



Newsletter No. 298

August 2026

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Contents:

Future Programme	2
Other Societies and Events	4
Editorial	6
An MBE for Colin Prosser	6
Geoconservation & Field Meeting Reports	
Smestow Valley	8
Dudley Museum and Archive	9
Burton Dassett Country Park	12
Mike's Musings No. 64	
Follow that dyke: Part 1 -	
Armathwaite	16

To find out more, read on!

Copy date for the
next Newsletter is
Thursday 1 October



Mark Jeffs Honorary Secretary, honsec@bcgs.info	Andy Harrison, Field Secretary, ☎ 07973 330706 fieldsecretary@bcgs.info	Julie Schroder, Newsletter Editor, 42 Billesley Lane, Moseley, Birmingham, B13 9QS. ☎ 0121 449 2407 newsletter@bcgs.info
For enquiries about field and geoconservation meetings please contact the Field Secretary. Please notify Andy Harrison in advance if you will be attending these events. To submit items for the Newsletter please contact the Newsletter Editor. For all other business and enquiries please contact the Honorary Secretary. For more information see our website: bcgs.info, YouTube, and Facebook.		

Future Programme

**Indoor meetings are held in the Lamp Tavern, 116 High St, Dudley, DY1 1QT
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.

Wednesday 26 August (Field Meeting): 'The Louis Barrow Trail, Around Bournville and Cotteridge Park', (Erratics Project Trail 2). Led by Julie Schroder. This trip has been arranged in conjunction with Monmouth U3A geology group (*read more in the Editorial, p.5, on the reasons for this mid-week trip*). Meet at 10.45 in the free car park at Cotteridge Park, Franklin Road, Birmingham, B30 2HN (Grid ref: SP 04922 80462.) **See the link to a Google map on our website.** **NB:** if the car park is full, there is plenty of free parking on the road nearby. After a brief introduction and distribution of trail leaflets we will visit The Shed nearby for refreshments/toilets (*the Monmouth group will have travelled a long way!*). In the morning we will visit locations on the trail route in Cotteridge Park and Cadbury Park examining the glacial features of the erratics, learning about their geological journey, and their preservation in historic times thanks to the Cadburys and their chief engineer Louis Barrow. After lunch in Bournville Village we will visit the erratics at Selly Manor, learn more of the Cadbury story and finish with a close examination of the 'Bournville Boulders' close to Bournville Station. Wear comfortable shoes. Bring a packed lunch or food is available in Bournville Village. View or download the Trail 2 Leaflet [here](#). Read more about Louis Barrow here: https://erraticsproject.org/louis_barrow/

Monday 21 September (Indoor Meeting): 'The Work of the National Brownfield Institute'. Speaker: Andrew Stott (National Brownfield Institute). Full details TBC.

Sunday 27 September 2026 (Field Meeting): Wren's Nest 70th Anniversary Walk.

Celebrating 70 years - to the day - since the site became the world's first national nature reserve for geology. Led by Andy Harrison. Meet at the wardens' house in Fossil View, off Wren's Hill Road, DY1 3SB (GR: SO 937 922) at 10.15 for a 10.30 start. The day will involve a walk around the reserve, exploring its heritage, why it was so important and how it came to acquire the prestigious status of a National Geological Nature Reserve, an SSSI, a Scheduled Ancient Monument and a designated UNESCO Global Geopark site. Wear strong shoes, appropriate clothing and bring a packed lunch. Finish around 3.30. *(See the box on p.4 for further 70th Anniversary information.)*

Sunday 11 October (Field Meeting): Smestow Valley and Erratics at Wightwick Manor and the Mount Hotel.

Led by Andy Harrison and Julie Schroder. *(This trip will be an approximate re-run of the BCGS field trip which took place on 14 February. Organised primarily for the Warwickshire Geological Conservation Group, this trip is now a BCGS/WGCG joint event.)* Meet at Smestow Valley Local Nature Reserve, Meadow View Terrace, Wolverhampton WV6 8NX (Grid ref: SO 891 999), 10.15 for a 10.30 start. See the link to a Google map on our website. In the morning we will walk around Smestow Valley, examining its geology in the context of the local landscape. Wear suitable outdoor clothing for the weather conditions. Finish this session around 12.30. Either bring a packed lunch or you can purchase lunch locally.

The afternoon session **starts at 1.30** in the car park at Wightwick Manor, Wightwick Bank, Wolverhampton, WV6 8EE, Grid Ref: SO 868982. (NB: The post code is misleading: the grid ref. shows the car entrance from the Bridgnorth Road, A454.) See the link to a Google map on our website. Meet by the ticket office in the car park where we will be admitted (without charge) as a group. **Please be there on time!** We will visit the recently cleaned array of glacial erratic boulders, and other glacial erratics around the property, and learn something of their geological and social history. Drive on to the Mount Hotel, Mount Rd, Tettenhall Wood, Wolverhampton WV6 8HL. Grid ref: SO 874989 (see the link to a Google map on our website). Meet in the hotel car park at 2.45 – 3.00 (depending on exit time from Wightwick Manor). Here we have permission from the hotel to visit the erratics from Charles Benjamin Mander's late 19th century 'bouldery'. We will examine their varied geology and learn about their connection with the Wightwick Manor erratics. Finish 3.30 – 4.00. **NB.** If we are unable to visit the Mount due to a private function, there will be an erratic-themed alternative.

Monday 19 October (Indoor Meeting): 'The Ediacaran Biota of Charnwood Forest: the behind the scenes story'.

Speaker: Dr. Mike Howe (Chief Curator and Head of the National Geological Repository at the British Geological Survey). There are several speakers talking on the results of the work and the implications for the origins of multicellular organisms, but I believe that the original discovery of the fossils around 1849 and their subsequent erroneous discrediting, plus the pivotal role played by a local society – Section C, LLPS (Leicester Literary & Philosophical Society) – in reinvigorating Ediacaran research in the UK, makes an equally interesting story.

Monday 16 November (Indoor Meeting): 'Bringing Forward the Past: Black Country Geology, Past, Present and Future' - Part 2'.

Speaker: Graham Worton (BCGS Chair and Keeper of Geology for Dudley). This talk will complete Graham's fascinating insight into the Geology of the Black Country. Part 1 was delivered to the Society on 19 January under the title: 'Geological Knowledge and the Geology of the Black Country up to 1900'. If you missed it, or want to refresh your memory before Part 2, it is available on our YouTube channel here: <https://www.youtube.com/watch?v=76Pi2HbQU-c>

Wren's Nest National Nature Reserve 70th Anniversary celebrations 2026-2027

To mark the 70th Anniversary of the Wren's Nest National Nature Reserve, a partnership of organisations within Dudley Council is involved in planning a year-long programme of events and activities to celebrate the natural and industrial heritage of the Wren's Nest. Numerous events and activities are in the pipeline! Here is a taster of what's to come, with a few dates for your diaries:

Saturday 26 September: non-formal opening of a special exhibition at the Museum and Archives to celebrate the history of the Wren's Nest from 1956 – 2026.

Sunday 27 September: The actual date of the anniversary. Wrens Nest Anniversary Walk (*see Programme of Events, above, p.3*). Press and Social Media announcements.

Saturday 3 October from 1.00: Formal opening of the special exhibition at the Archives with speeches and short talks. (Details to follow in due course.)

Sunday 4 October: A day of field trips to be organised by the Friends of Wrens Nest. (Details TBC)

Other Societies and Events

Birmingham Heritage Week

Friday 11 September 10.30 – 1.00: Building Stones of Birmingham, Trail 1. Led by Julie Schroder. From the Town Hall in Victoria Square to the Cathedral Square, this is one of three trails exploring the Building Stones of Birmingham. We will look beyond the architecture of Birmingham's amazing buildings and consider the huge variety of stones used in their construction, from local sources to distant continents. From the fossil remains of sea creatures, to ancient deserts, evidence of volcanoes and signs of tectonic earth movements, we will see how the stones that built the City provide a window into the deep history of the earth.

This is a public walk and booking is required. See: <https://birminghamheritageweek.co.uk/>
Saturday 15 August at 10.00 - booking opens for events that require tickets.

Geologists' Association

Friday 25 to Sunday 27 September: Geologists' Association Annual Conference. Yorkshire Museum and Tempest Anderson Hall. For details and booking: <https://geologistsassociation.org.uk/conferences/>

Friday 9 October: 'Thirty years of discovery at the UK's largest dinosaur track site in north Oxfordshire'. Speaker: Prof Kirsty Edgar.

For more information visit: <https://geologistsassociation.org.uk/lectures/>

Woolhope Naturalists' Field Club - Geology Section

Tuesday 8 September: Geology Of Wenlock Edge, led by Andrew Sims. A field meeting at Wenlock Edge, a National Trust owned and managed part of the Shropshire Hills National Landscape.

Non-members are welcome and pay £7. More info. at: <https://www.woolhopeclub.org.uk/meetings>

Shropshire Geological Society

Wednesday 9 September: 'Sea floor spreading'. Speaker: Prof Tony Morris (University of Plymouth).

Wednesday 14 October: 'The Chengjiang Lagerstatte.' Speaker: Prof David Siveter (University of Leicester).

Meetings are at 7.15, lived streamed on Zoom and held in person at The Methodist Centre, Lansdowne Road, Bayston Hill, Shrewsbury, SY3 0HZ. If you wish to attend please contact Albert Benghiat: 07710 421 581, email: SGS.chair@hotmail.com
Further information: <https://shropshiregeology.org.uk/>

North Staffordshire Group of the Geologists' Association

Saturday 12 September at 10.00: Bradgate Park, Charnwood Forest (including Precambrian outcrops with Charnia fossils). Leader: Dr. J Carney (BGS).

To book please contact NSGGA Field Secretary, Steve Alcock: steves261@aol.com
For more information: <https://nsgga.org/>

Mid Wales Geology Club

Wednesday 19 August: 'The Geology of Northumberland'. Speaker: Geoff Smith.

Further information: Web: <http://midwalesgeology.org.uk> lectures start at 7.15 and are a hybrid of in-person meetings at Plas Dolerw, Newtown, SY16 2EH and via Zoom. Those wishing to join a meeting remotely should contact the secretary, Chris Simpson, at christopher_s@btinternet.com

Geological Society of London

Tuesday 15 September at 6.00: 'Do you want ice with that? The impacts of climate change on nutrient cycling in polar coastal oceans'. Public Lecture. Speaker: Prof Kate Hendry.

These lectures are free to attend by Zoom or in person at Burlington House, Piccadilly, London, W1J 0BG.
More information at: <https://www.geolsoc.org.uk/events-and-venue-hire/public-lectures/>

Warwickshire Geological Conservation Group

Thursday 17 September at 7.15: 'Etruria Marl: what it is; how it formed; why it's special'. Speaker: Dr Bernard Besly.

Sunday 4 October from 10.30 to 4.00: WGCG Bridgnorth Field Trip. Led by Stuart Burley, Mike Allen & Ray Pratt.

Sunday 11 October from 10.30 to 4.00: Day Field Meeting: Smestow Valley and Wightwick Bank. Led by Andrew Harrison and Julie Schroder.

For more information visit: <https://www.wgcg.co.uk/> or email: WarwickshireGCG@gmail.com.

Editorial

In the wake of the GA awards that we announced in the last Newsletter (No. 298), I am delighted to bring you the news that Colin Prosser has been awarded an MBE for his long service to the conservation of geological heritage in the UK. See the item below for more on this.

Note the extra field trip on 26 August! Our Field Secretary, Andy, has recently been having some difficulty finding leaders for field trips, and was unable to fix anything for August. It just happened that I was in the process of fixing a guided walk on Wednesday 26 August with Monmouth U3A geology group, on 'Glacial Boulder Trail 2, around Cotteridge and Bournville.' I am pleased to say this is now a joint event with BCGS. Although it had already been fixed to take place on a Wednesday, and this is very short notice, we hope that some of you will be able to attend. This trail is at the heart of all the erratic trails which were established in Birmingham during the Erratics Project a few years ago. It has numerous preserved erratics and historical records which give an insight into the world of glaciology in the early part of the 20th century – and it takes us through the heart of the Cadbury chocolate factory! Details are in our Programme of Events. Do join us if you can.

Sunday 27 September is the 70th anniversary of the founding of the Wren's Nest National Nature Reserve. See p.3 for details of a special anniversary walk, and see p.4 for other information as known so far. More details will follow in due course.

I hope your summer is including some geological adventures. If you have anything of geological interest to report, please get in touch with the Newsletter Editor, details on p.2. ■

Julie Schroder

An MBE for Colin Prosser

Colin is a very long-standing Champion for all things geological in the Black Country and a staunch friend of our Society. Only last July during our 50th anniversary celebrations we had the pleasure of a talk jointly presented by Jonathan Larwood and Colin entitled 'Innovation and influence - the role of the Black Country in Geoconservation'. We send our warmest congratulations to Colin for this well-earned reward for 'services to the conservation of Geological Heritage in Britain'. The following is taken from a press release from Dudley Metropolitan Borough Council.¹ ►



*Colin Prosser, Cllr Paul Bradley deputy leader,
Nicola Beckley and Graham Worton*

A leading figure behind the creation of the Black Country UNESCO Global Geopark has been recognised in the King's Birthday Honours List 2026. Dr Colin Prosser, who works closely with Dudley Council at Wren's Nest National Nature Reserve and has played a key role in securing UNESCO Global Geopark status for the Black Country, has been awarded an MBE for services to the conservation of geological heritage in Britain.

Colin recently retired from Natural England, the government's adviser for the natural environment in England, after a distinguished career dedicated to the conservation, management and promotion of geological heritage. Throughout his career, he has been a passionate advocate for the Black Country's internationally significant geology.

Brought up and educated in Dudley, Colin studied geology at universities in Manchester and Swansea before embarking on a career in nature conservation. Today, Colin remains closely involved with the Black Country UNESCO Global Geopark as a volunteer, continuing to help the team to deliver, promote and celebrate the area's rich geological, natural and cultural heritage.

Speaking about the honour, Colin said:

"I have spent my whole career working to conserve, manage and promote the highlights of Britain's geological heritage and, to my mind, there is nowhere more interesting than the Black Country. The geology here defines the Black Country, providing the coal, limestone, ironstone and clay that fuelled the Industrial Revolution and shaped our landscape and culture, with nowhere better illustrated than at Wren's Nest National Nature Reserve. I am extremely honoured to be recognised with this award, which is in no small part down to the innovation, enthusiasm and hard work of the many colleagues, partners, volunteers and members of the local community involved."

Councillor Damian Corfield, cabinet member for neighbourhoods, said:

"On behalf of Dudley Council, I would like to congratulate Colin on this thoroughly deserved honour. His passion, expertise and dedication have played a major role in ensuring the Black Country's extraordinary geological heritage receives the recognition it deserves. The UNESCO Global Geopark is one of the region's greatest assets, showcasing the landscapes, fossils and industrial heritage that helped shape not only the Black Country but the modern world. Colin has been an outstanding ambassador for our area and an inspiration to many people working to protect and promote our natural environment and his MBE is fitting recognition of a lifetime of achievement."

BCGS wholeheartedly endorses this accolade. Congratulations, Colin! ■

¹ Contains Dudley Metropolitan Borough Council data © Crown copyright and database right.

Geoconservation and Field Meeting Reports

Saturday 9 May (Geoconservation Day): Smestow Valley Leaders: Smestow Valley Local Nature Reserve Wardens and Friends of Smestow Valley.

We met George from the Smestow Valley Friends Group in the car park off Meadow View, at the entrance to Smestow Valley Local Nature Reserve. Just after 10.00, we drove roughly 2 miles to Westacre Crescent at the south end of the reserve, where a pair of gates, known as the 'Tolkien Gates', provide access to the LNR. Walking through meadows and woods, we descended to the infilled former sand quarry where a notice about the 10th century 'Battle of Tettenhall' is located. Heading west, parallel to the canal, we crossed the former quarry (now meadows), into a wooded area where there are outcrops of Wildmoor Sandstone.



Smestow Valley LNR, Former Sand Quarry

The meadows were filled with wild flowers such as buttercups, vetch and dandelions while others, such as red campion, creeping geranium, and wood avens inhabit the woodland area. Trees, including sycamore, silver birch, field maple and holly are found here, and the air is filled with birdsong.



Smestow Valley, rock exposure before clearance

We spent the morning clearing brambles, nettles and ivy, and then lichen and moss from the Wildmoor Sandstone rock exposures. These form a long cut on the western edge of the former quarry. Measuring roughly 50m in length, the cut is a straight feature roughly 3-4m deep and now sealed at both ends with earth embankments. It leads from the former quarry to the edge of the Staffordshire and Worcestershire Canal and may have acted as an access between the quarry and canal, possibly for moving quarried sand and later, landfill.

The geology

The Wildmoor Sandstone outcrop comprises red-brown, in places mottled purple, well-bedded medium sized well-sorted sand. There are around four layers, and occasional patches of reduced greenish-grey silty sand. There was little or no evidence of clay layers or coarser gravel-size grains. The exposure clearly shows cross-bedding and horizontal beds formed by channels stacked one on top of another, with a flow direction towards the west. Many vertical fractures occur across the ►



Smestow Valley, rock exposure after clearance

cutting exposure. Part way along there is a roughly hewn break in the sandstone, approximately 1m across, which has been infilled with later reddish-brown slightly gravelly layered sandy deposits, possibly glacial in origin. The gravel is made up of sandstone, quartz and quartzite, medium to cobble-sized and angular to rounded. Rounded holes within the sandstone rock face are evidence of mining bees making the exposures their home.



Pond in Smestow Valley LNR

Roughly 30m from the cutting, we examined three glacial boulders that had most likely been moved to their current location by human hands. All three were relatively rounded with two roughly football size, and the third much larger. The first boulder was a brown sandstone and had probably not been carried very far. The second was a pinkish looking possibly granitic rock, similar to some of those seen at Wightwick Manor. The third larger boulder was dark in colour. Cleaning and further investigation of these boulders is required to confirm their lithology and provenance.

We finished around lunchtime and some stayed behind to do a final clean of the exposure. On the way back to the cars, we stopped to look at two ponds located within the south-west corner of the reserve and near the Tolkien Gate. The surrounding ground, though dried out, contains many plants that clearly love a wetter habitat. The ponds are probably man-made and sit within glacial till deposits that overlie the Wildmoor Sandstone.

Saturday 13 June (Field Meeting): Dudley Museum at the Archives. Leader Graham Worton

This year Dudley Museum at the Archives celebrates its 10th anniversary. We met Graham shortly after 10.30 in the main archive building foyer. Before entering the Museum, Graham explained why the old Dudley Town Centre museum closed in 2016, and how the opportunity came about to share the space in the new archive building. The move was not a smooth one and Graham explained what had to be done to get the space into an operating museum; how the space itself influenced what could be done in terms of displays; what the aims of the museum were and how they avoided conflicting with the local Black Country Living Museum. This all influenced what finally went on display and what story museum staff wanted to tell.



Introduction in the Miner's Gallery

At the Museum entrance a wall-mounted mission statement reads: *'Dudley Museums exist for the inspiration, education and enjoyment of everyone'*. This reflects the vision to inspire and educate the public about Black Country heritage, in particular geology, whilst enjoying the experience. A second underlying paragraph explains how this is achieved:

'We preserve, promote and provide access to local heritage through access to our geology, glass, art and other collections. We aim to enrich lives and make the Black Country a fairer, happier and better place to live, ►

work and learn. We will do this through encouraging engagement with local heritage, exploring and caring for the natural environment and supporting creativity in the arts. We will provide a window on the world through our partnerships, exhibitions and events'.

The Museum is split into several galleries intentionally arranged maze-like, to encourage visitors to walk through and marvel at what is around each corner. A circular trail through the galleries allows visitors to view them in a clockwise or anti-clockwise direction. Our visit followed an anticlockwise route starting with the Mining Gallery and progressing through the Silurian and Carboniferous galleries, Dinosaur Gallery, Ice Age Gallery, Invaders and Settlers Gallery and finally, galleries displaying Black Country industry, art and famous people, all reflecting Black Country Heritage through time.



Dudley Museum - the Silurian Gallery

The Mining Gallery is dedicated to the region's miners and mining heritage. On display are examples of the minerals that made the region famous; artefacts from the region's mining heritage – such as petrified pony straw and clay candle holders; texts on the Dudley Geological collection; mining hazards. The gallery also pays homage to Sir Roderick Impey Murchison and his work that was instrumental in putting Dudley firmly on the 'geological' map. The gallery includes the words Murchison gave at the inaugural meeting of the original 'Dudley and Midland Geological Society', as reported in the Illustrated London News (1849):



Petrified pit pony straw in the Miners Gallery

'In no part of England are more geological features brought together in a small compass than in the environs of Dudley, or in which their characters have been successfully developed by the labours of practical men. Where else can then a site be found in which the records of the past can be more successfully preserved, or where we can store up for instruction both the types of primeval life and the evidences of the mighty operations that mark the more ancient conditions of our planet?'

In his inaugural address, Murchison was not only paying homage to the laymen (miners), without whose help he would have struggled to produce his book, the 'Silurian System', but also suggested that a museum should be built to show off the fossils that Dudley had to offer.

Off to the side is a small theatre, screening short films that advertise the heritage and various sites of the Black Country and its Geopark. When leaving the Mining Gallery, the visitor has to take, with a 'big pinch of salt', the wall-mounted geological time scale that starts from the Ordovician Period, 488Ma.

The Silurian and Carboniferous Galleries display the Black Country's fossil diversity and tell the story of its earliest ancient environments. After a brief explanation on how fossils form, the Silurian Gallery showcases the diversity of corals, trilobites, brachiopods and bivalves, plus crinoids, gastropods and ►

cephalopods from the region, and ripples in the bed rock. All show that during the Middle Silurian (around 425Ma) shallow, tropical marine conditions covered the Black Country. A wall-mounted map illustrates where the Black Country sat, south of the equator at this time.

On leaving the Silurian Gallery, a small case displays examples of the Gornal Grit (Downton Castle Sandstone) and Ludlow Bone Bed that represent the end of the Silurian going into the Devonian, around 420Ma. This period marked a change from the earlier limestone seas as the region was uplifted during the Caledonian Orogeny, to sit within the eastern fringe of the Euramerica (Old Red Sandstone) continent that included Laurentia and Baltica. A map, dated 390Ma, shows England still south of the equator and as part of Euramerica where, over the next 100 million years, it was worn down to the low-lying swamps and floodplains forming the next part of the story.

On display in the Carboniferous Gallery are fossil plants, including *Lepidodendron* fragments (roots, bark, cones and leaves), horsetails and ferns, freshwater molluscs, fish, arthropods - including cockroaches, the Coseley spider (or mite) and millipedes - and worm burrows. These all illustrate life within the vast equatorial, tropical forests and swamps that gave us the coal measures and mineral reserves, which, in turn, helped to drive the Industrial Revolution. The display also contains examples of volcanic ash and silicified conifers from Barrow Hill and Tansey Green clay pit and dolerite from Rowley. These represent volcanic activity which affected the region around 307Ma.



The Dinosaur Gallery

(*Protorosaurus*, *Coelophysis* and *Postosuchus*). The Triassic also saw the appearance of mammal-like reptiles, or cynodonts, and the first flying reptiles (pterosaurs).

The Dinosaur Gallery reflects the Mesozoic periods. Wall-mounted texts explain the Permian and Triassic Periods, 299Ma to 201Ma, when the Midlands were predominantly land-locked arid, desert environments following the Hercynian Orogeny and recovering from the largest mass extinction event when around 95% of species were wiped out. Generally devoid of vegetation, these vast arid expanses were ruled initially by amphibians, primitive reptiles (pelycosaurs) and archosaurs, (which were early ancestors of the dinosaurs), and later by reptiles

During the Jurassic and Cretaceous periods, England mostly comprised shallow to deep marine basins with small islands between. Dinosaurs, marine and flying reptiles and crocodilians evolved and became the successful rulers of virtually every corner of our planet. At the same time, early mammals, birds, flowering plants, the first grasses and pollinators began to appear. The gallery displays include dinosaur and reptile models, casts of a T-Rex and allosaur skull, examples of flowering plants, and cases of fossils including fish, a marine reptile flipper, a silicified tree trunk, ammonites, bivalves, sea urchins, dinosaur eggs and vertebrate bones. Also on display are skeletons of marine reptiles and dinosaur/flying reptile species that illustrate the evolution of flight (*Compsognathus* to *Archaeopteryx*).

The Tertiary periods are not represented in the Black Country, so the next gallery, 'Ice Age', is dedicated to the Quaternary Period (2.6Ma to the present) and the Pleistocene Epoch (2.6Ma to 11,700 years ago). On display are models and casts depicting a woolly mammoth, sabre toothed cat (*Smilodon*), and an evolutionary succession of hominid skulls. This period is identified as the fourth great age of planet Earth, when the continents and landmasses were formed pretty much as they currently appear. The ►

climate became significantly cooler and the polar ice caps formed and grew to cover a large portion of the globe over several successive glacial episodes, numbering 11 in total, interspersed with warmer inter-glacial ones. The cause of these fluctuating glacial and inter-glacial episodes is largely unknown, but it is thought that the appearance of Iceland and the evolution of the North Atlantic Circular wind system is likely to have had an influence. Both influence marine currents and the way in which warm and cold air/sea water is distributed around the Atlantic Ocean.

Leaving behind the Ice Age Gallery, the remaining galleries explore human occupation, technological development, industry and the arts in the Black Country. The Invaders and Settlers Gallery explores Roman occupation from AD43, the Anglo-Saxons (500 to 1066) and Dudley Priory, which was founded in 1160. Building on the Mining Gallery displays, the Industrial Revolution Gallery explores the industrial landscape that turned the local landscape from green to black. The gallery reflects those industries - such as iron and steel, mining and glass making, and associated technologies which made the Black Country famous.



Model of a sabre-toothed cat in the Ice Age Gallery

From the Industrial Revolution Gallery back to the museum entrance, a long corridor acts as the Fine Art Gallery displaying a fraction of Dudley's art collection that began in the 1880s. The displays are refreshed annually and include Victorian oil paintings, British water colours, modern prints and paintings by local artists which, in particular, capture local historical and topographical interest. Finally, the Heroes Gallery, celebrates famous Black Country people from sport, science, stage and screen, such as Abraham Darby I, who was born at Wren's Nest in 1678.

On returning to the museum entrance, a small room acts as the headquarters for the Black Country UNESCO Global Geopark, which was established on 10 July 2020. Here, information and leaflets can be found on the Geopark's 44 Geosites, covering the four Black Country boroughs and various other sites to visit around the area.

We finished our tour shortly after 1.30 and there was time to look around and take in the exhibits, reflecting upon what Graham had told us. I would like to thank Graham for an extremely interesting tour and look forward to our next outing. ■

Andy Harrison

Sunday 5 July (Field Meeting, joint with WGCG): Burton Dassett Country Park. Led by Ray Pratt.

Background

Located in the south of Warwickshire, Burton Dassett Country Park (SP 395 522) is a northerly extension of the Cotswold Hills, and a listed Local Geological Site. It is composed of Liassic rocks, (early Jurassic), which stretch from the Dorset coast in the south to the north Yorkshire coast in the north-east. These deposits are of economic importance for farming, brick making, cement production and as a source of iron ore. ►

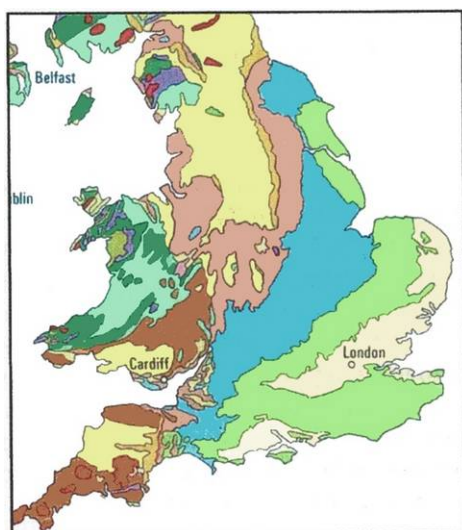


Fig.1. Geology map of England & Wales

The geological map of England and Wales (Fig.1) shows that the rocks of Southern Warwickshire and North Oxfordshire are in a zone (shaded blue) which stretches from Dorset through the Cotswolds to North Yorkshire. These rocks were formed during the Jurassic Period, roughly between 135 and 195Ma (million years) ago. The rock layers are tilted very gently towards the south-east and disappear below younger Cretaceous rocks (green).

The country park is owned by Warwickshire County Council and is a popular upland leisure area for walkers and picnickers with good parking and toilet

facilities. The park was created in 1972 from what was a complex of quarries and intervening disturbed ground, mostly overgrown but with some good exposures of the Liassic Marlstone Rock Formation, chiefly about 200m south-west of Windmill Hill. This large site incorporates several stratigraphic units and lithologies ranging from the Lower Jurassic Dyrham Formation to the Middle Jurassic Northampton Sand (see geology sketch map, Fig.2).

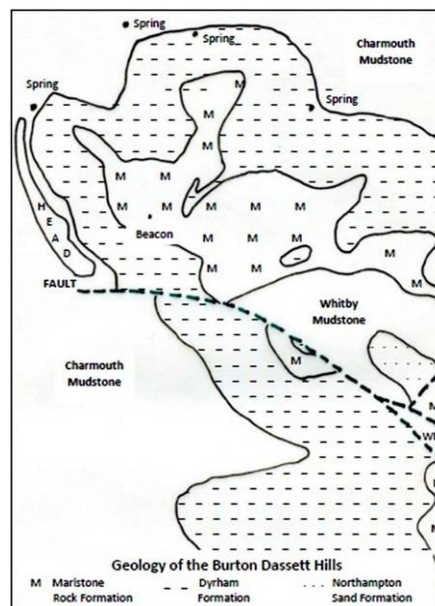


Fig.2. Geology sketch map of the area

Our Trip

Our field trip started at the high point of Beacon Hill where we had a good view of Edge Hill (south-west), and to the lowland areas in the west and north. Ray explained that these lowland areas were underlain by Charmouth Mudstone, a soft formation, good for agriculture. During the Pleistocene glaciations the Anglian glaciers (450,000 - 350,000 BP), would have wound their way through the area. However, the high land link between Edge Hill and Burton Dassett is believed to have remained intact sufficiently enough to enable the development of Lake Bosworth (also known as Lake Harrison), to have formed during the Wolstonian glacial period (350,000 - 130,000 BP). It is thought that the lake breached the rocks between Edge Hill and Burton Dassett creating the large valley we see today.

We then turned our attention to the landmark beacon beside us. It was constructed from local blocks of Marlstone in the late 15th century, but for what purpose remains unclear. It was probably used as a lookout tower during the Civil War (1642-1648), particularly for the first encounter of opposing sides at Edge Hill (1642). By examining these building blocks, we were able to get a good understanding of the Marlstone Formation lithology and its depositional setting. Many blocks are composed of fine sand within a calcareous argillaceous cement. Others are more argillaceous, calcareous mudstones. Brachiopod nests were seen and trace fossils (burrows) were also identified. Pebbles were occasionally seen. These variations imply that the depositional environment was variable, as to be expected. Most of the blocks are a light brown rusty colour, whereas some are a medium green-grey colour. This is due to the iron content within the rock, some of which has remained in its ferric condition, the marlstone being the iron ore that had been quarried here periodically from 1865 to 1925. ►

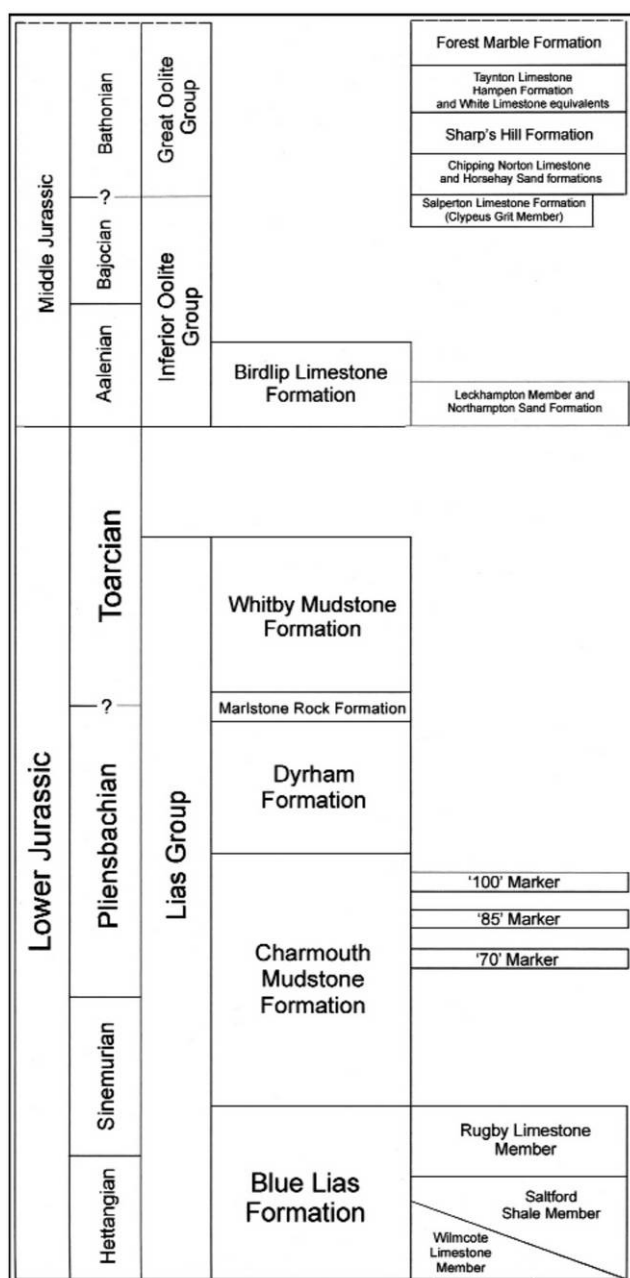


Fig.3a. Cotswolds Stratigraphic Chart. Outline of the Lower and Mid Jurassic succession in Warwickshire¹

ammonites and bivalves taken from the Charmouth mudstone at Blockley Brickpit, indicate shallow marine shelf conditions with a clean and well-oxygenated environment, excellent for marine life development. Warwickshire's plesiosaur and ichthyosaur skeletons were recovered from this formation.

At the first rock exposure (point B on the satellite view, Fig.4)² we were able to examine the contact between the base of the Marlstone Formation and the underlying Dyrham Formation. The Marlstone protrudes over the Dyrham Formation, clearly ►

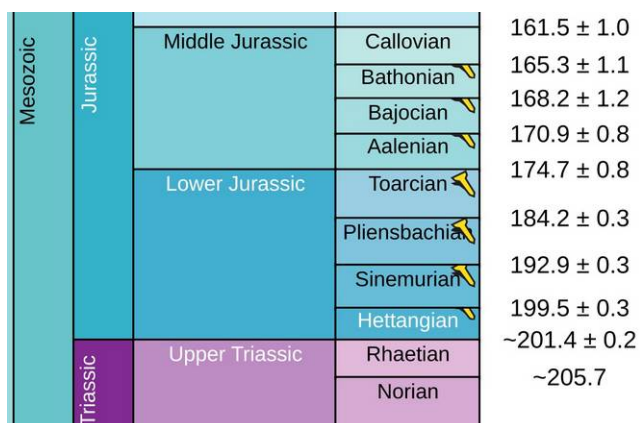


Fig.3b. Section from International Stratigraphic Chart © International Commission on Stratigraphy, 2026

With the aid of the stratigraphic charts (Figs.3a¹ and 3b) Ray explained that Blue Lias (important for cement manufacture in Rugby, Southam and Wilmcote), is not exposed in the Country Park. The Charmouth Mudstone Formation overlies the Blue Lias. This, likewise, is not exposed in the Country Park but forms the bedrock of the lowland area around Burton Dassett. The Middle Jurassic is represented to the west of the Vale of Morton Axis by oolitic and bioclastic limestones of Aalenian age (Birdlip Limestone Formation), replaced further east by the Northampton Sand Formation.

The tree-line visible from the Beacon marks the spring line around Burton Dassett. This is the junction where water emerges after percolating through the permeable rocks which overlie the impermeable Charmouth Mudstone.

Samples of

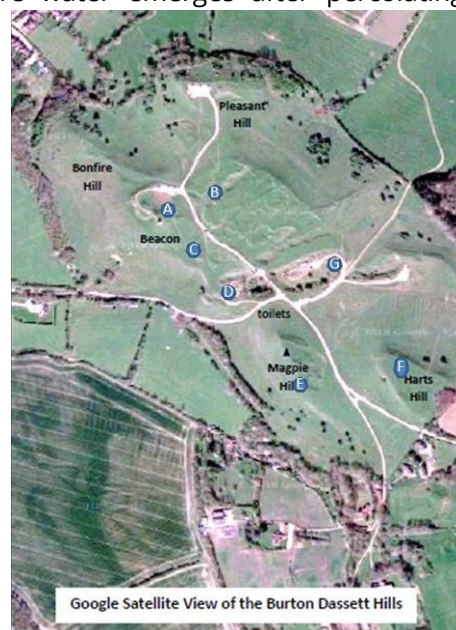


Fig.4. Burton Dassett Country Park²

showing that it is more resistant to erosion. The Dyrham Formation is generally finer-bedded and occasionally micro-micaceous, indicating a quieter and probably a deeper water depositional setting than the overlying beds. The bedding plane between the two formations was seen in an elevated worked face, and gave rise to a conundrum: why had the quarry men extracted so much of the Dyrham Formation? It is a non-iron-bearing rock, and consequently waste material. Tracing the contact along, we were able to see that the Marlstone did in fact descend to the worked floor and that the juxtaposition viewed was a consequence of faulting.



Fig.5. Rounded pebbles, base of the Marlstone

There was clearly a break in deposition prior to the Marlstone Formation as the base of the Marlstone is marked by the presence of rounded pebbles (Fig.5). We were able to trace this base in the exposures along the tramway from Beacon Hill to the toilet block.

The toilet blocks (point E, Fig.4) are constructed of local Marlstone, just like the Beacon and with the same sorts of inclusions. Next to the toilet blocks is a Marlstone face which appears to have remained unworked in order to support the roadway above. Just like the first exposure, we were able to observe the unevenness of the bedding plane surface indicative of current action during deposition. Here we also saw a clear lateral slip open fault surface trending NE-SW, further evidence of tectonic activity post-deposition and lithification.

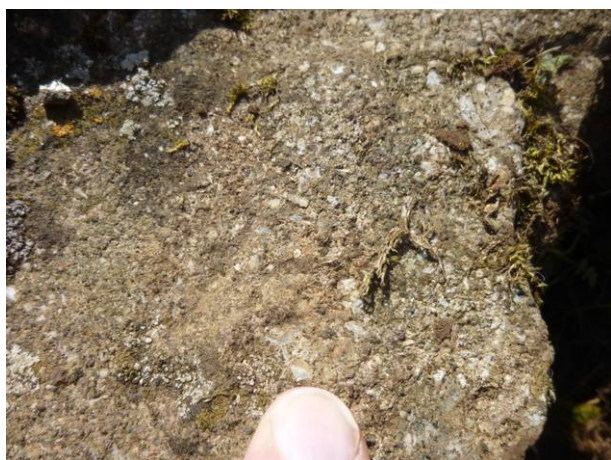


Fig.6. Magpie Hill marlstone with shell fragments

From the toilet block we followed the Marlstone outcrops from the base to the top of Magpie Hill (see front cover photo: the view from Magpie Hill and our group at the toposcope.) The exposure at the toilet block is quite massive, whereas those on Magpie Hill appear to be thinner bedded in general. In the photo (Fig.6) we see an example of Marlstone composed of fragments of shells, possibly deposited in a storm event. Viewing Harts Hill from Magpie Hill we see a noticeable break in slope near the top. This marks the boundary of the Northamptonshire Sand Formation and the underlying Whitby Formation,

both younger than the Marlstone Formation but at the same elevation as our current location. This was clear evidence of a NW-SE trending fault with its downthrown side to the east. This fault was orthogonal to the fault at the toilet block.

On the side of Harts hill there are a number of very small exposures of Northamptonshire Sand Formation. On close examination we see that the rock properties vary a lot. Some samples show good porosity, others show lots of sparry calcite filling the pores. Some samples contain oolites indicating a near shore tropical depositional setting.

Looking northwards from the top of Harts hill we observed that the slope still exhibits mediaeval ridge and furrow farming relief. It was no surprise to learn that underlying this mediaeval field was the Whitby Mudstone. The soils on the Marlstones and Northampton Sand are very thin and thus ►



Fig.7. Stress fractures in a Marlstone block

onset of lucrative sheep farming, for which the Cotswolds is well-known.

From Harts Hill we made our way north to a small Marlstone quarry at the base of the hill. At the east end of the quarry, we saw more faulting running NW-SE, and a lot of jointing, all indicating severe stress (Fig.7). Some faint cross-bedding is also visible (Fig.8), indicating a near-shore depositional setting.

Marlstone, whilst no longer quarried at Burton Dassett, is still quarried at Edge Hill and is an important local stone for aggregate and building blocks. It is commonly known as Horton Stone, and has been used widely in the construction of many south Warwickshire and north Oxfordshire villages.



Fig.9. The new toilet block by All Saints Church

unsuitable for horticulture, whereas on the mudstones they are thick and fertile. In 1908 an Anglo-Saxon grave was discovered on Pleasant Hill indicating that Burton Dassett was a settlement at that time. All Saints Church dating from the 12th century and located to the south of Harts Hill, is of considerable size, indicating that the population of the area would have been much bigger than today. The Black Death of 1348 would have ravaged the population; however the primary depopulation occurred at the end of the 15th century with the



Fig.8. Faint cross-bedding

The new toilet block by All Saints Church is constructed of this stone sourced from Edge Hill. Common in the stone are belemnite fossils, indicating a slightly deeper water environment for these free-swimming animals. The rusty colour is due to oxidation of the iron content in the stones (Fig.9). ■

Ray Pratt

Acknowledgements

1. Adapted from Sumbler, 1996; Barron et al., 1997; Cox et al., 1999; Ambrose, 2001 and Cox & Sumbler, 2002, and with kind permission from Jonathan D. Radley, and the 'Mercian Geologist' (EMGS).

2. Imagery ©2026 Airbus, Maxar Technologies, Map data ©2026 Google.

Mike's Musings No. 64

Follow that dyke: Part 1 - Armathwaite

One of the best known 'minor' igneous intrusions in Britain is referred to in geological literature as either the Armathwaite Dyke or the Cleveland Dyke. It is generally regarded as belonging to a major Palaeogene dyke swarm originating on the isle of Mull, from one of several intrusive complexes in ►

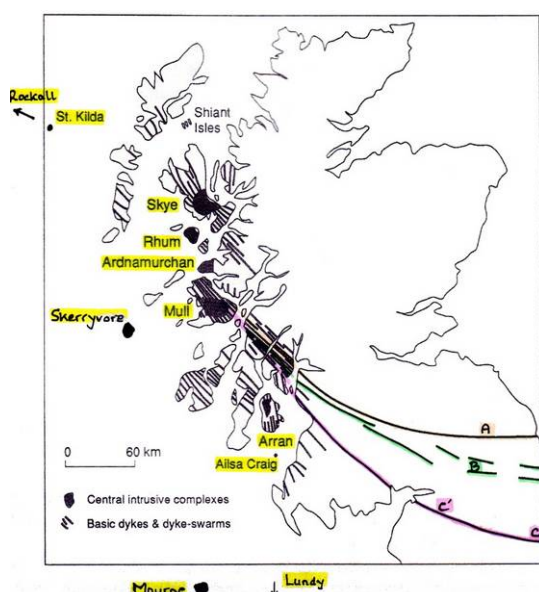


Fig.1. Mull Dyke Swarm - general relation to other Hebridean volcanic centres¹

the 'Blyth dyke group' (at 672km) as one of *"the longest continuously mapped dykes on Earth"*; quite an accolade for British geology, and a reflection of the diligence of survey geologists in tracking down isolated outcrops across the country, although a good part of its proven length extends across the North Sea (Fig.2). The Armathwaite / Cleveland dyke, by contrast, has only been traced over a distance of some 450km, mainly on land. This was first shown on a 'Geological Map of Yorkshire' published by William Smith in 1821, followed by further outcrops on his 'Geological Map of Durham' published three years later.

Over its full course, several major geological environments, or terranes, which are highly variable in terms of mechanical, thermal and compositional properties, play host to the dyke. In Scotland, the Highland Boundary Fault (HBF) appears to have no significant effect on the line of the dyke, and likewise the Iapetus Suture Zone (ISZ) around the English-Scottish border. The situation across the Southern Upland Fault (SUF) is less clear (Fig.2). That is not to say that there has been no 'interaction' at these boundaries: actual outcrops are more intermittent in some places and, as we shall see, small displacements have been proved in England across the Pennine and Teesdale Faults, and locally elsewhere on an even smaller scale. ►

the Hebrides associated with the opening of the North Atlantic. The age of intrusion has been determined as three events within a single magnetic chron (C26R) established by the history of Earth's magnetic reversals, constrained within the interval 61-58Ma (million years), and tied down still further by radiometric dating to 58.4 +/- 1.1Ma. Other ages, including 55.8 +/- 0.3 or 55.9 +/- 0.9, are also quoted in the literature, just to confuse matters!

This swarm has been separated into an 'A-B-C' trio of principal dykes (the three events) with the Acklington dyke (A) northern-most, a Blyth Group of dykes (B) in the centre, and the Armathwaite / Cleveland dyke (C' / C) southern-most (Fig.1). Further extensions into the Southern Uplands of Scotland are recognised (Fig.2), with local identities including the Hawick dyke (H) and Eskdalemuir dyke (E).

This particular dyke swarm was, coincidentally, the subject of a recent Geologist's Association lecture which described

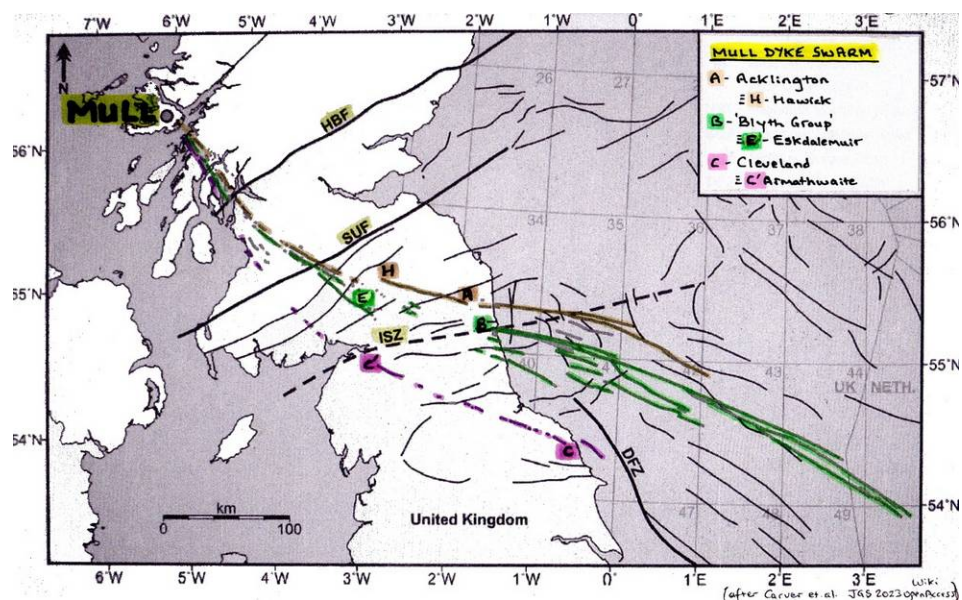


Fig.2. Mull Dyke Swarm in focus²

For what it's worth, I have spent time tracking down as many outcrops of this dyke as I could find across the northern England sector (a distance of a mere 160km), relying on various sources (mainly BGS memoirs or on-line), having previously come across a few of the better known locations on other occasions in the past. It has turned out to be both an entertaining and educational experience, remarkable for the varied accessibility and quality of the exposures. This two-part account provides an insight into this idiosyncratic exercise.

I begin in Cumbria near Dalston, four kilometres south-west of Carlisle, with mention of a former



Fig.3. Burthwaite: flooded old workings



Fig.4. Burthwaite: loose dyke rocks, large and small

exposure in the bed of the River Caldew. This was not a good start as I was unable to retrace any such outcrops, although there were a few fragments of appropriate-looking dyke rock on the eastern river bank! Matters improved in old quarries near Burthwaite, where my approach was facilitated by the assistance of a local builder who was working on a house whose grounds backed on to these rather overgrown, and somewhat unsavoury, long-forgotten shallow workings (Fig.3). Outcrops appeared to be absent, but there was plenty of loose dyke rock in the immediate vicinity (Fig.4).

Following its course south-eastwards, the first clear English appearance is an impressive wall of rock in the back garden of Crook's Cottage near High Wreay, which the owner was interested to learn about and happy for me to inspect more closely. Box-weathering marks the dyke out from the Penrith Sandstone it intrudes (Fig.5). The BGS Penrith sheet (E24) shows the dyke displaced twice by faults between here and the next sightings across Barrock Fell, (the 'Cobble Quarries' now restored to fields; access denied elsewhere). Near Aiketgate a little further south-east, a rough track over a conspicuous

unnamed hillside yielded large blocks of dyke rock discarded in the hedgerow (Fig.6).

I was happy to accept this as evidence for proximity to the course of the dyke, as shown on the same BGS sheet (E24). ►



Fig.6. Aiketgate: large blocks of dyke rock in hedge



Fig.5. Crook's Mill Cottage: box-jointed Armathwaite Dyke

Approaching Armathwaite village, four overgrown quarries following a wooded ridge (Fig.7) once worked the dyke. Here I found one single in-situ outcrop, deeply weathered and heavily smothered in lichen, but providing a fine display of 'onion-skin' weathering (Fig.8). A fresher outcrop forms the well-known series of rapids across the River Eden at Mill Farm, a few hundred metres south of Armathwaite Bridge (Fig.9).



Fig.8. Onion-skin weathering in the third quarry, dyke rock encrusted with ? lichen

Between Armathwaite and the Pennine Fault 10km further east, several more small outcrops are recorded following a series of small elongated hills: minor workings above Armathwaite; near Ruckcroft; on Whin Fell; on Scales Moor and at Renwick. The best of this crop occurs in a private quarry (access granted) on the east margin of Whin Fell, which I christened 'Blunderfield Quarry' after the nearest farm. This was being used to store winter feed on my first visit, but later afforded clearer access to decent exposures of the dyke, despite being partly, and predictably, somewhat overgrown (Fig.10). The BGS map shows two breaks in continuity in this area.

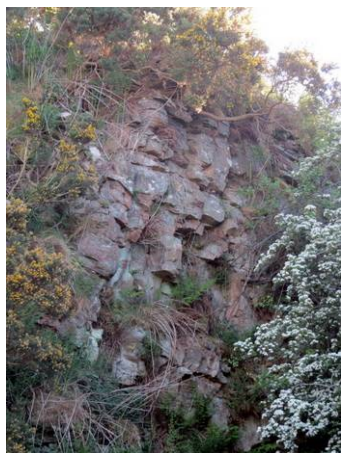


Fig.10. 'Blunderfield Quarry'

East of the Pennine Fault, reference is made to outcrops in Loo Gill and its tributary Grainings Beck. This is an area of bleak, mostly trackless moorland (Fig.11) with much evidence of past mining (lead, coal, barytes) where my search amounted to little more than one isolated block of dyke rock in the bed of Grainings Beck! Further east, the extensive moorlands south of Alston pay host to open ground better known for scattered outcrops of the much older Whin Sill, the line of the dyke being less clear. One easily accessible exposure (Fig.12) can be seen on the lonely 'South Tyne Trail', threading its way between Round Hill and Tynehead Fell, beyond the end of the metalled road south of Garrigill. Other sightings are recorded on the wild moorland, in Cross Gill headwaters and on Round Hill (a bit too wild for me; my excuse is not wishing to disturb the ground nesting birdlife as requested!).

The next series of closely strung outcrops in upper Teesdale takes us across the Teesdale Fault and the line of the Burtreeford Disturbance (a monocline). The first such location occurs on the Pennine Way (Long Distance Foot Path) on the eastern



Fig.7. Wooded ridge west of Armathwaite: four overgrown quarries lie within it



Fig.9. Mill Farm, River Eden: Armathwaite Dyke in its type locality



Fig.11. Haresceugh Fell, below the Penrith - Alston Road (A686): Across the Pennine Fault



Fig.12. The dyke seen in cross section on the 'South Tyne Trail', ~30m wide

bank of the River Tees, near its confluence with Harwood Beck (Fig.13). Loose material is largely dominated by blocks from the Whin Sill, which the dyke must transgress hereabouts. Despite reports of an exposure of the dyke in an unpublished Durham University e-thesis, I could only find undoubted loose dyke material amongst the liberal scatter of igneous rock (Fig.14).

A short distance further east, there is an outcrop, awkward to access beneath the



Fig.13. Cliff beside the River Tees, the dyke has been reported at the foot of the cliff

footbridge crossing Etters Gill Beck at Outberry Bat (Fig.15), which has the distinction of revealing the dyke intersecting the Whin Sill. Loose material from the dyke can be distinguished in hand specimen from pieces of the quartz-dolerite sill by virtue of its porphyritic texture (Fig.16). The dyke can be traced again via nearby Smithy Sike and Bow Lee Beck to an obvious gash in the hillside (Figs.15/17) above the hamlet of Newbiggin, known either as Hardberry or Coldberry Gutter. This defile marks the line of the Lodgesike Fault, along which a lead vein was worked by the opencast method known as 'hushing' from the mid-C18th until 1955, and where a single crag appears to be the sole in-situ survival of the dyke (Fig.18).



Fig.15. View across Ettersgill and the footbridge at Outberry Bat



Fig.14. River Tees: most blocks are of Whin Sill; three grey blocks of dyke rock stand out from the crowd



Fig.16. Porphyritic dyke rock (left) and Whin Sill (a quartz-dolerite, right)

The line of the dyke east of Coldberry Gutter must take another southward shift as the next outcrops appear east of Middleton-in-Teesdale near Eggleburn. Two rather unsatisfactory locations, one in Bell Sike, a tributary of the Eggleston Burn, and one in the latter burn itself, revealed uncertain outcrops, albeit backed up by many loose blocks (some large) of dyke rock. Cliffs in Eggleston Burn itself (apparently an old quarry) included blocky outcrops of dyke rock which were superficially indistinguishable from the baked grit host rock (Fig.19), but the steep, overgrown nature of the ground impeded closer observation. ►



Fig.17. Coldberry or Hardberry Gutter

Onward to the east lies an area of more open moorland above Eggleston village, extending to Woodland Fell. Here the dyke has been exploited in several old open-cuts (Fig.20) over a distance of around 1,500 metres. The BGS Barnard Castle sheet (E32) shows the dyke being displaced by several small faults, presumably more clearly revealed during the period of extraction.

Plotting the line of outcrops mentioned so far (Fig.21) it is clear that the line of the dyke is interrupted in some



Fig.18. The solitary surviving crag of dyke rock along 'the Gutter'

places by faulting, with displacements shown up by detailed survey mapping. Similar instances occur further east (as we shall see), but the most significant displacement occurs



Fig.19. Well-jointed dyke rock on the Eggleston Burn

between the last sighting near the Pennine Fault (Renwick) and the first sightings east of the Teesdale Fault (River Tees). This issue appears to be accounted for by a magnetic survey that has revealed an ore body (representing the dyke) with remanent Palaeogene magnetisation along the Teesdale Fault itself, explaining the dextral shift to the south. This may include more than one en-echelon displacement, suggested by the further shift between Coldberry Gutter and Eggleston. It is also

noticeable how the general trend of the dyke changes from WNW-ESE in Cumbria to E-W for some distance across Teesdale district. Moreover, the host rocks at outcrop have gradually passed upward through the Carboniferous succession from the Limestone Series near the Pennine Fault, through the Millstone Grit Series, into the Coal Measure Series on Woodland Fell and beyond, where superficial deposits (confound them!) become much more extensive, with surface exposures becoming far more intermittent for a while, although the dyke has also been encountered underground in local coal mines. ■



Fig.20. Old workings of the dyke on Woodland Fell, Co. Durham

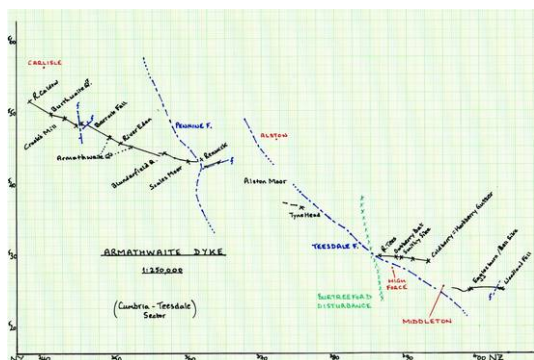


Fig.21. Trace of the Armathwaite Dyke

Acknowledgements:

1. The Fig.1 map is adapted from Fig.16.2, (p.381) 'Geology & Scenery in Britain', John Whittow (itself after BGS material)
2. Fig.2 adapted from open access research article by Francesca Carver et. al. (Journal of the Geological Society #180 (2023))

(to be continued...)

Mike Allen