



# Newsletter No. 243

## June 2017

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### **Committee**

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#### **Field Secretary**

Andrew Harrison

#### **Meetings Secretary**

Roy Starkey

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John Schroder

#### **Other Members**

Christopher Broughton

Bob Bucki

Dave Burgess

To find out more about this photo - read on!



**Copy date for the  
next Newsletter is  
Tuesday 1 August**

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For enquiries about field and geoconservation meetings please contact the Field Secretary.

To submit items for the Newsletter please contact the Newsletter Editor.

**For all other business and enquiries please contact the Honorary Secretary.**

For further information see our website: [bcgs.info](http://bcgs.info) and Twitter account: [@BCGeoSoc](https://twitter.com/BCGeoSoc)

## Future Programme

**Indoor meetings will be held in the Abbey Room at the Dudley Archives, Tipton Road, Dudley, DY1 4SQ, 7.30 for 8.00 o'clock start unless stated otherwise.**

*Visitors are welcome to attend BCGS events but there will be a charge of £1.00.*

Please let Andy Harrison know in advance if you intend to go to any of the field or geoconservation meetings. If transport is a problem for you or if you intend to drive and are willing to offer lifts, please contact Andy with at least 48 hours notice.

**Saturday 17 June (Field meeting): The newly refurbished Lapworth Museum, led by Jon Clatworthy** (Museum director). Meet at 10.30 in the museum for refreshments and an introduction to the history of the Lapworth redevelopment, followed by a tour of the galleries, new stores and archive. Bring a packed lunch. Finish around 3.00. Members are then free to look around the museum. Doors close at 5.00.

**Saturday 22 July (Field meeting): Huntley Quarry Reserve and Hobbs Quarry, Gloucestershire, led by John Moseley**, Geowarden for the Gloucestershire Geology Trust. This is a joint meeting with the Lickey Hills Geo-Champions. Meet at 10.30 at the Huntley Country Garden Centre, Ross Road, Huntley, Gloucestershire, GL19 3EY - next to the church. At Huntley we will see exposures of the Huntley Quarry Beds (Late Ordovician - very early Silurian volcanoclastics) and Late Triassic red beds. We will also examine the Blaisdon Fault and associated structures, mass movements and mineralisation. Lunch will be at either one of the two local pubs or at the cafe in the garden centre, or bring a packed lunch. In the afternoon we will visit Hobbs Quarry, located 3km from Huntley Quarry to see Gloucestershire's equivalent of the Wenlock Limestone with very impressive bioherms and a chance to do some fossil hunting. Finish around 3.30.

**Saturday 12 August (Field meeting): Wren's Nest, led by Graham Worton.** Meet at 10.30 at the Warden's office adjacent to the former Mons Hill college site, approached along the access road leading into the new development adjacent to the Caves Pub on Wrens Hill Road. Finish around 1.30.

## Procedures for Field Meetings

### Insurance

The Society provides public liability insurance for field meetings but personal accident cover is the responsibility of the participant. Details can be obtained from the Secretary, and further helpful information can be found in the [Code for Geological Field Work](#) published by the GA and available on our website. Schools and other bodies should arrange their own insurance as a matter of course.

### Health and Safety

If you are unsure about the risks involved or your ability to participate safely, you should contact the Field Secretary. Please take note of any risk assessments or safety briefing, and make sure that you have any safety equipment specified. The Society does not provide hard hats for use of members or visitors. It is your responsibility to provide your own safety equipment (eg. hard hats, hi-viz jackets, safety boots and goggles/glasses) and to use these when you feel it is necessary or when a site owner makes it a condition of entry. Hammering is not permitted unless specific permission has been sought and granted. Leaders provide their services on a purely voluntary basis and may not be professionally qualified.

**Saturday 16 September (Geoconservation Day): Wren's Nest.** Directed by the reserve wardens. Meet for a 10.30 start at the Warden's office adjacent to the former Mons Hill college. Approach along the access road leading into the new development adjacent to the Caves Pub on Wrens Hill Road. The day will involve scrub clearance and a 'geo-blitz' to record findings. Bring gloves, stout footwear and packed lunch. Wardens will provide tools, hard hats if necessary and a hot drink. Finish around 2.30.

**Monday 18 September (Indoor meeting): 'On the move in pursuit of "black gold" - highlights from three decades of international oil and gas exploration'. Speaker: Graham Hickman.** Graham Hickman, a long time member of BCGS, graduated from Leicester University with a degree in Geology and Geophysics. He joined BP Exploration in 1981 and has followed an international career in oil and gas exploration. This has involved his living and working overseas in Egypt, Trinidad, Oman and Texas. While based in London he has worked on projects in Angola, China, Vietnam, Colombia, Ecuador, Peru, Switzerland and Denmark. He will describe the challenges and highlights from his international career and the challenges facing the industry.

**Sunday 1 October (Field meeting): The South Malverns, led by John Payne.** Joint field visit with the Open University Geological Society, West Midlands branch. Details tbc.

**Monday 16 October (Indoor meeting): 'The Corsi Collection of decorative stones: where geology meets the arts.' Speaker: Monica Price,** Head of Earth Collections, Oxford University Museum of Natural History, and known to many members as a result of visits to OUMNH. Monica has made a special study of the Corsi collection and has developed an excellent website documenting its contents and history: <http://www.oum.ox.ac.uk/corsi/>

**Saturday 4 November (Geoconservation Day): Barrow Hill.** Details tbc.

**Monday 20 November (Indoor meeting): 'Cave Development.' Speaker: Tony Waltham.** Tony's wealth of experience exploring cave systems across the world, coupled with his geological training and engineering geology expertise have led him to a deep understanding of the formation of caves. Tony's engaging and enthusiastic style, coupled with a lifetime's experience underground combine to make an unforgettable evening.

**Saturday 2 December (*Geoconservation Day*): Saltwells LNR.** Details tbc.

**Monday 11 December (*Indoor meeting*): Members' Evening.**

## Other Societies and Events

BCGS members are normally welcome to attend meetings of other societies, but should always check first with the relevant representative. Summarised information for approximately **two months** is given in our Newsletter. Further information can be found on individual Society websites.

### Shropshire Geological Society

**Saturday 17 June: Old Radnor Quarry**, showing the extent of the Church Stretton fault movement. Meet at 10.30 at Burling Job junction of A44 with B4594 (SO 262 582). Leaders: David Pannett and Andrew Jenkinson. Booking to reserve a place and obtain joining instructions from David Pannett and arrangement of shared transport, email: [jessicapannett@hotmail.co.uk](mailto:jessicapannett@hotmail.co.uk); telephone: 01743 850 773.

**Sunday 9 July: Pistyll Rhaeadr and the Berwyns.** Leader: Andrew Jenkinson. A joint meeting with the Mid Wales Geology Club. Booking essential for full details of time, meeting place, etc., from Andrew Jenkinson, email: [andrew@scenesetters.co.uk](mailto:andrew@scenesetters.co.uk); telephone: 01938 820 764.

Some events have an attendance charge, indicated where known. An additional daily membership charge of £3 is levied for attendance by those who are not existing Members of the Shropshire Geological Society. Further info at: [www.shropshiregeology.org.uk/](http://www.shropshiregeology.org.uk/)

### Mid Wales Geology Club

**Wednesday 21 June: Geoconservation and the Saltscapes Project.** Speaker: Prof. Cynthia Burek.

**Sunday 9 July: Rocks and Landforms on the Berwyns.** Led by Andrew Jenkinson. A joint meeting with Shropshire Geological Society, see above.

**Wednesday 19 July (evening field trip): Hafren Forest Quarries.** Led by club members.

Further information: Tony Thorp (Ed. newsletter & Hon. Sec): Tel. 01686 624820 and 622517 [tonydolfor@gmail.com](mailto:tonydolfor@gmail.com) Website: <http://midwalesgeology.org.uk> Unless otherwise stated, meetings start at 7.15 (tea/coffee & biscuits) with talks at 7.30 at Plas Dolerw, Milford Road, Newtown.

### Manchester Geological Association

**Sunday 16 July: The Great Orme, Llandudno.** Led by Cathy Hollis. This one day field trip will examine the spectacular outcrops of Lower Carboniferous limestone that are exposed.

Contact email: [outdoors@mangeolassoc.org.uk](mailto:outdoors@mangeolassoc.org.uk) For further information about meetings go to: <http://www.mangeolassoc.org.uk/> Visitors are always welcome.

## North Staffordshire Group of the Geologists' Association

**Sunday 25 June: Nuneaton.** Joint trip with with EMGS, see below.

**Thursday 13 July (Evening Walk): Tegg's Nose, Macclesfield.** Meet at 6.00 at the Tegg's Nose Country Park car park, Buxton Old Road, Macclesfield SK11 0AP.

For field trip enquiries: Steve Alcock, Longfields, Park Lane, Cheddleton, Leek, Staffs, ST13 7JS. Tel: 01538 360431 or 07711 501028. Email: [steves261@aol.com](mailto:steves261@aol.com) More info: [www.esci.keele.ac.uk/nsgga/](http://www.esci.keele.ac.uk/nsgga/)

## East Midlands Geological Society

**Sunday 25 June, 10.30: Nuneaton Precambrian/Cambrian inlier sediments and intrusions.** Led by John Carney. The visit will examine the well exposed Cambrian sandstones and shales, with Caledonian igneous intrusions, in abandoned quarries around Nuneaton. We may also be able to see late Precambrian volcanic rocks of similar age to Charnwood. Meet at the car park of the Anchor Inn, Mancetter Road, Hartshill, CV10 0RT. Joint trip with NSGGA.

Non-members are welcome. Further info: [www.emgs.org.uk](http://www.emgs.org.uk) or email: [secretary@emgs.org.uk](mailto:secretary@emgs.org.uk)

## Warwickshire Geological Conservation Group

**Saturday 17 June: Martley, Worcestershire.**

**Saturday 19 August: Chinese fossil exhibition,** Wollaton Hall, Nottinghamshire.

For more details visit: <http://www.wgcg.co.uk/> or email: [WarwickshireGCG@gmail.com](mailto:WarwickshireGCG@gmail.com). There is a charge of £2.00 for non-members.

## Open University Geological Society - West Midlands Branch

**Sunday 2 July: Lickey Hills Geology and Landscape.** Led by Julie Schroder (and other members of the Lickey Hills Geo-Champions group).

Contact Sandra Morgan: [sandra.morgan.13@gmail.com](mailto:sandra.morgan.13@gmail.com)  
For more details visit the OUGS web site here: <http://ougs.org/events/index.php?branchcode=wmi>

## Woolhope Naturalists' Field Club - Geology Section

**Saturday 17 June: Visit to University of Birmingham Lapworth Museum.** Joint meeting with BCGS, see above for details.

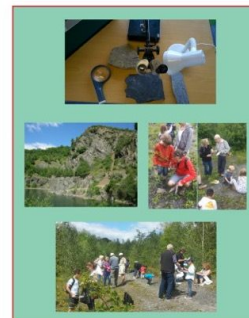
Guests are welcome with day membership of the Club: £2.00. Contact Sue Olver email: [susanolver@hotmail.com](mailto:susanolver@hotmail.com) or visit: [www.woolhopeclub.org.uk/Geology\\_Section/default.htm](http://www.woolhopeclub.org.uk/Geology_Section/default.htm)



## Abberley and Malvern Hills Geopark - Geofest

The 2017 Abberley and Malvern Hills Geofest is running from 27 May to 3 September with the usual variety of events and exhibitions, and will include, at Bewdley Museum, 'Lines in the Landscape' featuring craft activities based on geology, and from 22 July, 'Stunning Landscapes from space - How Satellites see the Geopark'. To view or download the Geofest programme click here: '[GeoFest 2017 What's On](http://geopark.org.uk/GeoFest2017What'sOn)'. For further information go to: <http://geopark.org.uk/>

## GeoFest 2017 27th May to 3rd Sept



Guided Walks, Children's Activities,  
Tours, Exhibitions and much more -  
highlighting and celebrating the  
Abberley and Malvern Hills Geopark



Events run & hosted by members  
of the  
Geopark Forum at various venues  
within the Geopark

[www.Geopark.org.uk](http://www.Geopark.org.uk)

Visit our website for  
information



## Editorial

Below (p.8) is a request from our Meetings' Secretary, Roy Starkey, that we should have a membership list to be circulated to all members. Our autumn and winter programme of indoor meetings and geoconservation days provide regular opportunities for us to meet and socialise a bit, but through the summer months our only point of contact is through attendance at field trips. Another dimension to the Society could come from you being able to keep in touch with other members who have similar interests or perhaps just live nearby. With data protection in mind, as things stand, only committee members who need to contact everyone hold the membership list, and all emailed communications are sent 'BCC'. We can't create the proposed new list without your permission, so please respond to Roy's request below. We like to feel that we are a friendly society, but we hope that you will agree with the committee that this initiative should help us all to get to know each other better.

During our recent field visit to Brymbo fossil forest, there was some sadness that the magnificent specimens which we had seen in situ on our two previous visits (2007 and 2009), are no longer there. This means that any photos taken during those visits may now take on some historical significance. John and I have added some of ours from 2007 to those already in our web photo archive from Barbara Richards. You can see them here: <http://bcgs.info/pub/bcgs-photo-archive/2007-2/>

Some of the specimens at Brymbo were lost to the ravages of the weather and vandalism. To safeguard them for the future most have been removed and sent to the National Museum of Wales in Cardiff. The good news is that Gary Brown and the Brymbo Heritage Group have ambitious plans for the future to include a proper exhibition and visitor centre, and some funding is already in place to get the project under way. Hopefully, some of the best specimens will eventually be returned. There will be more about Brymbo in Andy Harrison's report, hopefully in the August issue. In the meantime, if anyone else has photos from either of those two visits please send them to John: [webmaster@bcgs.info](mailto:webmaster@bcgs.info)

Finally, many of you have been wondering about the current status of the Black Country's bid to become a Unesco Global Geopark. In the detailed report from our Chairman (p.7 below) you'll see that the news is disappointing but nevertheless gives cause for optimism. There will be many challenges ahead for the Geopark Management Team, but we hope that the process will eventually lead to a satisfactory conclusion. ■

*Julie Schroder*

## The Black Country UNESCO Global Geopark Project Progress Report May 2017

*BCGS members may be aware that the Black Country Geopark Project Management Team submitted an application to join the Unesco Global Geopark network in November 2015. After passing through several hurdles, they have been awaiting a decision from the Unesco Global Geopark's executive on the outcome of their bid. The following is a summary of key points from a document sent to me by our Chairman, Graham Worton, who is also Chair of the Black Country Geopark Project Management Team. Ed.*

### 1. Recent steps in the Black Country Unesco Geopark Project

- **September 2016:** Team present the Black Country Global Geopark application to the Global Geopark conference, after which the evaluators drafted a recommendation statement to the senior executive to be considered in Paris in their spring 2017 meeting. Possible outcomes were stated as:
  - Refusal - does not meet required standards
  - Deferral - meets required quality but additional work required to meet full operational status
  - Endorsement - meets required standards and operational requirements
- **23rd March 2017:** an email was sent to The Black Country UNESCO Global Geopark team informing us that the UNESCO scrutineer decision of the Black Country application is:  
**Deferral with up to 2 years to address a few further pieces of work**
- **April 2017:** Briefing to ABCA (Association of Black Country Local Authorities) leaders and Chief Officers, and at ABCA's request, seek to accelerate the delivery of the geopark initiative through creation of a dedicated geopark officer post.
- **May 2017:** Attended the UK UNESCO Global Geoparks Forum (UKUGGF) in the North Pennines UNESCO Global Geopark, to clarify the UNESCO recommendations.

### 2. Context of the 2016 deferral decision

The process changed in 2016 from 'European Geoparks' to 'UNESCO Global Geoparks'. The Black Country will be the first UK geopark to go through this new UNESCO process. The March decision was disappointing to all of those involved, both locally and nationally.

UNESCO and its experts accepted without question that the quality of our geological and related heritage is indeed world class and applauded the enthusiasm and exceptional work that has been carried out to date by teams across the area. Despite this, they do however want additional clarification/assurances and some additional practical works before they approve our membership into the Global Geopark community.

Nicola Beckley and I attended a debriefing session in May 2017 at the UK UNESCO Global Geoparks Forum, with the UNESCO National Office and representatives of National organizations, and the UNESCO National Commission for Kenya. We presented recent works carried out by partners of the Black Country to demonstrate the strength of our teams and ongoing commitment. ►

Discussions clarified the need to focus on improving the seamless joining up of partners, geosites and activities across the Black Country. A key element that came up many times in discussions was the need to bring them all under one unifying, recognizable brand that is seen on all geosites and literature. A simple logo, tag line and colour scheme that appears time and time again reinforces the connectivity into the greater whole. The heavy demands and importance of modern, immediate communication styles was emphasized, and hence the need to upgrade the web presence and social media.

The process currently requires our updated evidence to be submitted to the UKUGGF team by April 2018. They have said that they would support us along the way as we require. The timeline as we see it at the moment would conclude with attendance at the Unesco Global Geopark Conference in Italy, in September 2018. At this point we should be told if we have given them everything they need to declare/award UNESCO Global Geopark status. If anything is outstanding, then we have 6 months to complete, and would have to wait until 2019. Hopefully this will not be the case and we can start celebrating in September 2018. ■

*Graham Worton*

## **Who's that? A BCGS Membership List?**

As a relative newcomer to the Society I would have been grateful to have received a list of members to help me learn who is who, where they live and who might have shared interests. After more than two years of attending BCGS meetings there are still unfamiliar faces, and faces without names, at each meeting. We discussed this at a recent committee meeting and I agreed to pen a few lines for the Newsletter.

The proposal is to produce a contact list of members, which will be published and circulated to members from time to time. The list would be provided as a useful reference for members' use only, and under no circumstances should the information therein be used for commercial purposes, or mailing lists.

If you are happy for your contact details to be included on the list, please email Roy Starkey ([meetingsecretary@bcgs.info](mailto:meetingsecretary@bcgs.info)).

A typical entry would read:

John Smith, 1 Anytown Road, Newtown, West Midlands, DY1 2AB. Tel: 01234 567890, email: js@gmail.com Interests: geological and/or non-geological: (e.g. General Geology; Fossils; Minerals; Mining; Industrial Archaeology; Photography; Documentary research; Historical Geology; Other non-geological interests and hobbies - please specify).

Thanks for your interest - I look forward to hearing from you. ■

*Roy Starkey*



## Lapworth Museum in the National Spotlight

### Your support is needed!

*We reported on the re-opening of the Lapworth Museum in Newsletter 238 (August 2016). The museum is in the spotlight again with the fantastic news that it has been short-listed for Art Fund Museum of the Year 2017, along with Tate Modern, The Hepworth Wakefield, Sir John Soane's Museum, and The National Heritage Centre for Horseracing & Sporting Art. Roy Starkey has been a volunteer and member of the project team for the last five years and below is his report and plea for your support. **But hurry! - the closing date for your comments is Friday 30 June. Ed.***

We have a campaign to promote the museum leading up to the final decision. This is where you can help. We are asking all visitors and people who know the Lapworth to: share selfies and other photographs, experiences, comments, and reviews of the Lapworth on Twitter and Instagram, and tell the Art Fund judges why you think we should win. See:

<https://www.artfund.org/news/2017/04/27/art-fund-museum-of-the-year-2017-social>

If you do so, please tag both Art Fund (@artfund) and Lapworth Museum (@LapworthMuseum) and use the hashtags #museumoftheyear and #lapworthrocks.

The Art Fund will be offering a weekly prize of a National Art Pass and a museum goody bag for their favourite post (across all five museums). The Lapworth will also award a prize to a favourite post each week.

Even if you are not personally active on social media, please spread the word to your friends and contacts/societies, and ask them to get involved. You can see a short video featuring the finalists here: <https://www.youtube.com/watch?v=GKqJtelCcxc>

Thanks for your support – fingers crossed for a good result! ■

Roy Starkey



*Birmingham University clock tower lit with the Lapworth and Art Fund logos*

## Field Meeting Report

**Saturday 22 April: Mortimer Forest, Ludlow, Shropshire.** Led by Paul Olver (Woolhope Naturalists' Field Club, Geology Section).

### Introduction

The day was clear and sunny with a chorus of birdsong and colourful flower display for our field visit to Mortimer Forest, Ludlow. This was a joint venture between members of BCGS, the Woolhope Naturalists' Field Club and the West Midlands branch of the Open University Geological Society (WMOUGS). We met at 9.30 in the Forestry Commission's High Vinnalls car park, west of Ludlow. With Paul Olver as our guide, the aim of the day was to explore the exposed Middle and Upper Silurian strata of the Mortimer Forest Geology Trail. ►

The Forestry Commission produced the Mortimer Forest Geology Trail guide in 1991 (reprinted in 2000), edited by Andrew Jenkinson of the Shropshire Geological Society. The trail follows a route from the High Vinnalls car park along Wigmore Road towards Ludlow. Our day focussed on visiting trail guide locations 2 to 5, and a regional view of the local geology from Wigmore Castle Mound.

## Geology of the area

### Stratigraphy

The Middle and Upper Silurian strata seen on the day belong to the Wenlock and Ludlow Series and are similar to those seen at the Wren's Nest. Paul mentioned how the British Geological Survey has caused some confusion with changing the names of each individual stratum within these Series and then changing them back again. The older Wenlock Series includes the Coalbrookdale Formation (previously the Wenlock Shale) and the overlying Much Wenlock Limestone Formation (previously the Wenlock Limestone). The overlying and younger Ludlow Series includes the Elton Group (previously the Lower Ludlow Shales), the Bringewood/Leintwardine Groups, and the Whitcliffe Group (previously the Aymestry Limestone and Upper Ludlow Shales). The Elton Group is split into a Lower, Middle and Upper sequence. During our visit we focussed on the Coalbrookdale Formation, Much Wenlock Limestone Formation and the Elton Group.

### Environments and Palaeogeography

The presence of patch reefs and corals within the Much Wenlock Limestone strata hints at similar marine conditions to those under which Wren's Nest formed. However, there are fewer patch reefs, and this, combined with fossil evidence and turbidite deposits within the Coalbrookdale Formation and Elton Group indicate relatively deeper marine conditions than those found at Wren's Nest. Looking at Mortimer Forest geographically, it is situated closer to Wales and further west than Wren's Nest or Wenlock Edge in Shropshire. Therefore, it is believed that the rocks of Mortimer Forest were deposited on the edge of a continental shelf, beyond the reef system that bordered the Welsh Basin.



*Graptolites in the Upper Elton Formation at  
Location 1 - Gorsty*

During the Silurian Period the West Midlands was located on the north-west shore of the Avalonian landmass. Land would have stretched towards the south-west and north-east covering areas such as the Mendip Hills. Southern England was covered with a shallow marine basin leading to the Rheic Ocean. To the north-west there were shallow marine seas with coral reefs and patch reefs leading to the deeper waters of the Welsh Basin and out to the closing Iapetus Ocean. The current political border of England and Scotland also marks the geological boundary of the Iapetus Suture, which formed after the ocean finally closed at the end of the Silurian. Like Wren's Nest, layers of volcanic ash, weathered to greenish bentonite, hint at the presence of active volcanoes on the Avalonian landmass.

Close examination of the local strata shows them dipping gently, roughly towards the north-west and south-east to form an anticlinal structure referred to as the Ludlow Anticline. The trail locations are situated on the northern limb of this anticline, the axis of which dips towards the north-east and Ludlow. ►

The same tectonic forces that shaped Wren's Nest and Castle Hill were at work here, uplifting the land during the Caledonian Orogeny at the end of the Silurian and finally deforming it during the Variscan Orogeny at the end of the Carboniferous.

## The Trail

### Location 1 - Gorsty (Location 5 on the Mortimer Forest Geology Trail)

From High Vinnalls car park we walked up the Wigmore Road towards Ludlow, to our first stop at Gorsty - a woodland track off the main road with a small quarry approximately 260m along the track. On the north side of the track the beds of the Upper Elton Formation are exposed. Along the length of the track thick brambles covered much of the exposure, which was best seen within the quarry.

The exposed Upper Elton Formation comprised weak, thinly to medium bedded, fractured, flaggy mudstones with occasional calcareous bands. These are purple, weathered to reddish-brown and green. Fossils include free swimming graptolites (*Monograptus tumescens*) and small brachiopods (*Shagamella sp.* and *Lingula lata*). The presence of graptolites and lack of bottom living fauna, such as gastropods, supports the idea that these sediments were deposited under relatively deep marine conditions.

### Location 2 - West of High Vinnalls car park (Location 3 on the Mortimer Forest Geology Trail)

From Gorsty we walked back along Wigmore Road and past the High Vinnalls car park, for approximately 270m to our next location. This was a small, heavily overgrown, woodland quarry, with an exposure of horizontally bedded Lower Elton Formation overlying the Much Wenlock Limestone.



*Exposure of the Lower Elton Formation overlying the Much Wenlock Limestone, Location 2*

The Lower Elton Formation comprised thinly bedded, purple and greenish siltstones, which also contained a thin bed of plastic, greenish bentonite clay like those seen at Wren's Nest. Bentonite clay beds occur throughout the stratigraphic sequence of Mortimer Forest and represent ash layers resulting from volcanic eruptions on the Avalonian landmass. According to Paul, chemical analysis of rare earth elements within this layer indicates a source located within the Mendip Hills. At Wren's Nest, chemical analysis of a similarly placed ash layer within the Lower Elton Formation has indicated a volcanic source located somewhere beneath Cheltenham.

Paul pointed out that when these layers were deposited there would have been a number of volcanoes erupting in different places. The result was to produce various ash layers at similar positions within the stratigraphic record, but each with its own individual chemical signature.

The underlying Much Wenlock Limestone layer was massive, nodular and equivalent to the Upper Quarried Member seen at Wren's Nest. It is thought that this limestone bed was once worked to produce slaked lime in a limestone kiln across the road at our third location. Towards the base of this layer, a conspicuous thick slot of greenish-grey bentonite represents another bed of volcanic ash. This layer has been largely eroded as a result of hammer-wielding geology students. As at Wren's Nest, ►

the Much Wenlock Limestone layer is rich in fossils, particularly corals (*Favosites* and *Heliolites*), and brachiopods (*Atrypa*, *Gypidula*, *Leptaena*, *Strophonella* and *Sphaerirhynchia*). Also found within this layer is the coiled gastropod *Poleumita*, which, along with the corals, indicates that this limestone was deposited under shallower marine conditions than the overlying Lower Elton Formation.

### **Location 3 – Limekiln Quarry** (Location 2 on the Mortimer Forest Geology Trail)

On the opposite side of Wigmore Road, our next location was Limekiln Quarry with the limekiln itself situated to the east of the quarry entrance. On the back wall and eastern edge of the quarry are exposures of the Much Wenlock Nodular Limestone, equivalent to the Nodular Member seen at Wren's Nest. Apart from occasional brachiopod shells (*Atrypa* and *Sphaerirhynchia*) and solitary rugose corals on weathered nodule surfaces, fossils were not abundant within this layer.

The Nodular Limestone was also quarried for the limekiln. A key feature of this outcrop is a fault plane running along its face, which can also be picked up in the eastern wall of the quarry. Working of the quarry has removed much of the fault plane so that only the bottom part remains with horizontal slickensides crossing it. Running a hand along the slickensides reveals that they deepen and form steps of ground up material in the direction of fault movement. The slickensides in the quarry indicate fault movements were generally towards the north-east.

From location 3 we collected cars from the High Vinnalls car park and headed, approximately 7.8km (5 miles) west for lunch at the Castle Inn pub in Wigmore village.

### **Location 4 – Wigmore Castle Mound**

After lunch we walked around 600m west, through Wigmore village and up to Wigmore Castle Mound. The view towards the north-east provided an excellent opportunity to view the structure of the Ludlow Anticline. Directly in front of us the landscape was flat, low-lying and covered with cropped fields. To the left and right the land rose and dipped to form two sets of north-east trending escarpments and dip slopes that met in the far distance. The escarpments represent the dipping strata of the Wenlock and Aymestry Limestone that form the Ludlow Anticline. The lower-lying land between represents the softer mudstone layers of the Coalbrookdale Formation and the Elton Group. From our vantage point at Wigmore Castle Mound we were looking straight up the axis of the anticline. Noticeably the steep scarp slopes of limestone were covered with woodland, whilst the shallower dip slopes supported agricultural fields.

To the south-east the sequence of limestone escarpments was repeated due to the presence of the north-east/south-west trending Leintworth Earles Fault, which has downthrown the strata to the north-west.

The view also shows features left behind after the Devensian ice advance during the last Ice Age. Today this landscape forms the Vale of Wigmore, through which flow tributaries of the River Teme. The Teme flows through Leintwardine, (north-west of the Castle Mound), then through the Vale of Wigmore, and then north-east out through the Downton Gorge. It then flows on towards Ludlow, approximately 12km (7 miles) north-east of Wigmore Castle Mound.

Before the last Ice Age the River Teme flowed southwards, through various gaps in the hills, past the location of Yatton village (south-east of the Castle Mound) to intersect the River Lugg approximately 3km (1.9 miles) to the south. During the Devensian ice advance, the Wye Valley glacier crossed this ►



area, blocking the route of the River Teme and stopping its southward flow. However, the river was still being fed from its head waters, which built up to form a vast lake - Wigmore Lake - which covered the low-lying land that we saw before us. As the head waters built up, they eventually overflowed through a channel to the north - the Downton Gorge. When Lake Wigmore subsided and the ice retreated the River Teme had changed its course towards Ludlow and eventually would meet up with the River Severn. At Yatton village the Wye Valley Glacier also deposited boulders of Welsh conglomerate, rhyolite and ignimbrite.

### Location 5 - Mary Knoll Valley (Location 4 on the Mortimer Forest Geology Trail)

From the Wigmore Castle Mound we walked back to the Castle Inn, picked up the cars and headed back to the High Vinnalls car park. After a short walk along the main woodland roadway and a green waymarked trail, we arrived at our final locality for the day, Mary Knoll Valley.



Looking for trilobites in Mary Knoll Valley,  
Location 5

Through the wooded valley runs a small stream, the banks of which were heavily overgrown and covered with fallen leaves. Exposures of the underlying bedrock were somewhat limited to a few small eroded patches in the banks of the stream and the stream bed. At this location the bedrock belonged to the Middle Elton Formation, which comprised dark olive-green mudstone and siltstone with occasional grey calcareous bands. Once again, fossil graptolites (*Monograptus colonus* and *Neodiversograptus nilssoni*) were to be found within these rocks and hint at formation under relatively deep marine conditions. Other fossils include brachiopods (*Slava* sp. and *Aegiria* sp.), which may have lived attached to

seaweed, and the trilobite *Dalmanites* sp. Complete specimens of this arthropod are rare and the avid fossil hunter was only likely to come across a head, thorax or tail. Many members of the party took the opportunity to sit in the sun with a drink and chat.

I would like to thank Paul for a very interesting field visit, and members of the Woolhope Naturalists' Club and the West Midlands branch of the Open University Geological Society for their attendance. We look forward to seeing Woolhope members in October for the planned visit to the Malverns.

**Reference:** Forestry Commission, Mortimer Forest Geology Trail Guide, edited by Andrew Jenkinson, 1991, (reprinted with minor corrections, 2000). Published by Scenesetters, ISBN 1 874200 09 2. ■

Andy Harrison

## Lockne - a museum with a bang!

Continuing my occasional theme of geological museums I have come across in my travels, this one was unfortunately closed when I stumbled upon it last summer whilst touring the length of Sweden. The name of this village had rung a bell with me for a reason that soon became clear as I pulled into the car park behind the museum, having followed signs off the main route between Östersund and Åsarna. ►





*Part of the display wall outside Lockne museum minerals (garnets and rubies)*

Lockne (pretty much in the dead centre of Sweden), marks the location of one of an ever growing number of meteorite impact sites discovered all over the Fennoscandian Shield. The majority of them are quite unimpressive in that they show up as little more than a shallow, lake-filled depression in the present day relief. Lockne is amongst their number, and is relatively small fry, having a diameter of only about seven kilometres and dated at around 450 million years old (late Ordovician). The much larger Siljan impact site further south makes a clearer impression on the landscape, and even more so on the geological map.

Nevertheless, the Swedes are clearly proud of their geological heritage, and at Lockne they have created an unassuming memorial to the event by way of the 'Lockne Kratern Meteorit Center' (*see front cover photo*). Housed in a modest, seemingly purpose built edifice, their literature is a little less modest, claiming that the "1800 feet wide meteorite, with a weight of 400 million metric tons and a speed of about 30,000 miles an hour hit the sea (Sweden was at this time submerged beneath the tropical Iapetus ocean) causing an enormous earthquake felt the world over..." This in turn caused a huge tsunami that "forced its way from the sea" etc. etc.



*Lockne Museum display - local algal sandstones*



*Lockne Museum display - concretion*

Being closed, I can only judge the interior from a leaflet and internet images, which give the impression of a substantial and atmospheric, well presented display (no doubt in Swedish). I imagine they may provide some degree of guidance in English as this is not uncommon in Scandinavia. A cafe and souvenir shop are, of course, staples of such a visitor attraction.

Outside, I was able to enjoy one display: a wall embedded with a variety of specimens, both mineral and fossil, including orthocones, trilobites and

crinoids, rhomb porphyries, schists, larvikite, marbles and a local 'stromatolitic' (or algal) limestone, feldspars, micas, garnets and gemstones - all of a reasonably high quality (considering they could so easily be vandalised - although perhaps not a high risk in this community).

A few kilometres away at Tandsbyn there is a 2 kilometre trail or 'craterpath' one can follow, with waymarks and information boards. The impactite rock (Tandsbybreccia and Locknebreccia) can thus be examined both in situ and as specimens in the museum. A return visit 'in season' is clearly called for. ■

*Mike Allen*



## Mike's Musings No. 9 - What's in a (Rock) Name?

Where do all the names of rocks (and minerals for that matter) come from? For the vast majority of cases this is an easy question to answer. Just think of a place or a person you wish to commemorate or honour (either as the location of discovery, or discoverer), add the suffix '-ite', and the job's done!

Fortunately (otherwise this would be a rather short article!), there are a few rocks that owe their nomenclature to rather more revealing origins. These often date from the early years of geology, when scholars often received a wider and more classical education, and were better versed in Greek and Latin as well as other contemporary languages to provide inspiration. They are also, for the most part, quite familiar names.

The obvious place to start is with the two most abundant igneous rocks, volcanic basalt and plutonic granite. **Basalt** has arguably the most exotic etymology. Derived from an Ethiopic word '**bselt**' or '**bsalt**', the feminine declension '**bsul**' means 'cooked'. A Hebrew word '**barzel**' meaning 'iron' has also been implicated. These words pass down through the Greek '**basanos**', a term for a touchstone used for testing the purity of gold coins, and now preserved in the rock name **basanite**. This is a specific type of basalt containing essential olivine. Some accounts also suggest a connection between basalt and its use in the construction of Roman basilicas. Basalt often lends itself to a 'stepped topography' due to a succession of lava sheets. This inspired the Germans to introduce the term '**trap**' for such landscapes, from the German '**treppen**' (steps, staircase).

**Granite** has a more straightforward etymology, derived from the Latin '**granum**' and Italian '**granito**' in reference to its obvious 'grained' (or crystalline) character. Associated petrological terms include 'hebraic granite' (the original **pegmatite**) and 'graphic granite', which has an intergrowth of quartz and feldspar that takes on the appearance of cuneiform script or Norse runes, and hence a rock name **runite**. One altered variety of granite, **greisen**, has a more recent etymology, derived from medieval German (via the miners of Saxony), '**greis**', meaning 'grey, with old age'.

The volcanic equivalent of granite is **rhyolite** (also known in some quarters as **liparite**, after the Italian Lipari Islands - a more typical derivation). This name comes through German '**rhyolith**' from the Greek '**rhua**', meaning a stream or torrent of lava. In view of the highly viscous nature of acid lavas, the term 'torrent' hardly seems very appropriate!

Another related rock type, the familiar **obsidian**, takes its name from 'a stone very similar to that discovered by **Obsidius** in Ethiopia' according to Theophrastus and/or Pliny (? the Elder). Hydrated obsidian breaks down into a material called **perlite** which is named from the French word '**perle**' (pearl) on account of the onion-skin like layering it exhibits. Rhyolite often occurs as a foamy rock that floats on water - **pumice**. This is also attributed to Pliny from the Latin '**pumex**' (plural 'pumices') or '**rpuma**' meaning 'foam' and ultimately from an ancient Greek word meaning 'worm-eaten'.

Another familiar, and fairly common rock is **dolerite**. This has nothing to do with dolorous (painful, sorrowful), but comes from the Latin '**doleros**' (the second vowel making all the difference!). This word means 'deceptive', and was coined for the slightly strange reason that dolerite was difficult to distinguish from **diorite** - the latter name being derived from the Greek '**diorizein**' meaning 'to distinguish'. So we seem to be going round in circles with these two names! Dolerite has often been referred to as the rather confusing 'greenstone' (now also used in other senses), since a German mineralogist began using the term '**grünstein**', whilst Americans often use the term '**diabase**', meaning 'transitional' (between gabbro and basalt), increasing the confusion still further. ►

Having mentioned **gabbro**, this is an odd name by any measure. Apparently it derives from an old Florentine, or Tuscan, word given to a particular group of rocks by the marble-workers, and found in that part of Italy. It has also been attributed to the Latin '**glaber**', meaning 'bald' or 'smooth', not adjectives I would readily associate with the coarse-grained, basic plutonic rock to which it has given its name, but incidentally it gave palaeontologists the term 'glabella' in relation to trilobites.

One variety of gabbro known as **eucrite** derives its name from '**eukritos**', meaning 'easily discerned' in Greek, which makes a far more sensible reference to the coarse-grained nature of all gabbros. Another variety of gabbro is **troctolite** a spotted rock which gets its name in reference to the rainbow trout (Greek '**troktes**' = marine fish) known more specifically to the Germans as '**forellenstein**' (trout-stone).

The even-more-basic group of plutonic rocks, the **peridotites**, have a name easily explained, without recourse to the classics. All of them are rich in the mineral olivine, the gem-quality variety being called '**peridot**' in French.

It is relatively unusual for basic rocks (low in silica) to have a high alkali (sodium and potassium) content, especially in the plutonic realm. Consequently, they were much sought after to fill a gap in a series of rocks containing nepheline (instead of the more usual alkali feldspar) as an essential mineral. One such rock was eventually identified and given the name **theralite**, from a Greek word for 'pursue' or 'eagerly looked for'.

Returning to the volcanic world, the well known textural term '**porphyritic**' - having some large crystals set in a fine-grained groundmass, indicative of two generations of crystal formation within a single rock (although this may be an over-simplification) - derives from an ornamental rock called **porphyry**, highly prized by the ancient Egyptians. This rock was of a specific type, purple in colour, from which the name is obtained (Greek '**porphura**' = purple). The term these days has become far more confused, being applied to all kinds of rock types according to inclination, with names like **porphyrite** and **porphyroid** adding to the chaos.

The name **phonolite** may be familiar to some of you. It is said to give a distinctive ringing sound when struck, hence the name (Greek '**phonos**' = sound). I have come across phonolites which do give a short, high-pitched note when hammered, but whether this is true of all phonolites, or indeed specific to them alone, I'm less convinced. Phonolites do have a relatively unusual composition, being highly alkaline in character, but this is far from unique.

Some rock names indicate a particular aspect of their mineralogy, e.g. **anorthosite** (rich in anorthite, the French word for plagioclase, here referring more specifically to the calcium-plagioclase end-member), and **carbonatite** (the generalised name for those odd carbonate-rich 'magmatic limestone rocks') are two cases in point. **Serpentinite**, indicating a rock rich in the mineral serpentine, is often what is meant when the mineral name is uttered - this is one for the pedants to get uppity about!

There are probably a handful of further, more obscure, rock names which buck these usual 'rules', but this is essentially all there is to be said on the subject.

A similar pattern is true for minerals, with one particular difference. Many minerals are indeed named after people or places, but a good number are named after a noteworthy property or quality they possess. This factor is less prominent amongst our rock nomenclature, as we have seen with those few exceptions described. I shall explore the case of mineral names further in my next article. ■

*Mike Allen*