

WGCG

Hidden wonders in the
landscape of Warwickshire

Warwickshire Geological Conservation Group

WGCG NEWSLETTER No. 48



Mam Tor - Peak District

Autumn 2024

On the cover: Photograph from the WGCG Peak District field weekend, one of 2 annual residential trips organised by WGCG. See the main article in the newsletter for more details.

WGCG does not accept any responsibility for views and opinions expressed by individual authors in this newsletter.

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WGCG ORGANISATION

i WGCG Aims and Objectives

WGCG is a charity operating under the rules of its constitution adopted 19th October 2011. It has two specific aims;

- A. To advance the education of the public of the significance of geology for the understanding and aesthetic appreciation of landscapes, for human settlements and economic activity, for recreation and leisure and for ecology.
- B. To conserve the geological heritage of Warwickshire through identification and active conservation of geological sites and through fostering an interest in and knowledge of the geology and landscapes of Warwickshire.

We achieve these objectives by:

- Holding educational meetings from September to April for members and non-members
- Holding field excursions of short, medium and long duration throughout April to September for the benefit of members and non-members.
- Monitor and maintain an LGS register and annually undertake geo-conservation of selected exposures within Warwickshire.
- Hold an annual educational workshop in February.
- Working with 3rd party organisations such as The Geology Trusts and participate in externally organised events e.g. "Ask a Geologist" quarterly event at Warwick Museum
- Installing and maintaining information panels at key geological exposures
- Producing information brochures of local geological walks and exposures
- Providing a point of contact for geological support in Warwickshire for other organisations such as schools, local planning, etc
- Through the funding of educational awards

ii Appeal to members

WGCG needs volunteers. We have a specific need for someone to volunteer to become a Trustee at the next AGM in November. This is a great way to discover all about the range of activities that take place within our organisation and a chance to influence decisions on the direction of the group. The trustees are the Management Committee. A broad range of skills within the management committee thus having a degree in geology is not essential. The first year as a trustee is mostly learning the ropes. Committee meetings are held on Zoom 6 times a year. Your location is not an issue for this role. Please complete the form on the following page to apply.

It is understood that providing your time is a valuable resource. However, the rewards are plentiful and varied. Please carefully consider this opportunity to assist the Group.

iii Soapbox

Got something to say? send your contribution to NEWSLETTER via email to warwickshiregcg@gmail.com

Warwickshire Geological Conservation Group Election of Trustees 2024

Nominations must reach The Secretary by 30th October 2024.

I would like to nominate the following member to serve as a Trustee of the WGCG.

Name of nominee (print):

Address:

e-mail:

Tel:

I, (name of Nominee) am willing to stand for election as a Trustee and, in accordance with **Charity Commission Rules, am not a disqualified person.** * see note 1

Signed

(by Nominee)

Personal statement (optional) :

Proposed by:

Name (print):

Address:

e-mail:

Tel:

Signature:

Date:

Note 1: The Nominee and Proposer must be paid up members of the Group. No-one under 18 can be a trustee of a charitable trust. For further information see <http://www.charitycommission.gov.uk/Library/guidance/cc30text.pdf>

Those disqualified from acting as Trustees (according to sections 178-180 of the Charities Act 2011) include:

- A. anyone who has an unspent conviction involving deception or dishonesty
- B. anyone who is an undischarged bankrupt
- C. anyone who has been removed from trusteeship of a charity by the Court or Commission for misconduct or mismanagement, and
- D. anyone under a disqualification order under the Company Directors Disqualification Act 1986
- E. Anyone who has entered into a composition or arrangement with their creditors which includes an individual voluntary arrangement (IVA), and is currently on the Insolvency Register

Note 2: This form may be returned by e-mail to warwickshiregcg@gmail.com. Confirmation of receipt will be returned by e-mail .

FROM THE CHAIR (Stuart Burley)



You will have noticed that already the evenings are drawing in, and the ambient air temperature has a distinctly autumnal feel to it. Our successful summer of field excursions and activities have drawn to a close, and I look forward to our winter programme of talks, which promises to be very entertaining. We start the winter programme with a talk from Phil Manning, of TV dinosaur fame, on his extraordinary discoveries in the Badlands of the south-central USA and their interpretation. Mike Simms will then talk us through the evidence for the Carnian Pluvial Event and its implications, which is of particular relevance to Warwickshire as we have exceptional exposures of the Arden Sandstone around the county. The Arden Sandstone of course was deposited in the Carnian (late Triassic) and provides very good evidence of flooding during Carnian times. I look forward to seeing you at these events.

In this newsletter you will find reports of our summer field excursions and other events WGCG has participated in. You could gain the impression that we have had a glorious summer of sunshine and blue skies given the photographs accompanying the articles. Or maybe Mike Allen is blessed with extraordinary powers of weather forecasting ! He has certainly done WGCG proud as chair of the Education Committee in delivering superb field trips and wonderfully interesting winter lecture programmes. During the recent Education Committee meeting I was amazed to hear that Mike has chaired this committee for 10 years – I know very well from my own participation in the Education Committee what a tremendous effort Mike and the rest of the committee dedicate to putting these programmes together for the membership. My thanks are extended to all of the committee, and to Mike in particular. Mike has now decided to stand down from the Education Committee next year to let new people get involved in our education activities and bring fresh ideas. We will miss Mikes enthusiasm for organising events and his wide network of contacts, but I am sure he will be most willing to help out when we need the benefit of his knowledge.

If you are interested in joining the Education Committee, or any of the other committees, please do contact me, Ray Pratt or any of the Trustees. We will be delighted to have a conversation with you and provide any support you need.

We continue our recent theme of introducing WGCG officers to the membership in this edition of the newsletter. Both Christine Hodgson and Ian Fenwick are long standing supporters of WGCG who have both been involved in several committees over many years. Their reflections highlight that you do not have to be a geologist or have any geological background to be an active committee member – enthusiasm and a general desire to learn are the only requirements. Working with one of our committees is indeed a hugely rewarding experience. WGCG sponsors university students, various charitable causes, engages with the public and local schools – so as well as providing our members with events we are a very outward looking organisation. We are extraordinarily fortunate to have reserve funds from the Rob Holloway bequest to enable us to do this. If we change only one young persons' life to take an interest in the natural world through our efforts then they are most definitely worthwhile. You can contribute to such activities through your active engagement.

EDITORIAL (Ray Pratt)



I am pleased to report that our Public Engagement programme is in regular action through participation in organised events including GeoWeek (Kenilworth Nature Week), The Warwick Folk Festival and our quarterly Ask a Geologist sessions at Warwick Museum. It is great to see the level of support we are getting from members to assist these sessions. Following every event, we get a short list of people expressing an interest in WGCG, some of which go onto become members. This newsletter contains two reports on these activities.

If you would like to get involved with the "Ask a Geologist" session at Warwick Museum or any other of our activities simply get in touch and we will fit you in.

Not resting on our laurels, the Management Committee are focussing on how we can attract more student members as discussed in this newsletter. We currently have 5 and hope to double this number in the next year. We have included some abstracts from student reports we have received from universities participating in our awards scheme in order that members can get an appreciation of how WGCG Holloway funding is being used.

A big thank you for the activity reports that have been submitted by a number of our members. The range of walks and talks has been very good. Despite this, the numbers attending our summer field trip programme has been a bit disappointing. Regrettably the wet start to summer may have been a significant contributor to this. We did see a good turnout in a recent event at Tardebigge, led by Mike Allen and assisted by glorious weather. The residential field trip participant numbers have been disappointing and we report on actions under consideration to counter this trend.

The Education sub-committee have organised a full season of talks for the winter programme, listed in this newsletter. We will continue the use of St Francis for the 2024-25 talks season. Other nearby societies events are also listed where available. Not yet organised are our site conservation work plans. These will be circulated to members as soon as they become available.

OFFICERS CORNER



Christine Hodgson

Christine Hodgson

Some thirty years ago I was introduced to WGCG during an Environmental Studies course run by Warwick University. I was welcomed then and have made good friends. Early meetings in St John's Museum heard original reports on sites of special geological interest in Warwickshire worthy of conservation (then RIGS since reclassified). Now we have 100 LGS and 20 SSSI listed, many of which I've visited and joined in their site monitoring and conservation required. When this work increased our responsibilities led us to become a Charity and I was one of the first Trustees. Not all are geologists, WGCG has always benefited from having members in diverse occupations and find this gives us a wider view of a shared interest.

As a chemist my special interest is in metamorphic rocks, fostered by the Open University Geology Degree and other University courses. Special field trips took me abroad, some as far as Oman, Ethiopia and Greenland. Many UK visits enjoyed, fondly Wales and often Scotland with its islands, gave me contacts who provided welcome Zooms when we were in lockdown. Previously as Chair of the Education Committee I had arranged residential weekend field trips for members and together we planned the meetings and day trips. In 2022 it was a great privilege to be awarded Honorary Membership of WGCG and I hope to enjoy meetings and continue being useful!



Ian Fenwick

Ian Fenwick

Rarely is one asked to take a retrospective look at one's life but I suppose this comes with age! It forces you to try and sift out the mundane from the vaguely eventful and significant.

My first encounter with the Group was in 2002 when we moved to Kenilworth from Reading where I had lectured in Physical Geography at the University – so I had some acquaintance with basic geology, but there were huge gaps where I had no understanding whatsoever. In that we knew nobody in the area, the discovery of the Group opened up the possibility of encountering others with similar interests.

Soon I began to be excited by the idea of geo-conservation – new to me – and took on the role of RIGS (now Local Geological Sites) Officer. So, I was visiting sites to assess their 'state of health' & looking for others that might be worthy of protection. This provided me with the opportunity to explore the county, one in which I had never set foot previously! And, importantly, meeting up with people who would become friends.

Effectively, I was a geological novice, heavily reliant on the willing advice and support of a few professional geologists in the association. But it made me realise how amateurs could make a meaningful contribution to the success of WGCG. Moreover, I could continue my love of field work by contributing to some of the 'geology' field trips. I soon realised that a geographical perspective had something to contribute in what was seemingly the undisputed domain of the hard rock geologists.

The 'noughties' were a time when Aggregates Levy (a tax on extractive industries) funding was available to groups such as ours to undertake conservation and public interpretation projects. Several grants involving £10-20k were secured which completely overshadowed the normal WGCG budget of c. £1000 p.a. Much good work was done but managing such huge sums was not in the DNA of a small volunteer group. One such project on the Quaternary Geology of S. Warks ran into difficulties because the project officer moved to a better post. In that I was a 'gardener' in the eyes of my hard-rock geology friends, I offered to see this project through.

Sadly, it became clear that some of the expenditure headings were being liberally interpreted! It was at this point that red lights started flashing and members began to shy away from joining the Committee. Should things go badly wrong, the risks were too great. Change had to happen! For a year or so, a small working group investigated structures which might provide some protection for our management team. To cut a long story short, in 2008 it was settled that the Group should become a Charitable trust with higher standards of financial management providing trustees with protection against litigation.

So it was that, in 2009, 9 trustees were elected and I found myself as the first chair of the new body! A far cry from the level of involvement I had imagined when I joined in 2002! But the job was just about to become so much bigger! Fortunately, I had the support of a stalwart and capable bunch of trustees – only two of them geologists. However, they all brought different skills to the table and, critically, they all had in common enthusiasm and fidelity. The moral is clear – volunteering, enthusiastic amateurs can really make the Group hum!

In 2010, one of our members, Rob Holloway, sadly died after a long illness. To our astonishment, he left virtually the whole of his estate to the Group – some £300k. In that he had been involved with young people throughout his life, he asked that some of the funds be used to support young geologists setting out on their careers, as well as allowing WGCG to expand its programme of public engagement, so fulfilling one of the prime demands imposed by Charity status – to provide ‘public benefit’. To date some £150k, essentially from the income derived from the investments, has been spent to fulfil his wishes – and long may it continue!

By 2012, I had been chairing the Group through a turbulent few years during which it had achieved Charity status, a membership knocking on 100, and had put in place the structures to support the Holloway Bequest, it seemed appropriate to hand on the baton to another Geographer, Brian Ellis.

In ‘retirement’, I have, with the help of several willing volunteers created a valuable resource of specimens, built around Rob’s own vast collection which we rescued from his leaking garage in Tamworth! With other donations it now stands at c.1000 items - rocks, fossils, minerals and structures.

FROM THE TRUSTEES - a summary of management committee meetings

- In May the WGCG investment manager gave the trustees a rundown on the performance of current investments and his thoughts for future investments. No changes in WGCG investment policy were agreed by the trustees. At the same meeting WGCG Treasurer gave the trustees a briefing on the state of WGCG finances. Internet banking finally became a reality for WGCG after several years of trying.
- New Charity Commission guidelines on policies were discussed in February and action apportioned to individual trustees. We aim to have these in place before the 2024 AGM
- The MC confirmed participation in the Warwick Folk Fringe Festival as part of our Public Engagement programme. Other events include our popular Ask a Geologist held quarterly at Warwick Museum, GeoWeek activities (last week of May), and Earth Science Week (mid-October).
- A review of alternative meeting facilities was undertaken following a price rise at St Francis. We will continue to use St Francis for the 2024 -25 season of talks.
- Brian Ellis and Anne Morton have now stepped down from administering the Holloway Awards programme. The trustees will take over all Holloway awards administration from June 2024. The Trustees would like to thank Brian and Anne for their dedicated commitment to this important area of WGCG activity.
- Updates to the Trustee Folder (WGCG governing document) will need to be made to update changes in finance procedures, awards procedures and Charity Commission new policy requirements.

- Despite rising costs for all WGCG activities the Management Committee have decided to hold membership fees to £15 per year unlike many other groups. In addition, tea & coffee at meetings will be available free of charge for 2024-25. WGCG membership is outstanding value.
- In an effort to make residential field trips more affordable to members the management are considering a new flat fee based on a daily charge. We hope to have this in place for our 2025 field season.
- Efforts are underway to encourage more students to become members of WGCG. Student members will be able to participate in field excursions and the annual workshop, free of charge.
- The WGCG database has largely been digitally copied to the cloud, making it accessible to WGCG officers wherever they may find themselves. The project is still ongoing.
- Management Committee Holloway Award meetings are held biannually in January and July.

Online Activity



LinkedIn Gareth Jenkins

Post	Type	Likes	Comments	Impressions	Reposts
EGGS collaboration	Repost	131	4		4
Warwick Jazz Fringe Festival	Post	41	0	1387	1
Moor Wood, Hartshill event flyer	Post	19	2	1147	2
Moor Wood, conservation	Post	44	0	1270	0
Earth Heritage magazine article	Post	147	5	8839	0
Lydney logging course	Post	8	0	704	0
Tardebigge event flyer	Post	17	1	1108	0
Saltwells event flyer	Post	20	4	1555	2
Time travel at Kenilworth flyer	Post	20	1	705	1
Gondwanaland lecture flyer	Post	19	0	796	1
Ask the Geologist	Post	52	2		1

This is a professional audience most within the construction industry



X (Twitter) Jon Radley

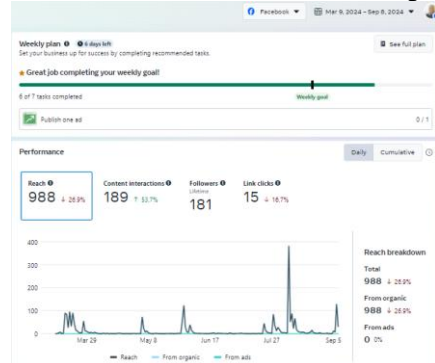
Numbers for August 2024

103 posts, typically each with 620 impressions (viewed) and 60 engagements, 27 likes and 5 reposts

We have 2521 followers worldwide ranging from industrial and academic geologists and students, to conservationists, museum curators, natural historians and amateur collectors.



Kathrin Schürumpf



WGCG Facebook page following has a broad age range, with c. 95% living within the Warwickshire area.

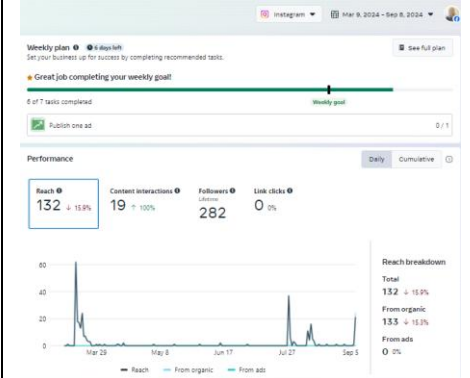
YouTube - Ray Pratt

Our YouTube channel continues to be popular with our top 8 videos each attracting an average of over 1000 views. They have an enduring appeal, all gathering further viewings with time. The two videos most popular are the Geology of Iceland and the Geology of Arran, both talks given by Stuart Blake.

5 videos have been posted in the last 5 months averaging 87 views each.



Kathrin Schürumpf



Instagram appeals to a younger audience but only 4% in the Warwickshire area and 35% within the UK. A large percentage is global

GEO NEWS

The UK is bidding to bring the 38th International Geological Congress to Glasgow in 2028. Visit <http://www.igc2028glasgow.org> for updates

The Geological Society and other learned societies resident in Burlington House have had the "Sword of Damocles" removed from their heads with the 999 years lease agreement for their apartments in Burlington House, London.

In its 2023 Annual Report the Geological Society has recorded a surge in new members along with an improved retention of existing members. Membership increased by nearly 300 in total. This is the first growth in membership since 2018.

Chris Damon was awarded the Geologists Association 2024 Halstead medal for his organisation of the Nationwide Geology Club which provides geological field trips in the UK and abroad. He does this in conjunction with running his Geosupplies shop and the production of the Down to Earth magazine which all WGCG members receive free of charge.

As a member of WGCG you receive our biannual newsletter and the monthly Down to Earth publications delivered directly to your inbox. However you can also get access to many other geological periodicals and educational material from the links we provide on our website. Simply click the links below to take you to our WGCG link pages. Happy Reading
<https://www.wgcg.co.uk/links/>

In Particular, you may wish to read the article in the latest edition of the Earth Heritage Trust Magazine contributed by WGCG Trustee Gareth Jenkins [EH-61-Final.pdf \(earthheritage.org.uk\)](#)

EDUCATION & STUDENT SECTION

Calling all geoscience school teachers. The Geological Societies Schools Geology Challenge is a prestigious annual competition held online with the finals at Burlington House in London. To find out more go to <https://www.geolsoc.org.uk/geochallenge>

Miss Molecule & Friends is a free educational resource to inspire and engage young people into STEM subjects. To find out more visit <https://www.missmolecule.co.uk>

Need a box of rocks for teaching aids? then the following sources are ready to help;
WGCG Send an email to warwickshiregcg@gmail.com and Peter Hawksworth will get onto it without delay

The Geologists Association will also provide a box of rocks to a school on request. Contact Haydon Bailey <https://www.schoolrocks@geologistsassociation.org.uk>

The Earth Heritage Trust have a number of fossil boxes available for schools
<https://earthheritagetrust.org/fossils/>

BGS Rock loan kits

<https://www.bgs.ac.uk/discovering-geology/maps-and-resources/rock-loan-kits/>

Links to educational material

- Digitising of Charles Lyell notebooks is almost complete and available from www.lyell.ed.ac.uk
- Teaching resources from the Geological Society can be downloaded from www.geolsoc.org.uk/resources
- The Geological Society also have a list of useful posters that can be downloaded and printed <https://www.geolsoc.org.uk/Posters>
- Geo Conversation podcasts with Marissa Lo can be found on www.geoscientist.Online
- Cone Penetration Testing (CPT) are logging instruments widely used on and offshore for geotechnical evaluation of the near subsurface. Used widely pre construction or engineering installations such as rig location or pipeline laying these tools have developed significantly since their early days where they were limited to soil strength. Want to learn more about these tools. Fugro offers free courses around the country. For more information contact Steve Poulter via email: s.poulter@fugro.com
- Want to get paid while you pursue a geoscience degree? Well a Geoscience Degree Apprenticeship may be for you. For more information about the Geoscience Degree Apprenticeship, visit the Institute for Apprenticeships and Technical Education website: www.instituteforapprenticeships.org/apprenticeship-standards/geoscientist-integrated-degree
- Geo-tourism is big business with the growth in UNESCO Global Geoparks. The latest to be added to this list is our neighbouring Black Country UNESCO Geopark which is in many ways unique. To explore more <https://blackcountrygeopark.dudley.gov.uk/bcg/>
- The GA "Geology From Your Sofa" was introduced during Covid and contains numerous links to educational videos and virtual field trips from around the country <https://geologistsassociation.org.uk/sofageology/>
- The GA Lectures are available on <https://geologistsassociation.org.uk/galecturesforall/>
- WGCG YouTube channel contains a number of lectures and virtual field trips <https://www.youtube.com/channel/UCf0fXO5P2BlSTFBsj9NWQrw>
- The Geological Society has a large catalogue of talks on YouTube https://www.youtube.com/results?search_query=geological+society+london
- Based in the NW USA Nick Zentner has created a large library of excellent geology lectures and virtual field trips. https://www.youtube.com/results?search_query=nick+zentner
- Rob Butler has put together a nice collection of tectonic videos https://www.youtube.com/results?search_query=rob+butler+geology
- BGS Seabed geology mapping. <https://www.bgs.ac.uk/datasets/bgs-seabed-geology/>
- The American Geoscience Institute have a lot of online free training sessions and a big video library. Well worth a visit. <https://www.americangeosciences.org/>
- Another society from across the pond that you may find of use is the Geological Society of America <https://www.geosociety.org/> Here you can download the GSA 2022 chronostratigraphic chart <https://rock.geosociety.org/net/documents/gsa/timescale/timescl.pdf?v=2022>
- Alternatively the 2023 Chronostratigraphic chart from the IUGS International Commission on Stratigraphy can be downloaded from <https://stratigraphy.org/ICSchart/ChronostratChart2023-04.pdf>

Student Contributions (Field Report Abstracts)

Mapping the Borrowdale Volcanics in Great Langdale Summer Vacation Project CSM3379 Daisy Marsh, Camborne School of Mines, University of Exeter January 2024

This thesis provides a comprehensive geological history of Great Langdale, English Lake District. It covers the lithostratigraphy and structural history of 8 km² bedrock geology, mapped at a scale of 1:10,000. The area consists of tuffs, ignimbrites, volcaniclastic lake sediments, and igneous intrusions. The 18 units mapped are part of the Borrowdale Volcanic Group which formed in the Ordovician Period. The oldest unit mapped is called Andesite Sheet Flows and the youngest the Lincomb Tarns Formation. There are two separate intrusive igneous units; dacite and andesite. Some tuffs and ignimbrite units have varying thicknesses across the mapping area. The largest unit variation is in the Long Top Member, which ranges from 52 – 200 m thick. Unconformities occur in between Andesite Sheet Flow and Wetside Edge Member, both below and above Lingmell Member, and in between Dungeon Ghyll Member and Pavey Ark Member. The volcanic units have a porphyritic texture with predominantly plagioclase phenocrysts and a recrystallised cryptocrystalline matrix. Garnet, orthoclase, and quartz are included in some units and regional metamorphism has led to replacement epidote and chlorite. Great Langdale is a highly complex area of folds and faults and has been subject to at least five phases of deformation making this a challenging area to map. Structural measurements describe bedding, cleavage, eutaxitic fabric, flow banding and slickenlines. The bedding was found to be predominantly dipping gently north. The cleavage dips northwest more steeply. Also, a fold on The Band and numerous soft sediment deformation on Bowfell were mapped.

Kirkby Stephens in Minecraft, Ed McGowan, University of Leicester January 2024

Overview of project outcome

I was successfully able to produce a 3D digital recreation of geology at Kirkby Stephen within Minecraft and published it on my website. Unfortunately, the original plan of recreating a 6 km² area had to be scaled down to 1 km². This is due to the amount of time it took to place the blocks. Upon researching how other Minecraft builders create such large areas, it became apparent they use a mix of mods only available on Windows computers (I own a MacBook), teams of builders, or take hundreds of hours to complete their projects. However, I focussed on an area that had the most range of geology and believe the map still has the same benefits a larger map would provide. Within the map, players are given a field note book with descriptions of the geology, based on my own observations, and tools to dig in order to explore the local geology.

Geology for Climbers, Bethan McCarroll, University of Leicester January 2024

The proposal submitted was to write some leaflets showcasing the geology of popular climbing destinations around the UK. These leaflets aimed to teach climbers more about the rocks they climb on and spread knowledge and passion for geology. With support from the Holloway Bursary 2 leaflets have been created, one on the Carboniferous Limestone of Gower and one on the Peak District Gritstone.

The leaflets have been made in a similar style, making them identifiable as a set. They have been laid out and written to make them accessible to a wide audience, and the geological language is kept basic so no prior knowledge of the topic is needed. The climbing routes suggested also make it accessible to a range of climbing experience levels with easy and challenging options in both sport and traditional climbing styles.

The geology of Gower leaflet was distributed at the BMC (British Mountaineering Council) Gower Climbing Festival event where over 350 climbers from all over the UK attended. People were very excited to have a resource to teach them more about the geology of the area and the rocks they were going to climb on. An online survey was created to gather written feedback on the leaflets. 100% of responses agreed the leaflet was easy to understand and had a good layout. All responses also indicated they would like to see more leaflets on the geology of other popular climbing destinations, suggestions included; Portland, the Peak District, South Wales sandstone and Schist in the Alps.

[Download: Bethan McCarroll Geology for climbers leaflet](#)

The Geology of San Emiliano, Abigail Massey, University of Keele, February 2024

Abstract The area of San Emiliano in Cantabria- Northern Spain was mapped in July 2024 with the aim of producing a geological map, cross section and GVS of the area to gain a better understanding of the lithology and the story behind its deposition. Field observations were the main source of data when constructing the geological map and desk-based interpretations were used where formations were poorly exposed, the vegetation was too thick to walk through (or the topography was too steep to safely get to outcrops). The mapped area contains four groups, Group 1 is the oldest and lies in the north of the map, it was deposited during the lower Cambrian in a shallow marine environment and contains three formations: the Chomba La Guarda formation, Cow formation and the Las Vallinas formation. It has one formation of muds and silts which have a red/ brown colour and two formations of crystalline dolostone. Group 2 was deposited next during the middle Cambrian and also lies in the north of the mapping area; it comprises one formation called the Vegetation formation which is a glauconitic sandstone deposited in a shallow marine environment. Group 3 was deposited at around the same time as Group 2 and is made up of two formations: the Guzpillera formation and the Steep Hill formation, both lying in the north west of the mapping area, this group was deposited in a tidal upper facies environment possibly close to a beach and comprises pink and white orthoquartzites. The youngest group is Group four which was deposited during the Carboniferous, it covers the bottom two thirds of the mapping area and contains 3 formations: The Farm Land formation, the El Rebordillo formation and the La Majua formation. The El Rebordillo formation is a carbonate mudstone that has been dolomitised and the other two formations comprise mixed muds and silts which are brown/ black in colour (all deposited in a shallow marine environment). The stratigraphy of the mapping area is the right way up and youngs upwards, however the area has been affected by thrust faulting and the oldest group (Group 1) has been thrust on top of the youngest group (Group 4).

GEOLOGY OF THE AREA AROUND SAN EMILIANO, CANTABRIA, SPAIN, Oluwafeyikunmi Michael-Idowu, University of Keele, January 2024

This dissertation investigated the geological evolution of the area around the San Emiliano region in Cantabria, north-western Spain, with the main focus of mapping and analysing the sedimentary formations of the Cambrian to Carboniferous periods.

This research was conducted over a four-week period, from the 2nd to the 30th of July 2023, through a methodology that combined detailed fieldwork and desk study research that involved sediment composition analysis (through thin section imagery) and further geological and structural analysis (through aerial photography). This project aimed to interpret the area's complex stratigraphic and structural background.

There were eight distinct sedimentary formations identified. These formations displayed the transition from a shallow marine environment in the early Cambrian period to the thrust influenced cyclic fluctuation within the shallow marine environment during the Carboniferous period. Structural deformation was also

documented in the area. The thrust and extensional faults played a significant role in the region's geological evolution. Additionally, this study also highlights widespread dolomitisation and recrystallisation within the mapping area; these provide valuable insights into the area's diagenetic history.

The geology of the area around Coniston in the English Lake District, Jack Taylor, University of Keele, March 2024

The purpose of the project is to geologically map 10km² of the area of Coniston, noting lithology textures, bedding types and structures to create geological formations, members, and informal units. This information is used to derive the depositional processes, geological setting, structural evolution, and geological history of the mapped area.

The study was carried out by producing a geological field slip as well as notes over a period of 30 days using a range of mapping techniques such as traverse mapping, boundary following, feature mapping and green line mapping for complex and isolated areas. Preliminary work was also undertaken using DEM data to determine concave and convex lines in aid of areas where geology had a direct relationship with topography, which was minimal. Office-based techniques include the use of Google Earth for the interpretation of some fault and boundaries for the fair copy map.

The study has determined a dominant volcanic environment based on lithology types that were deposited from a range of processes including pyroclastic flow, fall and surge with a dynamic geological history ranging from the late Ordovician period, with a strong volcanism phase, to a rising sea level during the early Silurian period. The mapped area is dominated by a wide range of structures such as columnar jointing, tilted bedding, slaty cleavage, angular unconformity, and wrench faults, with normal faults being the dominant type, likely due to caldera collapse and batholith emplacement as a result of volcanism generated from the subduction of Iapetus Ocean.

The geology of the area surrounding Baslow and Grindleford, KEELEY BEESTON, University of Keele, January 2024

The mapping area surrounding the towns and villages of Baslow, Eyam and Grindleford was termed 'Big Moor' due to the abundance of moorland and marshland across the district (see introduction for an exact reference of the area mapped). The purpose of this dissertation is to investigate the bedrock and superficial geology of the Big Moor area, with the use of traditional fieldwork techniques and modern, desk based techniques. Thus it can be considered a 'hybrid' project, due to poor outcrop exposure and fieldwork time constraints.

Firstly, informative reading of the literature led to the curation of a succinct, relevant literature synthesis, which has been reduced for the dictated size of the dissertation. Secondly, desk based techniques were used to investigate the validity of the memoirs and results of the literature review. This included examining and correlating borehole logs, acquired from the British Geological Survey, which evidenced a N-S orientated 'split' of the lithologies, with carbonates primarily occupying the west – southwest, and the clastic formations dominating the east. Further landscape analysis allowed for the estimated mapping of superficial deposits, as well as an estimation of some large scale boundaries.

Then, traditional fieldwork was carried out. This consisted of reconnaissance mapping to get an overview of the basic strata, then traverse mapping and green line mapping in the east of the map, prioritising the sections where multiple lithologies appeared in quick succession. Finally, boundary mapping techniques allowed for the accurate placement of boundaries, presenting folded strata and slip-strike faults.

In conclusion, the expectation of this hybrid project was to investigate the geology of the area surrounding Big Moor, culminating in relevant, appropriate formations and thorough structural detail. This was achieved in the overall dissertation and mapping poster, which is explained in a detailed and evidenced geological evolution of the area, particularly during the Carboniferous period.

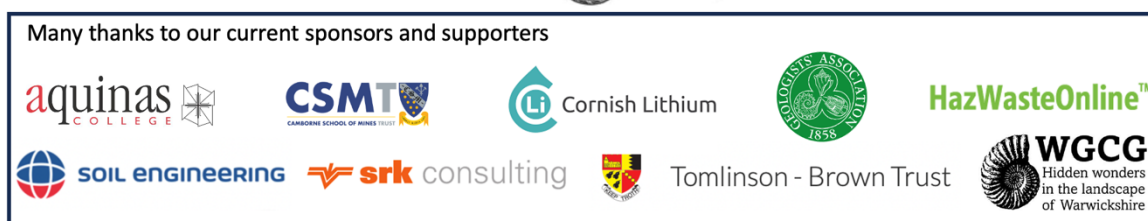
ESTA/EGU Geoscience Education Summer School 2024 – Report to sponsors

Once again, the ESTA-EGU Geoscience Summer School was held at Aquinas College Stockport at the beginning of the summer break (29th July – 2nd August). This year 11 delegates were trained to teach up to A level standard. All had geoscience related degrees and were qualified teachers of science or geography from all parts of the country including Scotland; either recently qualified or already established in the profession. Of these, five have been given the green light to be teaching geology at their school by 2026, and two already have geology in their schools. Three others are resolved to encourage their school to start up geology or at the very least set up a promote the subject amongst their students by bringing the ideas into their teaching. Finally, one delegate is a science PGCE teacher trainer at Cambridge University and attended as she wishes to bring geoscience firmly back onto the science PGCE training curriculum at her university.

The course covered all the pedagogical aspects of teaching geology as a school subject including practical work, integrated fieldwork, 3D spatial thinking skills and an understanding of the many misconceptions that are passed onto students by non-specialists and the media. Sessions were also provided in ‘thinking like a geoscientist’, updates on plate tectonic theory and teaching strategies based on Earth Learning Idea activities. We were delighted that Prof. Chris Jackson was able to give a keynote address entitled “Can Geology save the world” (it can...if we work at it!). Prior to the course delegates had to complete a written ‘knowledge and understanding task’ featuring a selection of A level examination questions. Many of the activities were documented on social media (LinkedIn) and a selection of photos is available here and on the Earth Learning website (https://www.earthlearningidea.com/home/Photo_gallery_11.html).

Our grateful thanks to all our sponsors without whom the 2024 Geoscience Education Summer School would not have been possible. The following logos were included on all resources and the course formally endorsed by the Geological Society of London. We were also pleased that Simon Baxter (Soil Engineering) was able to join us again for a brief spell to share with us his firm’s rationale for supporting Summer School and to outline career opportunities in his sector. We offer this invitation to all our sponsors and would love for you to join us at some point at future events.

Endorsed by the
Geological Society of London



During the evaluation of the course delegates were asked “Do you have a particular message you would like to forward onto your sponsors?” A selection of their responses are as follows:

Thank you so much for funding this excellent summer school. CPD is never cheap and to have all food, accommodation, tuition and resources provided for by your kind generosity is very much appreciated.

Thank you for providing funding for this course. As an educator we rarely get CPD of this quality that is specific and genuinely useful.

Thank you so much for your sponsorship - you are changing the world of geoscience; one Earth Learning Idea at a time!

A full analysis of the lessons learned from delegate evaluation sheets is in the process of being completed but responses were entirely favourable and summed up by one delegate who answered the evaluation question – “Would you recommend this course to your colleagues, and why?” with the following:

“Yes, because it was the best CPD I've ever done. The course tutors were hugely knowledgeable and experienced, the course was focused, with no irrelevant sessions and it was great fun being taught and meeting new people.”

Pete Loader
(EGU Geoscience Field Officer - UK)
August 2024

2023-24 HOLLOWAY AWARDS

Brian Ellis and Anne Morton have now stepped down from administering these awards, which will now be handled collectively by the Management Committee.

Digitising of Charles Lyell notebooks is almost complete and available on www.lyell.ed.ac.uk

Holloway Award pledges for 2023-24 - update

Award	Pledge	Note
Teacher Training and CPD		
ESTA Geoscience Summer School	£1500	
ESTA Subscription	£45	
Student Individual Projects		
Birmingham University	£2400	Based on 6 students
CSM (Exeter University)	1200	Based on 3 students
Keele University	1200	Based on 3 students
Other		
Tara Sunang-Joret (Portsmouth University)	400	field camp in Wyoming USA
Total Pledges	£6,745	

PAST EVENTS

PUBLIC ENGAGEMENT EVENTS

Quarterly **Ask a Geologist at Warwick Museum*** (Gareth Jenkins, Kathrin Schüttrumpf, Peter Hawksworth, Joe Mazgajczyk, Anthony Allen, Chris Vincett, Ray Pratt)

GeoWeek 25/5 - 2/6/24

Report by Ray Pratt

GeoWeek is a national event in which geoscience communities around the land are encouraged to put on events to celebrate and raise awareness within the community of the importance of geo-sciences in everyday life. During this week WGCG commonly holds free to attend events in order to promote interest in WGCG activities, increase membership and add to our friends list. Whilst we treat these as public engagement campaigns WGCG members are also encouraged to participate bringing along friends and family. Accompanied children are also welcome.

GeoWeek and the Kenilworth Council event "Nature Week" coincide. Participation in the latter enables us to benefit from Council promotion of our events attracting people we would normally not be able to reach. This was the second year we have worked with the council on holding events.

Deep Time Travel through Old Kenilworth led by Ray Pratt (26/5/24) attracted 16 registrants, but due to bad weather concerns only 9 turned up. Commencing at the Abbey Fields car park we began with an explanation of Geological Time in relation to Archaeological time using a 24 hour clock to aid understanding. It is fair to say that several of the participants had no prior concept of geological time and were amazed. The tour began with an inspection of the nearby stone bridge with its visible sedimentary features. The participants were informed what geologists could determine from the colour and visible features of these rocks. Here the concept of plate tectonics was used to explain why tropical desert conditions that had prevailed at the time of the deposition of the Kenilworth sandstone existed where we were standing today. This was clearly a jaw dropping nugget of information for some.

From here we walked to Abbey Barn (now a museum) taking a look at some of the gravestones nearby. Being on the outer edge of the church cemetery many of these graves were younger than those nearest the church, postdating the coming of the railway to Kenilworth. This enabled more exotic stones to be brought in and used as memorial stones for loved ones past. Near the barn there are several tombs made from colourful igneous rocks. The basic three geological rock categories were explained and then a simple explanation of the types of igneous rocks was given using the gravestones as examples. Thereafter the participants were invited to guess which category of rock type we were viewing. They soon got the hang of it.

From the Abbey Barn and its locally manufactured bricks (which several of the group were knowledgeable on) we walked through the Abbey ruins to St Nicholas Church. Inside the church we looked at the wall mounted marbles and the serpentinite step leading to the altar, discussing how pre railway stone would have been brought in a high cost only by those with money. In the porch way of the church we saw "early recycling" i.e. old gravestones had been used to pave the entrance. Attention was drawn to the very old tiling

at floor level in the church entrance. The stained glass within the church was a relatively recent addition, a Victorian fad.

From the church we ventured onto the high street of old Kenilworth observing most of the features listed in the Old Kenilworth Building Stones brochure as well as the variations in the stone sets and the use of different geological materials for the roofing. The probable origin on both types of material were discussed.

The last example of stone viewed was the White Lias sets seen in the road gutter near "Little Virginia", the oldest part of Old Kenilworth. Here we added a little hydrochloric acid to one of the sets to explain the chemical reaction between carbonates and acid. Very positive feedback of this trip was received.



Marble memorial C.1772



Serpentinite step to alter - St Nicholas church



Marble memorial C. 1670

A Scientific Walk along Kenilworth Greenway (Forge lane to Kenilworth Cutting Exposure)

led by **Ray Pratt** (30/5/24).

Only 6 people registered for this event with only 3 turning up on a damp Thursday afternoon. The lesson to be learned from this was don't hold weekday events during the day, (unless the weather can be guaranteed), and ensure better promotion of events is undertaken.

This aim of this short walk was to try to explore the interconnection of flora & fauna with the underlying geology. This was a first attempt at an integrated walk and talk. Attempts to recruit someone with an understanding of ecology to assist were unsuccessful. Since the walk two offers of assistance have been made which we can build upon for a future repeat of this walk.

There are several information panels along the walk introducing the reader to biodiversity within the area.

Now a Local Nature Reserve, Kenilworth Common has a long history traced back to its creation in 1756. Back then it offered rough grazing land and was covered with heathland and acidic grassland. There were no more grazing cattle after the 1800's and oak and birch trees moved in, creating the woodland we enjoy today.

Finham Brook along the southern edge of the reserve hosts a population of brown trout and provides a rich fishing ground for the kingfisher. Split by the Coventry to Leamington Spa railway, the reserve still has remnants of heathland, which is now a rare habitat in Warwickshire. There's bracken and

wavy hair-grass with broom and heath bedstraw all further reminders of a habitat once common locally.

Gorse and heather grow outside the reserve on undisturbed slopes where slow-worm and common lizard have been observed. Spring flowers colour the woodland floor and summer welcomes fairytale glow-worms. In autumn a range of fungi appear including amethyst deceiver, ugly milkcap and fly agaric, whilst a crisp winter visit provides clear viewing of colourful finches, tits and jays.

WGCG also has an information panel beside the exposure of the Kenilworth Sandstone Formation.

Geology directly influences the character of our landscape, habitats and species. This diverse and dynamic geological past has produced the diversity of landscape we see around us. There is a direct relationship between geodiversity and biodiversity. Geology influences climate, a good example being the rainfall variance between NW and NE England as a consequence of the Pennines.

Key points for participants

1.
 - i Geodiversity = Biodiversity
 - ii Geology dictates soil development and impacts soil type. Minerals in soil come from the underlying rock. As a rule, limestone yields a thin well drained alkaline soil, mudstones yield a thick fertile soil, sandstones and clays of the Midlands create slightly acidic soils good for heathland and pastures
e.g. at Burton Dassett the limestones give thin well drained pastures, whereas the mudstones give thicker soil development, are not so well drained. Remnants of ridge and furrow agriculture are still evident from medieval times on the mudstone slopes.
 - iii Rock impacts soil pH and drainage which influences flora
 - iv The geology dictates drainage patterns. *e.g. Tree line / spring line on hills at Burton Dassett*
 - v All variables combine to provide a mosaic of habitats
2. The Wolstonian glaciation, (300000 years ago), covered Warwickshire. This event reshaped the landscape and created the current river drainage patterns. During this glacial event much of the soil and vegetation were cleared leaving bare rock on which glacial till was deposited on retreat. Rivers and eskers deposited sands and gravels.
3. Following glacial retreat grass and heath land would have quickly developed. However, this would have been short lived as trees would take over.
4. Land management is required to maintain heathland and grassland environments.
5. Bare rocks are desirable for insects, reptiles, nesting birds and some invertebrates - University of Birmingham studies at Bar Beacon in Walsall indicate a proliferation of bees that create nesting holes with south facing rock faces. Bees are a key species for the fertilisation of crops and other plants and are thus a crucial component for biodiversity.
6. Generally, there is a poor understanding of the bio-diversity in geo-sites and the geo-diversity in biological sites
7. Variations in landscape impact the weather *e.g. Pennines and Welsh Mountains*
8. Geology is a record of palaeo environments. The contrast in the glacial depositional environments of the common and the underlying Permian bedrock exposed at the cutting were discussed



Kenilworth Sandstone at Kenilworth Cutting

Urban Geology of Warwick - led by John Radley 31/5/24 -

Cancelled due to lack of interest

Only one person signed up for this generally very popular walk so resulting in the rescheduling of this event to **September 13th 2024** (Earth Science Week). Again we suspect that we failed to advertise this event to members, friends and the general public sufficiently well enough.

Ask A Geologist, Warwick Museum, Saturday 1st June

Report by Chris Vincett

On a rather cold Saturday on 1st June we hosted a morning called 'Ask a Geologist' at Market Hall Museum, in Market Square in the heart of Warwick. This has become a regular event for the Warwickshire Geological Conservation Group, but it was the first time I had done it and it was really enjoyable for both the visitors and those of us who met them (Kathrin Schütrumpf, Ray Pratt, Peter Hawksworth and Chris Vincett).



Kathrin, Peter, Chris & Ray lay out the WGCG Ask a Geologist stall in Warwick Museum

We set up three tables in the ground floor of the museum, with examples of rock specimens, sand and gravel from various locations around the world, fossils, mineral crystals and geodes., along with maps, pictures, and other things of interest on boards. One item of great interest to many visitors was a hand-held digital microscope connected to a tablet, which showed in incredible detail things like the rock crystals and fins of fossil fish.



Kathrin displaying the electronic microscope to a young visitor

Over three hours or so, we had a constant stream of visitors, most whom had clearly come specifically to meet us. The youngsters ranged from small toddlers up to teenagers, accompanied by parents, grandparents, or other responsible adults. Many came armed with bags of rocks, fossils, and other items, collected from their gardens, local walks and, commonly, holiday locations around the UK and abroad. Many of the items were things like flints in interesting shapes, or quartz with interesting colours or features. However, some were quite surprising. One little girl had a piece of black gravel, and stated it was magnetic. A piece of magnetite on the table had drawn lots of interest, by demonstrating that it could deflect a small compass. Sure enough, the specimen presented also managed to deflect the compass so was definitely magnetic. When asked where it had come from, it was apparently recovered from a cliff face on the Norfolk coast. After a bit of head scratching, we (the 'experts') decided the most likely way it could have got there was to have been brought over as an erratic from Scandinavia in the last glaciation. This sparked fascination in the concept of the effect of glaciation on our landscape and in forming the islands we now live on. Later research shows that pieces of magnetite have indeed been recorded in the Glacial Till of East Anglia, which is nice to have found out.

Young people are on a constant journey of discovery and combining the concept of millions of years of history with simple specimens gathered from under their feet, really does spark their imagination. This was often also picked up by the adults, who may never have considered the concept of geological time in relation to the normal view of human history. It is so important that we do whatever we can to continue to feed young minds with such questions and (hopefully) answers. Schools currently hardly touch on Geology directly, or even on aspects of physical geography linked to formation of the landscape or what lies under our feet. With the future of our zero-carbon society being utterly dependent on environmentally friendly ways of utilising the resources from the ground at our disposal, it is essential that in future generations there will be a detailed interest and understanding of Geology. This can only come when the seeds of childish intrigue are fed with nuggets of information from those of us who do possess some knowledge. Universities

need to continue to provide courses in geology to provide the expertise needed in the future. Lack of geological knowledge in today's young people at school will reduce applications to universities, with the knock-on effect that universities will cease to offer courses in Geology. This is already happening, so community events like Ask a Geologist, and school visits are essential.



Ray and Chris engaging with the public

The next 'Ask a Geologist' at Warwick Museum is on 7th September 2024 (10.30am - 1.30pm). Entry to the museum is free and it provides a fascinating chance to discuss anything geological that comes up, from volcanoes to dinosaurs to coastal erosion. Do come along and encourage anyone you know to bring some young people along. It's a really fascinating eye-opener! It is also a useful way of showing the WGCG to the local community and maybe attracting new members.

Warwick Folk Festival 28th July 2024

Report by Joe Mazgajczyk



Joe Mazgajczyk and Marketa Kicmerova with an interested younger audience

On Sunday 28th July 2024, WGCG participated in the Warwickshire Fringe Folk Festival with a stall to showcase the group and local geology. Volunteers Gareth Jenkins, Joe Mazgajczyk, Marketa Kicmerova, Brian Ellis and Mel Bianco engaged with the public about the geology and fossil specimens on show as well as advertising the wide range of events the group runs. It was a successful day with fantastic participation from the public resulting in 11 new names for the newsletter. Overall, it was a great day talking about geology along with some Morris Dancers, folk music and sun!

GEO-CONSERVATION

Local Geological Site 11. Moor Wood Railway Cutting, Nuneaton. 20/7/24

Report by Gareth Jenkins

This LGS is a disused railway cutting to the north west of Chapel End. Exposure of the Outwoods Shale Formation of the Upper Cambrian Stockingford Shale Group 495 to 505 million years. This site is believed to be the type locality for the fossil trilobite *Pseudagnostus* (*Sulcatagnostus*) *securiger* (Lake). In addition, a

2m section of coarse-grained pebbly sandstone ascribed to the Carboniferous Millstone Grit has been revealed in the past decade.

Ahead of the 18th August field trip to Moor Wood one of the exposures needed a bit of assistance to show itself off.



Before



After



Lauren Sewell, Tom Collins, Gareth Jenkins, Andrew Sanderson, Jane Alum, Mike Allen

Thank you for those who attended on the 19th July to undertake this clean up and conservation work. Special thanks go to Tom Collins and Mike Allen for organising the works.

LGS Sites 71 & 92 Seven Trent Water - Will Messenger & Ray Pratt

Seven Trent contacted us to advise of their plans to lay pipes in the vicinity of LGS site 71, Oldbury Grange Sills and LGS site 92 Chapel Green Fillongley.

LGS71 states: *"This is a geomorphological feature which displays two bifurcating hill ridges created by intrusive igneous sills. The lower ground between the sills is occupied by Cambrian Outwoods Shale Formation. Small exposures reportedly exist of both the shale and the sill rock".*



Photo by Ray Pratt 2/8/24

LGS92 states: "Section 1 (South side): comprises a quarried face c.25m x 6m high in the Keresley Member of the Salop Formation (Upper Carboniferous) which has weathered to reveal cross-bedding. The sediment in the lower 1.5m has accumulated as a massive, well jointed, uniform medium to coarse ferruginous gritstone. Above, there is 2m of well jointed, thinly bedded sandstone".

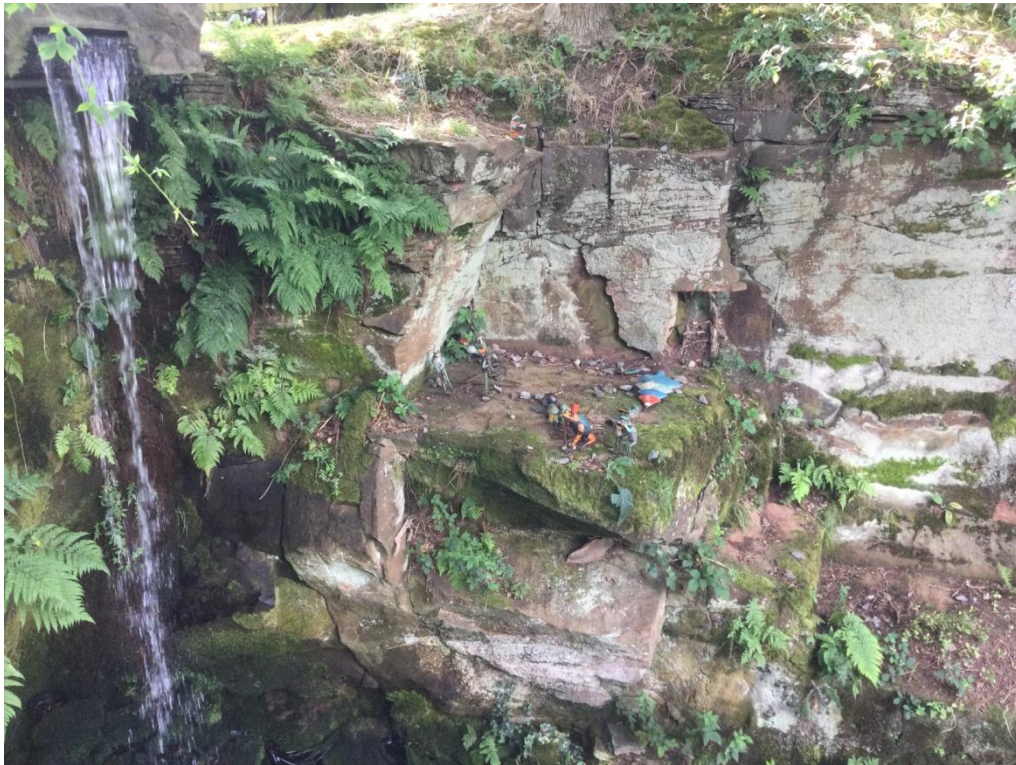


Photo by Ray Pratt 2/8/24

LGS92 states: "Section 2 (North side): comprises a section c.10m x 2m high with two distinct units separated by a fault. The unit on the left is a medium to coarse bright orange ferruginous gritstone with a 'rubbly' bedding while that on the right displays fine bedding in ~30mm units and is a duller brown in colour".



Photo by Ray Pratt 2/8/24

FIELD EXCURSIONS:

WGCG Field Trip to Suffolk: 15th - 17th September 2023 - led by Tim Holt-Wilson

Report by Mike Allen. Attendance 8

My records suggest that this would be the Society's first visit to the Suffolk Coast, so the eight participants were breaking new ground when meeting up on Friday evening to meet our local guide, Tim Holt-Wilson, for an introductory briefing in the Market Hall meeting room in Saxmundham.

Things took an unexpected turn when reconvening the following morning at the Pakefield Holiday Village, only to find that the intended meeting place by the Coastwatch was out of bounds: the site had been taken over by the World Petanque / Boules Championships which were in full flow on our arrival. We were all ushered to an alternative parking area, but were further concerned by the lack of a leader! Tim's car had failed him on his journey home the night before, but he had fortunately been able to engage the assistance of a friend to deliver him to Pakefield shortly after our arrival. All in all an inauspicious start, but the Gods were back with us thereafter.

And so to some geology. We were all well aware after the briefing that the weekend would be concerned mostly with the most recent geological past – the last 4 million years in fact – with older formations at just one location. A simplified summary of the stratigraphy, adapted from Tim's information, is as follows:

	<u>(approx. age)</u>	<u>Formations</u>	<u>Comments</u>
HOLOCENE			
Flandrian	0.01 Ma	<i>Breydon Formation</i>	freshwater peat / alluvium / coastal sand & shingle
UPPER PLEISTOCENE			
Devensian	0.02 Ma [Ma = million years]		(latest Pleistocene....last glacial event)
MIDDLE PLEISTOCENE			
Anglian	0.44 Ma	<i>Lowestoft Formation</i>	) glacial till &
	c. 0.50 Ma	<i>Corton / Happisburgh Fm.</i>	) outwash deposits
Cromerian	1.7 - 0.5 Ma	<i>Kesgrave Formation</i>	sands & gravels (early R. Thames deposits)
	1.7 - 0.5 Ma	<i>'Cromer Forest-Bed'</i>	freshwater & marine deposits
LOWER PLEISTOCENE			
	2.4 - 0.6 Ma	<i>Wroxham Crag Fm.</i>	(also known as <i>Weybourne Crag Fm.</i>)
		<i>Norwich Crag Fm.</i>includes:	<i>Westleton (Beds) Member</i>
			<i>Easton Bavents (Clay) Member</i>
			<i>Chillesford Clay (= Chillesford Mbr).</i>
			<i>Chillesford Sands (= Chillesford Church Mbr.)</i>
PLIOCENE			
(part Pleistocene)	2.9 - 2.5 Ma	<i>Red Crag Formation</i>	fossil-rich marine sands
	4.0 - 3.6 Ma	<i>Coralline Crag Fm.</i>	sandy, fossiliferous, marine limestone
MIOCENE			
	c. 7.0 Ma	<i>'Trimley Sands'</i>	marine sandstone ('boxstones')
EOCENE			
	52 Ma	<i>London Clay Formation</i>	marine mudstone
	c. 55 Ma	<i>Harwich Formation</i>	marine sandy / silty clay ('cementstones')
PALAEOCENE			
	56 Ma	<i>Reading Formation</i>	floodplain mudstones and sandstones



The lower part of the cliff section west of the Coastguard station at **Pakefield (1)**, exposes shallow marine deposits (Pakefield Member) of Lower Pleistocene age assigned to the youngest part of the Wroxham Crag. It includes material brought in by ancestral river systems such as the 'Proto-Thames' and Bytham rivers.

The most interesting member of the Middle Pleistocene, pre-Anglian 'Cromerian Complex', the organic-rich Cromer Forest-Bed **(2)**, is no longer exposed, due to a build up of recent sediment following coastal defence work at Lowestoft. Elsewhere this bed has yielded a varied mammalian fauna including the celebrated West Runton Elephant as well as evidence of the earliest human occupation of Britain.



The overlying Corton Sands **(3)** comprise glacial material once believed to be related to the Scandinavian 'Anglian' ice sheet but this interpretation has been questioned and re-assigned instead to an older, pre-Anglian, Scottish ice sheet. They are characterised by a wide variety of 'erratic' constituents derived from Jurassic and Cretaceous rocks, notably chert, quartzitic rocks and more specific lithologies such as Kimmeridgian septarian concretions and 'Ditropa-Rock' containing the eponymous polychaete annelid worm casts.



4) Pakefield Cliffs: Lowestoft Till with cryoturbation lobes

The upper part of the cliffs reveal the Lowestoft Till, which is assigned with greater confidence to the most severe, Anglian, glacial event. The uppermost layers preserve fine cryoturbation structures **(4)** formed, perhaps, during peri-glacial conditions as the ice waned.





(5) St. Andrew's Church, Covehithe

St. Andrew's Church at **Covehithe (5)**, while still safely some 500m. inland, is increasingly compromised by the fast eroding coastline hereabouts, retreating around 5m. annually. The current church was built in the late 17th century, partly reusing material from its ?15th century predecessor, whose ruins include some fine, square-knapped, black flint 'flushwork'.

(6) Covehithe Cliffs: Remnants of disrupted infrastructures damaged by coastal retreat

A short walk brought us to the abrupt end of the tarmac road, which now plunges over the edge of the cliff. A cliff top track to the north led down to the beach at **Benacre Broad**. Along the way we could look down over the cliff-edge to see the upper members of the Norwich Crag (Easton Barents Clay and Westleton Beds) overlain by a thin cap of the same Lowestoft till seen at Pakefield. Also hanging out of these cliffs are the unedifying vestiges of human conflict: pipes, cables and fragments of pillboxes dating from World War 2! **(6)**



(7) Benacre Broad: fringed by weather-blasted trees

Benacre Broad itself is a brackish tidal inlet subject to regular breaches of the narrow shingle barrier, created around 300 years ago and now adorned by gnarled trees blasted by salt spray during winter storms **(7)**.

8) (Benacre Cliffs): Norwich Crag at nearby Easton Bavents with sand-martin nesting holes. (From 'Tides of Change' with permission @ Tim Holt-Wilson)

The low cliffs comprise sandy deposits which may be part of the Norwich Crag or younger and equivalent to the Kesgrave Sands – opinions seem to differ. They are riddled with nesting holes of sand martins **(8)**, while the broad is an important breeding site for the little tern and ringed plover.



(9) Westleton Common: Norwich Crag (Westleton Beds Member)

After lunch at the Five Bells in Wrentham, we moved slightly inland to visit a site of former gravel extraction on **Westleton Common**. Part of a broader area known as 'The Sandlings', this provided an opportunity to examine more closely the Westleton Beds **(9)**, the uppermost member of the Norwich Crag

(10) Thicker development of the pebbly Westleton Beds in the cliffs at Dunwich. On line with one of the suggested tidal inlets (From 'Tides of Change' with permission @ Tim Holt-Wilson)

This consists of a varied series of silt and sands interbedded with pebbly gravel beds. The coarser units contain many water-rounded, pale-coated flints **(10)** accumulated in high-energy beach-face and tidal environments. They are often chatter-marked and some are characterised by a distinctive 'café-au-lait' staining. Detailed local mapping has revealed a series of aligned linear zones between Southwold and Dunwich in which the gravels exceed 4m. thickness, suggestive of tidal inlets.





(11) Greyfriars Friary, Dunwich: The reconstructed 'Geological Wall'

Saturday's itinerary concluded at **Dunwich**, celebrated for having once been one of Britain's most important North Sea trading ports, now largely lost to coastal retreat. After a brief visit to the splendid and informative village museum, we regrouped on the site of Greyfriars Friary to examine the diversity of rocks used during its construction **(11)**, including some exotic types probably recycled from buildings in the town as it was slowly washed away by the advancing coastline.

Unsurprisingly perhaps, flints dominate the surviving walls that show signs of repair in places. However, these include local beach flints (East Anglian flint is usually black), matt lusted flints from Scandinavia and flints with distinctive internal, coffee-coloured, 'picture' staining (café-au-lait) derived from material originating in the Chalk but recycled into the Crag deposits. Several limestone lithologies are present from which some distinctive provenances can be recognised: oolite from the Peterborough area and a creamy yellow sandy limestone from Caen in Normandy, both brought into the area by human agency for use as ashlar in important buildings such as churches and some 'grander houses'. Harder varieties of Chalk, again from East Anglia, and cementstone from the 'Harwich Stone Bed', at the base of the Eocene London Clay, also feature.



(12) Greyfriars Friary, Dunwich: Garnet schist, presumed Scandinavian origin....did this arrive in ship's ballast, or on an ice sheet?

More exotic rock types from further afield, possibly derived from ship's ballast, include 'Old' and 'New' 'Red Sandstones', quartzite perhaps recycled from Triassic beds of the Midlands, and some igneous contributions (granites, dolerite and andesitic lava). Perhaps the most unexpected lithology was a piece of garnet schist **(12)**, which may have been brought.

in on either Scottish or Scandinavian ice....or in ship's ballast?! All in all, an interesting exercise in recognising a wide range of geological materials

Participants had been left to make their own accommodation arrangements, so plans had been made to meet up for a group dinner in the Poachers Pocket on the outskirts of Saxmundham, which, apart from its limited car park and location along a narrow, but busy, lane, proved a happy choice for good food and atmosphere.

Sunday was spent in the south of the county, meeting up in the morning in the car park at the end of **East Lane, Bawdsey**. A short walk passing one of several substantial and rather forbidding looking martello towers which adorn this stretch of the Suffolk coastline, brought us to some low cliffs with small patches of Red Crag resting unconformably on slumped London Clay.

(13) Bawdsey 'East Lane' Cliffs: Red Crag on London Clay, much slumped

The narrow beach is littered with fallen blocks of both fossiliferous lithologies **(13)**. The older London Clay (Eocene age, c.50 Ma) consists of stiff, blue-grey, silty mudstone which forms a shallow dipping wave-cut platform best seen at low tide.



A wide range of fossils have been discovered in this formation, washed out into tropical waters some 200-500m deep, from a nearby coastline with mangrove swamps not unlike those around present day shorelines of the Indian Ocean. Here we found the main fare was fragments of fossil wood, often pyritised, with other plant remains (seeds, fruits etc.) proving elusive, but one person was fortunate enough to pick up a nice sharks tooth.



(14) Red Crag 'icon': Three examples of *Neptunia contraria* (sinistral coiling) with a 'normal' dextral coiled species for comparison (scale divisions in cm. / mm.)

The contrasting, and much younger Red Crag (Pliocene age c.2.6 Ma) comprises highly fossiliferous, loosely consolidated sands deposited likewise close to a shoreline, but as sandbanks and intertidal sand-flats in shallower water and in a rather cooler or temperate climate. Although

yielding remains of large mammals (both marine and land-dwelling), the main fare are shells (both bivalves and gastropods, including *Neptunia contraria*, distinctive by its sinistral coiling **(14)**).

Tim was at pains to point out the curious iron stained 'boxstones' which may also be found amongst the loose blocks on the beach. These are the only survivals of a Miocene age marine sand deposit (c.7 Ma), the Trimley Sands, from which only hard concretions, typically of matchbox-size, remain. Some of these preserve fossils characteristic of their particular age. This stratum is only found intact on the other side of the North Sea, in Belgium and other parts of Europe.

(15) Shingle Street: Undulating shingle banks (note the water-filled 'slack' on landward margin)

A short distance further up the coast, but reached only by a circuitous network of narrow lanes, **Shingle Street** fully lives up to its name. Situated just beyond the present reach of the celebrated Orford sand-spit (the longest in Europe) further north, the coast hereabouts is a rolling expanse of undulating shingle (15) that stretches for around 3 km. back to East Lane at Bawdsey.



(16) Shingle Street: Shingle ridges marking individual storm events

Intermingled with the many shingle ridges (16) (each marking a single storm event) small 'slacks' (scours or hollows) are filled with water. A small spit is also beginning to develop, mimicking its grander neighbour to the north, and low tides reveal a shifting series of sand bars just offshore. In places, an equally ephemeral presence of thin vegetation has taken hold, but storms and visitors' footfall combine to impede its more persistent development.

Red Crag, Orford Lodge Pit, Chillesford

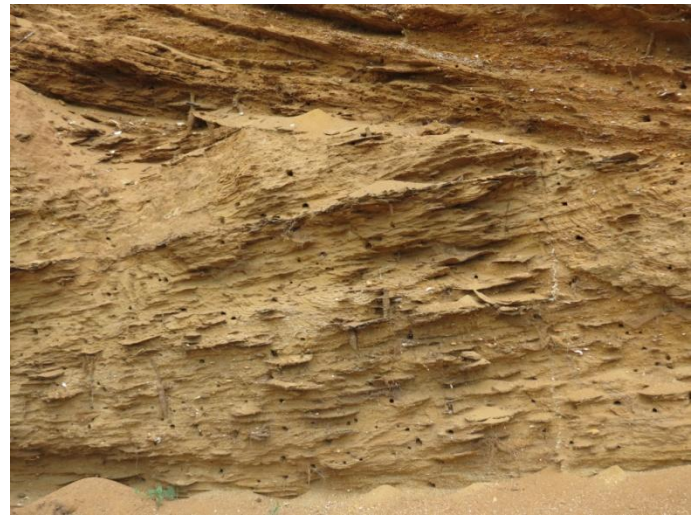
Lunch at the King's Head in Orford was a rather protracted, but very welcome, diversion, before moving back inland to **Chillesford**. This village pays host to several small pits in the Red Crag and lower members of the overlying Norwich Crag (the eponymous Chillesford Sands and overlying Clay). Our time was spent on a walk south of the village to reach a fine section of the Red Crag in **Orford Lodge Pit (17)**. This somewhat isolated exposure reveals three separately identified units within the Red Crag that together mark an upward shallowing sequence of beds interpreted as an increasingly restricted, tide dominated, coastal embayment





(18) Red Crag Lowest Unit

The lowest unit **(18)** consists of planar cross-bedded coarse-grained sands with abraded shells, mainly fragmented bivalves. In places this unit contained weakly cemented infilled joints and sporadic vertical burrows.



(19) Red Crag Middle Unit

The more localised middle unit is the most distinctive due to the many vertical burrows within the trough cross-bedded, bioturbated sands containing much less shell debris. The burrows **(19/20)** are described as being of 'Skolithos' type, generally identified with the inter-tidal zone, with occasional branching types. Both the lower and upper margins of this unit are sharp and erosive.



(20) Red Crag Middle Unit: closer view of burrows ('Skolithos-type')

more strongly rippled. The wealth of sedimentological detail at this site is really one for the specialists!



(21) Top Unit (the redder material) above the Middle Unit (yellowish in colour)

The top unit **(21)** again consists of coarse-grained sands with large-scale, low-angle trough cross-bedding, with sets commonly truncated and locally

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coarse-grained sands with large-scale, low-angle trough cross-bedding, with sets commonly truncated and locally more strongly rippled. The wealth of sedimentological detail at this site is really one for the specialists!

By the time we returned to our vehicles our schedule had slipped too much to allow time to visit the final destination on Tim's itinerary (**Thorpeness**, to see the Coralline Crag), so we halted proceedings with a final show of appreciation for Tim's excellent guidance over the weekend, before heading our respective ways home. There is much more to see in this part of the world, so a return visit might be well worth considering for the future.

FOOTNOTE:

Tim provided us with a link to his publication '*Tides of Change: 2 million years on the Suffolk Coast*' which is also available on-line as a free download.

<https://coastandheaths-nl.org.uk/wp-content/uploads/2022/11/Tides-of-Change-2-million-years-on-the-Suffolk-coast.pdf>

Cement Related Matters. WGCG visit to CEMEX Rugby, 14th May 2024

Report by Janet Tryner (Attendance 18)

Thank you to Gareth for asking me to write about WGCG's tour of CEMEX's Rugby Cement Works and also for allowing me to incorporate in a sound artwork an audio recording of Stuart Burley's speech about Coventry Cathedral's limestone font. As a contemporary artist-archaeologist I'm fascinated by patterns, textures and forms created by human redistributions of matters against the matrix of time.

Consider words on a flimsy page as historical product and archaeological trace of a single mechanism in a chain of motion of beings and matters intersecting with adjoining and overlapping active chains which are also in motion. These chains diversely and deeply intersect in arrangements and agreements, all with their own attendant hierarchies and biases, by-products of which are sophisticated enduring human-lithic relationships.

You can attempt to unwind chains backwards from the lithic components of any designed space. Of course, wound forward in time stone continues to transform as it ever did. Under some of Coventry's 'brutalist' late twentieth-century concrete buildings speleothems; flowstone and calthemite, have formed. Just like stalactites and stalagmites from water flow in limestone caves, but formed instead from water seeping through lime-rich cement and concrete. Surprisingly quick to form, in ideal conditions a calthemite can grow up to 2mm a day (Smith 2023). Their sticky wet surfaces attract dust. On a bridge over the Coventry ring road they have turned black from particulates in the air. Under a microscope it is possible to see these fossilised particles. Responding to problems in combating airborne pollution which partly lies with the inherent invisibility of polluted airs (Calvillo, 2023), I thought calthemite might provide an important clue to making air pollution visible.

The archaeological approach invokes the past. Therefore, visiting the cement works at CEMEX Rugby would, I thought, be a useful step in unwinding calthemites backward chain.

The factory visit was an unusual field trip for WGCG, and it was also my first excursion. Happily everyone was friendly and welcoming. We sat in a conference room for a talk from CEMEX's community liaison manager and public-relations officer about the Portland cement manufacturing processes, clinker, quarries, its 57-mile chalk slurry pipeline, its recent history and place in the UK's production of cement. We also heard about recent adaption's in kiln fuel. From highly calorific coal, to relatively clean burning of tyres, then to unrecyclable domestic waste. This was all usefully aided by plastic and glass jars filled with the relevant matter handed around as they were described.

As an artist I am interested in strong feelings sparked by sensorial experience. I'm looking for things that have resonance. Matters that elicit strong emotions can manifest as attraction or repulsion. Either makes me think something is worthy of further research or artistic prod. Calthemites over Coventry Ring Road attracted me because most people are viscerally repulsed by them. Now I was similarly struck by the jars showing unrecyclable waste fuels.

Were any of the brown polythene scraps in the large jars marked Solid Recovered Fuel (SRF) or Label Waste Shred once mine? I already knew that unrecyclable domestic plastics, mainly inseparable food packaging plastics, from Warwickshire were, rightly, no longer foisted onto other countries to deal with but incinerated rather than sent to landfill. Now I had to wonder how I felt about my waste being burnt to fuel cement production. I admit, I'd fantasised it would heat somewhere else more, I don't know, needful? The direct link was now abruptly clear between my consumption of plastics and the visible physical impact of cement-associated construction on the world.

The tone of CEMEX's role around adaption for net zero greenhouse gases was necessarily serious. Carbon dioxide emissions in the cement process are very high, even though cement does sequester some carbon dioxide during its lifespan. Yet they are lower and more controllable than landfill emissions. It is a pragmatic pay-off that produces an interesting set of unresolved questions of the type that crop up repeatedly in this era of climate change-driven adaption. This time around intersecting fields of food logistics and consumption, fossil fuel extraction, construction, plastic waste and waste management. All arranged as dirty flecks of inseparable plastic and plastic-embedded cardboard and metals in a sweetie jar.

The plant's position in a mixed rural landscape of industry, agriculture and habitation was demonstrated by the view from the top of the plant. Although it was a little too heady for some to enjoy, the vista from the metal gantry on the side of the factory was a highlight for me. The view could also be enjoyed from a firmer position on the other side of the roof.

We also witnessed factory ephemera. A control room containing a bank of monitors and an exercise bike. A steel clinker ball. Outside, a metal mug covered in clinker dust and a model peregrine tied to a railing in a failed attempt to repel pigeons. There was time to pause and watch the huge brown tube-kiln flanked by its air-conditioning units rotating at hypnotic speed. At the end, we handed back our hi-vis jackets, plastic specs and helmets and exited by the garden just as lunch was being taken.

CEMEX Rugby is continuing to open for Heritage Open Weekends. Although this publication arrives too late for this year's, I highly recommend a visit. I uncovered an unexpected personal connection to calthemites and new areas of research for my creative practice MA Contemporary Art & Archaeology final project. Now I just need to source a bag of SRF!

Further reading:

Smith, G.K. (2023) 'Morphology of Speleothems and Calthemites influenced by man-made structures and biota' in *Caves Australia* 224/15-17

Calvillo, N (2023) *Aeropolis: Queering Air in Toxic polluted Worlds*. Columbia Books on Architecture and the City. New York.

Artist website: www.janetryner.com

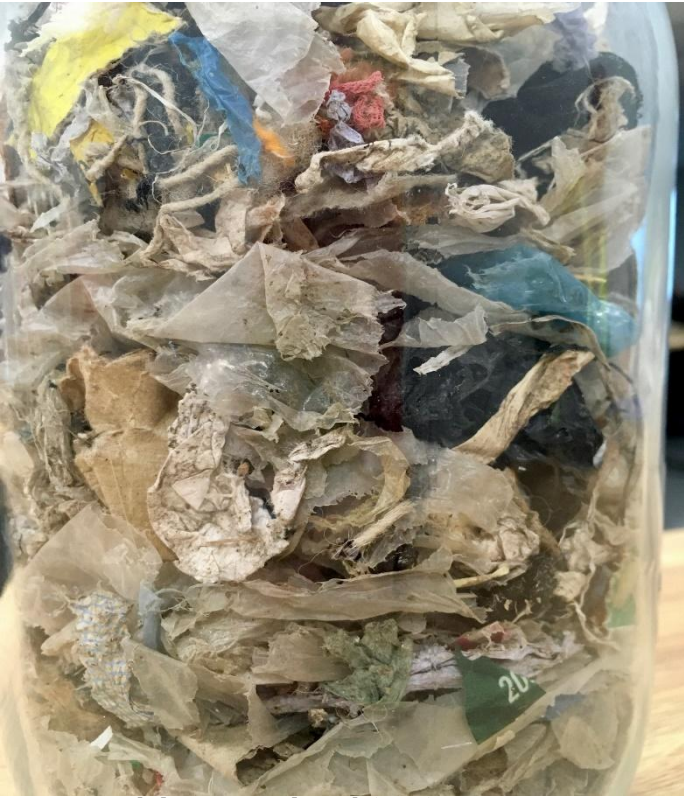
All images credit Janet Tryner.



CEMEX Rugby steel clinker crushing ball



View from gantry over CEMEX Rugby and old clay quarry



CEMEX Solid Recovered Fuel (SRF)



View toward Daventry from gantry at CEMEX Rugby.

WGCG Field Trip to Saltwells National Nature Reserve 22nd June 2024 led by Andrew Harrison

Report by Gareth Jenkins. Attendance 12

Saltwells National Nature Reserve is part of the Global Black Country GeoPark and is located in Dudley, West Midlands. On Saturday 22nd June 2024, Andrew Harrison of the Black Country Geological Society (BCGS) hosted the WGCG to the park and shared his expertise with the group.

Introductions were made at the Saltwells main car park and Andrew explained about the reserve and the wider Black Country GeoPark. Saltwells was designated during COVID in 2020 and covers approximately 100 hectares.

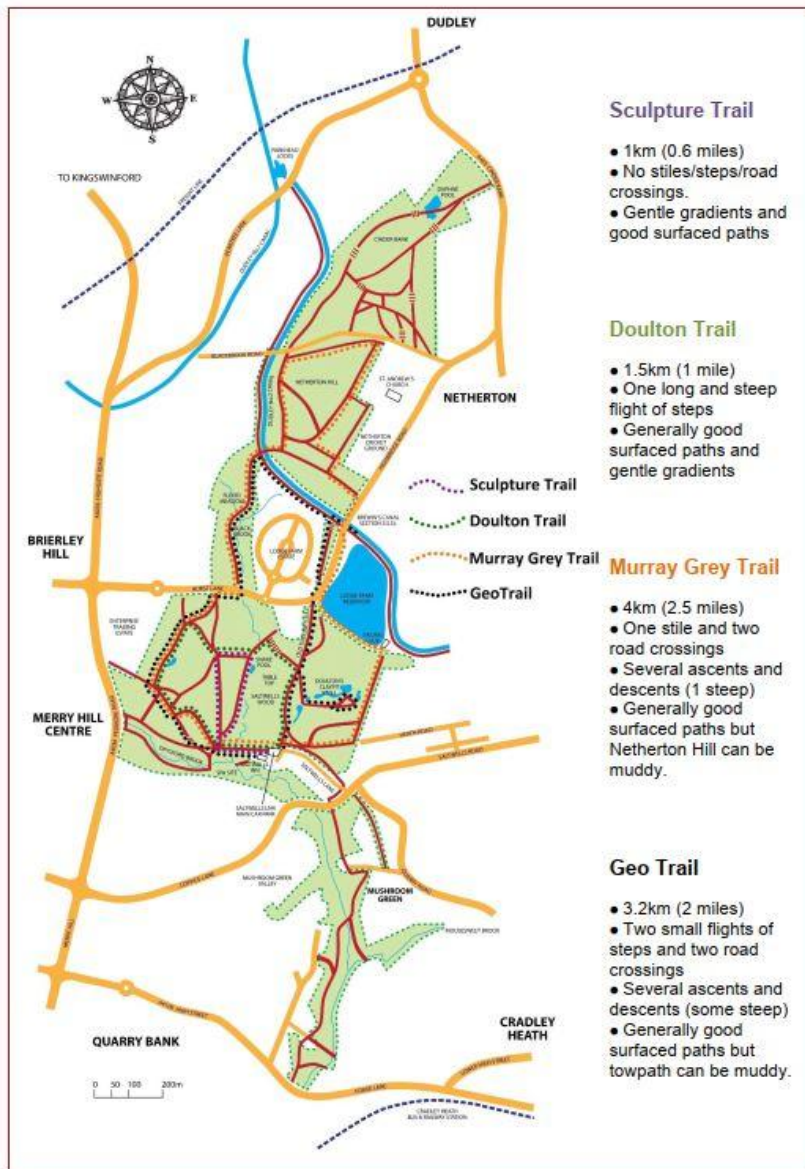
There are three Sites of Special Scientific Interest (SSSI) in the park and they are all geological.

The geology is late Silurian and Carboniferous and the Carboniferous coal measures have been extensively worked for many years prior to closing in 1940.

The SSSIs are:

- Doultons Claypit;
- Brewin's Bridge Canal Section;
- Salt Well

This field trip took us to see the Old Tub Line and Brewin's Bridge with plenty to see in between. In addition to the geological SSSI the area is famed for its woodlands and bluebells. Dudley No2 Canal runs through the park and there are numerous evidences of coal mining to explore.

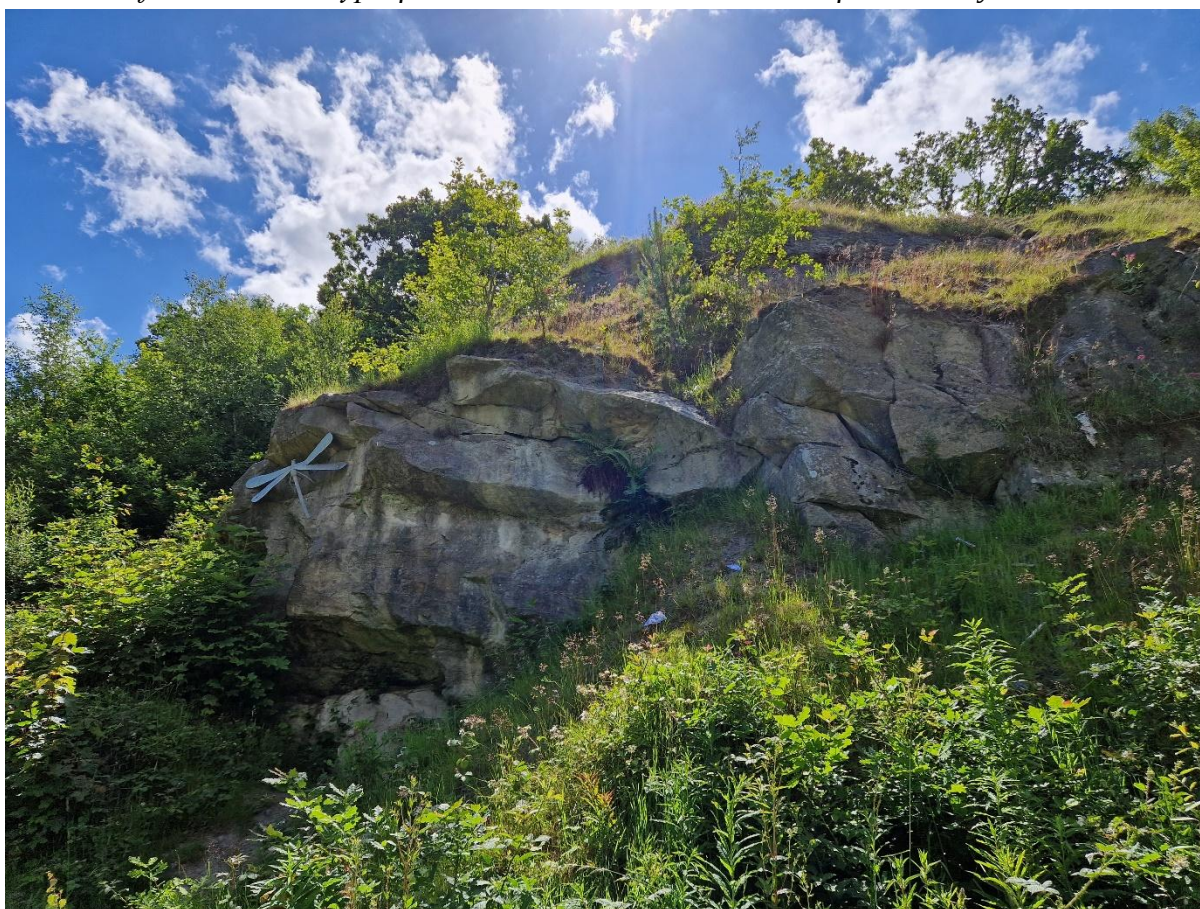


Doulton Claypit

The group set out for a short walk from the car park and walked north and upwards along the Old Tub Line (more later). This led to a spectacular view across Doulton's Claypit. The name comes because the area was once worked up to 1940 by the Royal Doulton ceramics company. The Royal Doulton company worked the seatearths and clays from the pit to manufacture salt glazed sewerage pipes following the cholera outbreak in the 1830s.



The view of Doulton's Claypit from the Old Tub Line on a beautiful June day



The view of the longwall in the east of Doulton's Claypit

The workings have left an exposure of the Pennine Middle Coal Measures (~319-310mya). All the strata dipped steeply to the east at an angle of approximately 35° and show typical cyclothems of sandstone shale and iron ironstone, seatearth and coal. These have been heavily faulted, which has placed older beds up against younger beds.

Andrew explained that at one point the South Staffordshire Thick Coal would have been present on top of the sandstone cliffs but has long since been removed along with marls, fireclays, seatearths and ironstone from within the pit. The Thick Coal was approximately 12m thick and comprised thirteen separate coal seams. Also worked here was the Lower Heathen Coal and the New Mine Coal.

Doulton's Claypit is an ecological SSSI.

Waste and minerals were recovered from the pit and transported by the Old Tub Line, our next stop.

Old Tub Line

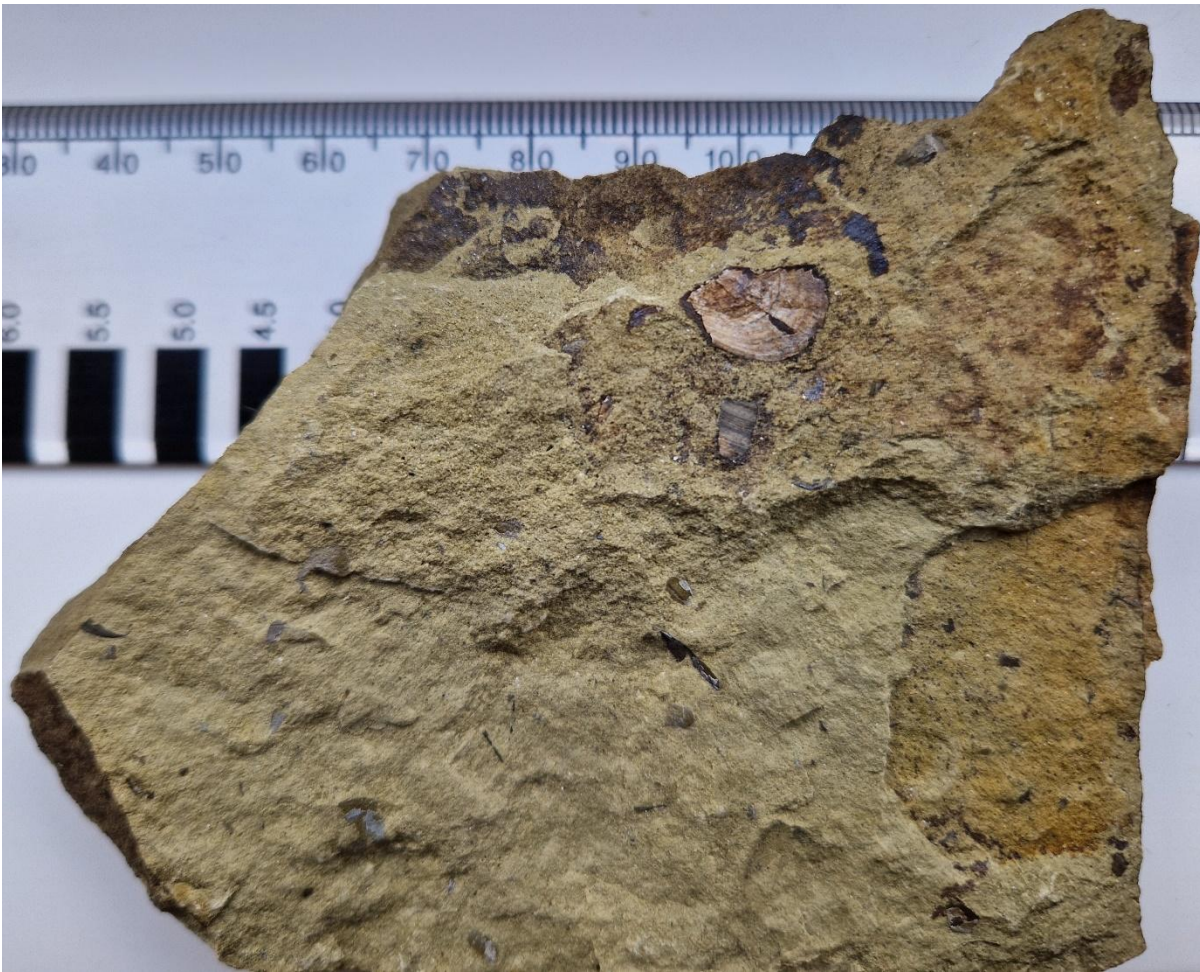
The Old Tub Line is the name given to a now removed inclined mineral tramway used to export the materials of Doulton's Claypit to the Dudley Canal No2 to the north. The name refers to the 'tubs' the minerals and waste were transported in on the line. The group stopped at a cutting to examine the Silurian rocks of the Lower Elton Formation (425-427mya). These rocks were much more thinly bedded but also dipping to the east at a similar angle to the younger Coal Measures beds seen earlier. These comprised interbedded sandstone and mudstones and are Silurian in age - and this is our first geological SSSI of the day.



Silurian rocks of the Lower Elton Formation exposed in a cutting for the Old Tub Line

Crossing Highbridge Road we were treated to more spectacular exposures of Silurian Downtown Castle Sandstone which the Friends of Saltwells NNR had cleared of vegetation together with the park wardens. These exposures are maintained by these groups together with the BCGG. Further north again and there is the unexpected appearance of small irregular shaped hollows in some of the sandstone beds. Andy explained that a theory is that they are fossilised gas bubbles. The source of the bubbles would have been related to the injection of a micro-gabbro here, which occurred ~310mya. The theory is the heat of this magma would have boiled any groundwater in the rocks, and the steam created the hollows. This rock is known as the Brewin's Bridge Micro-gabbro Dyke. However, a more likely answer is that these were formed by animal burrows!

While eating our lunch next to the rocks with the holes Kathrin found a *Lingula* fossil on the ground. Andy also found one but others in the group were not so fortunate.



A Silurian Lingula fossil found by Kathrin while she was eating her lunch

The dolerite (micro gabbro) was historically known about from the Brewins Cutting. The new exposures on the tub line show it has intruded much further south than previously thought. Also, that it has formed thin streamers along the sandstone bedding in places to form thin sills.

Brewin's Bridge Canal Section

Our next SSSI is at Brewin's Bridge. This bridge carries Highbridge Road high over the Dudley No2 Canal with the canal in a steep sided cutting. This was not always the case, as the cutting began life as a tunnel (Brewin's Tunnel) and there is a plaque to remember the work of the 'leggers'.



Field trip leader Andy looking at the rocks at Brewin's Bridge

The exposure here is of what makes this a SSSI. There is a contact here between the Silurian age Downton Castle Shales and the later Carboniferous rocks which have seen today. The contact is marked by an unconformity where the Devonian should be. This represents 100 million years of missing geological time due to the erosion of the Devonian Old Red sandstone continent. What is unique is that despite this 100-million-year gap both ages of rock have the same dip angle and easterly dip direction. The exposure had been beautiful cleaned up by the BCGS.

Saltwells

Next, we turned west and took a short walk along the canal towpath before turning south and downhill through the woods. To our left as we descended, we passed old canal dredgings (an area known as 'Tailings Tip'). This is the only heathland in the park and the flora changed to gorse.

Following Blackbrook in the valley bottom we discovered the then Coal Board, caused the viaduct that carried the sidearm of the Dudley No. 2 canal over the Blackbrook Valley, to collapse by undermining it. This drained the local canal network and ended up closing the sidearm, which provided quicker access to the Dudley No.1 canal.

As we continued we passed bell pits showing original mining techniques which were revitalised during the war years.

We then visited the site of Saltwells House. Before Salt Wells House this was the location of the former Netherton Hall where the Lords of Dudley sat since the 16th Century until it collapsed in 1860. The cause

of the collapse – mining subsidence! A new house was constructed. However, now tree and vegetation cover what gives the reserve its name. Lady Dudley having planted the woods, named after her, to hide the mining scars her husband inflicted on the landscape. The house was owned by the council, who wanted to sell it to a private developer. However, strong local protest averted this, hence the friends group was founded, but the council still demolished the house rather than turn it into a wardens base or something useful, stating it was too unstable.

Some of the trees in this area were splendid including a large monkey puzzle and cedar.



Taking a rest in front of a splendid cedar

Moving on led the group to the area where the reserve gets its name, the Salt Wells. Brine water was abstracted here and became popular in the 19th Century when it was claimed the water had healing properties with an 1833 publication stating, *‘in Lady-wood is a valuable spring, called the Spa Well, in high estimation for its efficacy in cutaneous disorders and complaints arising from indigestion’*. The spa baths were near the Saltwells Inn public house. As such, it was decided to enjoy the modern medicinal properties of the Saltwell Inn in tradition with its history.



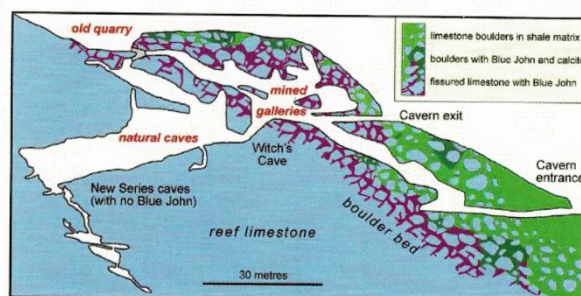
WGCG would like to thank BCGS for providing this tour around the reserve. Special thanks to Andrew Harrison and Mike Allen for their giving time and sharing their knowledge. And thanks also to those who attended and supported this excursion.

Peak District Field Trip 5-7th July 2024. Led by Dr Martin Whiteley

Report by Ray Pratt Attendance 9

Our base for this field trip was Near Castleton in Hope Valley, an outstandingly beautiful location. Castleton straddles the boundary between Lower Carboniferous rocks (mainly limestones and associated igneous rocks), and overlying Carboniferous shales and sandstones. We congregated at 3pm on the Friday to enjoy a guided tour of Treak Cliff Cavern. There are 4 show caves near Castleton. Treak Cliff was chosen because it has a superb vein of Blue John (Fluorspar) which is still mined (restrictively) today.

Inside the cavern much of the limestone was in the form of boulders. We learned that the Blue John mineralised zone was restricted to this “talus” zone of limestone having formed along the fore reef from erosion of the underlying limestones.



Profile through Treak Cliff Cavern showing how the deposits of Blue John have been found mainly within the boulders that lie between the 'reef' limestone and the overlying shales

Schematic from field guide

Blue John is a distinctive colour banded variety of fluorite deposited by hydrothermal fluids. The purple colour is due to radiation from uranium minerals that distort the atomic structure, absorbing all the colour wavelengths except purple.



Mineralised blocky fractured limestone with some Blue John from outside Treak Cliff Cavern



Traces of Blue John Fluorspar seen in the sample (*30 magnification)

The Pillar' is the largest piece of Blue John Stone ever discovered. The Pillar contains roughly 16 tonnes of the precious stone. The Pillar is found in one of the main chambers, called The Witch's Cave.

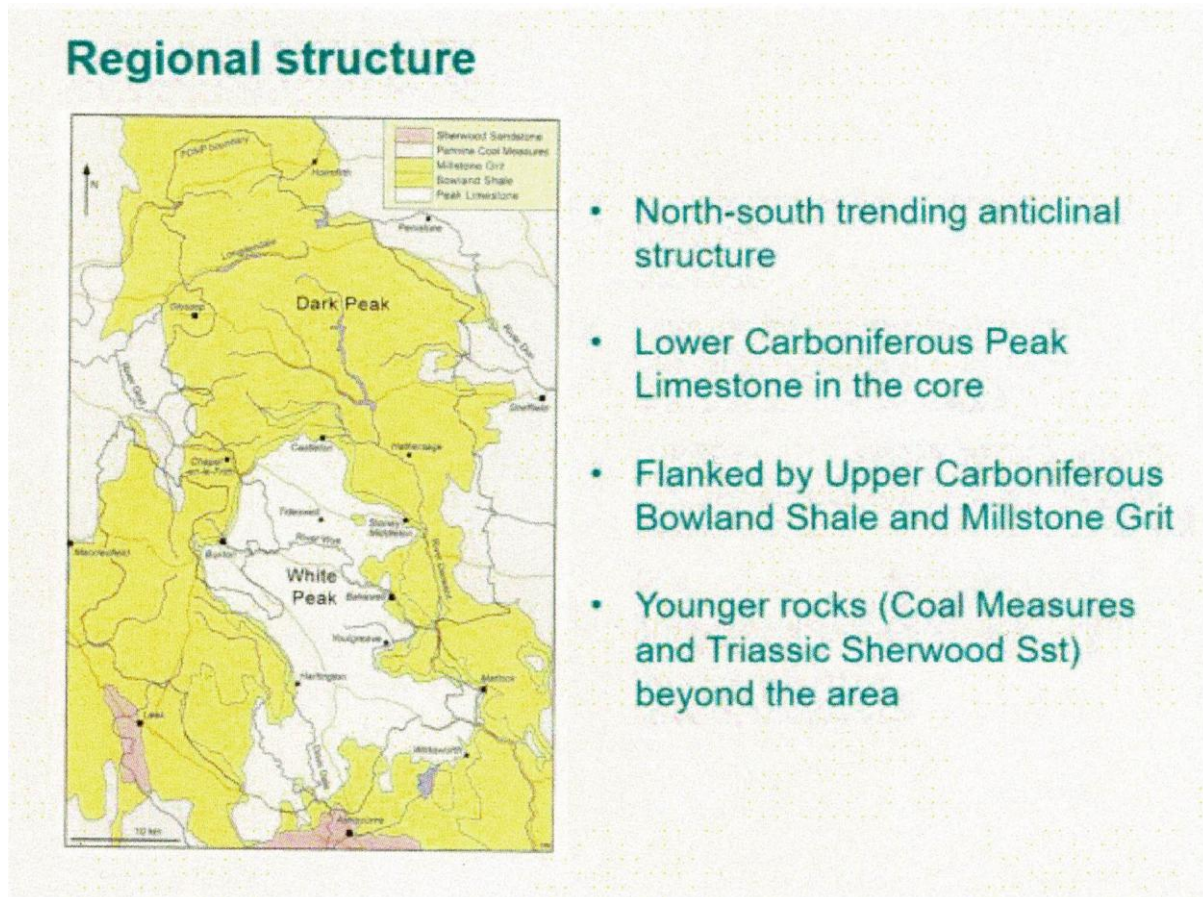


The chamber leads deeper underground to Aladdin's Cave, where richly coloured flowstone lines the cavern wall. In Aladdin's Cave are a striking series of stalagmites, nicknamed The Seven Dwarves. Other cavern chambers show fantastic formations of stalactites (from the cavern ceiling) and stalagmites (growing up from the cavern floor).



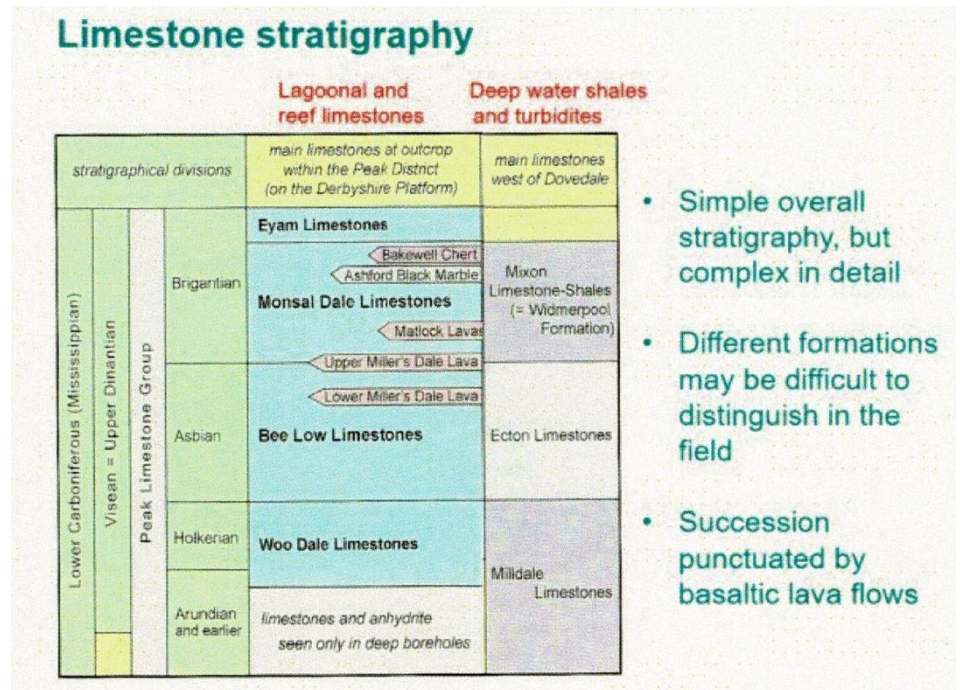
Following the cavern visit we congregated in the Bike and Boot hotel lounge where Martin gave us an introduction to the geology of the area.

The Peak District is composed of Carboniferous Dinantian (Visean) limestones with some basic igneous rocks, and overlying Namurian clastics. The structure is a north-south trending anticline with the older limestones forming the core known as the White Peak and the younger clastics on the flanks, where the northern exposures are known as the Dark Peak. The limestones are strong rocks but susceptible to chemical weathering thus producing a variety of landforms. Whilst the rocks are old the landscape is comparatively young being formed during the Quaternary glaciations.



The limestones of the Peak district are the same age as those in the northern Pennines, Cheddar gorge and the Mendips, and the Burren of Ireland. They were all deposited in shallow water shelf environments, with the reefs forming in a lagoonal setting, probably fault bounded with the surrounding shelf. In the surrounding deeper areas, shales and limestone turbidites were deposited.

The Fore reef deposits dip to the north and to the south on either side of reef, reflecting their original deposition on a submarine slope between a shallow water lagoon reef complex and deep water shales at the foot of the slope.



The Bee Low fore-reef limestone beds dipping northwards reflecting the slope on which they were deposited.

Occasionally uneven bedding planes within the limestone show evidence of sub aerial erosion as a consequence of eustatic changes linked to the Carboniferous glaciation of the southern hemisphere.

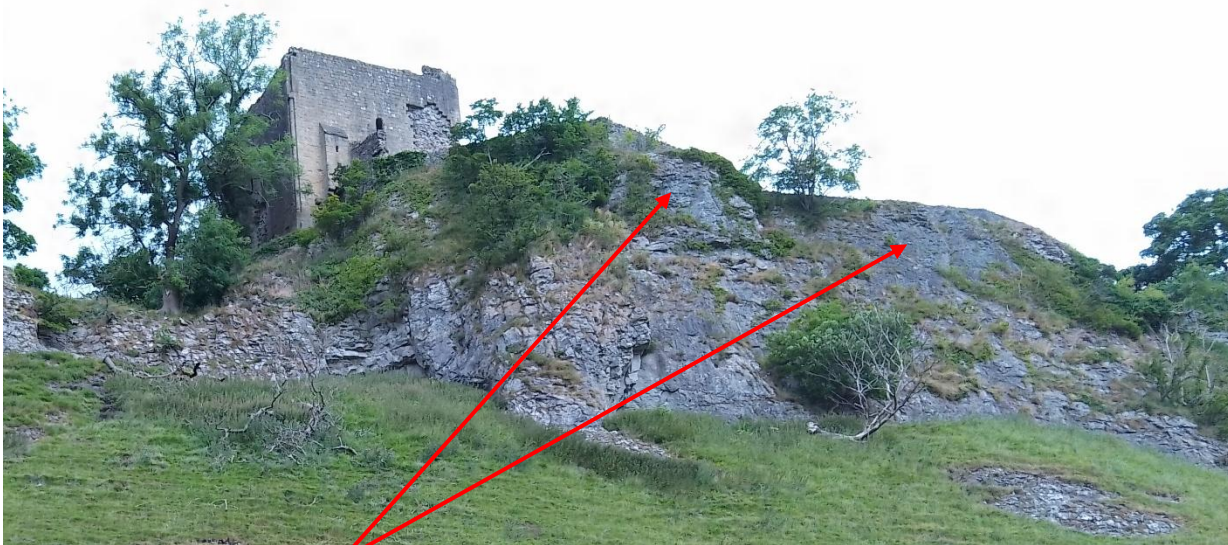
The reef itself is close to flat with bedded limestones on either side of the reef, often referred to a “Mud Mounds” composed of massive limestones located close to the top of the succession.

These patch reefs are not composed of corals but are the result of blue green algae bacteria. Close inspection of the patch reefs reveals vuggy porosity but no visible algal mats. Supposedly the algae collects around grains rather than forms mats but this was not visible to the naked eye.



Patch Reef – Cave Dale

We learned that the dry valleys and cavern systems we see today are geologically young, a product of the glacial and interglacial periods that dominated the northern hemisphere over the last two million years. The area would have been covered by ice during the Anglian glacial period, but relatively unimpacted by subsequent glacial events. The limestone pavement features, common in the northern Pennines and the Burren of Ireland, are not seen in the Peak district nor the Mendips and seem to be related to the degree of glaciation experienced.

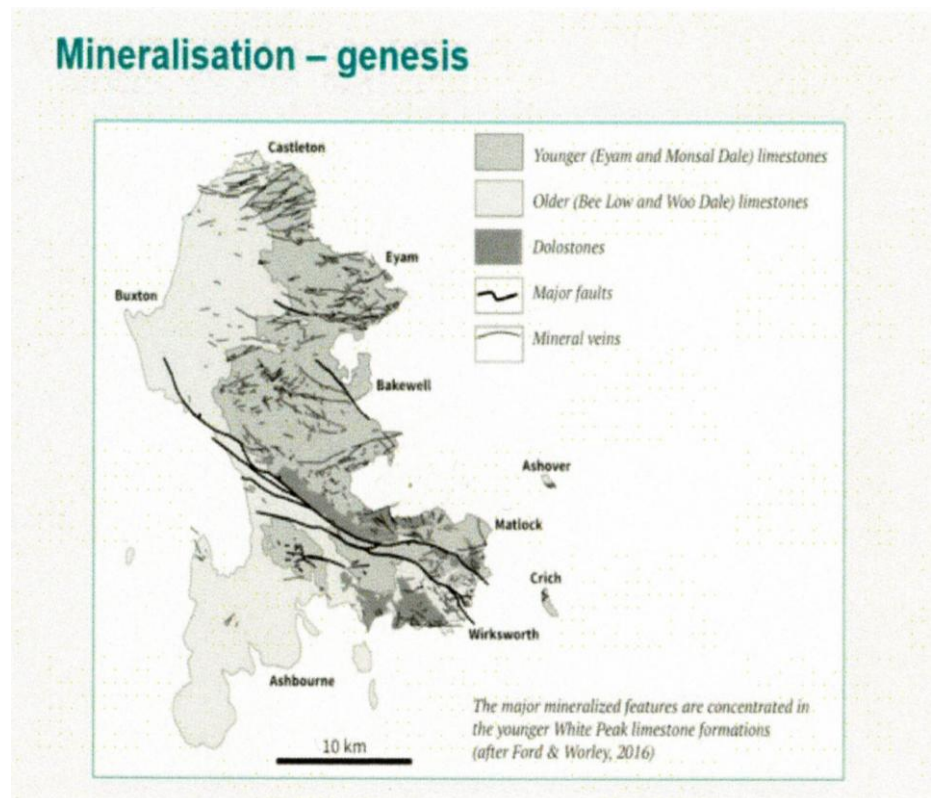


Mud mounds / patch reefs



Patch reef

The mineralisation of the carbonates is believed to have occurred during the late Carboniferous during a period of extension, with the faults providing the lines of weakness for the mineral bearing fluids to permeate through. This is restricted to the eastern side of the White Peak area.



Unlike many areas of lead mining, the mineralisation is not related to igneous intrusions but to burial of organic rich mudstones to depths where Pressure Temperature conditions enabled kerogen cracking to take place, a similar process to oil generation. The Namurian Bowland shales provided the source rock for mineral concentrated fluids to form and migrate along lines of weakness. Where pressure temperature conditions allowed, the minerals crystallised out, initially along the wall of the host rock, and growing out into the fracture. Open fractures and vugs allowed crystal forms to develop. 80% or more of the mineral vein consisted of gangue minerals (Calcite & Baryte) which were tipped nearby. East-west linear mounds of waste material can be seen in today's landscape, a legacy of lead mining in the area. The fluorite is used for making ornaments and jewellery.



East West trending lead mining rake tailings has left a hummocky landscape stretching into the distance.

The Saturday trip began from the centre of Castleton towards Cave Dale where we inspected steeply dipping limestone beds of fore reef origin. A fore reef would have been deposited in a relatively high energy environment with distal deposits being laid down in deeper water. The limestones of Cave Dale are known as the Bee Low Limestone.

Further up Cave Dale the dip of the limestone beds decreases, eventually becoming near horizontal in the proximity of Peveril Castle. Here we also saw Mud Mounds or Patch Reefs in the cliff face.

About half way up the valley, the footpath became wet in the proximity of an exposure of basalt lava with hexagonal jointing. The hexagonal jointing of the lava is indicative of extrusion onto a land surface with very limited lava flow.



A little further along the track we came across holes in the cliff face on both sides of the valley. These were exploratory holes exploring a east-west trending mineral vein for lead. Only calcite and baryte were present explaining why further extraction had not taken place.



Shortly after this we left the dry river valley and headed west where we found a long east west trending stretch of tailings forming a surreal hummocky landscape shown in the picture above.



Sample of baryte from the talus piles. Baryte and calcite are the two most common gangue minerals left behind after the extraction of galena (lead ore).



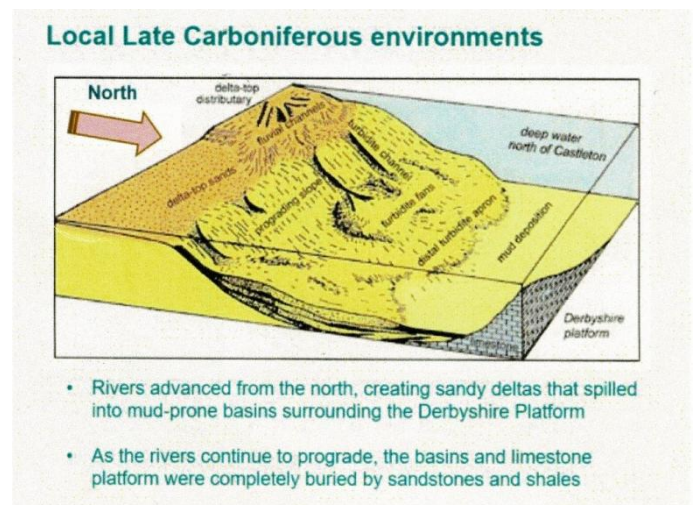
*Baryte sample magnification *30*

From here we headed north east as we headed to Windy Knoll, a back reef deposit. The upper part of the exposure is a regolith of limestone held together by bitumen. The lithified limestone had been sub aerial eroded prior to reburial and covered in organic rich mudstone which generated the bitumen we see today.



Windy Knoll back reef limestone regolith bound together by bitumen

Following lunch at Blue John Cavern, we headed to the lower slopes of Mam Tore and the Mam Tor landslide. Here we were able to inspect the black, very fissile, organic rich, Bowland Shale, the primary objective for the short-lived UK fracking projects. The Bowland shales are reportedly rich in bivalves and goniatites. This thick unit of deepwater Namurian shale is overlain by interbeds of sandstones and shales, the sandstones being brought into the basin by turbidity currents. Overlying beds become gradually coarser as the basin filled, with the uppermost bands being of fluvial origin and known as Millstone Grit.





Thick unit of Bowland Shale, a fissile black shale, is the cause of the Mam Tore landslide



Interbedded sands and shales laid down in a deepwater environment by turbidity currents



Sole marks on the underside of sandstone beds show the direction of flow of the sand laden currents (which researchers have determined to be from the north). Arrow indicates direction of flow shown by the flute casts.

Where permeable strata overlie thick units of impermeable mudstones slumping always occurs. The initial rotational back slip landslide took place about 4000 years ago. In the 1950s, a road was built across this slide linking Sheffield and Manchester. It was finally abandoned in 1979 due to the unstable nature of the underlying land on which it had been built, clearly obvious in the remnants of the road that we see today.

From Mam Tor we headed to Odin Mine, an initial Roman working for lead, reworked in the 18th and 19th centuries. Rare traces of galena can be seen on the face of the mined cutting. The host rock is fore reef limestones rich in disaggregated and broken fossils.



Odin lead mine worked since Roman times



Fore reef deposit containing abundant fossil fragments



A little further along the road brought us to the entrance of Treak Cliff Cavern, yesterday's underground excursion. On this occasion we took a look at the productid rich forereef limestone unit.

Following the foot of the fore-reef deposit on our way back to Castleton, we crossed the entrance to Winnats pass on our way to the uninspiring Speedwell vent, a low relief feature composed of well weathered volcanic material, identified primarily due to the soil colouration.



Speedwell Vent lava deposit creates this low relief landscape feature



Photo from top of Winnats Pass. The limestone sequence is the same as Cave Dale

We returned to the car park in Castleton having walked a good 11 kms

The following day we met at a car park in Tideswell Dale, south of the village of Tideswell. Located about 10 kms in from the carbonate margin seen around Castleton, the rock succession reflects changing sea levels and tectonic instability within a lagoonal setting.

The first exposure of the day was of the Bee Low Limestone, the same rock unit as seen in Cave Dale on route to a disused roadstone quarry extracting the Tideswell Dale Sill, a doleritic intrusion. The spherical weathering, common in basaltic rocks, gave an impression of boulders within a matrix. Closer inspection and discussion quickly ruled out volcanic bombs and pillow lavas. This sill was intruded at the end of the Carboniferous and is the same age as the Whin Sill, Intrusions of the Scottish Midland Valley, the basalts and dolerites of the black country and basalt extrusive's around Ballycastle Bay in Northern Ireland

Looking to the landscape nearby, breaks in slope pick out volcanic intervals sandwiched between limestone beds. Other ash beds were seen in the cliffs by the footpath where they form clefts between the more competent limestone beds. These extrusive's are older than in intrusive dolerite sill seen in the quarry.



The limestone cliff at the bottom of Tideswell Dale. Bee Low Limestone beds separated by thin beds of volcanic ash. (The red staining is algal growth)

Joining the Monsal trail the bedded limestones were flat lying. As we approached, they became steeply inclined as they passed laterally to a basalt.

Was this onlap? – if so, why are the beds dipping? Was it an intrusion forcing the beds upwards? There was a lot of debate as to whether this was an intrusive sill or an extrusive lava and whether or not the rounded shapes were volcanic bombs, pillow lavas or simply spheroidal weathering. None of the proposed answers satisfied all the observations. A subaqueous lava flow is the current favoured idea.



Rapidly cooled and congealed pillow-like masses of lava set amongst angular fragments of lava and ash. The lava passes laterally and vertically into contemporaneous limestones

Photo from field guide

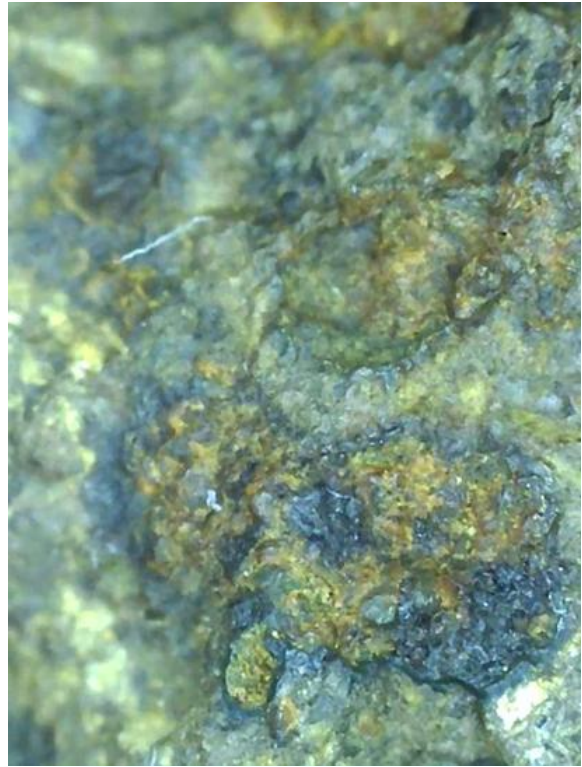
Following lunch at the Anglers Rest by the banks of the river Wye in Litton Mill, we hiked up a steep road to inspect interbedded lava flows within the limestones that showed a topographic expression in the landscape, (break in slope). The rocks were dominantly basalt although some contained lithic fragments indicating an ash component.



Basalt bed with an ash component identified by the change in slope of the landscape



Sample from the basalt lava showing an iron concentrated vein and pieces of basalt fragments within the sample indication an aerial component (ash) to the deposit



**30 magnified image of basaltic sample to left*

A gentle walk back to the car park across some beautiful farmland and along a dry river valley concluded this 7 km walk. The field trip was very illuminating, well put together and enjoyed by all who participated.

References

- Tony Waltham, 2021, The Peak District - Landscape and Geology. The Crowood Press
- Ford, 2013. Classic localities explained: Castleton, Derbyshire. *Geology Today* v29, v.30, p.229-237
- Southern et al. 2014. Classic localities explained: The Carboniferous Southern Pennine Basin. *Geology Today*, v30, p71-78
- Stephensen et al. 2003. Carboniferous and Permian volcanic rocks of Great Britain - Central England and the Welsh Borderland. *Geological Conservation Review Series*, No. 27, p.281-316

Tardebigge Walk 28th July 2024 Led by Mike Allen

Photos by Ray Pratt (Attendance 22)

A gentle stroll of 3 hours commenced from St Bartholomew's church at Tardebigge, Bromsgrove. The area is underlain by Triassic sandstones and mudstones, rarely outcropping, but influencing the landforms. A number of glacial erratics were seen, vestiges of the Anglian glacial event c. 450,000 years ago. The return part of the walk was along the Worcester Birmingham Canal towpath which included the celebrated Tardebigge flight of 30 locks. A very pleasant afternoon was had by the participants.



22 members and friends joined Mike Allen in a guided walk around Tardebigge discussing the geology and geomorphology along the route.



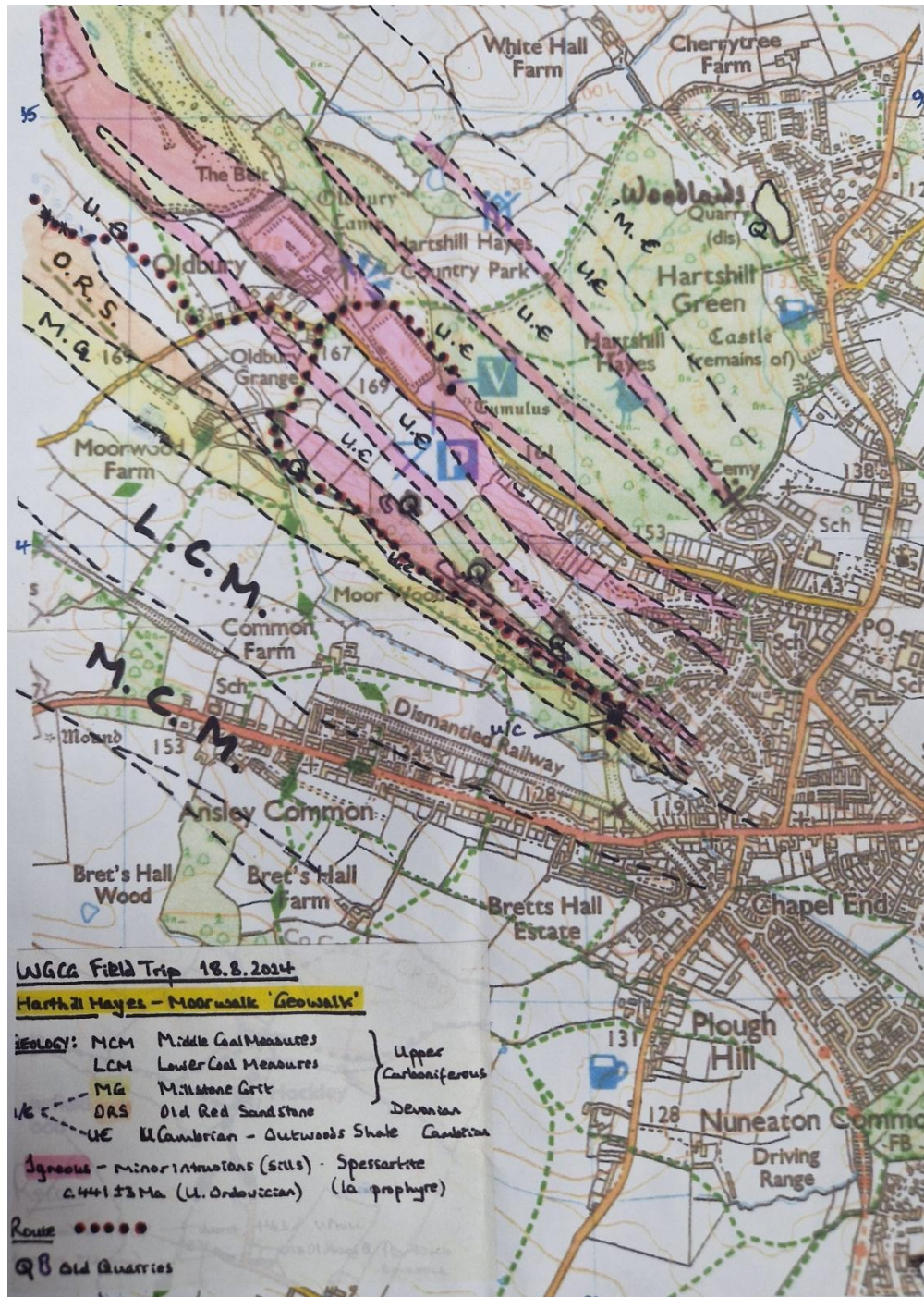
Exposure of Triassic Bromsgrove (Helsby) Sandstone, near St Bartholomew's church.



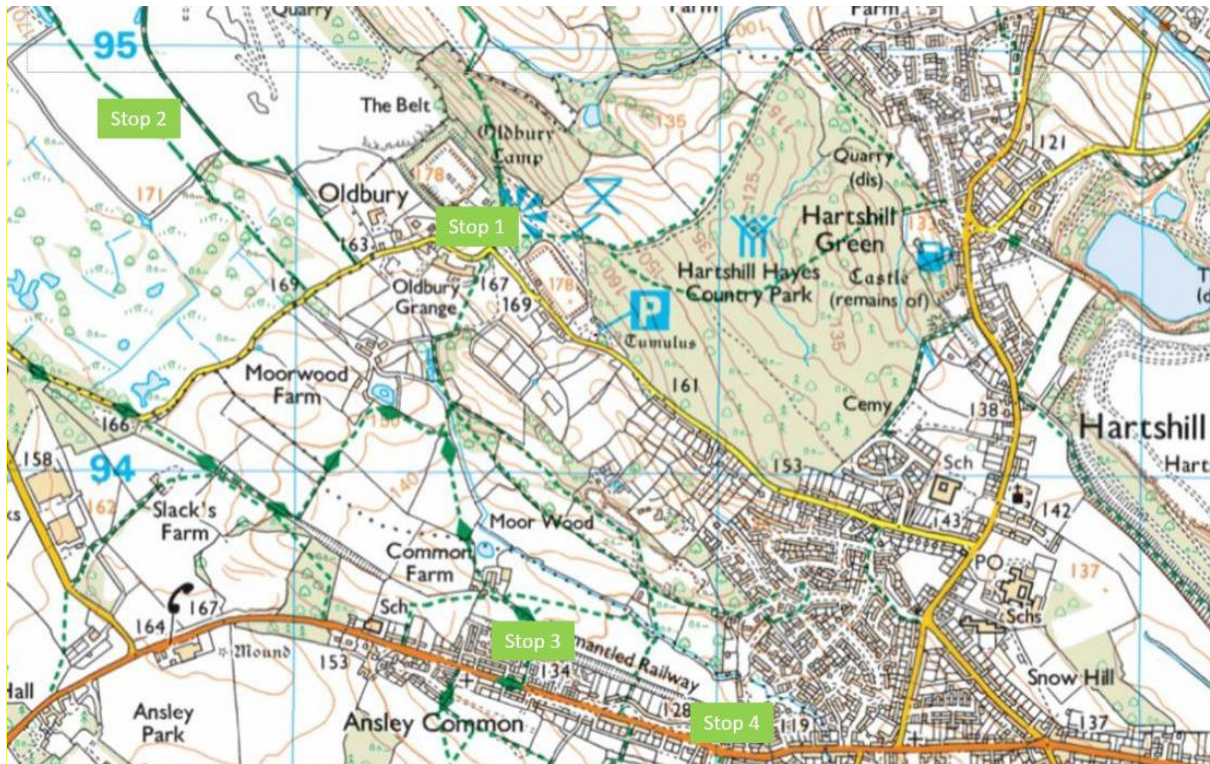
Mike explaining the depositional environment of the Bromsgrove sandstone

Moor Wood field trip – 18th August 2024 – led by Mike Allen & Brian Ellis

Report by Gareth Jenkins. Attendance 10



Course notes prepared by Mike Allen



The area of the walk showing exposure locations

Following the conservation work at Moor Wood on the 19th July 2024 WGCG members re-assembled at Hartshill Hayes Country Park to undertake a fieldtrip on the 18th August 2024. Many thanks to all those who gave their time to undertake this work and make the subsequent field trip possible.



The view north-east across Warwickshire and Leicestershire. Charnwood Forest could be seen on the horizon

Once the group was assembled and briefed it was only a short walk from the car park to a spectacular view across the Warwickshire and Leicestershire countryside (Stop 1). In the distance the predominantly Pre-Cambrian Charnwood Forest could be seen. (WGCG together with Dr Nick Chidlaw will be running another fieldtrip in late September to Charnwood Forest. Details of this trip can be found here: [Charnwood Forest Field Trip – Nick Chidlaw – Warwickshire Geological Conservation Group \(WGCG\) \)](#)

The group were standing on Stockingford Shale Group deposits. These are of Late Cambrian age, and between the Pre-Cambrian Charnwood deposits there was predominantly Triassic age strata. The group reflected about the age of the landscape and how this spectacular vale has probably been a basin for the deposition of later sediments for a very long time.



Looking north across Mancetter Quarry

The group walked the short distance through the village of Oldbury before turning north down a footpath adorned with blackberries to reach the southern boundary of the large and now flooded Mancetter Quarry (Stop 2). After a suitable viewing platform was found there was a chance to view the stratigraphy of the Stockingford Shale Group in a vast exposure at the quarries north-east face.

This quarry, as others in the vicinity are considered to be the best places to view Late Cambrian rocks in England. The quarry was principally opened to exploit the Oldbury Sill which was intruded into the shale group. More information about these quarries can be found here: [Mancetter Quarries | GeoGuide \(scottishgeologytrust.org\)](https://www.scottishgeologytrust.org/geo-guides/mancetter-quarries/)

The Stockingford Shale Group comprises many different Formations. Principally these Formations are shales and mudstones although sandstone and limestones are also present. It is interpreted that the depositional environment was a distal sea shelf environment where water depths were not too deep. There is evidence of varying amounts of organic material and oxygen concentrations across the Formations. Although the rocks could not be considered fossiliferous, the Group is famed for containing trilobite fossils together with other species such as lingulid brachiopods. Some of these fossils from the WGCG collection were passed around. Unfortunate no fossils were found by the group despite some enthusiastic searching.



A trilobite fossil from the Stockingford Shale Group

After an opportunity to pick through some of the rocks near the quarry wall the group partially retraced their steps before heading south through more brambles (and a chance to grab a free, juicy snack) and joining a dismantled railway line.

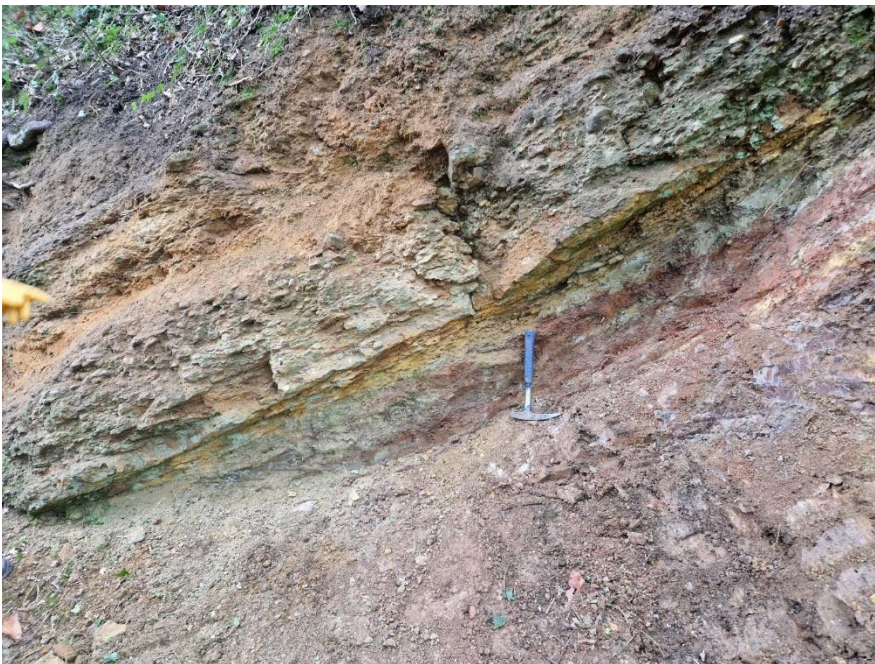
To the north of the former railway line a linear abandoned quarry marks the location of where a sill intruded the Outwoods Shale Formation (part of the Stockingford Shale Group) (Stop 3). This is Moor Wood Quarry and is Warwickshire Local Geological Site (LGS) 42: [LoGS42.pdf \(wgcg.co.uk\)](#).

This sill is a spessartite lamprophyre meaning it is a mafic igneous rock where the principal mineralogy comprises amphibole and biotite. These are chemically and mineralogically similar to diorite, hence historical confusion in the names used. These sills are known collectively as the Midlands Minor Intrusive Suite. The thin sills have been intruded into the Stockingford Shale Group host rock. The sill has been quarried out but a small section was left by the quarrymen for posterity.



Mike explains what a lamprophyre is

Continuing down the disused railway line brought the group to the final exposure (Stop 4). In an embankment of the former railway cutting at Moor Wood there was an angular unconformity between the Cambrian Stockingford Shale Group deposits and the Carboniferous Millstone Grit Group deposits. This angular unconformity represented a gap in time of approximately 170million years. This is Warwickshire LGS site 11 and more information can be found here: [LoGS11.pdf \(wgcg.co.uk\)](#)



Angular unconformity between the Cambrian Stockingford Shale Group and the overlying Carboniferous Millstone Grit Group

The British Geological Survey and Joint Nature Conservation Committee recognise the national significance of this area in their publication 'Precambrian Rocks of England and Wales. Further reading can be found here: [GCR Series No. 20. Precambrian Rocks of England and Wales: Chapter 3 \(Nuneaton Inlier\)](#) ([jncc.gov.uk](#))



Thank you to Mike and Brian for leading the trip and all those involved in making it a success. Thanks also to those who came along and showed such interest in this part of Warwickshire's past.

EVENTS TO COME

WGCG Events (WGCG.co.uk)

Lectures will be held on a Thursday evening commencing 7:30 pm at St Francis, Kenilworth

2024

- September 7th Ask a Geologist Warwick Museum 10:30 to 12:30
- September 19th Phil Manning Dinosaur Bones and Badlands
- 20-22nd September Residential Field Trip, Charnwood Forest led by Nick Chidlaw
- October 12th Ask a Geologist Warwick Museum 10:30 to 12:30
- October 17th Mike Simms Carnian Pluvial Event
- October 18th Urban Geology walk of Warwick led by Jon Radley 10:30 Warwick Museum
- November 21st A.G.M. St Francis, Kenilworth
- December 12th Christmas Social St Francis, Kenilworth

2025 (Provisional)

- January 14th Jim Rose 'Early Humans in Britain'
- February 20th Kirsty Edgar (Dinosaur tracks) (Feb or March)
- March 20th Joe Mazgajczyk / Kieren Quigley (Warwick Triassic) (any month)
- April 17th Phil Gibbard / Seb Gibson (Wolstonian) (? April)

GeoWeek 23-31st May 2025

Mihaela Bokor will lead an urban geology trip around Leamington Spa (date to be confirmed)

Ray Pratt will lead a walk of scientific discovery along Kenilworth Greenway (date to be confirmed)

4-6th July 2025 Residential Field Trip to the Long Mynd and Ludlow, Shropshire. Led by Martin Whiteley

Events by other organisations

Geologists' Association (GA)

7th September Hampshire Mineral & Fossil Show <https://www.sotonminfoss.org.uk/smfsshow.htm>

27-29th September. GA Annual Conference, Bristol <https://geologistsassociation.org.uk/conferences/>

4th October 18:00: Hybrid talk. The Geology of Woodsmith Mine, Yorkshire. Lisa Gillespie Anglo Am.

2-3rd November GA Festival of Geology <https://geologistsassociation.org.uk/%20festival/>

6th December 18:00 Hybrid talk. Geological considerations of landfill design. Ewan Thomas Geotechnology

<https://geologistsassociation.org.uk/lectures/> <https://geologistsassociation.org.uk/ukfield/>

East Midlands Geological Society 60th Anniversary Symposium. Saturday 1st October 2024.

School of Geography, Sir Clive Granger Building, University of Nottingham

<https://emgs60.weebly.com/>

EMGS Lectures are held in the School of Geography Sir Clive Granger Building on the Nottingham University Park campus <http://www.emgs.org.uk/>

Black Country Geological Society (BCGS)

New Venue: The Lamp Tavern, 116 High Street, Dudley, West Midlands. DY1 1QT 7.30pm

14 September Walk around Barrow Hill 10:30 - 16:00

16 September H.W.Hughes - a glimpse into the life and works of a man of coal by Peter Glews.

Venue: The Lamp Tavern, 116 High Street, Dudley, West Midlands. DY1 1QT. 19:30 hrs

<https://bcgs.info/pub/the-society/programme-of-events/>

The Lapworth Museum of Geology

The Lapworth Museum runs a range of exciting family activities, from educational talks to tours and arts and crafts activities.

7th October Museum Tour 12-13:00 hrs

14th October Digital methods in palaeobiology 16:00hrs

4th November Museum Tour 12-13:00 hrs

2nd December Museum Tour 12-13:00 hrs

<https://www.birmingham.ac.uk/facilities/lapworth-museum/events/>

Leicester Literary Philosophical Society

Presentations are held in theatre at the Leicester University campus at 7:30 pm, from whence they will be broadcast **on-line via Zoom**. Zoom links will be emailed to WGCG members a few days before each talk.

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

North Staffordshire Group of the Geologists Association

Lectures generally at Keele University 7:30pm on the second Thursday of each month -

<https://nsgga.org/>

Shropshire Geological Society (SGS)

Talks are held in hybrid form, in person at the Higher Education Centre, Shrewsbury College, London Road, Shrewsbury SY2 6PR, and by Zoom

2024

11th September Prof. Peter Worsley, (U of Reading) Glacial geology in and around Shrewsbury

9th October Nick Davidson The Greywacke

13th November Prof. Kevin Taylor, (U of Manchester) The wondrous variety that are mudstones

11th December Roy Starkey, Sir Arthur Russell and his mineral collection

2025

8th January Dr Katy Chamberlain (U of Liverpool), From cataclysmic super-eruptions to monogenetic burps: A crystal eye=view of the timescales of volcanism

12th February Michael Roberts, *Darwin Week Public Lecture*. The 1831 Darwin-Sedgwick tour of North Wales

12th March Prof. Alex Liu (U of Cambridge) The role of the Ediacaran strata of the Long Mynd in determining the severity of "Earth's first mass extinction"

9th April AGM

14th May Dr Fiona Simpson (Imperial College, London), Project EARTH (Electromagnetic Array over a Tectonic Hotspot): Iceland as a Unique Geophysical Laboratory

<https://shropshiregeology.org.uk/events/>

Teme Valley Geological Society (TVGS)

Talks take place in Martley Memorial Hall (MMH – postcode WR6 6PE) from 7:30pm

TVGS talks are free to members with a small charge at the door for non-members.

2024

23rd Sep Nigel Woodcock. "Geological History of Britain and Ireland" (Zoom event)

28th Oct Paul Wright. "When the Law of Superposition does not work: *What Nicolaus Steno and William Smith did not know about some carbonate successions*" *Looking at how we now understand that in many carbonate successions the First Law of Stratigraphy does not always apply as a result of the remarkable mobility of some forms of calcium carbonates - more details*

25th Nov Chris Clayton. "The origin of Flint and working with archaeologists"

2025

30th Jan Prof Stephen Sparks. - something volcanic - title to be announced.

24th Feb TBD

24th Mar TBD

28th Apr TBD

<https://geo-village.org/>

The Woolhope Club

All meetings are held at Hereford Town Hall. Friday evening meetings start at 6 pm, Saturday afternoon meetings at 2 pm. There is a £2 charge for all non-members.

<https://www.woolhopeclub.org.uk/geology>

The West Midlands Regional Group of the Geological Society (WMRG)

Talks are held in hybrid form, in person at Mott MacDonald's Birmingham Office (10 Livery St, Birmingham B3 2NU) & Zoom

Tuesday 8th October 2024, 6:30pm Where was the Devensian Ice Margin in the West Midlands?

Adrian Collings (Retired Senior Engineering Geologist - Arup)

<https://www.geolsoc.org.uk/wmrg>

WGCG OFFICERS

Management Committee (Trustees)



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Deputy Chair Dr Philip Henser



Hon Treasurer Kathrin Schüttrumpf



Hon Secretary Ray Pratt



Compliance Peter Hawksworth



External Groups Rep Gareth Jenkins

Education Sub Committee



Chair Mike Allen



Ian Fenwick



Christine Hodgson



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YouTube

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Newsletter editor

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Geo-conservation co-ordinator

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Office - Cataloguing

Electronic Data Management

Group Admin Assistant

Dr Jon Radley (**volunteer required**)

Kathrin Schütrumpf

Kathrin Schütrumpf

Gareth Jenkins

Ray Pratt

Ray Pratt, Gareth Jenkins & Kathrin Schütrumpf

Anthony Allen supported by Ray Pratt

Vacant Ray Pratt (acting)

Dr Andrew Sanderson

Tom Collins

Will Messenger

Ian Fenwick

Ray Pratt

Julie Harrald



Julie Harrald



Jon Radley

**Your Picture
should be here**



Andrew Sanderson



Anthony Allen



Tom Collins

OBITUARY: Doug Aspell

by Brian Ellis



Doug died unexpectedly in May 2024 after a short illness. Doug was most recently known to members serving teas and coffee on Thursday evenings before our talks, along with his wife Jill. There was much more to Doug than that.

Doug was a Coventry man, served his apprenticeship in the printing trade, becoming a member of the Coventry Freeman's Guild and for many years ran his own printing and design business, I.C.P.S (Industrial and Commercial Publicity Services) in Coventry. The precision and attention to detail that trade requires carried over into many aspects of his life, including his contributions to WGCG.

For many years Doug was a member of the Conservation Committee and most recently produced careful and well-illustrated reports on the condition of the LGS at Brailes Hill and Rowington Canal Cutting. He and Jill enjoyed taking part in field trips and were regular attendees at winter evening talks. Doug could be relied on to tug on any loose ends that had not been adequately tied up in the field, at talks or committee meetings. His willingness to be involved was invaluable in a voluntary and membership organisation like WGCG. Doug was always sociable and his good humour will be missed.

Doug had a 'hinterland', which many members may well not know about. He and Jill were enthusiastic caravanners, with a particular love of France and Italy. Doug was also a keen sailor. He could turn his hand to most aspects of DIY with meticulous results. He was proud of his service as a medical orderly in the RAF. Doug had an enquiring mind. Amongst other things he was a long-time member of a U3A History/Geography Group and only this year he had completed another course in computing skills and IT skills.

Doug leaves a wife (Jill), two daughters, a son and three grandchildren.

WARWICKSHIRE GEOLOGICAL CONSERVATION GROUP



WGCG

Hidden wonders in the
landscape of Warwickshire

Warwickshire Geological Conservation Group

MEMBERSHIP FORM FOR JOINING OR RENEWING

We need some data so we can keep in touch. The information you provide will be carefully protected. Only officers of WGCG will have access and then only to communicate with members. Very importantly, no information will be made available to any outside organisations.

We rely heavily on email to communicate with members as it is fast, efficient and cost effective. We hope you will allow us to communicate with you in this way.

Please confirm:

That we may keep your details on our data base and used as described above

YES/NO

That we may communicate with you by e-mail

YES/NO

Please print in block capitals:

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ADDRESS	
Tel no.	Mob no.
Email:	Year of birth
Geoscience Education: Please indicate your level of geological knowledge	
Profession: Please indicate your current or previous professional background and or experience	

HOW TO PAY: Subscriptions are from 1st January to 31st December and are **£15.00 per year**, but free for students in full time education. **Please tick box** which applies and return the completed form by email to; WGCG@JEGH.me.uk with heading **Annual Subscription**, advising of date of payment.

- ☐ BACS Transfer to **Warwickshire Geological Conservation Group** at branch sort code **40-27-06** to account **51411101** and when asked for a **reference** please enter **Name**
- ☐ Annual **Standing Order** to sort code **40-27-06** to account **51411101**
- ☐ Pay at your bank using the attached paying in slip
- ☐ **Post a cheque with your form** to: Julie Harrauld (WGCG),
70 Blackbrook Road, Loughborough, Leicestershire, LE11 4PZ
- ☐ **Hand your form and payment in person** to Frances Morley at the next WGCG meeting
- ☐ If you are a **full time student**, membership is free.

GIFT AID : As WGCG is a charity, registration number 1144717, we can reclaim the tax you have paid on the subscription direct from the Inland Revenue at no cost or inconvenience to you. It provides an extremely valuable source of income to the Group.

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GA Affiliated Groups and Local GA Groups (LG)

Amateur Geological Society <http://amgeosoc.wordpress.com>
Association of Welsh RIGS Groups Avon RIGS <http://avonrigsoutcrop.blogspot.co.uk>
Bath Geological Society www.bathgeolsoc.org.uk
Bedfordshire Geology Group www.bedfordshiregeologygroup.org.uk
Belfast Geologists' Society www.belfastgeologists.org.uk
Black Country Geological Society www.bcgs.info
Brighton & Hove Geological Society www.bhgs.org
Bristol Naturalists' Society www.bristolnats.org.uk/geology
British Micromount Society <https://bms.mineralcollective.com>
Bucks Geology Group www.bucksgeology.org.uk
Cambridgeshire Geological Society www.cambsgeology.org
Carn Brea Mining Society <https://www.cbms.org.uk/>
Cheltenham Mineral and Geological Society <http://cmgs.yolasite.com/society.php>
Cumberland Geological Society <http://www.cumberland-geol-soc.org.uk/>
South Wales Geologists' Association (LG) www.swga.org.uk
North Wales Group Geologists' Association (LG) www.ampyx.org.uk/cdgc/cdgc.html
Devon RIGS Group www.devonrigs.org.uk
Devonshire Association <https://devonassoc.org.uk/organisation/sections/geology-section/>
Dinosaur Society www.dinosaur society.com
Dorset Group (LG) <https://dorsetgeologistsassociation.org/>
Dorset Natural History & Archaeological Society enquiries@dorsetcountymuseum.org
Earth Science Teachers' Association <https://earth-science-teachers.uk/>
East Herts Geology Club www.ehgc.org.uk
East Midlands Geological Society www.emgs.org.uk
Edinburgh Geological Society www.edinburghgeolsoc.org
Essex Rock and Mineral Society (LG) www.erms.org
Farnham Geological Society (LG) www.farnhamgeosoc.org.uk
Friends of Sedgwick Museum Society <https://sedgwickmuseum.cam.ac.uk/support-us/friends-sedgwick-museum>
GeoEast <https://www.geo-east.org.uk/>
GeoLancashire (LG) www.geolancashire.org.uk
Geological Society of Glasgow www.geologyglasgow.org.uk
Geological Society of Norfolk www.norfolkgeology.co.uk
Harrow & Hillingdon Geological Society (LG) www.hhgs.org.uk
Hastings & District Geological Society
Hertfordshire Geological Society (LG) www.hertsgeolsoc.org.uk
History of Geology Group <https://historyofgeologygroup.co.uk>
Horsham Geological Field Club www.hgfc.org.uk
Huddersfield Geology Group www.huddersfieldgeology.org.uk
Hull Geological Society www.hullgeolsoc.co.uk
The Jurassic Coast Trust <https://www.jurassiccoast.org/>
Kent Geologists' Group (LG) www.kgg.org.uk
Kingston Lapidary Gem & Fossil Society kingstonlapidarysocietyhull@gmail.com
Leeds Geological Association www.leedsga.org.uk
The Geology Group of the Leicester Literary and Philosophical Society www.charnia.org.uk
Liverpool Geological Society www.liverpoolgeologicalsociety.org.uk
Manchester Geological Association www.mangeolassoc.org.uk
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Medway Fossil and Mineral Society www.mfms.org.uk
Milton Keynes Geological Society <https://www.facebook.com/mkgeosociety/>
Mineralogical Society www.minersoc.org
Mid Wales Geology Club www.midwalesgeology.org.uk
Midweek Geology Club Mole Valley Geological Society (LG) www.mvgs.org.uk
Newbury Geology Society <https://newburygeology.org.uk/>
Norfolk Mineral & Lapidary Society Norfolk Geodiversity Forum
www.norfolkbiodiversity.org
North Eastern Geological Society www.negs.org.uk
North Staffordshire Group of the Geologists' Association (LG) <https://nsgga.org>
Open University Geological Society www.ougs.org
Oxford Clay Working Group Email: saurian@live.co.uk
Oxfordshire Geology Trust www.oxfordshiregeologytrust.org.uk
Peak Lapidary & Mineral Society <http://rockexchange.uk/>
Peterborough Geological Palaeontological Group <http://peterboroughgeology.org>
Plymouth Mineral & Mining Club www.denul.net/pmmc
Reading Geological Society (LG) and www.readinggeology.org.uk
Rotunda Geology Group www.rotundageologygroup.org
Royal Geological Society of Cornwall www.geologycornwall.com
The Russell Society www.russellsoc.org
Scottish Geological Trust www.scottishgeologytrust.org
Shropshire Geological Society www.shropshiregeology.org.uk
Sidcup Lapidary and Mineral Society www.sidcuplapminsoc.org.uk
Southampton Mineral and Fossil Society www.sotonminfoss.org.uk
Teme Valley Geological Society <https://geo-village.org/>
Tertiary Research Group www.trg.org
UK Fireball Alliance www.ukfall.org.uk
Ussher Society www.ussher.org.uk
Warwickshire Geological Conservation Group www.wgcg.co.uk
Welsh Stone Forum <https://museum.wales/curatorial/geology/welsh-stone-forum/>
Westmorland Geological Society www.westmorlandgeolsoc.co.uk
West of England Group of the GA (LG) www.wega.org.uk
West Sussex Geological Society (LG) www.wsgs.org.uk
Woolhope Club, Hereford www.woolhopeclub.org.uk
Yorkshire Geological Society www.yorksgeolsoc.org.uk

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<https://wgcg.co.uk>

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