne University Abu Dhabi.

George Apostolopoulos is Professor at the National Technical University of Athens, School Of Mining And Metallurgical Engineering, Mining Engineering Section, Laboratory Of Applied Geophysics.

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FURTHER READING

A list of selected references may be read in the Online version of this article Editor.

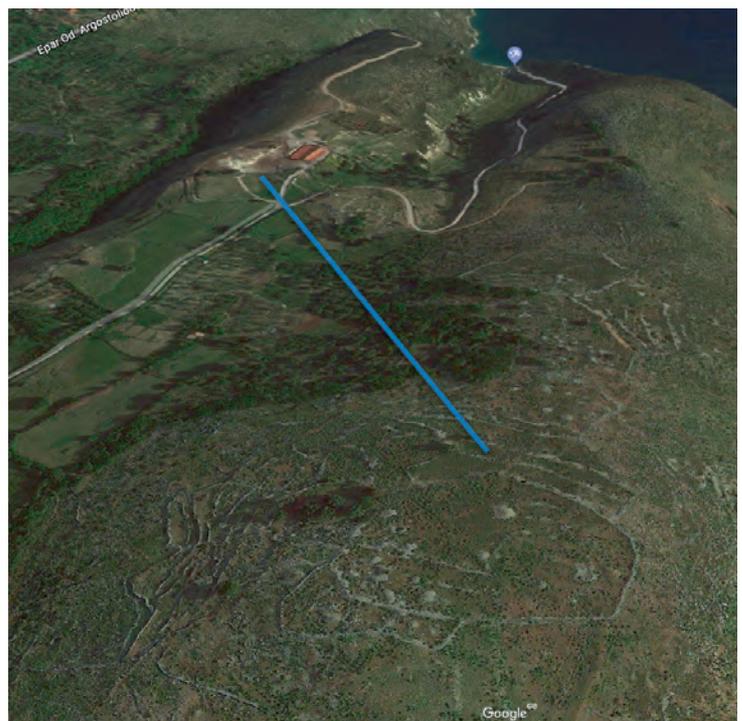


Fig. 13: Satellite image looking south (from Google Maps) showing a historically recent Roman settlement apparently over-run by overlapping landslide material which would provide a means of determining the age of the major mass-wasting events which might have closed the marine channel. Blue line - profile, Fig 11 (online)

THE

DALESMAN DON





This year is the bicentenary of Adam Sedgwick's appointment as Woodwardian Professor. **Douglas Palmer*** writes.

Adam Sedgwick (1785-1873) graduated from Trinity College, Cambridge in 1808, became a Fellow of the College in 1810 and Vice-master in 1845. To fulfill the conditions of fellowship, he was ordained in 1817 and later granted a prebendary stall in Norwich Cathedral (1834). In 1818 he was elected to the Woodwardian professorship, and to fellowship of the Geological Society of London (becoming President 1830-1831, winning the Wollaston Medal in 1851), followed by fellowship of the Royal Society in 1821 (where he won the Copley Medal in 1863). Sedgwick had undoubtedly arrived – becoming part of the established network of British science and one of the most important geologists of the 19th Century.

Cambridge

As a lifelong Cambridge don, the Reverend Professor delivered his first lecture course in 1819 (becoming one of the first to fulfill this requirement in Woodward's bequest!). Sedgwick's lectures proved popular with 'town and gown' - including women, whose admission to lectures was unusual for the time. However by 1870 and his last lecture course, three years after the foundation of the first women's college (Girton), Sedgwick was referring to aspiring female undergraduates as 'nasty forward minxes'.

Despite this, Sedgwick was a university reformer, campaigning in 1834 for the abolition of the religious test, which only allowed members of the Church of England to enter the University (it was finally removed in 1869). When Prince Albert became Chancellor of the University in 1847, he appointed Sedgwick as his secretary and then as a member of the Royal Commission on University Reform in 1850.

Royal connections

Sedgwick's Royal connection began in 1843 when he showed Queen Victoria and Prince Albert around the new University Museum of Geology in the recently built Cockerell building. Sedgwick's admiration

was evidently reciprocated, as invitations to Osborne (1847), Balmoral (1859) and Windsor (1863) duly followed.

If young geologists today have heard Sedgwick's name at all they will probably associate it with the Sedgwick Museum in Cambridge. However, anyone delving into the details of Lower Palaeozoic biostratigraphy will become more aware of Adam Sedgwick's geological achievements.

So, beyond the bald facts of his career, who was Adam Sedgwick? Is it possible to get a sense of how he rose from being a Yorkshire grammar-school boy to a pillar of Victorian Establishment?

Bootstraps

Sedgwick's early life and education was a successful 19th Century aspirational parable of good genes, a supportive family and social environment, and hard work. Born in 1785 and bred in Dent, Yorkshire, Adam was one of the seven children of a local schoolmaster – the Rev. John Sedgwick and his wife Margaret.

Clever but relatively unrefined Dalesmen, Adam, his father and two of his younger brothers all gained entry to the University of Cambridge - Adam helped by tutoring from local physician and mathematician, John Dawson. Without much money, and again like his father, Adam was assisted by a sizarship (a sizar is an undergraduate at Cambridge or Trinity College, Dublin, who received financial help from the college, formerly in return for certain menial duties) before winning a Trinity College scholarship (1807) and graduating as 5th Wrangler in 1808 (A 'wrangler' is a person placed in the first class of the mathematical tripos).

Further hard work precipitated a breakdown in his health; but in 1810 he was awarded a college Fellowship. He still had to earn his living by the tutorial teaching of undergraduate mathematics, which he found unrewarding (both financially and intellectually). The subject just did not interest him. Nor did he wish to follow in his father's footsteps as schoolmaster and priest. Seduced by the intellectual stimuli of collegiate life ►



Sedgwick's house at Norwich.

Sedgwick's Norwich home

► in Cambridge, Adam needed a more engaging subject than maths or theology - but what?

A glorious & healthy field

None of Sedgwick's biographers has found any evidence of particular interest in geology prior to his entering the competition for the Woodwardian chair. Indeed when, in 1859, he looked back on his reasons for turning to geology, Sedgwick wrote: "I knew very little indeed of geology – just enough to know that it was a glorious and healthy field in which I might find ample enjoyment and better health". As a countryman used to being out on the Fells in all weathers, he believed in the restorative effects of nature.

With little or no geological background Sedgwick might seem a surprising choice for the Woodwardian chair; but the position was something of a sinecure since the subject was not examined at the time. Its duties were not onerous but the stipend was only £100 a year. Nevertheless, Sedgwick was an inspired choice and went on to fully justify his election. He said: "hitherto I have never turned a stone; henceforth I will leave no stone unturned". He kept his promise.

Married to the Museum

But there was a personal cost to be paid. As Sedgwick ruefully noted in 1858,

"Woodward put the ban of domestic sterility upon his Professor, but my Museum is in the place of wife and children". Clearly Sedgwick had not fully taken this into account when competing for the post, vacated upon the marriage of the previous incumbent John Hailstone.

Sedgwick's zeal as a lecturer, field geologist and collector firmly established the science of geology within the University - despite its having no part in

any examination until the foundation of the Natural Science Tripos in the 1850s. Under Sedgwick, the Museum collections grew well beyond the core 11,000 specimens endowed by John Woodward in 1728. Sedgwick himself collected thousands of specimens and bought collections and important specimens from the likes of Mary Anning. He also pressured the University authorities to provide more space for the collection.



Sedgwick's memorial in Dent

When Queen Victoria and Prince Albert visited Cambridge in 1843, Sedgwick proudly showed them around his new Museum in the recently built Cockerell Building. The royal couple was suitably impressed and when the Queen asked where one of the ichthyosaurs came from, Sedgwick replied that it was 'a delegate from the monsters of the lower world to greet Her Majesty on her arrival in the University'.

Achievements

From the start of his geological career Sedgwick embarked upon fieldwork across Britain, initially in mining areas, especially southwest England, then the Isle of Wight and the Lake District.

As Clark and Hughes detail in their 'Life and Letters', for nearly three decades from the early 1820s Sedgwick was indefatigable in his pursuit of geology. His mapping of the Lake District, North Wales and Devon was a major achievement. He pioneered understanding of the complex structure and slaty cleavage of these ancient terranes. And, in collaboration with Murchison he founded the Cambrian and Devonian Systems.

By the 1850s ecclesiastical duties and ill health prevented Sedgwick from doing

any innovative geological work. His geology became out of touch with the times, and he viewed with dismay the publication of the 'Origin of Species' (1859) by one of his most famous pupils. As he wrote to Darwin: "You have deserted...the true method of induction". Although Sedgwick accepted many of the transformative discoveries of early 19th Century geology, he was an evangelical Christian and baulked at the theory of evolution - and especially its implications for humankind.

Postscript

Such was the esteem in which Sedgwick was held that, upon his death in 1873, a public subscription raised £12,000 towards a memorial building to house his hugely expanded geological collections. Although it took over two decades to realise, the Sedgwick Museum was opened in 1904 by King Edward VII. Sedgwick had first met Edward, aged six, at Osborne in 1847 when he 'entertained' the royal family with a droll story of how a Cambridgeshire woman survived burial in snow for eight days in the winter of 1799. ♦

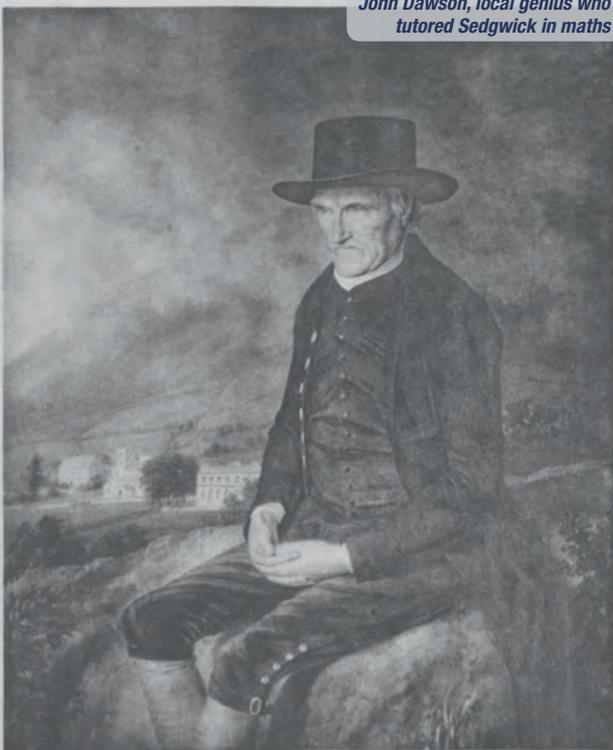
“ ALTHOUGH SEDGWICK ACCEPTED MANY OF THE TRANSFORMATIVE DISCOVERIES OF EARLY 19TH CENTURY GEOLOGY, HE WAS AN EVANGELICAL CHRISTIAN AND BAULKED AT THE THEORY OF EVOLUTION ”

REFERENCE

Clark, J.W. and McKenny Hughes (eds) 1890. *The Life and Letters of Adam Sedgwick*. Cambridge University Press (two vols) i-xiii, 1-539 and i-vii, 1-640..

***Douglas Palmer, author, is Public Programmes Coordinator for the Sedgwick Museum, Cambridge**

John Dawson, local genius who tutored Sedgwick in maths



JOHN DAWSON, OF SEDBERGH.

Born 1734; died 1820.

From a water-colour drawing by William Westall, 1817.



The 'aged P' - Sedgwick's father Richard in old age

ENDORSED TRAINING/CPD

MEETING	DATE	VENUE AND DETAILS
Geology of the Lakes: An Introduction	4-6 May	Venue: Higham Hall College, Bassenthwaite Lake, Cockermouth, Cumbria. Leader: Annette McGrath E: annette.mcgrath@york.ac.uk. Fees apply – see website for links and details.
Lapworth's Logs	N/A	'Lapworth's Logs' is a series of e-courses involving practical exercises of increasing complexity. Contact: info@lapworthslogs.com. Lapworth's Logs is produced by Michael de Freitas and Andrew Thompson.

EVENTS

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

MEETING	DATE	VENUE AND DETAILS
Fellows' Manchester Event Geological Society	1 May	Meet the President and listen to Dean Lomax. Venue: Renold Building, The University of Manchester. Time: 1800. See website for registration. Contact E: sarah.woodcock@geolsoc.org.uk
GeoWeek: Active Geoscience Week	5-13 May	GeoWeek is an initiative set up by the Earth Science Education Forum to promote active geoscience. See website for details..
Continuous monitoring and the impacts of unconventional gas exploration Yorkshire Regional	9 May	Evening meeting. Speaker: Simon Talbot. Venue: Leeds TBC. Contact E: yorkshireregionalgroup@gmail.com
Pyrite Oxidation: where are we now? NHM/Geological Curators Group	10 May	Venue: Natural History Museum. Fees apply – see website for details. Contact E: events@geocurator.org
Geoenergy Observatories project South Wales Regional	14 May	Venue: Lecture Theatre 1.40, School of Earth & Ocean Sciences, Main Building, Cardiff University. Speaker: Dr Geoff Baxter, BGS. Contact W: www.geolsoc.org.uk/south_wales
Heat from abandoned mine water Engineering Group	16 May	Venue: Burlington House. Time: 17.30 for 18.00. Speaker: Peter Brabham.
Glossop Lecture South West Regional	17 May	Jackie Skipper reprises her Glossop Lecture: 'Variability and ground hazards: how does the ground get to be 'unexpected'?'. Venue: Plymouth University. Time: 18.30. Contact E: gordonneighbour@hotmail.com
Could we ever know how dinosaurs thought or behaved? Public Lecture	23 May	Venue: Burlington House. See advert, p07
Student Symposium Geologists Ass	25 May	Venue: Burlington House. See website for details. Speaker: Dr Iain Stewart Contact E: gass@geologistsassociation.org.uk
Eastern Mediterranean – An emerging major petroleum province Petroleum Group	29-30 May	Venue: Burlington House. Fees apply – see website for details and registration. Contact E: sarah.woodcock@geolsoc.org.uk

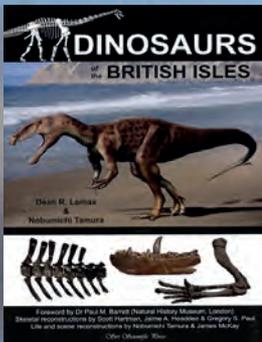


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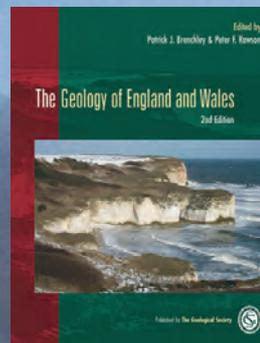
Dinosaurs of the British Isles



This book is truly unique, providing the first comprehensive account of the dinosaurs of the entire British Isles. It will be of interest to a broad audience, from academics to those with a general interest in fossils.

View more at: www.geolsoc.org.uk/MPDIN

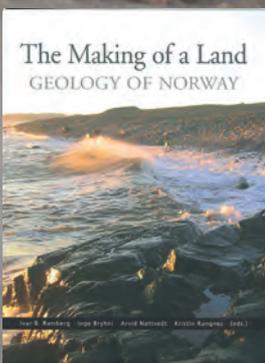
The Geology of England and Wales, 2nd edition



This second edition of The Geology of England and Wales is considerably expanded from its predecessor, reflecting the increase in our knowledge of the region, and particularly of the offshore areas. Forty specialists have contributed to 18 chapters, which cover a time range from 700 million years ago to 200 million years into the future.

View more at: www.geolsoc.org.uk/GOEWP

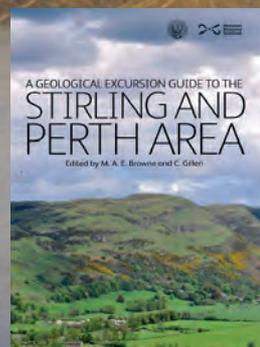
The Making of a Land Geology of Norway



A fantastic journey from the summits of Norway's spectacular rugged and weather-beaten mountains to the riches concealed in the sedimentary rocks on the continental shelf. This book displays the treasures of Norwegian geology for everyone to see.

View more at: www.geolsoc.org.uk/GNOR

A Geological Excursion Guide to the Stirling and Perth Area



The Stirling and Perth area comprises some wonderfully varied geology, from the Dalradian metamorphic rocks in the southern Highlands to a range of sedimentary and igneous rocks within the Midland Valley. The eighteen excursions in this book guide the reader to the best geology that this region has to offer.

View more at: www.geolsoc.org.uk/MPSPA

View more online at: www.geolsoc.org.uk/geogifts

Or call the Publishing House on +44 (0)1225 445 046

Engineering Geology and Geomorphology of Glaciated and Periglacial Terrains



In 2010 the Engineering Geology Group set up a steering committee to review the current state of knowledge and art arising from former Quaternary periglacial and glacial ground

conditions. The instruction was to provide a book with a strong emphasis on practical interpretation, while being concise and digestible.

This book is the result. It is quite simply a *tour de force*, a clear and complete synthesis of the combined disciplines of geomorphology, geotechnics and geology as they relate to glacial and periglacial terrains, rolled up into one rather handy bible. Mission accomplished!

The scope of the book follows a systematic description of types of sediments, structures, landforms and geomorphology of such terrains. This forms one third of the book, and amounts to an atlas and framework or 'architecture' of unconsolidated soils: a very significant undertaking. It has excellent photography and abundant cross referencing, to allow the practitioner to follow up a line of observation and reasoning.

This is followed by a detailed description of ground models, material properties and potential geohazards. In turn this provides a basis of specification for engineering investigation and assessment, design and construction considerations. This is accompanied by a variety of illustrative case studies taken from various parts of the world.

The central tenet of the work is that, through a conceptual ground-model approach, practitioners will be able to predict the likely materials that are liable to be encountered. Although, be warned, one can always find ways of seeing what one is expecting to see!

The language used is particularly noteworthy, as each of the disciplines has erstwhile evolved different

terminologies; here, there has been an attempt to reconcile some of those differences. The result is both detailed and succinct, an example of a writing technique for other specialists to follow.

Examples are mainly taken from previously published sources, dominantly British and European; but there are some from North America and elsewhere, covering the Northern Hemisphere down to 40 degrees North; but the antipodes are not ignored.

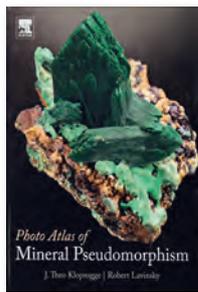
In my view any geologist, engineering geologist or geotechnical specialist who is engaged in practical fieldwork, or the commissioning and interpretation of site investigation reports, ought to be making arrangements to place a copy of this book at their elbow.

Reviewed by: **Arthur Tingley**

ENGINEERING GEOLOGY AND GEOMORPHOLOGY OF GLACIATED AND PERIGLACIAL TERRAINS

by GRIFFITHS J S AND MARTIN C J (Eds) 2017 Geological Society Engineering Geology Special Publication No. 28.
List Price: £120.00. Fellows Price: £60.00.
W: www.geolsoc.org.uk/SPE28

Photo Atlas of Mineral Pseudomorphism



Traditionally, mineralogy books - like those of Sowerby, Rashleigh and Haüy - utilised pen and ink or watercolour images to illustrate minerals. Kirkaldy, in his famous *Introduction*

book that for several generations of geologists was possibly their first introduction to minerals, used hand-specimen photographs - generally a little blurred!

However, the trend in 'serious' mineral text books has been to shy away from photographs as though they were a little vulgar. So, it is with pleasure I read this recent *Photo Atlas of Mineral Pseudomorphism*. Yes, there are excellent photographs of beautiful minerals, geological eye-candy; but the text is a scholarly discussion of pseudomorphs in the mineral kingdom.

Mineral pseudomorphs have been subject to several historical studies, but only a few scattered publications from the mid-20th Century onwards. The combination of a

university academic and an international mineral dealer has been successful and produced a book that both entertains and educates.

The volume is not perfect. The introduction section is the educational thesis, and a little confusing in its organization - although well written and edited. However I think the following sections that are the 'Atlas' could have benefited from text discussing the nature of pseudomorphs specific to each of those discussed. A nice feature is that mineral photographs of the mineral doing the pseudomorphing and the mineral replaced are shown alongside the pseudomorph itself. Several important pseudomorphs are missing, for example native gold after calaverite from Cripple Creek, Boulder and Kalgoorlie.

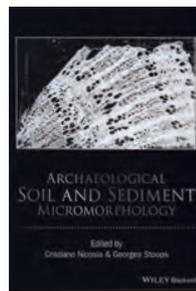
But these small omissions aside this is an excellent first edition and I am sure will be reproduced as it should prove a popular book and perhaps even stimulate new research on this interesting mineral phenomenon.

Reviewed by: **Rob Bowell**

PHOTO ATLAS OF MINERAL PSEUDOMORPHISM

by KLOPPROGGE JT AND LAVINSKY R, 2018 Elsevier Press
290pp hbk Hardcover ISBN: 9780128036747
List price: £75.00. W: bit.ly/2HSrFgR

Archaeological Soil and Sediment Micromorphology



As witnessed by the work of Henry Sorby, a Sheffield ironmaster of independent means and a past-President of the Geological Society, the petrographic microscope was first

used in geology in the 19th Century, revolutionising petrography. By the 1930s the instrument was being applied by soil scientists to large, resin-impregnated thin-sections of samples from soil horizons. Again, by the late 1950s and 1960s archaeologists were beginning to apply the petrographic microscope to archaeological deposits, but it was not until the 1970s that such work became at all widespread and systematic.



The new discipline was called 'micromorphology'. It embraced the identification and evaluation of archaeological materials, the elucidation ancient technologies, and the understanding of archeological contexts and human impacts. The petrographic microscope remains central to these endeavours, but is now supplemented and expanded by a great variety of microscopic and instrumental techniques.

Central to micromorphology are natural materials, artefacts, and 'ecofacts'. The most important natural materials are mineral grains, fragments of rock, coal, soils, soil spherulites, and biospheroids. Among the artefacts found in thin-section are fragments of worked stone, slags and metal-working debris, pottery, brick, earth construction materials, plasters and mortars. A great diversity of ecofacts are encountered: bones, teeth, fish scales, molluscan shells, microfossils, plant remains, seeds, dung, parasite ova, charcoal, and ash. Most of these materials can be modified by fire, which may have been either natural or human in origin.

Work with these materials allows many central questions to be tackled, for example, the use of space (e.g. hearths, seasonal reflooring/replastering), location of routeways, the whereabouts and character of animal gathering enclosures, the effects of different agricultural methods (agricultural soils, dark earths), and activities in rock-shelters and caves.

Composed of 44 detailed papers by 52 mainly European authors, Nicosia and Stoops' *Archaeological Soil and Sediment Micromorphology* is an impressive and appealing handbook and sourcebook on the materials, problems, techniques, achievement, and prospects of the subject. It is a pleasure to handle, with its large, double-column format, copious photomicrographs of the highest quality, and comprehensive reference lists. The subject clearly goes from strength to strength but, as the editors are at pains to point out, is held back by the poor or non-existent background in geology possessed by many micromorphologists - a clear weakness, for example, in British archaeological education.

Reviewed by: **John R L Allen**

ARCHAEOLOGICAL SOIL AND SEDIMENT MICROMORPHOLOGY

by C NICOSIA and G STOOPS (Eds.) 2017. Published by: Wiley Blackwell, i-xix, 476 pp. ISBN: 9781118941058
List price: £100. E-book: £90.99 W: bit.ly/2u7hhQb

Geology and Medicine: Historical Connections



In 2014 I reviewed SP375 *A History of Geology and Medicine* which was the first ever volume dedicated to this subject. That volume was the result of a conference convened by The History

of Geology Group, held at Burlington House in 2011. The first meeting had been exploratory in its approach and it became obvious that the themes were worthy of further investigation. This led to a second meeting (November 2014) which forms the basis of this second volume under the same editorial team as before. (Interestingly I have spoken to two people recently who thought that this was just a 'second edition' of SP375, but this is definitely not the case!)

This volume explores the development and overlap of medical and geological sciences by an international group of authors that includes geologists, medical professionals and historians. There are some 19 papers with contributions from Italy, Spain, France, Switzerland, Greece, South America and a number from the UK.

Some of the historic personalities recorded are well known to many such as Nicolas Steno and James Parkinson, but there are other lesser-known contributors to our geological knowledge that include some of Italian ancestry who are acknowledged here for their contributions to geology. Many other names not so well known to geologists, such as Hodges, Sperling, Siques and Lemone, are also recorded for their contributions to our knowledge.

Two papers under the general theme of 'Geotherapeutics' explore the historical use minerals and 'earths' in curative medicine in the 17th and 18th Centuries. The paper dedicated to 'Serpent Stones' gives a fascinating historical view of their medical applications delving deep into antiquity, and if you read only one paper from this publication, it should be this one.

This is a well-produced volume of varied topics that examines the relationships between geology and medicine. It makes fascinating reading and once dipped into is compelling and even difficult to put down. The volume is well illustrated with many

monochrome maps, figures and drawings of historic origin, but the lively text is also enhanced with many illustrations in colour.

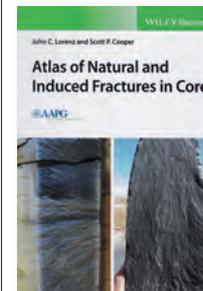
It will be of specific interest to Earth scientists and those with an interest in the medical profession, be that as a medical professional or just as an interested individual. This volume will also appeal to the general reader with an interest in science. It will not disappoint and is highly recommended.

Reviewed by: **Richard Porter**

GEOLOGY AND MEDICINE: HISTORICAL CONNECTIONS

by DUFFIN C J; GARDNER-THORPE C; AND MOODY R T J, (Eds.) 2017. Geological Society of London Special Publication 452. ISBN: 978-1-78620-283-3 (hbk) 304pp
List price: £100. GSL Fellows: £50. Other Societies: £60. W: www.geolsoc.org.uk/SP452

Atlas of Natural and Induced Fractures in Core



Practical publications in the geosciences have always been welcome particularly when they are an 'Atlas'-type approach, geology being a very visual science. So, this recent

AAPG publication, which focuses on cataloguing the nature of fractures in drill core will have value in many sectors of applied geology.

The volume provides visual representation with brief explanation of the different physical features observed in core, be it natural or artefact of mining. The natural and induced fracture data contained in cores provide a wealth of information, once they are recognised and properly interpreted. Written by two experts in the field, this resource provides a much-needed tool to help with the accurate interpretation of these cores.

The Atlas demonstrates how to recognise non-fracture artefacts in a core since many of them provide other types of practical information. The visual catalogue of fractures and artefacts is an invaluable guide, particularly for less experienced core logger. Too many times artefacts are not recognised, and

labelled with lavish description and interpretation - leading to confusion and erroneous logging.

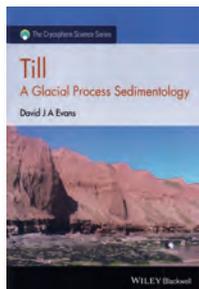
Presented in full colour and free of obvious errors, this is a high quality publication that should be an essential text in any and all core facilities and essential reading for anyone who spends time looking at core.

Reviewed by: **Rob Bowell**

ATLAS OF NATURAL AND INDUCED FRACTURES IN CORE

by JOHN C LORENZ AND SCOTT P COOPER 2017.
 ISBN (print) 9781119160007. Online DOI: DOI:
 10.1002/9781119160014. 328pp (hbk)
 List Price: £120.00. W: bit.ly/2G9e9rJ

Till: A Glacial Process Sedimentology



The author, David Evans, has brought together a comprehensive summary of the available data for till. The target audience for this book consists of researchers and specialists

in glacial science and sedimentology. It covers a vast literature, including experimental and laboratory based reviews and assessments, in addition to comprehensive field studies. It is immediately evident that it comprises many hours of rewarding work from the author and colleagues. The book is built from international research in an attempt (among other things) to answer the simple but deceptively difficult-to-answer question: what exactly should be called 'till'?

Each chapter begins with a helpful quote, from contemporary glacial scientists and even a former British Prime Minister. An early chapter outlining the history of till research is a welcome addition to the literature, providing a summary of research to date covering the adoption of the word 'till' as a geological term in 1863 through to the prevalence (and subsequent decline) of the alternative term, 'boulder clay'.

Although relatively short, an early discussion on the appropriate usage of 'till' helps shape and dictate the direction of subsequent chapters. An overview of the literature on glacial

processes and suggested classifications is provided, including from the Glacial Working Group. The author builds upon previous recommendations of fellow glacial sedimentologists to develop a threefold classification system of till as generic terms, including: 'glacitectorite', 'subglacial traction till', and 'melt-out till'. In establishing a simple and systematic nomenclature, future objective assessments of glacial deposits can be undertaken.

One personal quibble with the book relates to the editing - specifically, to the placement of references within sentences. In certain chapters, within the main text, the location of so many such references adversely affected my flow as a reader. For example, references distended one sentence to cover more than four pages! This is, perhaps, a minor comment, and perhaps would not be so off-putting to readers more familiar with the subject matter. It does not detract from the overall scientific quality of the book.

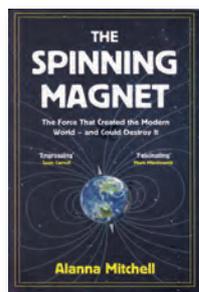
If you are looking for a text that brings together a detailed review of the current state of 'till science', then this book is highly recommended - as a useful source of reference. It is hardly a light read, however.

Reviewed by: **Giles Bushell**

TILL: A GLACIAL PROCESS SEDIMENTOLOGY

by DAVID J A EVANS, 2017. Published by: Wiley-Blackwell
 cryosphere science series (HBK) ISBN: 978-1-118-65259-6
 List Price: £95.00. W: bit.ly/2GPcTYT

The Spinning Magnet



This intriguing and fascinating book delves into all corners of research behind electromagnetism. It is great for anyone who, as well as learning about geological concepts, also loves to learn about how they came to be and the amazing people who came up with them.

Mitchel goes into riveting detail. She discusses long-forgotten scientists who are rarely mentioned today. A scientific timeline is created leading up to what we know now, as well as offering a glimpse into a future where poles have reversed.

The book is excellent at explaining some basic ideas such as the geodynamo;

however if you want a more in-depth telling of the science you might be a little disappointed. However, had Mitchell gone into greater detail this book would be a couple of extra hundred pages long! Her in-depth reporting is evident; going on an adventure with Jacques Kornprobst through central France, exploring where Bernard Brunhes made the discovery that the poles had once switched places by looking at reheated terracotta.

She touches on why Brunhes remains so long forgotten. She ends with a discussion with Daniel Baker of the University of Colorado, asking what would happen if a solar storm struck astronauts on the moon (dig a hole and lie down on it, the junior on top, hoping that at least one might make it back alive!). She also asks what a future would be like where we were heavily affected by a magnetic pole reversal.

Mitchel's reporting skills are evident and she doesn't hold back - travelling anywhere she can get some answers. I urge you to buy this book now, as it holds the most up-to-date information. Some might say this book even offers something of a warning that we face a dangerous and treacherous future bathed in solar radiation.

Reviewed by: **Eleanor Dunn**

THE SPINNING MAGNET: THE FORCE THAT CREATED THE MODERN WORLD - AND COULD DESTROY IT by ALANNA MITCHELL, 2018. Published by: Oneworld 277pp (pbk) ISBN: 978-1-78607-424-9
 List Price: £16.99. W: bit.ly/2E4hkvK

BOOKS FOR REVIEW

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

- ◆ **NEW! Earth Materials - introduction to mineralogy & petrology** by Klein C., and Philpotts, A. 2018 (2nd Ed) 594pp sbk
- ◆ **NEW! The Permian Timescale** by Lucas S G & Shen S Z (eds) Geol Soc Spec Pub #450 2018 458pp hbk
- ◆ **NEW! Introduction to Environmental Modelling** by Gray WG & Gray GA 2018 425pp sbk
- ◆ **NEW! The First Global Integrated Marine Assessment - World Ocean Assessment 1 (united Nations)** by Ijnick L and Simcock A (coordinators) 2018 973pp hbk
- ◆ **NEW! Petroleum Geology of NW Europe: 50 years of learning (Proc. 8th PGC)** by M Bowman and B Levell (eds) 2018 GSPH 646pp hbk in slipcase

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

It may be the hardest word but it isn't enough

Sir, Re. Jonathan Silk's response to the ongoing online CPD system debacle, unfortunately a 'sorry for any inconvenience' response really won't do to explain two years of delay, even assuming the latest deadline for reinstatement is met.

I note that we are now somewhat richly being chased for CPD declarations. Can I politely suggest that any further rolling out of the new CPD system and any requests for CDP declarations be suspended until such time as the Society manages to put in place a modern online recording system? Alternatively can we all be allowed two years to get things right? Responsibilities for CPD cannot only be one-way.

CHRIS MILNE – CGEOL FGS EURGEOL CENG FICE EURING, DIRECTOR UK REGISTERED GROUND ENGINEERING ADVISER

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STICKS AND STONES

IF I HAD JUST ONE (GEO) WISH....



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DISTANT THUNDER

Overwhelming generosity

Geologist and science writer Nina Morgan recalls a generous offer that went viral

In 1856 workers cutting brick clay from the glacial deposits overlying the Middle Jurassic Cornbrash limestones on a farm in Tingewick, Buckinghamshire, owned by a Mr Greaves, hit on a haul of ‘concretionary objects’ at a depth of about six feet – and kicked off a ‘Fossil Rush’. When the fossil material was first discovered, specimens were sent to the surgeon and natural history enthusiast, William Stowe [c.1791 – 1860]. Stowe, in turn, reported his impressions of the find to a local Oxford paper, which noted that:

“... We are authorised to say that Mr Stowe would send specimens to any institution or individual who takes an interest in such matters on their paying the carriage by rail.”

News goes viralh

The Oxford report, including Stowe’s generous offer,

was picked up by *The Times* on 6 January 1857 and such was the interest that Stowe quickly found himself embroiled in a 19th Century version of a Twitterstorm. In an attempt to calm matters, Stowe himself wrote to *The Times* on 9 January saying:

“Sir – The transference of a paragraph about fossils from a local paper into your word-wide publication has overwhelmed me with applications for them, having had about 70 in 24 hours, which it is impossible to attend to at once. I propose sending them off as widely as I can, and, in the meantime allow me to say that there are specimens to be seen in the Geological Museum in Jermyn-street, whither I sent them a week ago. Yours truly, W. Stowe, Buckingham, Jan 8.”

The following day *The Times* published a letter written under the pseudonym Conchos, highlighting another source for obtaining similar fossils:

“Sir – Perhaps the fossil collectors who have overwhelmed your Buckingham correspondent, W. Stowe, whose letter appears in your columns of to-day, may feel interested in the fact that, in excavating for the sewers on the

new London road now forming to shorten the distance from central Essex and the Lea-bridge-road to the metropolis, the workmen have within the last few days, at a depth of about 20 feet, dug into a bed of sea sand, containing numerous shells, both univalves and bivalves of supposed extinct species, commingled with what appears to be drift wood in large pieces, now quite black, thus evidencing that at some period of our world’s history the seashore reached to Upper Clapton. For those curious in the matter I may add that the site of this discovery is not far from where Clapton-gate formerly stood – for that barbarian barrier, with its ante-diluvian gatehouse is, if not fossilised, at least disintegrated, and now, like the inhabitants of the said uni and bi valves, among the “things that were, but are not” – and on the new line of the road thus thrown open opposite its site, proceeding west and south-west towards London.

The distance is about two and a-half or three miles from the Royal Exchange. I am, Sir, your obedient servant. CONCHOS, London Jan. 9.”

But in spite of Conchos’s suggestion, requests for specimens continued to pour into Mr Stowe’s letterbox. An article about the Tingewick fossil find in *The Illustrated London News* of 24 January 1857 reported that:

“We understand that Mr Stowe has been almost overwhelmed with some 170 letters applying for specimens; but

he is unable to go on satisfying the claimants, as the men have ceased to dig clay for the season.”

Whetting appetites

The Illustrated London News piece probably did nothing to stem the tide of specimen requests. Their writer noted that many of the fossils:

“... are like biscuits, others like Lilliputian mince-pies and oysters. Others are like roots of ginger and compressed mushrooms of all sizes – the smaller or button-shaped ones simulating mince-pies, and the larger ones so like biscuits that at an evening party they were put on the supper-table and taken for real biscuits.”

With a description like that, the temptation for many a society hostess to claim samples of the fossils to grace their buffet table must have been great – the risk of broken teeth notwithstanding!

➤ Acknowledgement

End notes: Sources for this vignette include: *Geological Collecting and a Geological Career: Daniel Jones (1836 – 1918) with notes on other Midlands Collections from the Jones Archive by Hugh Torrens, Geological Curator, Vol. 4, pp. 493 – 501*; Letters to the Times from W. Stowe, and Conchos published on 8 and 9 January 1857, respectively; and *Fossils Found in Buckinghamshire*, published in *The Illustrated London News*, 24 January 1857, pp. 67 – 68.

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





Northern exposures

Interested in a Postgrad Diploma in 'The Geology of Yorkshire and northern England' at York University? Amanda Pauw writes

This exciting two year part-time programme is run entirely online by distance learning, but includes a residential week in York at the beginning of each year, for field and class-based study.

Dr Annette McGrath, Associate Lecturer leading the programme, told Geoscientist: "We are so lucky in the UK to have a great diversity of rocks and spectacular landscapes on our doorstep, and northern England in particular has an abundance of world-famous and classic geological sites. This exciting and unique diploma utilises the geological wealth of northern England and explores the main principles of geology



through a regional examination of the area. Students on the programme also assess the the area's importance with respect to current controversies in Earth sciences, from fracking to climate change, while also reflecting upon the region's vital role in the history of geology. We go on to examine human interactions with the region's rocks and landscapes, from Palaeolithic to present day."

The PG Diploma programme was launched in September 2015 and has been a great success. We are currently considering applications for September 2018 intake, so to know more, or apply for a place, please visit:

W: www.york.ac.uk/geology; contact E: lifelonglearning@york.ac.uk, or call T: **01904 328482**.



The Society notes with sadness the passing of:

- Aitkenhead, Neil**
Booth, Tony *
- Bowen, Geoffrey Gordon *
- Brierley, Malcolm Lawrence**
Chillingworth, Patrick Cecil Hamilton *
- Drysdall, Alan Roy *
- Droogmans, Serge L *
- Elueze, Anthony Azbuike *
- Fischer, Alfred*
- Gladwell, David Robert *
- Helm, Derick *
- Helm, Douglas George *
- Howell, Frank Travis *
- Illing, Leslie Vincent**
Kelly, Desmond Michael *
- Kenna, Raymond ***
Laws, Michael James *
- Leighton, James *
- Marshall, Mr John A *
- Morgans, Michael William *§**
O'Reilly, Kevin J O *
- Shepherd, Colin*
- Shingleton, Sam *
- Whitlow, Roy *
- Young, Paul Ivor *

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

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

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

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, publications list and a photograph to Ted Nield at the Society.

CAROUSEL

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

◆ John Cope



(National Museum Wales, Cardiff) has been awarded the Geologists' Association Halstead Medal for 2018. The medal is awarded 'for work of outstanding merit deemed to further the objectives of the Association and to promote geology'.

◆ Hugh Rollinson



Has moved from the University of Derby to take up the post of Course Director at the Faraday Institute of Science and Religion, St Edmund's College Cambridge. Hugh is a Chartered Geologist and a member of the Higher Education Academy.

Crossword

The winner of the March Prize Crossword draw, in a crowded field, was **Eric Freeman of Wimbledon**. The monotreme thanks all those who wrote so nicely with their final submissions. He was touched, but not otherwise influenced.



OBITUARY Michael Welland 1946-2017

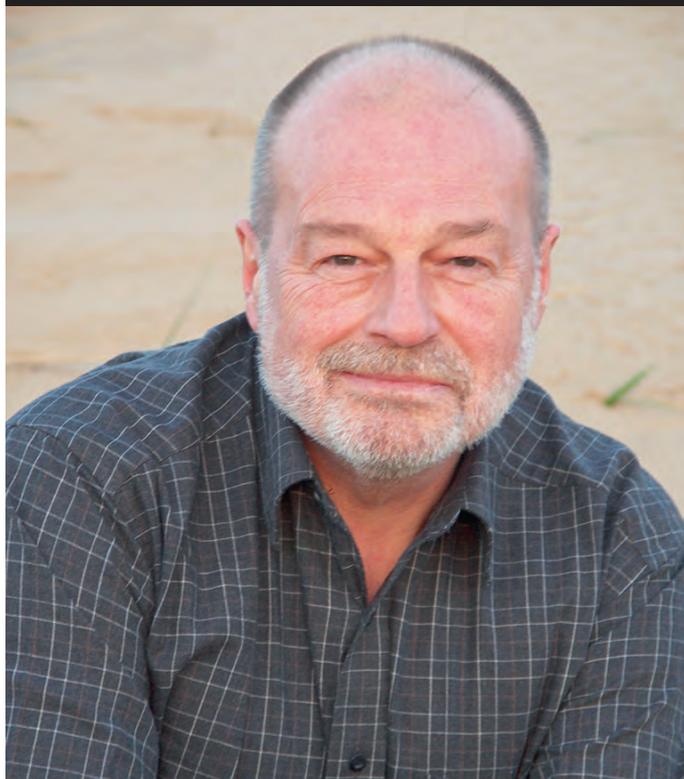
Michael Welland's death from cancer in October 2017 deprived us of a versatile scientist, talented communicator, and good friend of The Geological Society.

Only child of Dennis Welland, Professor of American Literature (and later Pro Vice Chancellor) at Manchester University and Joan, a teacher, Michael was educated at Manchester Grammar School and Selwyn College, Cambridge, where he won a place in 1965. We became friends during a field trip to Arran, puffing along behind W B Harland, who shot up hillsides like a mountain goat. Harland also organized expeditions to Spitsbergen; joining one in 1967 cemented Michael's commitment to geology.

Harvard

After graduation, he took a Masters at Harvard University, and met his wife Carol, a classicist from Mount Holyoke College. They married in 1969. The couple returned to Cambridge UK when Michael embarked on a PhD (on the geology of the eastern Othris Mountains, Greece) under Alan B Smith. Carol, working at the University Library, typed Michael's thesis on one of the first electric typewriters, making it an unusually splendid production in the era of carbon copies.

Michael joined BGS's Overseas Division, working

Distinguished oil-industry geologist who later wrote two fine books for the general reader

in Oman (kindling his love of deserts) and publishing on the Oman ophiolite. In 1973 he took an adjunct professorship at the University of Pennsylvania before moving to Wayne State University, Detroit - researching in Nevada, and making field trips to Wyoming and Montana. He quit academe in 1977, working briefly for geothermal company Hydrossearch before joining Arco (1978 - 1992).

Dallas

The Wellands enjoyed Dallas, Michael working mostly in the south-western

states; but Indonesian projects satisfied his wanderlust. He eventually became Arco's Vice President (Exploration), but when he left, it was for three years in Indonesia, with Lasmo. Work in Algeria and the North Sea followed.

Based now in north Dorset and with the oil business in trouble, Michael quit to set up the consulting company Orogen (1997-2015). Alongside that, he took contracts in Kazakhstan, emerging chaotically from Soviet rule. Not all of them paid! Another job in Cairo (with Regal Petroleum) came to an abrupt end, in a boardroom coup. Returning

to Indonesia (Atlantic Petroleum, 2011-12) was a relief.

Meanwhile, Michael nursed the idea of a book about sand. He built up an extraordinary collection of samples as he researched how vital sand was to so many industrial processes, and travelled to remote regions of the Sahara to hear the singing dunes. *Sand* (2009, OUP) received good reviews, containing all the arenaceous facts you could wish for, couched in an unforced, entertaining style. A documentary film ('Sand Wars', dir. Denis Delestrac, 2013) followed.

Deserts

It was natural to go on to write about deserts, driven by his admiration for Ralph Alger Bagnold, who contributed so much to understanding sand's physics. He described desert peoples, deserts' place in history, and the creatures that live in them. The *Desert: lands of lost borders* (Reaktion Books) appeared in 2015.

Michael's humour erupted into gruff laughter, particularly at the world's absurdities. Occasionally irascible, he was never uncharitable. For him, geology always came first. His last, precious field trip was to Iceland, shortly after his diagnosis.

He is survived by Carol, children Iain and Katherine, and granddaughter Fotini.

► By Richard Fortey

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

OBITUARY William Gilbert Chaloner 1928-2016

Bill Chaloner FRS died 13 October 2016. He was born in London on 22 November 1928, the youngest of four. He attended Kingston Grammar School and evening classes at Chelsea Polytechnic where he became interested in Geology.

Bill went to Reading University (1947) to study botany, chemistry and geology, graduating with first class honours (1950) and remaining to study fossil plants with Professor Tom Harris FRS. For his doctorate Chaloner studied *in situ* spores from Carboniferous lycopods and was able to determine the main coal-forming vegetation of the time.

Fellowship

Bill obtained a Commonwealth Fellowship to spend two years at Ann Arbor in the USA. On the voyage home he met Judith (*née* Carroll, known as Judy), whom he married in 1955 and who remained a strong influence and support. They had three children. Judy died in 2017.

Bill was conscripted into the Army and spent much time in Germany. Returning to Britain in 1956, he was appointed Assistant Lecturer in the Department of Botany at University College London, where he began to use fossil spores to interpret the ecology of ancient landscapes. He also helped start the UCL MSc in Micropalaeontology.

Chaloner was promoted Lecturer (1958), and then Reader in Palaeobotany (1963). In 1961 he spent a year as

Lyell medallist, Vice-President and world-renowned pioneer of palaeobotany and palynology



visiting professor in the Department of Geosciences at Pennsylvania State University and in 1965-66 was seconded to teach at the University of Nigeria at Nsukka.

Forest fires

Bill gained the chair of Botany at Birkbeck College in 1972, remaining until 1979. He pioneered scanning electron microscopy for the study of fossil plants. He also became interested in ancient forest fires and the use of fossil charcoal to provide information on the levels of oxygen in ancient atmospheres. In 1979 he

“ HE PIONEERED THE USE OF GROWTH-RINGS IN FOSSIL WOODS TO RECONSTRUCT CLIMATES ”

took the Chair of Botany at Bedford College, University of London. Here, with students and postdoctoral fellows, he pioneered the use of growth-rings in fossil woods to reconstruct ancient climates.

When Bedford College merged (with Royal Holloway) in 1985, Chaloner became first chair of Biology, and

then Head of the School of Life Sciences. He developed a technique using stomata of fossil plants to reconstruct levels of carbon dioxide in ancient atmospheres. He became interested in the link between changes in carbon dioxide and climate, believing that understanding past changes would help us to understand the future.

Honours

Bill received numerous honours, including election to the Royal Society (1976). He was a trustee of the Royal Botanic Gardens, Kew; President of the International Organization of Palaeobotany and President of the Linnean Society in its bicentennial year. The House of Lords Select Committee on Science and Technology sought his services as a scientific adviser to their subcommittee on biological systematics. He served on the Natural Environment Research Council, received both the Linnean and the Lyell medals, and served as Vice-President of the Geological Society of London.

After retirement (1994), Chaloner was made Emeritus Professor in the Department of Geology (now Earth Sciences), Royal Holloway University of London, and continued to publish until his death. With a warm sense of humour and a self-effacing manner he was ever approachable, especially for young researchers. His thoughtful, polite, and generous approach won him many friends in a long career characterised by excellent research, inspirational teaching and astute leadership.

► By Andrew C Scott

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.

BRYAN LOVELL MEETING 2019

Role of geological science in the decarbonisation of power production, heat, transport and industry

21-23 January 2019

The Geological Society, Burlington House



Convenors

Mike Stephenson (British Geological Survey)
Dave Schofield (British Geological Survey)
Sebastian Gieger (Heriot-Watt University)
Philip Ringrose (Statoil/NTNU)

Further information

For further information about the conference please contact:
Rhianna McLean, Conference Office,
The Geological Society, Burlington House,
Piccadilly, London W1J 0BG
T: 0207 434 0981
E: rhianna.mclean@geolsoc.org.uk
Web: www.geolsoc.org.uk/lovell19

 Follow this event on Twitter: #lovell19

In the UK and elsewhere, decarbonisation of power production, industry, transport and heating to meet climate change targets is a major challenge and one that intrinsically involves the subsurface and geoscience.

Decarbonising centralised power generation will involve expansion of renewables as well as the civil nuclear program. Renewables will require a huge increase in grid-scale energy storage to cover intermittency, which will mean greater reliance on more efficient batteries, pumped storage and compressed air energy storage. Geothermal power, heating and cooling will require assessment of resources and impacts of development, while the safety critical nuclear sector will require a detailed understanding of risks associated with natural hazards such as seismicity as well as meeting the challenge of effective geological disposal of radioactive waste. All require geological studies, for example investigating the geological origin and prospectivity of transition metals and rare earth elements for batteries; or for siting of power station, dams and tunnels in pumped water storage; geological studies for compressed air energy storage (CAES); and detailed characterisation of the subsurface for radwaste disposal.

A transition may also involve more natural gas and hydrogen, with implications for the possible supply of 'home grown' shale gas, and the underground storage and transport of hydrogen. Carbon capture and storage (CCS) and 'bio-energy and CCS' (BECCS), require fundamental research into geological sequestration and its environmental implications.

Decarbonisation is central to Government and international policy and this three day conference will host national experts from industry, academia, and government to look at the geological and reservoir engineering aspects of the problem. The main objective will be to identify the high level barriers to progress and the main science questions – and begin a roadmap to solve the problems.

Call for abstracts

Abstracts are invited from early career researchers who wish to exhibit posters at the conference. Posters that address any aspect of decarbonisation geoscience are encouraged, for example geothermal, gas storage, compressed air energy storage, critical metals, radioactive waste disposal, CCS, and bio-energy and CCS (BECCS). Abstracts should be approximately 500 words and include a title and acknowledgement of authors and their affiliations where possible. Please send your abstract as a Word document to rhianna.mclean@geolsoc.org.uk by 1 October 2018.

WILLIAM SMITH MEETING 2018

Mineral resources at the frontier

2-3 July 2018

The Geological Society, Burlington House



As ore grades decline and mineral deposit discovery rates slow down, future global demand for raw materials is likely to lead the exploration and mining industry into more extreme and technically-challenging environments. These frontier areas include the polar regions and ocean floors, as well as ultra-deep ore bodies in mature mineral provinces. Recent publications have even highlighted the mineral potential of extra-terrestrial bodies. In many respects these can just be considered new frontiers for an industry that has thrived on risk and continued expansion into new environments. Whilst the resource potential of these environments has long been discussed, new datasets, refined ore deposit models and advances in prospectivity modelling have improved our knowledge considerably. A broad array of technological developments have also brought mining in these environments closer to commercialization.

The 2018 William Smith Meeting will consider mineral resources in ultra-deep terrestrial environments, the deep-ocean (>200 m), the polar regions and extra-terrestrial settings. The Meeting provides a platform to discuss the key global drivers for mineral extraction in frontier environments, including security of supply concerns; to assess current understanding of the resource potential of these largely unexplored parts of the planet and beyond; to identify the geoscience knowledge gaps and science opportunities; hear about research and technology developments in exploration and extraction of these resources; and discuss the challenges for environmental protection and issues surrounding resource ownership, governance and the development of regulatory regimes.

Call for Abstracts

We invite oral and poster abstract submissions for the meeting, and these should be sent in a Word document to rhianna.mclean@geolsoc.org.uk by 11 May 2018. Abstracts should be approximately 250 words and include a title and acknowledgement of authors and their affiliations.

Convenors:

Paul Lusty (British Geological Survey)
Bramley Murton (National Oceanography Centre)
Teal Riley (British Antarctic Survey)

Further information

For further information about the conference please contact:
Rhianna McLean, Conference Office, The Geological Society, Burlington House, Piccadilly, London W1J 0BG

T: 0207 434 9944 E: Rhianna.mclean@geolsoc.org.uk

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