

# YORKSHIRE GEOLOGICAL SOCIETY

President: Nick Riley MBE



*Islay: Gently folded turbidites of the Smaull Greywacke Formation (Colonsay Group) at Dun Bheolain on the western side of the Rhinns peninsula. (Photo: Dave Webster)*

## JANUARY TO MARCH 2021

VERY IMPORTANT – COVID-19 EMERGENCY: PLEASE KEEP CHECKING THE YGS WEBSITE FOR THE LATEST PROGRAMME AND OTHER INFORMATION: <http://www.yorksgeolsoc.org.uk>



# CONTENTS

YGS 2021 Programme	3
YGS Zoom Lectures online January – March 2021	5
Hull Geological Society Zoom Lecture: <i>New Light on the Neanderthals</i>	8
President’s Word	10
Officers and other Council Members for 2021	12
New Officers of the Society: <i>Professor Paul Wignall and Haley Scholefield</i>	13
Membership Subscriptions 2021	14
YGS Opportunities Fund	14
YGS Field Guide to the Geology of Graves Park, Sheffield	15
YGS Publications now available as WIKI pages	16
Biography of Dorothy Helen Rayner FGS (1912-2003)	16
A Geological Short Story: “The Green Aire June 1899”	18
Corresponding Societies	22
Next YGS Circular (# 633) April 2021: Deadline: 10 <sup>th</sup> March 2021	27
Key Yorkshire Geological Society Contacts	27



Welcoming the incoming President and Secretary together with our new Principal Editor, the coming year sees the Society offering a vibrant and strong programme that combines virtual and face-to-face events that uphold the very high standards we expect of the Society for its members.

The challenge to the events programme caused by the COVID-19 pandemic has provided Council with the opportunity to expand the diversity and range of events we offer, notably by creating a suite of virtual material and events. This enables us to offer a programme that is not only bespoke to YGS but also offering links to other regional societies and their virtual programmes. The disappointment at not being able to meet face-to-face for internal meetings or field excursions is to some degree offset by creating this virtual programme, enabling our members to still feel part of the society and its ongoing events as well as providing opportunities to contribute in a minimal risk setting with respect to their exposure to catching the virus.

It is our intention to resume face-to-face events as soon as it is safe to do so. We also plan to continue with our virtual programme of webinars, virtual and mini field trips for the foreseeable future, enhancing access of events to all our members. In addition to the virtual field trips we are now offering mini field trips to classical localities across our region. These will be for small groups up to a maximum of 6 in accordance with government guidelines. The first tranche of these will be offered during the first quarter of 2021; they are listed on our website and in the summary table at the end of this article. More details will follow as planning proceeds. We are also receiving invitations from some other societies to share their online lectures and webinars with our members: information on these is circulated via our members' email list.

Guidance for mini field trip participants is contained on the website including the risk management measures that ensure we comply with government guidelines. Many of these are already standard practice for YGS trips. Additional risk controls will be stated on the risk assessment for each trip. Each trip will be led by a recognised expert and will be of 2-3 hours duration. The 2021 meeting programme follows the content advertised at our virtual AGM in early December. While the constraints on open public meetings prevail, it comprises a series of webinars that we hope to offer monthly if we can get suitable high quality speakers. Once these constraints have been removed and it is safe to host public events for larger groups, we plan to continue offering webinars quarterly. In this way those members unable to make main meetings or field trips can continue to attend virtual meetings and participate in society activities.

During the first quarter of 2021 we have webinars on the 21st January when Dave Webster will give a talk Geology of Islay and its Whisky. On 25th February Nick Shaw will give a talk on Geology and Geothermal Energy and a month later on 25th March we have Professor Chris Greenwell from Durham talking about Central Wales Lead Mining.

We are also putting together a monthly webinar programme for the second quarter of the



year that we hope will include a diverse suite of talks by Professors Chris Jackson and Patrick Boylan together with Douglas Robinson and Mike Bowman. Our earliest planned face-to-face will be the day-long event at the University of Leeds. This will be on Deep geological disposal of radioactive waste: The role of geoscience. Postponed due to the Coronavirus pandemic from the announced original date in March 2020. It is a Joint Meeting of the Yorkshire Geological Society and RWM (Radioactive Waste Management: the public organisation established by Government responsible for planning and geological disposal of radioactive waste in the UK). The meeting will comprise invited talks from an international group of speakers and experts on the subject. It will review the critical role played by the geosphere in deep geological disposal of radioactive waste. It promises to be a fascinating meeting that will update us on the UK's current programme for the disposal of its medium to high level radioactive waste as well as overviewing some of the major overseas programmes. It is one of the UK's major environmental programmes and geology will play a key part in its success. We hope to be able to publish the papers presented at the meeting as a special thematic YGS *Proceedings*.

If constraints on open public meetings remain in place, this joint YGS/RWM meeting will be rearranged as a virtual event with shorter duration sessions spread over consecutive days commencing 12th April, and would still involve talks by the same scheduled speakers, together with discussion groups. Details of this will follow once we have greater clarity on the risk to face-to-face events in 2021.

The remaining programme of events in 2021 will include Yorkshire Geology Day at the NCMME Caphouse (National Coal Mining Museum for England) in early May (date to be confirmed). This year's theme will be Geology in the Popular Media, a very topical subject given the climate change and environmental challenges confronting us. It promises to be both entertaining and educational. The event will be organised by Paul Hildreth and John Simmons; John is an ex NCB geologist who recently retired after a successful career creating geology focussed films and communications for industry and the BBC.

The President's address which traditionally takes place alongside the AGM has been deferred to 26th June 2021; we anticipate that it will be held at Weetwood Hall, Leeds and planning is already ongoing for this event. For the rest of the year we plan to host a range of internal meetings, traditional and mini field trips as well as offering webinars and additional virtual field trips.

Going forward we must continue to build on what we have learned during the challenges of 2020, to develop a strong programme of virtual and face-to-face events. Council welcomes any ideas or suggestions you the members have for meetings, talks or field trips – it is your Society. We need your help and participation to create a strong and vibrant programme. Please send any suggestions for these to the Secretary at [secretary@yorksgeolsoc.org.uk](mailto:secretary@yorksgeolsoc.org.uk).

**Mike Bowman, Indoor Meetings Secretary**



## YGS ONLINE ZOOM LECTURES JANUARY – MARCH 2021

Important notice: Pre-booking is essential for each Zoom lecture.

Please email Rick Saville, Web Editor, in advance.

Rick will send you the Zoom address a few days before the lecture.



### GEOLOGY OF ISLAY AND WHISKY

Dave Webster. 4pm Thursday 21st January 2021

The geology of Islay is very varied with two billion-year-old gneisses, late Precambrian glacial deposits together with rocks and structures testifying to the opening and closing of the Iapetus ocean. The talk will visit some key localities, explore a fossil 'oil play' and connect the geology with the island's history, archaeology and, of course, its whisky.

David Webster has a degree in geology from Oxford University, an MSc from Stockholm University and worked for many years in the oil industry. Now actively retired, he has built a house on Islay, and is the co-author of "A Guide to the Geology of Islay".

*Islay: Gently folded turbidites of the Smaull Greywacke Formation (Colonsay Group) at Dun Bheolain on the western side of the Rhinns peninsula. (Photo: Dave Webster).*





## YGS ONLINE ZOOM LECTURES JANUARY – MARCH 2021

### A NEW (EXCITING) OPPORTUNITY FOR GEOTHERMAL ENERGY IN YORKSHIRE

Nick Shaw, University of Leeds. 4pm Thursday 25th February 2021



Yorkshire's rich resource history might allow a revival at our doorstep – it is time for a “down to earth” look at geothermal. Although it is nearly 60 million years since Yorkshire was visited by magmatic and volcanic activity as evidenced by the Cleveland dyke, the usual images and concepts associated with geothermal energy might seem out of place. According to the BGS, ‘geothermal energy’ refers to any heat derived from the ground, from depths of a few metres to multiple kilometres beneath the earth surface. In Yorkshire therefore there could be scope for heat production and if not production, heat storage in natural aquifers or abandoned and repurposed flooded coal mines or former petroleum assets.

The natural fabric of the land was documented by early surface geological mapping at the start of the science of geology in Yorkshire from 1815 onwards. It was augmented by knowledge gained through monastic and artisanal coal and metal mining and the hydrogeological experience gained during construction of the canals network and then railways and tunnels. With the development of steam powered pumps, the dewatering of the coal sequence allowed substantially deeper mine development and the temperature increase with depth established the reality of earth heat in the exposed and concealed coalfield areas. The onshore search for hydrocarbons that shifted towards the eastern side of Yorkshire following the oil price shocks in the 1970s through the 1980s confirmed significantly higher temperatures, regional seals and reservoirs.

A variety of technologies for geothermal energy development are available, also known as Geo-energy (Ground source heat pumps GSHP, Borehole Thermal Energy Storage BTES); these are well established and regulated. Mine-water heat recovery is now recognised as a potentially significant resource and is subject to the BGS-UKRI science project in cooperation with the Coal Authority and various UK universities. These legacy geoassets may also provide large scale heat storage using the existing flooded mine galleries and seams of underlying industrial, urban and residential areas.

Newly built aquifer thermal energy storage ATES and also deeper drilled well doublets developing medium temperature resources in sedimentary aquifers have been successfully developed across the North Sea. There is substantial synergy and learning available for the Northern Power House from the Randstad and Rhine-Ruhr conurbations across the North Sea. Pre-abandonment single wells or watered-out oil fields might also be repurposed as heat delivery or storage units in the years to come.

This talk will review the geology, economics and potential of the geothermal energy schemes to help Yorkshire move through the “Energy Transition”. I will try to demonstrate where and how various geothermal energy technologies might be deployed to match resource conditions





# YGS ONLINE ZOOM LECTURES JANUARY – MARCH 2021

## A NEW (EXCITING) OPPORTUNITY FOR GEOTHERMAL ENERGY IN YORKSHIRE

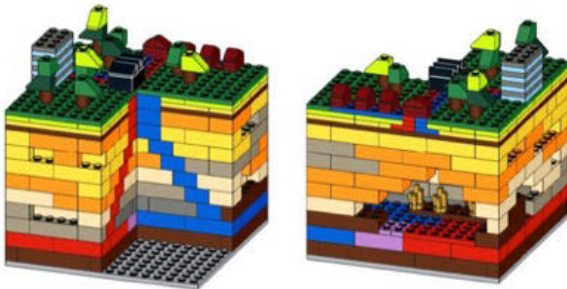
Nick Shaw, University of Leeds. 4pm Thursday 25th February 2021

and potential markets. In addition, I will share some key enablers encouraging successful development of geothermal in the Netherlands and Switzerland. I will finally highlight the challenges to making reliable reserves and resource estimates when faced with incomplete and spatially aliased subsurface datasets, a way ahead is using play fairway analysis. The challenge for the YGS and the universities of the North as well as wider society is how to work together to help geothermal contribute to our energy (heat) transition.

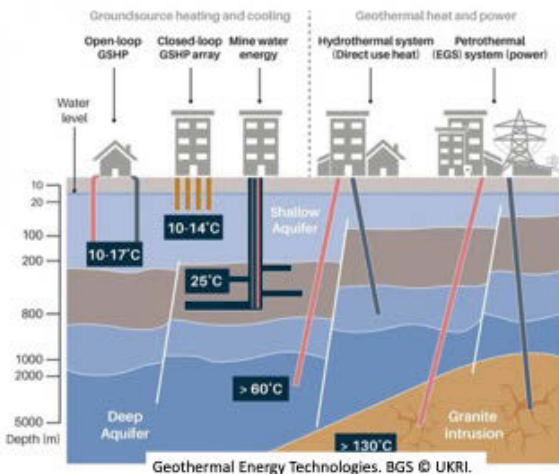
**Biographical note:** In 2016, on retiring after a 37 year career with Royal Dutch Shell, Nick Shaw joined the Leeds Department as Visiting Lecturer in Applied Geosciences - contributing to Petroleum Engineering, Structural and Engineering Geology programmes. He has been involved in Geosolutions Leeds since its inception focussing on geothermal, storage, hydrocarbons and play fairways analysis.

Nick Shaw, University of Leeds

Email: [N.D.Shaw@Leeds.ac.uk](mailto:N.D.Shaw@Leeds.ac.uk)



*Lego models of geothermal wells doublet and ground source heat pump (courtesy of Wouter van Leeuwen, Univ Wageningen)*



*Summary of Geothermal Energy Technologies BGS/UKRI.*



YGS ONLINE ZOOM LECTURES JANUARY – MARCH 2021

CENTRAL WALES LEAD MINING

Chris Greenwell. 4pm Thursday 25th March 2021

ABSTRACT NOT YET AVAILABLE: THIS WILL BE POSTED ON THE YGS WEBSITE WHEN RECEIVED.



HULL GEOLOGICAL SOCIETY ZOOM LECTURE:

NEW LIGHT ON THE NEANDERTHALS: MUSIC, ART, ROPE-MAKING,  
AND NOW A POSSIBLE LINK TO COVID-19

University of Hull, Thursday 14th January 2021, 7.30pm -8.10pm

Professor Patrick Boylan (Hull Geological Society Honorary Member)  
School of Arts and Social Sciences, City, University of London

*Anyone wishing to view this lecture must register in advance no later than 12th January with the HGS Secretary [mike@zenrocks.karoo.co.uk](mailto:mike@zenrocks.karoo.co.uk) For internet security reasons the Zoom connection address will not be emailed out to registered participants until the day of the lecture.*

*Gibraltar 1 Neanderthal skull, found in 1848; (Photo: Gibraltar Museum)*



The Middle and Upper Pleistocene Neanderthals have generally had a bad press through more than a century and a half. Until comparatively recently Neanderthals were widely regarded and caricatured as primitive, clumsy and probably brutal, creatures. Knowledge, and more important, attitudes have changed remarkably in the last 20 years or so, through many additional discoveries and new interpretations of this Hominin species.





## HULL GEOLOGICAL SOCIETY ZOOM LECTURE:

### NEW LIGHT ON THE NEANDERTHALS: MUSIC, ART, ROPE-MAKING, AND NOW A POSSIBLE LINK TO COVID-19

University of Hull, Thursday 14th January 2021, 7.30pm -8.10pm

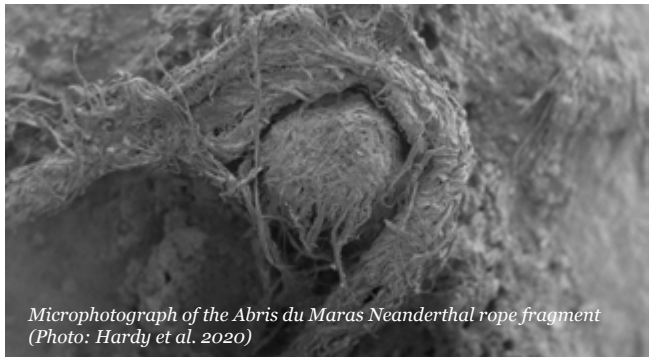
We now know that Neanderthals were dominant across most of Europe and beyond from around 400,000 to 40,000 years ago, with significant populations stretching from the Mediterranean and beyond out into what is now known as “Doggerland” – the vast area of land under what is now the North Sea, while DNA studies show that Neanderthal genes survive in many present-day European and Asian populations. More and more is also being discovered about the culture and traditions of these populations. I was able to help in a minor way with one of the most remarkable finds in a Slovenian cave: a 50K – 40K year old Neanderthal flute made out of the thigh bone of a young Cave Bear. Even more remarkably this would have played the notes of the present-day diatonic (Do, Re, Mi) musical scale. Also, recent work on the earliest Neanderthal site – Gough’s Cave, Gibraltar, has found evidence of both art and personal adornment with feathers.

In March 2020 an equally significant technological discovery was made in France during excavations of Neanderthal levels within the Abri du Maras Cave located in the southern France Ardèche valley. Due to preservation conditions organic remains other than bones and teeth are generally extremely rare. However, the excavators have found a tiny fragment of a double 3-ply twisted cord adhering to a stone tool, made from fibres from the inner bark of trees (Hardy et al. 2020).



*Divje Babe Cave Neanderthal flute  
(Photo: National Museum of Slovenia)*

*Neanderthal and Patrick Boylan in  
modern dress – which is which?!  
(Photoshopped by Mike Horne!)*



*Microphotograph of the Abri du Maras Neanderthal rope fragment  
(Photo: Hardy et al. 2020)*





## HULL GEOLOGICAL SOCIETY ZOOM LECTURE:

### NEW LIGHT ON THE NEANDERTHALS: MUSIC, ART, ROPE-MAKING, AND NOW A POSSIBLE LINK TO COVID-19

University of Hull, Thursday 14th January 2021, 7.30pm -8.10pm

This was not just the only startling Neanderthal discovery announced in 2020. Two medical reports of investigations into possible genetic risk factors for COVID-19 published in leading medical Journals show that a Neanderthal derived gene cluster on chromosome 3 is linked to respiratory failure in severe COVID-19 infections (Ellinghaus et al. 2020; Zeberg & Paabo 2020). There is clearly very much more to learn about the Neanderthals more than 30,000 years after they finally became extinct.

#### REFERENCES

Ellinghaus, D. et al. 2020. Genomewide association study of severe COVID-19 with respiratory failure. *New England Journal of Medicine*, 15th October 2020.

Hardy, B L et al. 2020. Direct evidence of Neanderthal fibre technology and its cognitive and behavioral implications. *Nature Scientific Reports*, 20th April 2020.

Zeberg, H & Paabo, S, 2020. The major genetic risk factor for severe COVID-19 is inherited from Neanderthals. *Nature*, 30th September 2020.



## PRESIDENT'S WORD

Nick Riley MBE, President



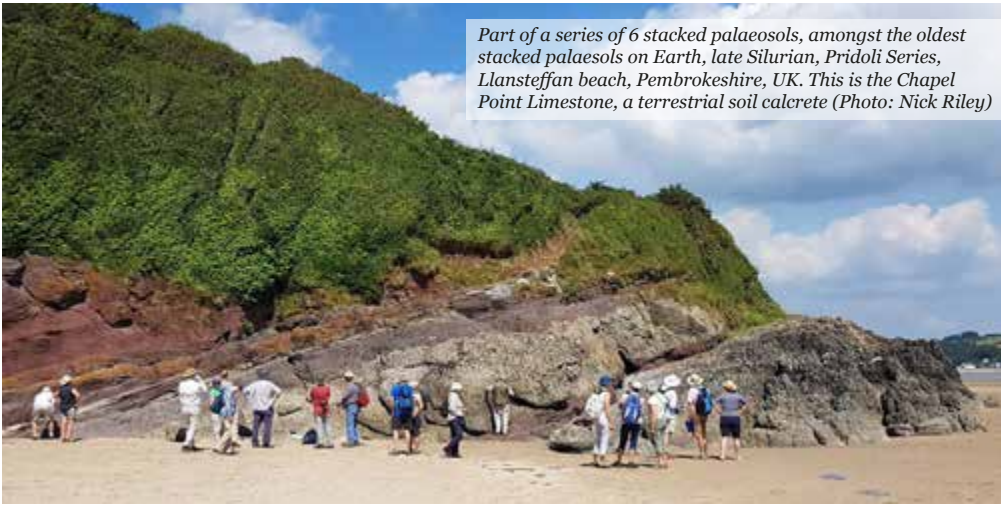
As I write this, in mid-December, I am looking across the landscape of the East Midlands Oilfield, from my kitchen (no – not an oil kitchen, at least not at the present land surface!). The trees are stripped bare of all they wear. Twigs and branches, and even tree trunks, are waving in the lashing rain and violent, roaring wind. Trees are amazing; so resilient. Have you ever wondered why? It is due to the natural polymer lignin. Without lignin there would be no trees (and not much coal). Have you ever wondered how lignin might have appeared on Earth? When did it happen? How did it happen? I don't know how it happened. I have a hunch how it might have happened.

I think the evidence is reasonably clear when it did happen. It was at least by the mid-Devonian, when the earliest fossil trees occur. Which takes me back to July 2019, when I met up with my wonderful peers of the Bristol 1977 Geology Graduates, and the now legendary Prof Brian Williams. Brian was a young lecturer when I was a Bristol. I was and still am really into carbonates as the most interesting sedimentary rocks. Despite this, Brian with his huge enthusiasm and knowledge opened up the whole new world (to me and others) of understanding clastics. In July 2019, he took us to outcrops in Pembrokeshire, some



## PRESIDENT'S WORD

Nick Riley MBE, President



*Part of a series of 6 stacked palaeosols, amongst the oldest stacked palaeosols on Earth, late Silurian, Pridoli Series, Llansteffan beach, Pembrokeshire, UK. This is the Chapel Point Limestone, a terrestrial soil calcrete (Photo: Nick Riley)*

of which we visited with him back in the '70s.

It is sobering to compare what was “known” then, to what is “known” now. That is one of the joys of scientific progress. Brian showed us one of the earliest stacked palaeosols on Earth, in the late Silurian. There were no trees then. Just primitive vascular plants such as mosses, along with liverworts, algae and lichens colonising rocks and soils. There were also fungi, bacteria and arthropods.

As I walked over the outcrops it hit me how different it was to a Carboniferous palaeosol. I mused about the big difference between the late Silurian-Early Devonian flora & the Carboniferous. It was the lack of trees and therefore lignin, bingo! So, how did lignin appear? Was it an accident by a random mutation? Or was it something else? I suggest that it was the interaction with viruses that was harnessed by vascular plants that enabled them to produce lignin. I cannot prove it yet.



*Lycophyte tree root, with spiral rootlet scars. Associated with the Caton Coal, Carboniferous, early Arnsbergian, E2a3 subzone, Lancaster Fells, Lancashire. (Photo: Nick Riley)*

Some of you will know I floated this suggestion before COVID-19 hit us. Now, as research on viruses jumps in leaps and bounds, I look forward to



## PRESIDENT'S WORD

Nick Riley MBE, President

this hypothesis being tested. What is clear, is that viruses have played a major part in the origin and evolution of life. Without them we would not be here. It seems that viruses were also involved in the evolution of the cell and its organelles, as well as evolution of the mammalian placenta. So, although we can get angry and frustrated about COVID-19 and resent the awful personal suffering and loss it has caused to many of us, perhaps we should be open to the fact that some viruses are not necessarily bad?



## OFFICERS AND OTHER COUNCIL MEMBERS FOR 2021 ELECTED AT THE ANNUAL GENERAL MEETING, 5TH DECEMBER 2020

President	Dr Nick Riley
Vice President 1	Mr Paul Hildreth
Vice President 2	Vacant (Note 1)
General Secretary	Vacant (Note 2)
General Treasurer	Mr John Holt
Principal Editor	Professor Paul Wignall
Membership Secretary	Dr David Blythe
Indoor Meetings Secretary	Professor Mike Bowman
Field Meetings Secretary	Hayley Scholefield
Grants Secretary	Professor Mike Rogerson
Publications Secretary	Dr Joanna Thomas
Circular Editor	Professor Patrick Boylan
Web Editor	Mr Rick Saville

### OTHER COUNCIL MEMBERS

Dr Elizabeth Atar	Mr Tom Berry
Dr Natasha Dowey	Mr David Hill
Dr John Knight	Dr Annette McGrath
Mr Bill Paley	Professor Colin Waters

**Note 1:** The second Vice President position will be taken up by the nominee for President 2023-24. A nominee will be sought from Council to fill this role on a temporary basis in the meantime.

**Note 2:** Mr Paul Hildreth will take up this role in an acting capacity pending the co-option and election of a General Secretary.



## NEW OFFICERS OF THE SOCIETY ELECTED AT THE DECEMBER 2020 AGM



### PROFESSOR PAUL WIGNALL, EDITOR-IN-CHIEF

I was President of the Society a little over 10 years ago and left the Council shortly after that, so it's good to be re-joining and see some familiar faces and many new ones. The Society's *Proceedings* has been in the safe hands of Stewart Molyneux for a long time and I hope to keep it thriving during my tenure. I've been involved in editorial management of other journals which will hopefully hold me in good stead.

Academically, I'm a "soft rock" geologist based at the University of Leeds with interests in many areas including palaeontology, sedimentology, geochemistry and stratigraphy and even volcanology (which is definitely not a soft-rock topic). Most of my attention is on mass extinction intervals, especially the largest event at the Permo-Triassic boundary, although I find all ancient crises are interesting. However, my research began in the 1980s on the Carboniferous rocks of the Pennines: a topic that remains close to my heart.



### HAYLEY SCHOLEFIELD, FIELD MEETINGS SECRETARY

I was delighted and honoured to be nominated by the Council for the position of Field Meeting Secretary at the 2020 AGM. I am a recent Structural Geology with Geophysics postgraduate from the University of Leeds, following on from my Bachelor's degree in Geoscience from Keele University. I was very fortunate to start exploring the world from a very young age from leaving my home country of Scotland, to live and study in multiple European and Asian countries over a 15-year period before landing back in the UK. This exposure allowed me to experience a variety of different cultures and adventures and quite frankly, has allowed me to see

first-hand some amazing places.

I have always had a passion for the outdoors and science, thus studying a geology-related degree was a no brainer, the perfect combination. Undergoing my undergraduate dissertation in a small but diverse geological area of Caer Caradoc in Shropshire, I found my interest in structural geology emerging. I decided to narrow my field of interest and study at the University of Leeds in their unique and globally leading Master's programme. This has provided me with the advanced theoretical and practical training needed to flourish in a career in applied structural geology. I am proud to call myself a geologist, albeit a graduate and look forward to where 2021 takes me.



## MEMBERSHIP SUBSCRIPTIONS 2021

NOTE: If your 2021 YGS Membership Card is in the envelope with this copy of the Circular you have already paid by Direct Debit or by cheque in advance – Many thanks.

Annual subscription payments are due on the 2nd January 2021. For 2021 subscriptions remain unchanged, i.e. £33 standard membership (£23 if aged over 65), £15 student membership, and £13 associate membership (without the *Proceedings*).

Direct Debits were drawn on 2nd January 2021. Most members now pay by Direct Debit, which is cheaper on both sides and a big help administratively. If you have a UK bank account but are not yet registered for Direct Debits please consider doing so: the Membership Secretary will send you the official form for this.

Those members that still pay by cheque, PayPal or bank transfer are asked to pay as soon as possible after 1st January. (Overseas members should note that credit card payments can now be made through the PayPal system.)

Payments made after 28th February will attract a surcharge of £2.

**David Blythe, Membership Secretary**

**Email: [membership@yorksgeolsoc.org.uk](mailto:membership@yorksgeolsoc.org.uk)**



## YGS OPPORTUNITIES FUND

As reported in the last *Circular* and at the December 2020 AGM the Council has allocated financial resources to a new Opportunities Fund. The intention is that this new Fund will be used to respond, promptly and flexibly in line with the Society's charitable objects, to opportunities for which the existing fund structure is restricted or inappropriate.

It is envisaged that this will allow the Society to respond to requests for support in any of a number of areas, which for example may include conservation and protection measures, signage, rescue and documentation of short-term exposures, representation and participation at public or educational events. In contrast to the long-standing Society funds, which have an annual cycle for applications and award, sums from the Opportunities Fund budget can be allocated by Council to specific requests for immediate support, which meet the criteria of the Society objects.

The Opportunities Fund will comprise a budget allocation, set annually as part of the Society financial statement, from which sums, normally of up to £1,000, may be awarded following formal requests submitted by any member or members of the Society for consideration by Council. Members of the Society are encouraged to consider how the Society can be





pro-active in protection and promotion of earth heritage and engagement with the public at large. This will include collaboration with geology trusts or other earth-science organisations in our footprint where appropriate.

Members are encouraged to discuss any such opportunities in the first instance with any member of Council. Applications for support from this fund should be submitted to the YGS Treasurer: [treasurer@yorksgeolsoc.org.uk](mailto:treasurer@yorksgeolsoc.org.uk).



## YGS FIELD GUIDE TO THE GEOLOGY OF GRAVES PARK, SHEFFIELD

Graves Park is Sheffield's largest public park and an ideal place to learn the basics of geological mapping and coalfield geology. The Park was used for many years by the British Geological Survey as a training ground for its mapping geologists.

The YGS visited the Park in both 2018 and 2019 for field trips led by Andy Howard and Colin Waters. Their *Field Guide to the Geology of Graves Park* is now available: go to our Virtual Field Trips webpage to view and download at <https://www.yorksgeolsoc.org.uk/virtualfieldtrips>



*Andy Howard demonstrating the Greenmoor Rock (Pennine Lower Coal Measures, Langsettian) exposed in a former flagstone quarry in the Park.*



*YGS field trip participants get to grips with measuring the inclination of dip slopes, Graves Park August 2018.*



The popular YGS field guides to Yorkshire and Northumbria have now been made available to everyone as wiki-style pages on the BGS Earthwise site, which aims to promote free exchange of information within the wider geological community. The guides can be accessed via our new Online Guides YGS webpage at

<https://www.yorksgeolsoc.org.uk/virtualfieldtrips/onlinefieldguides>

or directly on Earthwise at

[http://earthwise.bgs.ac.uk/index.php/Category:Yorkshire\\_Geological\\_Society](http://earthwise.bgs.ac.uk/index.php/Category:Yorkshire_Geological_Society).

Field guides by the Edinburgh Geological Society and the Geological Society of Glasgow are also available on Earthwise.

The wiki field guides offer an option to create a pdf from selected content, such as an individual excursion, for printing or offline viewing. We welcome your comments and encourage you to contribute your own articles on related topics.

**Jo Thomas, Publications Secretary**



## BIOGRAPHY OF DOROTHY HELEN RAYNER FGS (1912-2003): VERTEBRATE PALAEOLOGIST AND ACADEMIC

*To mark the centenary of the election of the first women Fellows of the Geological Society of London, the Society is publishing early in 2021 as a Special Publication, a major review of the scientific contribution of women geologists: Celebrating 100 years of Female Fellowship of the Geological Society: Discovering Forgotten Histories, edited by C.V. Burek and B. Higgs (Geological Society, London, Special Publications, no. 506). This includes a substantial chapter by Patrick Boylan on Dr Dorothy Rayner, the first (and so far only) woman President of the Yorkshire Geological Society.*

### ABSTRACT

Dorothy Rayner was one of the first women to be appointed to a tenured academic post in any English university geology department, joining the Leeds Department in 1939, serving for 38 years to her retirement in 1977. She had two very important early influences in her life. The first was her family, with its tradition through several generations of doctors, scientists, engineers, mathematicians, radical politics and social activism. The other was her earlier education, particularly her seven years at the very influential Bedales School, the first of what were to become known in the 20th century as “progressive” schools.



## BIOGRAPHY OF DOROTHY HELEN RAYNER FGS (1912-2003): VERTEBRATE PALAEOONTOLOGIST AND ACADEMIC

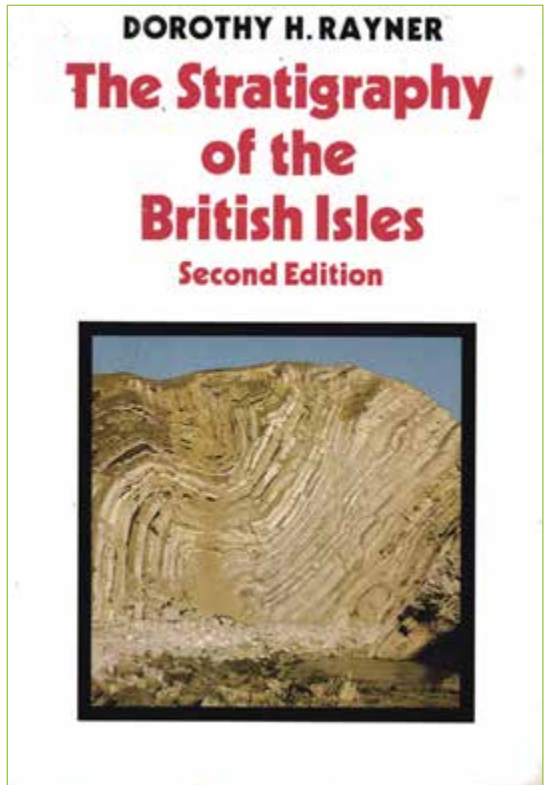
After gaining a First at Girton College in the Cambridge Natural Sciences Tripos, she undertook ground-breaking research on the taxonomy and neural systems of Jurassic fishes, for which she was awarded a Cambridge PhD in 1938, soon after which she was appointed Assistant Lecturer in Geology at Leeds. In addition to an always very heavy teaching load she continued with a broad range of research, including further work on fossil vertebrates, and the stratigraphy of first the North of England and then the whole of the British Isles. She was also an outstanding Editor of the YGS *Proceedings* for ten years. Following the award of the Society's Sorby Medal in 1968, she was a noted President of the Yorkshire Geological Society for 1969 and 1970.

*The full text of this biography is now available through the Geological Society Publishing House's First Online service in advance of publication of the complete book at:*

<https://doi.org/10.1144/SP506-2020-44>



*Dr Dorothy Rayner, President of the Yorkshire Geological Society, ca. 1969. (C. Executors of Dorothy Helen Rayner)*



*Dorothy Rayner: Stratigraphy of the British Isles 2nd Edition, 1971.*



## A GEOLOGICAL SHORT STORY: “THE GREEN AIRE JUNE 1899”

Colin Speakman, author and environmentalist



*Malham Cove (Photo: Colin Waters)*

*This fanciful and purely fictional short story is based on the true account of the discovery of the actual source of the River Aire at Malham Tarn and Airehead Springs, by members of a Committee of the Yorkshire Geological Society, as recounted in Kendall and Wroot’s classic **Geology of Yorkshire**, 1924 (pp 74-75) and in the PYGS for 1900.*

A perfect summer’s morning. Malham Tarn, glistening in the sunlight, its surface perfectly still, clouds and woods by the shore reflected in the waters, a green ring of fells beyond. Hardly a breath of wind. Two middle-aged gentlemen, Mr Fennell and Mr Bean, in tweed suits and stout hob-nailed boots, keen members of a special research committee set up by the prestigious Yorkshire Geological and Polytechnic Society, have this morning come by train to Stalling Busk Station, to be collected by pony and trap and taken to Malham and up the steep lane to Malham Tarn.





## A GEOLOGICAL SHORT STORY: “THE GREEN AIRE JUNE 1899”

Colin Speakman, author and environmentalist



*Emergence of the River Aire  
from the foot of Malham  
Cave. (Photo: Colin Waters).*

They are now striding across to the little dam at the end of the Tarn. Encouraged and supported by Mr Walter Morrison, of Malham Tarn House, local landowner and philanthropist, the geologists are involved in a complex series of experiments to discover the true source of the River Aire. How does the sparkling mountain stream which flows out of the Tarn find its way down into Malham Beck, the apparent source of the River Aire?

The River Aire was, in the 1890s, one of the most important of all Yorkshire rivers for industry, powering and providing the essential water supply for numerous textile mills and iron works -



## A GEOLOGICAL SHORT STORY: “THE GREEN AIRE JUNE 1899”

Colin Speakman, author and environmentalist

Kirkby Malham, Airton, Cononley, Cowling, Keighley, Bingley, Saltaire, Shipley, Rodley, Kirkstall, Armley, Leeds, Castleford, the heartlands of Industrial West Riding. Yet it began its journey in an area of idyllic rural beauty, a glacial tarn among the windswept limestone crags of the Yorkshire Dales.

In ancient times, and on rare occasions of extreme flood in the 18th and 21st centuries, the dry valley leading from the Tarn to Malham Cove has filled with water to create a gigantic waterfall, the waters for which otherwise force their way underground. Geologists by late Victorian times already suspected that even the great Professor John Phillips (1800-74), the renowned expert on the limestone geology of Craven, was probably not correct in assuming that Malham Beck, the stream that emerged from underneath Malham Cove, was fed by Malham Tarn. Later studies showed that this beck was almost certainly fed from an insignificant stream known as Smelt Mill Syke on the moorland to the north west of Malham village, among old zinc and lead mine workings.

So what was the true source of the River Aire? The evidence seemed to point to the waters of the Tarn emerging over a mile downstream, just above Kirkby Malham Mill, at a powerful spring now known as Aire Head Spring, the point where Malham Beck becomes the River Aire. But there was no conclusive proof that this was the case, despite several attempts over the years. If it was indeed true, then there must be an extraordinary and complex network of deep caves and aquifers carrying the Malham Tarn water, travelling in underground passages, actually below the Smelt Mill Syke stream that emerges at Malham Cove.

Experiments sending surges of dammed up water from the Tarn down this stream which emerged some time late at Aire Head gave credence to this view. Some years previously Lord Lister and Mr Morrison had thrown some straw chaff down the Water Sink. Some of this had emerged at Aire Head Spring but other experiments had failed. What was needed was irrefutable scientific proof. The scientists had even carried out numerous tests on the chemical content of the water, but because the streams picked up or changed their chemical content from rocks in transit on their long underground journey the evidence remained inconclusive.

Bean, Farrell and their YGPS colleagues thought they had a fool proof test. So today was the day of that test. The two geologists arranged for their assistants to put a quantity of a harmless but vividly coloured chemical into the water to give a clear trace of the flow. This was fluorescein, a synthetic colouring agent which emits an intense greenish colour when mixed with alkaline water, even in very diluted quantities, such as one part in 200,000 or one grain in 30,000 gallons.

So they waited with some excitement. Just under an hour and a half after the dye had been released into the outflow from Malham Tarn and into Water Sinks, sure enough the waters gushing out of Aire Head spring turned a bright green, and for a time the young river took





## A GEOLOGICAL SHORT STORY: “THE GREEN AIRE JUNE 1899”

Colin Speakman, author and environmentalist

on this bright verdant hue. It was a moment of triumph. They had proved conclusively that Malham Tarn and Aire Head Spring, not Smelt Mill Syke, was the principle source of the River Aire. “I have only one worry”, said Mr Bean. “Supposing the dye find its way into any of the local bore holes or wells, as many farms around here will not be on public water supply? I know the dye is harmless, but I suspect the locals won't quite see it that way.”

The two geologists, tired and excited from their long day of activity, were staying at the Lister Arms, Malham's 17th century village inn, for the night, before travelling back to Leeds the following day. They enjoyed an excellent meal and retired to the bar to sip a well-earned pint of frothy Yorkshire ale. After a few minutes two elderly farmers came in. “Tha' won't believe what happened today, Fred”, said one. “The missus drew a bucket o' watter fr' t well in the yard, and beggar me, it weren't bright green. I've never seen owt like it. We poured it away - it weren't fit even to give t'cattle.” “I think ah know what's 'appened”, replied Fred. “There were these posh geology fellahs up at Malham Tarn today, tha' knows, messing around wit' sluices and bits of measuring equipment. They've put summat int' watter”. They turned towards the bar where there were two quite empty seats.

### REFERENCES:

- J.H. Howarth, G.W. Fennell, & J.A. Bean, 1900. The Underground Waters of North-West Yorkshire. Pt I. The Sources of the River Aire. *Proceedings of the Yorkshire Geological and Polytechnic Society*, Vol. 14, pp. 1-44.
- P.F. Kendall & H. Wroot, 1924. *The Geology of Yorkshire*, pp.74-75.



## CORRESPONDING SOCIETIES

Please contact the society representatives and/or websites shown for the latest information, and if you would like to attend a particular meeting as a guest

**Important notice to Societies and Groups:** Due to the coronavirus emergency we have not been listing Society and Group programmes since March 2020. We are now resuming this with this issue. Will the Societies please (a) check their contact details as in the present Circular and (b) resume sending brief summaries of spring and early summer programmes from April 2021 onwards to Patrick Boylan [circular@yorks.geol.soc.org.uk](mailto:circular@yorks.geol.soc.org.uk).

**YGS Members:** Many Corresponding Societies are happy to welcome YGS members as guests at meetings. Please check their websites for the latest information and contact the society representatives well in advance if you would like to attend a particular meeting or event.

### CRAVEN AND PENDLE GEOLOGICAL SOCIETY

<http://cpgs.org.uk>

Venue for indoor meetings: St. Joseph's Community Centre, Bolland Street, Barnoldswick  
BB18 5EZ  
at 7.30pm.

### CUMBERLAND GEOLOGICAL SOCIETY

<http://www.cumberland-geol-soc.org.uk> (Contact Form on the website)

### EAST MIDLANDS GEOLOGICAL SOCIETY

[secretary@emgs.org.uk](mailto:secretary@emgs.org.uk) <http://www.emgs.org.uk>

Usual meeting place: School of Geography, Nottingham University.

### EDINBURGH GEOLOGICAL SOCIETY

E-mail: [secretary@edinburghgeolsoc.org.uk](mailto:secretary@edinburghgeolsoc.org.uk) <http://www.edinburghgeolsoc.org/>

Lectures are held in the Grant Institute of the University of Edinburgh, West Mains Road, Edinburgh, at 7:30pm, except where stated otherwise.

### ALL ZOOM LECTURES

**Wednesday 20 January, 7pm – Gold: Exploring Scotland's Untapped Potential**

Charlie King, Scotsgold, Cononish

**Wednesday 3 February, 7pm – MIS/EGS Joint lecture: Drilling into mines for heat**

Alison Monaghan, BGS Edinburgh, the UK Geoenergy Observatory in Glasgow



## CORRESPONDING SOCIETIES

Please contact the society representatives and/or websites shown for the latest information, and if you would like to attend a particular meeting as a guest

### EDINBURGH GEOLOGICAL SOCIETY - CONTINUED

**Wednesday 17 February, 7pm – Clough Medal Lecture: The Port Askaig Formation in Argyll: uncovering the evidence for repeated climatic changes in a Cryogenian glacial sequence**

Anthony M. Spencer

**Wednesday 3 March, 7pm – Dating the earliest land biotas – Scotland was the first!**

Michael Brookfield, University of Massachusetts at Boston

### GEOLOGISTS' ASSOCIATION

<http://geologistsassociation.org.uk>

### HUDDERSFIELD GEOLOGY GROUP

<http://www.huddersfieldgeology.org.uk/>

Indoor Meetings at Greenhead College, Huddersfield, at 7.15pm unless otherwise stated.

### HULL GEOLOGICAL SOCIETY

<http://www.hullgeolsoc.co.uk/org>

Usual meeting place for indoor lectures: Department of Geography, University of Hull, at 7.30 pm. N.B. for security reasons the door is locked at 7.40pm.

### BOOKING IS REQUIRED FOR ALL THE OUTDOOR AND ZOOM EVENTS.

**Thursday 14 January – New light on the Neanderthals: music, rope-making and now an apparent genetic link to Coronavirus**

Evening Zoom lecture – Professor Patrick Boylan, (Hon. Member) City, University of London (See Abstract included)

**Thursday 4 February – Morning walk “Geology in Hull”**

Led by Mike Horne

**Thursday 11 February – “Geology beneath Hull”**

Evening Zoom talk by Mike Horne

**Thursday 11 March – “The geology of southern Sweden”**

Evening Zoom lecture meeting by David Hill



## CORRESPONDING SOCIETIES

Please contact the society representatives and/or websites shown for the latest information, and if you would like to attend a particular meeting as a guest

### LEEDS GEOLOGICAL ASSOCIATION

[lga.sec@btinternet.com](mailto:lga.sec@btinternet.com) <http://www.leedsga.org.uk/>

Usual meeting place for indoor lectures: Rupert Beckett Lecture Theatre (Michael Sadler Building) Leeds University at 7.15pm)

### MICROSOFT TEAMS ONLINE LECTURE

**Thursday 28 January – The ‘Europe’s Lost Frontier’ Project**

Dr Phil Murgatroyd, Bradford University

### LEICESTER LITERARY & PHILOSOPHICAL SOCIETY – SECTION C GEOLOGY

<http://www.charnia.org.uk/>

Usual meeting place for indoor lectures (unless otherwise stated): Lecture Theatre 3, Ken Edwards Building, University of Leicester, Thursdays at 7.30pm, refreshments from 7.00pm.

### ZOOM LECTURES

**Wednesday 13 January – Tsunamis! Past, present and future**

Kirstie Wright (Heriot-Watt University)

**Wednesday 20 January – Hydrology of the London Underground**

Jonathan Paul

**Wednesday 10 February – Chasing recent and historical earthquakes around the world**

Zoe Mildon (Universities of Plymouth and Cambridge)

**Wednesday 17 February – Anthropocene**

Ian Fairchild

**Wednesday 10 March – to be confirmed (see the website)**

**Wednesday 17 March – Skye Meteorites**

Dr Simon Drake



## CORRESPONDING SOCIETIES

Please contact the society representatives and/or websites shown for the latest information, and if you would like to attend a particular meeting as a guest

### MANCHESTER GEOLOGICAL ASSOCIATION

secretary@mangrolassoc.org.uk <http://www.mangeolassoc.org.uk>

Usual meeting place for indoor lectures: Williamson Building, Department of Geology, University of Manchester

### ZOOM LECTURES

#### **Wednesday 13 January – Plate tectonics explained**

Prof. Peter Burgess, University of Liverpool

#### **Wednesday 10 February – President's Address**

Niall Clarke, MGA President

#### **Wednesday 10 March – Minerals in Afghanistan**

Robin Grayson

### MID-WEEK GEOLOGY GROUP IN YORKSHIRE

<http://www.mwgyyorkshire.org.uk> Email: [mwgyyorkshire@hotmail.com](mailto:mwgyyorkshire@hotmail.com)

Informal mainly amateur and retired group that organises monthly field meetings or museum visits on Tuesdays, Wednesdays or Thursdays.

### NORTH EASTERN GEOLOGICAL SOCIETY

<http://www.negs.org.uk>

Lectures are at 7.30pm in the Arthur Holmes Lecture Room, Science Laboratories Site, University of Durham.

### NORTH STAFFORDSHIRE GROUP OF THE GEOLOGISTS ASSOCIATION

<http://www.esci.keele.ac.uk/nsgga/>

Usual meeting place for indoor meetings: William Smith Building, University of Keele at 7.30pm.

### ROTUNDA GEOLOGY GROUP (SCARBOROUGH)

<http://www.rotundageologygroup.org/>

The Education Room, Woodend, The Crescent, Scarborough YO11 2PW.



## CORRESPONDING SOCIETIES

Please contact the society representatives and/or websites shown for the latest information, and if you would like to attend a particular meeting as a guest

### **WESTMORLAND GEOLOGICAL SOCIETY**

[mail@westmorlandgeolsoc.org.uk](mailto:mail@westmorlandgeolsoc.org.uk) <http://westmorlandgeolsoc.co.uk/>

Meetings are on Wednesdays and start at 8 pm (unless otherwise stated) and are held in the Abbot Hall Social Centre, Kendal.

### **ZOOM LECTURES**

#### **Wednesday 20 January – Looking inside Icelandic volcanoes**

Dr Hugh Tuffen, University of Lancaster

#### **Wednesday 17 March – Some of my Favourite Outcrops from Around the World:**

##### **A GeoVisual Tour**

Prof Pete Burgess, University of Liverpool

### **YORKSHIRE PHILOSOPHICAL SOCIETY GEOLOGY GROUP**

<https://www.ypsyork.org/groups/geology-group/>

### **YORKSHIRE REGIONAL GROUP OF THE GEOLOGICAL SOCIETY OF LONDON**

<https://www.geolsoc.org.uk/yrg> Secretary: Mark Lee [Mark.Lee3@atkinglobal.com](mailto:Mark.Lee3@atkinglobal.com)

Usual meeting place: The Adelphi Hotel, Leeds.





NEXT YGS CIRCULAR 633 – APRIL 2021:

DEADLINE: 10th MARCH 2021

Please send all copy including your texts, illustrations and ideas for short articles, plus updates on Corresponding Society programmes, to the Circular Editor, Patrick Boylan:  
email: [circular@yorksgeolsoc.org.uk](mailto:circular@yorksgeolsoc.org.uk) or by post to: 2a Compass Road, Leicester LE5 2HF.



KEY YORKSHIRE GEOLOGICAL SOCIETY CONTACTS FOR 2021

<http://www.yorksgeolsoc.org.uk>

**Nick Riley, President:** [president@yorksgeolsoc.org.uk](mailto:president@yorksgeolsoc.org.uk)

**General Secretary:** [secretary@yorksgeolsoc.org.uk](mailto:secretary@yorksgeolsoc.org.uk)

**Mike Bowman, Indoor Meetings Secretary:** [meetings@yorksgeolsoc.org.uk](mailto:meetings@yorksgeolsoc.org.uk)

**Hayley Scholefield, Field Meetings Secretary:** [fieldtrips@yorksgeolsoc.org.uk](mailto:fieldtrips@yorksgeolsoc.org.uk)

**David Blythe, Membership Secretary:** [membership@yorksgeolsoc.org.uk](mailto:membership@yorksgeolsoc.org.uk)

**John Holt, Treasurer:** [treasurer@yorksgeolsoc.org.uk](mailto:treasurer@yorksgeolsoc.org.uk)

**Patrick Boylan, Circular Editor:** [circular@yorksgeolsoc.org.uk](mailto:circular@yorksgeolsoc.org.uk)

**Rick Saville, Web Editor:** [web@yorksgeolsoc.org.uk](mailto:web@yorksgeolsoc.org.uk)

### YGS WEBSITE LINKS

**YGS News:** <https://www.yorksgeolsoc.org.uk/news>

**YGS Events:** <https://www.yorksgeolsoc.org.uk/events>

**Community Events:** <https://www.yorksgeolsoc.org.uk/community-events>

**Virtual Field Trips:** <https://www.yorksgeolsoc.org.uk/virtualfieldtrips>

**Geology Online:** <https://www.yorksgeolsoc.org.uk/geology-online>

**YGS Blogs:** <https://www.yorksgeolsoc.org.uk/ygs-blog>

**YGS Grants:** <https://www.yorksgeolsoc.org.uk/grants>

# JANUARY TO MARCH 2021

*Please Note: Articles and abstracts published in the YGS Circular reflect the views and opinions of the individuals writing those parts of the Circular and do not necessarily represent the views of Council or of the Society as a whole.*



*Part of a series of 6 stacked palaeosols, amongst the oldest stacked palaeosols on Earth, late Silurian, Pridoli Series, Llansteffan beach, Pembrokeshire, UK. This is the Chapel Point Limestone, a terrestrial soil calcrete (Photo: Nick Riley)*



*Front cover: Islay: Gently folded turbidites of the Smaull Greywacke Formation (Colonsay Group) at Dun Bheolain on the western side of the Rhinns peninsula. (Photo: Dave Webster)*