

CHARNIA

Newsletter of the

Geology Section

Of the Leicester Literary and Philosophical Society



January 2021

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Front cover picture: Memories of 2020

Editor's notes

Welcome to the first edition of Charnia for 2021. As Roger writes in his article that starts below, we were glad to see the back of 2020. He also asks for comments and support as to how we face up to the challenges of the coming year so please read it and think about how you can contribute.

We have taken advantage of the opportunities offered by Zoom to share talks with other societies and the Abstracts that start on page 6 have included these along with our own programme. The known future talks for early 2021 are also included but it would pay to look at the web sites of the other societies to see if there is anything new.

We are aware that not everyone has access to Zoom but, in case you did not know, Zoom can be used with most devices - PC, laptop, tablet or smart phone. Get in touch if you need help.

The lockdown has kept most of us confined to home for most of the last year so contributions to Charnia have been limited. Please do think if you have something that others may enjoy. Frank Ince has added to Roy's note circulated with the last Charnia commemorating Helen Boynton and Diana Sutherland's has a review of a book about Dorothea Bate. Thank you to both of them: they are examples that others may wish to follow, especially as books are a good way to fill all this time that we now have.

Brian Waters bdh2o@hotmail.co.uk

New Year prospect.

I suppose that I should begin this quick review of the current situation for the Section by wishing you a Happy New Year. However, though we were all glad to see the back of 2020 and looking forward to 2021 as being better, it's turning out that at least the first quarter of this year is a seeming continuation of last year.

The Covid crisis posed us real problems during 2020. As we released from the first lockdown it became clear that the Summer Programme of field trips and geology weekends was not going to go ahead and had to be cancelled. Your committee debated how we were going to make the Winter Programme work in the likelihood that even if the virus was overcome it was unlikely that the University would be available for Sectional lectures as in the past. So instead we have had to go online and create Zoom webinars for our Winter Programme. But "it is an ill wind that blows nobody any good", and although we were forced to that rather more impersonal way of delivering the Programme, and we had to recognise that those of our members who were "challenged" by IT would not gain any benefits from doing so, there were some positives. We were able to get speakers from the wider range of locations than would have been possible for physical lectures. Belgium, and Florida provided us with speakers. We were able to link in with colleagues in the Yorkshire Geological Society and the Warwickshire Geological and Conservation Society so that in total, for

those who could join the webinars, there was a greater frequency of events and a greater range of subjects that we would normally have.

It was disappointing, however, that the events which were organised for our own membership alone were not strongly supported perhaps recognising that chatting online is not the same as meeting together in person. And as we enter the New Year the Winter Programme, together with those lectures of the YGS and the WGCS will hopefully give us a successful winter season to help us through the third lockdown.

But the question that is exercising the committee at present is how do we go on in the future? It seems likely to us that the post Covid situation – if we ever to get to such a thing – will not be a question of going back to normal. We will face a “new normal” as coronavirus and its various strains become endemic. So the committee will be debating how we mix and match online and “physical presence” events, both in the Summer and Winter Programmes. We be happy to receive any thoughts that you have on these issues.

One of the immediate issues that we face however will be the AGM. It seems unlikely that we will be able to hold an AGM as we would do during March. The current lockdown does not suggest that that is a practical possibility. But it is not just the logistics of organising the AGM that concerns us at present. Over the last few years we have made appeals for people to come forward and help the Section to organise programmes on behalf of the membership. With few exceptions we have not had the volunteers that we need. I write to you as Vice Chair because we do not have a Chair for the Section. There are other roles which are unfulfilled on the committee at present. Most committee members are having to cover more than one job necessary for the Section. This situation cannot continue indefinitely. Eventually, long serving members of the committee will be retiring from their roles and stepping down. Unless we can get new committee members in place such changes will create a serious crisis for the continuation of the Section. So can I conclude this New Year’s message by appealing to you to think carefully about the possibility of volunteering to serve on the committee of the section and help in organising the sections programs for the future. If you can volunteer, then please contact me or the secretary, Gavin Drummond, at our email addresses given below.

Roger Latham.

Vice Chair and Treasurer.

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A Metamorphic Aureole at Longcliffe Quarry, Shepshed.

Frank Ince

I was sad when reading Roy's obituary for Helen and I will miss our conversations. She was a remarkable lady and interested in many topics; particularly any that might be related to Precambrian geology and especially the rocks of Charnwood Forest. During one of the bedding plane moulding sessions organised by the BGS near the Outwoods, we had a brief chat about the chemistry related to fossilisation processes. This resulted in a memorable, lengthy discussion that involved me (as an organic chemist) describing the chemistry of amino acids, peptides, and proteins, whilst trying to convince Helen that it would be most unlikely (but not impossible?) that fossilised collagen could have survived in the Charnian rocks. On another occasion we were chatting about metamorphism (and, needless-to-say, its effects on fossil preservation) and I mentioned that I had seen an interesting example of thermal metamorphism in the rocks exposed in Longcliffe Quarry. I sent Helen a few images (see below) and she suggested that that I ought to write a note for *Charnia*. At that time I was rather busy with other projects and I said I would think about it. As a personal tribute to Helen, now seems to be the appropriate time to put 'pen to paper'.

Many of you will recall that the Charnwood quarries, Newhurst Quarry (west of the M1 near J23) and Longcliffe Quarry (east of the M1 near J23), worked the regionally metamorphosed and tectonically altered late Precambrian volcanoclastic Blackbrook Reservoir Formation (BRF) and the igneous North Charnwood Diorites (NCD); see Carney *et al.* (2001: pp. 3–9). In the 1980s–1990s both quarries were active and, on one visit to Longcliffe Quarry (with the Russell Society), the thermally metamorphosed rocks adjacent to the BRF-NCD contact were exposed on the lowest bench and samples could be easily (and safely) collected.

Given that the metamorphic aureoles produced by igneous intrusions can be kilometres wide, the example from Longcliffe Quarry [c. SK 492 170] is rather small (but I would say “perfectly formed”). As can be seen from the figures and descriptions below, the complete sequence could be examined over a distance of 150 m:

- Fig. 1 shows the rocks of the laminated, regionally metamorphosed BRF c. 140 m from the BRF-NCD contact, they appear to be largely unaltered;
- Fig. 2 illustrates the onset of the thermal metamorphism of the BRF c. 30 m from the BRF-NCD contact, with significant heat-related distortion and some quartz veining in the original volcanoclastic sediments that still retain some of the laminations;
- Fig. 3 demonstrates the obvious consequences of the intrusion of the NCD on the BRF 0.15 m from the BRF-NCD contact with marked spotting, and yet it appears that the original laminated texture is retained;
- Fig. 4 shows the NCD; unfortunately, this sample was not collected close to the BRF-NCD contact and does not include the chilled margin mentioned by Carney *et al.* (2001: p. 9).

An analogous chilled margin occurs in Old Cliffe Hill Quarry, Markfield between the regionally metamorphosed and tectonically altered late Precambrian volcanoclastic Bradgate Formation and the igneous South Charnwood Diorites. It was described by Carney and Pharaoh (2000: pp. 3–9); they also discuss the alteration of the sedimentary and igneous rocks.

Acknowledgements: Thanks to Helen for hours of stimulating discussions and to Mike Howe for his comments and suggestions on an early draft of the note.

References

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Derby. Sheet description of the British Geological Survey 1:50,000 Series Sheet 141 Loughborough (England and Wales). British Geological Survey, NERC [available online at: <http://pubs.bgs.ac.uk/publications.html?pubID=B06078>].

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Figures and figure caption.

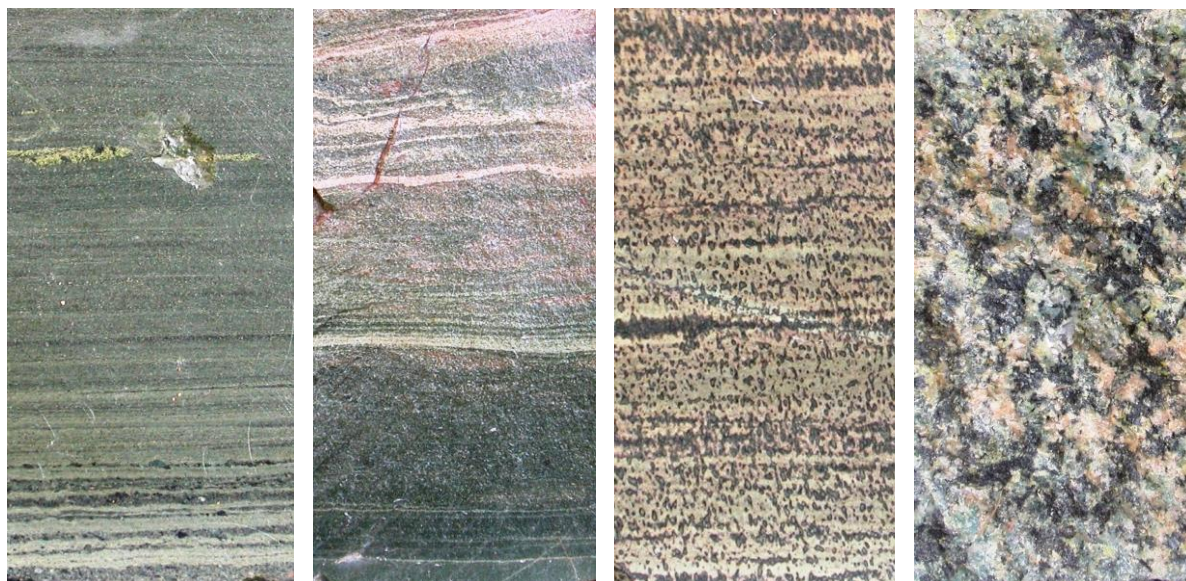


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Examples of the rocks exposed near the contact between the Blackbrook Reservoir Formation (BRF) and the North Charnwood Diorites (NCD) at Longcliffe Quarry, Shepshed. The specimens were cut, ground with grit (to 600 mesh) and 'polished' with a beeswax furniture polish (it seemed a reasonable method to use at the time!). Figures (all c. 30 mm across): 1. BRF 140 m from NCD, 2. BRF 30 m from NCD, 3. BRF 0.15 m from NCD, 4. NCD.

Discovering Dorothea by Karolyn Shindler

A book I have read in 2020 would surely be of interest to many of our Members – the story of a remarkable woman. When she was just nineteen, in 1898, Dorothea Bate went into the London Natural History Museum and asked to meet the Keeper of the Bird Room. She surprised him with her knowledge of ornithology and was hoping for a job at the Museum. Her interests included cave deposits, and she impressed Dr Henry Woodward, Keeper of Geology and Palaeontology, with an account of her astonishing investigation of caves at Symonds Yat. An opportunity then arose for her to collect fossils from cave deposits in Cyprus for the Museum. This was the start of her extraordinary fieldwork study of fossil remains in the islands of the Mediterranean, involving the discovery of pygmy elephants, pygmy hippos, and unusual new species.

As a reader I was wondering about caves not only near sea level, but some high in mountains, and I came to realise how little I had thought about what must have happened to Tethys! * Dorothea later met with archaeologist teams investigating early man south of the Mediterranean.

Karolyn Shindler, an Oxford graduate in Modern History, has given a very readable account of Dorothea's extensive travels, in the light of subsequent geological understanding. Dorothea died in 1951.

First published 2005; this edition by Natural History Museum 2017, paperback, 390pp, £9.99.

*A geologist friend in Northamptonshire has recommended a book by Dorrik Stow: *Vanished Ocean how Tethys reshaped the world*, 2010 (paperback 2012), Oxford University Press.

Diana Sutherland

1Leicester Literary and Philosophical Society, Section C (Geology)
Winter Programme, 2020-2021

This listing includes lectures by the Geology Section and those by invitation of other Societies. YGS is Yorkshire Geology Society and WGCG is Warwickshire Geology Conservation Group. Others are in full.

ABSTRACTS 2020

Wednesday 8th July: Analogous Mudstone Successions from the Yorkshire Coast and the USA (YGS).

Professor Kevin Taylor, (University of Manchester).

Mudstones make up greater than 70% of the sedimentary rock record, and in addition to providing fundamental insights into sedimentary processes through time, they can act as significant oil and gas source rocks, as reservoirs of oil and gas themselves (unconventional reservoirs) and have been considered as host for nuclear waste burial. Significant research over the last decade on these rocks has yielded new insights into their origin and variability, and their economic and societal attributes.

The Yorkshire Coast has a series of thick well-known mudstone successions (the Whitby Mudstone and Redcar Formations, and their internal members). Three of these successions - the Jet Rock, the Bituminous Shales, and the Redcar Mudstone Formation - have clear analogues in major, and economically important Mesozoic mudstone successions in the USA - the Eagleford Shale (Texas), the Haynesville-Bossier Shale (Louisiana-Texas) and the Mancos Shale (Utah-Colorado). Although all these successions, in Yorkshire and the USA, were deposited in shallow marine shelfal environments, their contrasts in composition, textures and later burial are a function of the sub-tle differences in depositional process, sediment and organic input, and water composition to these systems.

In this talk I will present the major characteristics of these mud-stones succession, through outcrop, core and thin section analysis, and explain the processes that led to their formation and current, and different, characteristics. I will also outline how research into these successions has realised a new understanding of mudstone depositional processes.

Wednesday 9th August: Mining in North Wales (WGCG).

Rob Vernon.

This talk will begin with an introduction to the geology of North Wales before discussing the most important minerals worked (copper, lead, gold, slate, coal and a few “miscellanea”). We will then take a round trip of the various mining districts, including perhaps the best known copper mine in Wales (at Parys Mountain on Anglesey), as well as the Parc lead and zinc mine at Aberconwy and the Gilfach copper mine in Caernarvonshire, among many others.

Wednesday 16th September: Jurassic calamari: new research on fossil squid-like cephalopods from the Wessex Basin (WGCG).

Professor Malcolm Hart (Emeritus Professor, University of Plymouth).

Discoveries of some exquisite specimens of soft parts of squid-like cephalopods have been found in the fossil record in the Wessex Basin. They are around 190–160 million years' old, and there is exceptional preservation of eyes, ink sacks, beaks and arm hooks. Balancing organs, 'statoliths', of aragonite have also survived and show internal (daily?) growth lines.

There are specimens of fossil squid-like cephalopods in the Natural History Museum (London) and Lyme Regis Museum, some collected by both Mary Anning and Henry De La Beche. When the GWR railway was built from Swindon to Bristol, local palaeontologist Joseph Pearce uncovered fossils at Christian Malford that caused great excitement as soft parts of squid-like animals were preserved. The ink sacks and the muscle scars survived and reconstruction of the creatures from the arms, some with pairs of hooks could be attempted. A specimen from Bristol Museum & Art Gallery has non-paired hooks so there is a potential for identifying species. Scattered statoliths have been recorded but cannot be linked to a named species. It has been argued that the white discs with hooks could have been suckers, but it is difficult to understand that a sucker with a hook in its centre could function effectively. The Christian Malford beds were re-opened in 2008 by the BGS and a core from the 'squid bed' was found to have earbones, or 'statoliths', scattered throughout it. There is a need to relate these to a species, so CT scanning of specimens from Christian Malford in the Natural History Museum is taking place to see if this can be achieved. Different shaped hooks are now thought to exist on the same animal, as one specimen from Germany shows five different kinds, and there are interesting questions on the evolution of the hooks that we see in the geological record.

An ichthyosaur specimen in the Etches Collection appears to show hooks as stomach contents, but it is possible that these may have fallen onto the specimen after death.

The exceptional preservation of material is exciting and there is plenty more research to be done. Recently new specimens have been found and cleaned, clearly showing the arrangement of hooks in the arms. An old specimen, from the BGS collections, has been shown to record the capture, and presumed feeding, of a squid-like cephalopod holding a fish (*Dorsetichthys bechei*); one of the earliest records of cephalopod predation.

Wednesday September 30th: Understanding Earth's climate during the Cambrian radiation of animals.

Dr Tom Wong Hearing (University of Gent, Belgium).

Fossils of the Cambrian Period (541 to 485 million years ago) record an astonishing rise in animal abundance and diversity across Earth's oceans. Major advances in palaeontology over the last century have helped to illuminate the biological aspects of the Cambrian ecological revolution, but aspects of Earth's physical environment remain poorly understood. I will use this talk to illustrate some of the key advances that we have made over the last few years in quantitatively investigating Earth's climate in the early part of the Cambrian Period. I will draw together evidence from two independent methods to build up a global picture of early Cambrian climate. Both approaches suggest that the early Cambrian world was warm, in a greenhouse climate state with limited or no permanent polar ice sheets. These independent approaches provide the first steps in establishing a quantitative framework for understanding Earth's climate during the Cambrian radiation of animals.

Wednesday October 14th: Fifty years of plate tectonics: past, current and future questions (WGCG).

Marco Mafioni (University of Birmingham).

Plate tectonics is the most unifying theory in Earth Sciences and one of the top five most relevant theories in the Sciences. Plate tectonics is the simple and elegant explanation of how our planet has been, is, and will be shaped by the continuous movements and interactions of tectonic plates. I will guide you through the long journey of scientific discoveries that brought several scientists with different backgrounds to contribute to the birth of the plate tectonics theory, ultimately formulated just over 50 years ago. Since then we have understood much of how our planet works, which helped in the '90s to reach a new important discovery on how our oceans expand. Today we still have several questions about key processes, such as the formation of new subduction zones, which represent new challenges for the current and future generations of Earth scientists.

Wednesday October 21st: Coprolites to Cholera, William Buckland's life (WGCG).

Peter Lincoln.

William Buckland (1784-1856), Oxford's first 'Professor' of geology, was a central figure of the 'heroic' foundational age of geological investigation. Buckland was a meticulous scientist and a devout, if sometimes rather too down-to-earth, clergyman. A charismatic lecturer, his flamboyant delivery stimulated his admirers and scandalised his detractors and, as a result, he was both venerated and vilified in life and, since his death, his eccentricities have often been more remembered than his achievements. However, Buckland's foundational work in stratigraphy and palaeontology – his explanation of a hyena den at Kirkdale won him the Royal Society's Copley Medal – and his early acceptance of glacial theory put him firmly at the forefront of early nineteenth century geological endeavour. Equally at home with queens and quarrymen, William Buckland's humanity shone through in everything he did. Appointed Dean of Westminster in 1845, he did not hesitate to use his new position to advocate scientific solutions to the problems of famine and disease. In this talk I shall aim to restore the memory of this geological hero by describing his long and eventful life and outlining some of his many achievements, both in geology and in the wider world.

Thursday 22nd October: What does a Geologist do for a Cathedral? (YGS).

Dr Mike Ashton (Ashton Geology Ltd).

Lincoln Cathedral is unique amongst the great English Gothic Cathedrals in being built of the stone upon which it rests and working its own quarry that provides that stone. For the last 150 years the 'Lincoln Stone' used for the renovation and maintenance of the cathedral has been quarried from the Dean and Chapter Pit in the northern part of the city. The recent decommissioning of the quarry has presented Chapter with a series of new challenges centred around replacing the stone supply: whether to replicate the current quarry installation, or to seek

external supplies of 'Lincoln Stone' or to use other UK or foreign sources of stone. These decisions are complicated by contrasting views on whether 'Lincoln Stone' is confined to the City of Lincoln area. Part of the dilemma revolves around the parochial terminology applied to building stones compared to that used for their 'geological host formations'.

In this talk I will illustrate the range of masonry and conservation skills that are applied in maintaining the fabric of Lincoln Cathedral, before characterising geologically the 'Lincoln Stone' and placing it in its broader stratigraphical and depositional context within the Middle Jurassic Lincolnshire Limestone Formation. From this sedimentological vantage point I will discuss examples of how the pure geology can be used to guide the applied needs of the Cathedral either in the search for any potential new quarry site or the evaluation of externally sourced building stones of local or foreign origin. Finally, I will propose how the conflicts of terminology and understanding can be resolved through the development of a stone characterisation archive that can underpin decision making around the Cathedral's fabric activity in the future.

Wednesday 28th October: Fire and rain: exploring the links between weather, climate, and volcanism.

Dr Jamie Farquharson (University of Miami, USA).

It is well understood that volcanic activity can influence Earth's climate: the 1783 eruption of Laki, Iceland, blasted enough sulfur dioxide into the atmosphere to cause a drop in global mean temperatures and crop failures as far away as India. Similarly, ash from the 1815 eruption of Mount Tambora, Indonesia, circumnavigated the globe, reduced global mean temperatures, and was a critical factor leading to the 1816 "Year Without a Summer". However, the inverse phenomenon—the initiation of volcanic activity due to external factors—remains both contentious and poorly-studied.

Discrete case study examples exist: research at a handful of volcanoes—such as Mount St Helens (USA), Soufrière Hills volcano (Montserrat), and Piton de la Fournaise (La Réunion)—has demonstrated that volcanic activity can, on occasion, be triggered by heavy rainfall. Kīlauea Volcano, Hawai'i, USA, provides a recent demonstration of how rainfall may directly trigger the movement of magma from deep in the crust to the Earth's surface. Indeed, historical patterns of Kīlauea's eruptive activity suggest that its volcanic behavior is often modulated by increased periods of rainfall, both seasonally and aseasonally. The question remains: are these geographically discrete examples purely random, or are they symptomatic of a prevalent underlying link between volcanic activity and the hydrological cycle?

With the advent of spaceborne precipitation detection systems, we can explore this phenomenon on a global scale. We find that a significant correlation exists between eruption occurrence and the timing of the rainy season at several individual volcanoes and across certain volcanic regions. Due to anthropogenic climate change, many parts of the world are anticipated to experience a change in annual mean precipitation and—potentially more importantly—increases in extreme precipitation. In the context of our ever-changing global climate, understanding external modulation of volcanic activity remains an important frontier topic.

Tuesday 10 November: Geology of the Cononish Gold Deposit and Exploring for Gold in Scotland (YGS).

Charlie King (Scotgold Resources Ltd.)

Since its discovery in 1984 the Cononish Gold and Silver deposit has held the interest of keen geologists worldwide, with both its unique setting and complex history putting it on the map. In this talk I will discuss the geology of this high grade, narrow vein deposit and what the practical implications are for mining as the Cononish Mine is brought into production at the end of this year. I will also discuss how the knowledge we have gained from Cononish is aiding exploration efforts and may ultimately help us to discover the next gold and silver deposit in Scotland.

Wednesday 18th November: The Jurassic Coast: the biggest story on Earth (WGCG).

Richard Edmunds. (former Earth Science Manager for the Site and the first warden of the Charmouth Heritage Coast Centre).

A look at the Dorset and East Devon coast World Heritage Site;
185 million years of the Earth's geological history explored in the global context of plate tectonics, extinction events and the evolutionary steps that eventually led to us.

Tuesday 24th November: The rise and fall of the dinosaurs (North of England Institute of Mining and Mechanical Engineers).

Prof. Steve Brusatte (University of Edinburgh).

The dinosaurs ruled the Earth for over 150 million years, evolving into spectacular giants like *Brontosaurus* and *T. rex*. In this talk, palaeontologist Steve Brusatte, author of the book *The Rise and Fall of the Dinosaurs*, will recount the story of where dinosaurs came from, how they rose up to dominance, how most of them went extinct when a giant asteroid hit, and how some of them lived on as today's birds. At a time when *Homo sapiens* has existed for less than 200,000 years and we are already talking about planetary extinction, dinosaurs are timely reminder of what humans can learn from the magnificent creatures that ruled the Earth before us.

Tuesday 1st December: Minerals of the East Midlands (Geological Society EM).

Roy Starkey.

Roy's research interests are in the areas of British topographical mineralogy, the history of mineralogy, and the mineralogy of Scotland in particular. He published his first book - *Crystal Mountains – Minerals of the Cairngorms*, in September 2014; and followed this with *Minerals of the English Midlands* in September 2018. He has authored numerous research papers.

Wednesday 2nd December: How useful is legacy oil and gas data for nascent geoenergy activities onshore in the UK.

Dr Mark Ireland (Newcastle University).

The decarbonisation of energy systems to achieve net zero carbon emissions will likely require the rapid development of carbon capture and storage, energy storage in the subsurface and geothermal energy projects. Subsurface data such as seismic reflection surveys and borehole data will be vital for geoscientists and engineers to carry out comprehensive assessments of both the opportunities and risks for these developments. However, often, relative immature activities, such as the recent controversial hydraulic fracturing for shale gas in the UK, may be associated with greater subsurface uncertainty. This includes the geological uncertainties associated with resource characterisation, as well as the those which are associated with potentially negative environmental and societal impacts. What may have been considered an acceptable level of geological uncertainty for one activity in the past, may no longer socially be perceived as acceptable.

Through looking at the characteristics of legacy oil and gas datasets aspects of geological uncertainty in the deep subsurface of the UK are explored. Specifically, the spatial coverage and chronology of the acquisition of key seismic reflection and borehole data acquired for onshore hydrocarbon and coal exploration in the UK are examined, as well as aspect of data resolution and limitations. The implications of the spatial variability in subsurface datasets and the associated subsurface uncertainties will be discussed, as this is vitally important to understanding the suitability of data for future geoenergy activities and decision making.

Despite over a century of subsurface data collection onshore UK, there remains significant subsurface uncertainty, which in part are due to the quality and accessibility of existing key subsurface datasets. An awareness of the limitations of available datasets is critically important when considering subsurface interpretations and modelling, which often assume perfect knowledge. Understanding the provenance and quality of data are vitally important for future geoenergy activities and public confidence in subsurface activities. There is still a relative paucity of both well and seismic data across the onshore UK, and considerable uncertainty in many of the models and predictions that are generated from these data.

Wednesday 9th December: History and Hidden Gems of the Lapworth Museum of Geology (WGCG).

Aerona Moore (Lapworth Museum, Birmingham).

The Lapworth Museum of Geology holds the finest and most extensive collections of fossils, minerals and rocks in the Midlands. Dating back to 1880, it is one of the oldest specialist geological museums in the UK. Enabling visitors to explore life over the past 3.5 billion years, the Lapworth Museum showcases exceptional objects of both scientific and historical importance.

This talk will reveal the Museums fascinating history and its recent transformational redevelopment. Hear about the influential geologists who have contributed to the Museum's collections, including Charles Lapworth whom the Museum is named after.

Leicester Literary and Philosophical Society, Section C (Geology) Winter Programme, 2020-2021

Future programme 2021. On Zoom until further notice.

Titles in **bold** are arranged by the Section and start at 1930. Others are by invitation from other Societies and *may start at different times*. More details are on the relevant web sites listed at the end. There may be additional lectures offered and these will be circulated if available.

Wednesday 13th January: Lava Delta Systems on the Northeast Atlantic Margin *and* The Value of Core; from Continental Shelf to Bookshelf by Kirstie Wright (Heriot-Watt University).

Wednesday 20th January: Hydrology of London Underground by Jonathan Paul.

Wednesday 20th January: Castle Bank: a new Ordovician Burgess Shale-type fauna from Wales by Joe Botting (WGCG).

Thursday January 21st: Geology of Islay by David Webster. A virtual tour of the geology of Islay, including its 2 billion year old gneisses, 700 million year old tillites, and 12 year old malt whiskies (YGS).

Wednesday 10th February: Chasing recent and historical earthquakes around the world by Dr Zoe Mildon (University of Plymouth/University of Cambridge).

Wednesday 17th February: Geological Time and the Anthropocene by Ian Fairchild (WGCG).

Thursday 25th February: A new (exciting) opportunity for future geothermal energy in Yorkshire by Nick Shaw. Yorkshires rich resource history might allow a revival at our doorstep – it is time for a “down to earth” look at geothermal. Come learn more about how Yorkshire can play a pivotal role in decarbonising the UK's heat demands (YGS).

Wednesday 10th March: tbc

Wednesday 17th March: Skye meteorites by Dr Simon Drake.

Wednesday 24th March Annual General Meeting and Chairman's Address.

Monday 12th April Joint meeting with the Parent Body: **Ethiopia from top to bottom: using seismology to understand how tectonic plates rise, split, then fall** by Dr Ian Bastow (Imperial College, London).

Wednesday 21st April: Noel Worley tbc.

YGS Yorkshire Geology Society www.yorksgeolsoc.org.uk/events

WGSG Warwickshire Geology and Conservation Group www.wgsg.co.uk/talks

SECTION C COMMITTEE 2020 – 2021

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