



The
Black
Country
Geological
Society

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Newsletter No. 207

June 2011

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**Copy date for the next Newsletter is
Monday 1st August 2011**

The Society provides limited personal accident cover for members attending meetings or field trips. Details can be obtained from the Secretary. Non-members attending society field trips are advised to take out your own personal accident insurance to the level you feel appropriate. Schools and other bodies should arrange their own insurance as a matter of course.

Leaders provide their services on a purely voluntary basis and may not be professionally qualified in this capacity.

The Society does not provide hard hats for use of members or visitors at field meetings. It is your responsibility to provide your own hard hat and other safety equipment (such as safety boots and goggles/glasses) and to use it when you feel it is necessary or when a site owner makes it a condition of entry.

Hammering is seldom necessary. It is the responsibility of the hammerer to ensure that other people are at a safe distance before doing so.

Future Programme

Lecture meetings are held at Dudley Museum & Art Gallery,
St James's Road, Dudley, DY1 1HU. Tel. 01384 815575.
7.30 for 8 o'clock start unless stated otherwise.

Those wishing to attend field meetings please contact our Field Secretary, Andy Harrison, telephone: 01385 370 188, mobile: 07973 330706 or email: andrewcfharrison@yahoo.com

Car Sharing for Field Trips

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. We hope that this will encourage members to attend the more distant field visits.

Sunday 12th June: (Field Meeting) Visit to Apedale Colliery, Apedale Heritage Centre, Loomer Road, Chesterton, Newcastle-under-Lyme, Staffordshire, ST5 7JS (SJ834488). Meet at 11:00am at the Heritage Centre. We will be given a guided tour of a working mine and a chance to look round the museum. Either bring a packed lunch or there is a cafe on site.

Sunday 7th August: (Field Meeting) The Woolhope Dome. Led by Moira Jenkins and Rosamund Skelton (Woolhope Naturalists' Field Club, Geology Section). Meet 11:00am, at a small quarry and picnic site (SO 5780 3853). Bring sandwiches. Pub/toilet stop at lunchtime - food not guaranteed. From Ledbury: A438 towards Hereford. At Dormington turn left onto a minor road to Mordiford. Just under a mile turn left up a road with a picnic place sign to a T junction. Turn right and then left fork up hill. At a hairpin bend to the left, the quarry with P is on the right. Pull in here. Views across Herefordshire into Wales. Formations include Aymestry Limestone, Downton Castle Sandstone and Raglan Mudstone. The day will include a walk of approximately half a mile.

Monday 17th October (Indoor Meeting) 'A New Look at the Silurian Period'. Speaker: Dr. David Ray, Neftex Consultants. David will use modern techniques of sequence stratigraphy, computer animation, and applied palaeontology to look at the Silurian world, focussing on the Black Country Silurian rocks and how they fit into the global picture of the world at this time.

Monday 21st November (Indoor Meeting) 'Next Steps for the Development of the Lapworth Museum of Geology'. Speaker: Jon Clatworthy Lapworth Museum, University of Birmingham. The Lapworth Committee have plans for a major re-fit of the Lapworth Museum. Jon will share this vision with us and focus on some of the wonderful new initiatives of the redevelopment.

Monday 5th December (Indoor Meeting starting at 7.00) Christmas Members' evening. The usual chance for members to share their geological stories and experiences. This is our annual social event with refreshments and a buffet so bring your Christmas spirit and join in the geofun!

Other Local Events

Friday 17th - Sunday 19th June: Three Counties Show, Malvern Showground. The GA is sponsoring a geology marquee and BCGS is invited to display along with other local Geological societies. The main exhibitors will be the H&W EHT and Gloucestershire Geology Trust. **2 volunteers needed each day!** (Expenses re-imbursed, free entry for the 2 volunteers.) **8.30 to 18.00** each day. If you can help for any part of these dates, please contact the Sec. Bob Bucki (*contact details on p.16*).

Have a look at our website at: www.bcgs.info

Saturday 24th & Sunday 25th September Dudley Rock 'n Fossil Festival

Bigger and better than ever, it will feature the usual talks, activities, demonstrations, exhibitors, special exhibitions and traders in everything earth science related for boffins and families, and we need your help:

Volunteers are needed for the BCGS stand

Please contact the Hon. Sec., Bob Bucki (*details on p.16*) if you can help, am and/or pm on either day.

Items are needed for sale on the BCGS Stand

If you have any geological artefacts (ie. rock specimens and fossils), publications, or other geological material to sell for BCGS funds, please contact Mike Williams, email: bungalowmike@blueyonder.co.uk or tel. 01902 822 505. These may be sold on the stand, or made up into 'Goodie Bags'.



Sunday 3rd July: Whitwell Coppice, Shropshire (just N. of Much Wenlock). A few fit volunteers with hand tools needed to help with clearance work at this SSSI which will be visited by the Silurian Sub-commission. See: <http://www.natureonthemap.naturalengland.org.uk/map.aspx?m=sssi>
If interested contact Graham Worton for details: graham.worton@dudley.gov.uk or tel. 01384 815575.

Saturday 16th July: Visit to Dudley by the international scientists of the Silurian Sub-commission. The Society will have the opportunity to help to host this visit and meet and greet the delegates.
As we go to press, we have no further information on this. Ed.

The Geologists' Association 2 day Meeting

Saturday & Sunday, 9th & 10th September in Worcester: 'Geoconservation for Science and Society' a one day conference with lectures and debates, and a one day field trip to the Wren's Nest and sites in Worcestershire. Phone: 020 7434 9282, email: geol.assoc@btinternet.com
Registration for conference: GA & QRA members £25.00, non-members £30.00. Cost of field trip not yet known. Booking essential. Further info: <http://www.geologistsassociation.org.uk/conferences.html>

Other Societies

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

Manchester Geological Association

Saturday 16th July: Great Orme and Copper Mines: Joint excursion with OUGS. Leader Jacqui Malpas. Meet at 10.00. We plan to visit Bishop's Quarry with its fossils & folds & the limestone pavement at the top of the Orme. Further information will be available shortly. Afternoon visit to the Copper Mines. £5.50 per person - adult (group rate) to be paid on the day. Contact Jane Michael.

Please book in with Jane Michael if you intend to come along to any of the field events :- Tel. 07917 434598, email: outdoors@mangeolassoc.org.uk. There is no charge for visitors from other societies at lectures or field visits. Further information about meetings at <http://www.mangeolassoc.org.uk/>

Warwickshire Geological Conservation Group

Wednesday 22nd June: Shrewley Cutting and Rowington Church. Led by Martyn Bradley & John Crossling. Meet at 7 p.m. Village Hall car park. (SP 21413 67317) A visit to see the exposures of Arden Sandstone revealed in the canal cutting at Shrewley. This SSSI has recently been cleared and the sections should be well exposed. John Crossling will then lead us to Rowington Church, once the parish of Revd. Peter Brodie, the father of Warwickshire geology.

Wednesday 20th July: Avon Terrace Walk - Hampton Lucy. Led by Brian Ellis. Meet at 7 p.m. Boar's Head (SP 25502 57041) A walk to explore the flight of four river terraces above the village of Hampton Lucy, near Stratford. We hope to be able to examine the materials laid down by the river in its early history, as well as for evidence of glacial deposits.

If you wish to attend contact Ian Fenwick swift@ianfenwick.f2s.com or 01926-512531. The WGCG mobile phone (0752 7204184) available on the day from 11.00. There is a charge of £2.00 for non-members. For further information visit: <http://www.wgcg.co.uk/>

Herefordshire & Worcestershire Earth Heritage Trust (H&W EHT)

GeoFest 2011: 1st June - 31st Aug. Numerous activities and events highlighting the Abberley and Malvern Hills Geopark. View or download the programme of events at: <http://79.170.44.138/earthheritagetrust.org/pub/news/geofest-2011/>

Monday 13th June: Geology and Landscape: Tank Quarry and North Hill (Malverns). Explore the rocks and structures of North Hill, and interpret the scenery. Guided walk, 3 miles, moderate, 2.00 - 5.00pm, Meet: Tank quarry free car park, SO 768471. Booking: 01905 855184. Cost: £1.50.

Wednesday 22nd June: Geology and Landscape: Martley Circular Trail. Looking at how geology has shaped the landscape. Guided walk, 6 miles, moderate. 10.30am - 3.30pm. Meet: Martley church car park. SO 756597. Booking: 01905 855184. Cost: £1.50.

Sunday 26th June: Industrial Archaeology and Geology. Guided walk following the line of the Leominster Canal from Newnham bridge via the Rea aqueduct, Marlbrook and Mamble collieries, Stocking Pool and Southnett tunnel. Bring a packed lunch. 10.30am - 4.30pm. Meet: Broombank Layby SO 671700 on the A456. Booking: 01905 855184. Cost: £5.00

Tuesday 28th June: Volcanoes, Earthquakes and Tsunamis. Talk by Dr Paul Olver on how the Earth moves. 7.30 - 9.30pm at The Link Room, St. Matthias' Church, Church Road, Malvern, WR14 1NP. Booking: 01905 855184. Cost: £1.00.

Saturday 2nd July: 11.00am - 3pm. Rock & Fossil Roadshow. Learn about rocks, fossils, minerals and Earth Science. Fun activities, specimens to examine. The Lyttelton Well, 6 Church St, Malvern, Worcs. WR14 2AY. A free event in the centre of Great Malvern Town.

For further EHT information visit: <http://79.170.44.138/earthheritagetrust.org/pub/category/news/> or phone: 01905 855184.

Woolhope Naturalists' Field Club - Geology Section

Saturday 23rd July: Volcanic and plutonic associations in the northern sector of the Malvern Hills led by Richard Edwards.

Guests are welcome, but must take day membership of the Club: £2.00. Further information: Sue Hay on 01432 357138, email svh.gabbros@btinternet.com or visit their web site: www.woolhopeclub.org.uk/Geology_Section/default.htm

Shropshire Geological Society

Monday 13th June: (evening Rockhop meeting, commencing 19.00 pm): Precambrian and Ordovician around Willstone Hill, Cardington, to be led by Peter Toghill. Walking (one mile); some rough ground; bring your own refreshment, if required (booking to reserve a place and obtain joining instructions from Frank Hay, preferably by email: frankhay@waitrose.com; telephone: 01694 724 723).

Saturday 18th June: (all day, commencing at 10.00 am): Glacial geology around the Stretton area, to be led by Dr Simon Cook. Walking (two miles) over rough ground; bring your own refreshment, if required (booking to reserve a place and obtain joining instructions from Peter Toghill by email: p.toghill@bham.ac.uk; telephone: 01694 722 713).

Saturday 2nd July: Wrens Nest, to be led by Graham Worton. Walking (two miles); some rough ground; bring your own refreshment, if required (booking to reserve a place and obtain joining instructions from Keith Hotchkiss by email: kah22@btinternet.com; telephone: 01694 723 130).

Monday 18th July: (evening Rockhop meeting, commencing 18.00 pm): Glaciation of the Longmynd, around Ratlinghope, to be led by Ian Langford. Walking (one mile); some rough ground; bring your own refreshment, if required (booking to reserve a place and obtain joining instructions from Keith Hotchkiss by email: kah22@btinternet.com; telephone: 01694 723 130).

Sunday 24th July: Bridgnorth, to be led by Andrew Jenkinson, part of the Abberley and Malvern Hills Geofest. Walking (one mile) on pavements; bring your own refreshment, if required (booking to reserve a place and obtain joining instructions from Andrew Jenkinson by email: andrew@scenesetters.co.uk; telephone: 01938 820 777).

Anyone wishing to attend a field meeting should telephone a meeting co-ordinator at least 48 hours in advance. A nominal charge is levied for non-members. The Rockhops are primarily intended for beginners. Arrive 15 mins before the start of field trips for admin. Further info at: www.shropshiregeology.org.uk/

North Staffordshire Group of the Geologists' Association

Saturday 9th July: 10:00 Weaver Hills led by Dr Patrick Cossey (Staffordshire University) Examining the Carboniferous Limestone exposures in the Weaver Hills reveals not only an interesting sedimentology and fossil content, but also some spectacular geological structures. Meet at 10am at The Walk car park SK 1063 4614 on Back Lane, north of Wootton.

Non-members pay £2 to cover temporary membership giving them insurance cover. A field fee of £2 per head is normally charged for members and non-members to cover leader's expenses. Further information at: www.esci.keele.ac.uk/nsgga/

Mid Wales Geology Club

Wednesday 15th June 7.15 for 7.30: Talk by Dr. Jacqui Malpas on the geology of the Clwyddian range in North Wales

Sunday 19th June "Ludlow Building Stones and their Silurian setting", led by Prof. Michael Rosenbaum. A whole day walking around Ludlow with a café lunch available by the river or bring a packed lunch

Meetings are held at Plas Dolerw, Milford Road, Newtown, Montgomeryshire, SY16 2EH. Meet at 7.15 for 7.30pm. Further details: Ed. newsletter & Hon Sec: Tony Thorp: Tel. 01686 624820 and 622517 jathorp@uku.co.uk Web site: www.mwgeology.uku.co.uk/

Editorial

The main focus of this edition is to highlight the great variety of events which are taking place during the summer months, offering numerous opportunities for us to become involved. We have two exciting and very different field trips heading in opposite directions - one concentrating on geology beneath the ground at Apedale colliery, and the other focusing on the beautiful landscape around the Woolhope Dome. If transport is a problem, please make use of our new car-sharing policy (details on p.2).

We also need volunteers for 4 very different events (details above): helping with the stand at the 3 Counties Show (which will gain you free access to the show); helping along with volunteers from other local Geological Societies to make Whitwell Quarry in Shropshire fit for the scrutiny of the international Silurian Sub-commission; possibly helping with hospitality during their visit to Dudley (no details yet), and helping with our stand at the Dudley Rock and Fossil Festival. Or perhaps a contribution for the Wren's Nest Story Stones? (see below). I feel sure that there must be something for everyone in this rich mix of possibilities. I know from experience the many rewards of geo-volunteering; it's amazing how many new doors have opened to me through taking that small step to get involved - so, whatever your background and age, get in touch and give it a whirl!

I'm delighted that the 'Boulder Bonanza' continues to gather pace with a fascinating article from one of our newest members, Roland Kedge (p.9) and an intriguing follow up on the Calcot Hill Farm boulder from Peter Twigg (p.16). Do you know of any glacial erratic boulders or do you have anything to add to help piece together the story of their origins in and around the Black Country? ■

Julie Schroder

Committee Report

With many new initiatives and forthcoming events to discuss, the committee has been particularly active recently, and we hope the following account of some of the main issues will help to inform and involve our members in matters which will affect the future direction of this society.

There has been considerable discussion about the 'Geology Matters' website and how it relates to the BCGS (www.geologymatters.org.uk). Now that it is up and running we hope there will be more inter-communication, and it will be our doorway into the world of the internet social media. It is a fantastic resource for studying the Black Country Museums' geology collections, and provides a forum for those who feel more comfortable with this form of communication. Chris Broughton has been involved in the creation of this site, and we are lucky to have him on the committee as our representative. We hope that this link may help to engage the younger generation, and perhaps attract new members.

There has been ongoing discussion about publicity for the Society, and it is good to be able to report that publicity leaflets should soon be available through which we can advertise ourselves and hopefully attract new members. Any suggestions from our members on this subject would be welcome, and can be aired through the Members' Forum section of the Newsletter.

Conscious of the fact that transport is a problem for many of our members, we are trying to start a car-sharing scheme. The success of this will depend on the co-operation of members, and we hope you will contact Andy (details above) and offer or request lifts for our field trips and other more distant events. We are also considering the possibility of holding some indoor meetings on Saturday afternoons. This may be more convenient for some of our members and be preferable for those who have transport problems on Monday evenings. We'd like to know if you would prefer this and would welcome any other suggestions, about this or any matters relating to the future of the BCGS. ■

Julie Schroder

Wren's Nest 'Story Stones'

Those on email will know that 5 'Story Stones' are to be erected on the viewing platform above the Seven Sisters, and one of them will be inscribed with stories from local people. A 'drop-in' session was arranged for 9th June (sadly, too soon for this Newsletter). Some of these stories - perhaps of fossil hunting, or playing down the mines as child - will be collated by artists and inscribed on to the stones to create a permanent feature the landscape. If you have a story to tell, please contact Jessica Welch as soon as possible: 01384 812785 or Jessica.welch@dudley.gov.uk

The Dudley Bug

Welcome

It's been a busy few months since the last issue of 'The Dudley Bug'. There's been another volcanic eruption in Iceland, several holidays and lots of hard work too. So this time round we are providing a quick guide to bugs and pollen and the techniques used for dating them. For those jetting off in the next few months we hope you have a wonderful summer. And if you are anything like us, you can't help but look at the rocks at your holiday destination!

Ali and Chris



Bugs and Pollen

Pollen has been used as a proxy since the 1920's due to its high preservation rate in anoxic peat, lake sediments and soils. The global distribution helps to correlate areas on a continental scale. The diameter of larger pollen grains reaches around 80 -100µm, but is dominantly about 25 - 35µm. When extracted as a stratified core, they can indicate the vegetation history throughout the Quaternary.

Radiometric dating techniques use exponentially decaying naturally occurring stable isotopes, such as ^{14}C , ^{210}Pb and ^{40}Ar . Radiocarbon dating can provide absolute dating to between 80,000 years BP and 100,000 years BP. Dendrochronology can provide absolute dating to about 1000 years by counting tree rings.

Uplift has a large effect on regional temperatures. Post-glacial isostatic uplift is significant in high latitudes, for example there has been around 300 metres of uplift around the Baltic Sea. The temperature gradient is $-0.6^{\circ}\text{C}/100\text{m}$; this is variable seasonally and spatially. This calibration is still underused but is increasing in importance in affected areas.

Holocene sea levels and coastal palaeoenvironments can be interpreted using pollen from intertidal sediments. This however can be difficult due to the number of transportation factors which affect the grains, such as the reworking of the sediments. In Poole Harbour, coniferous tree pollen such as *Pinus* and many salt marsh plants like *Phragmites communis* are well preserved. The type of vegetation can indicate its proximity to the coast, and therefore sea levels in the Holocene. When used with the marine foraminifera microfossils they can provide an accurate picture of sea level transgression through the late Holocene.

Palaeoclimate Reconstruction from Beetles



An effective way of reconstructing Quaternary palaeoenvironments is to investigate the range and distribution of beetle populations. The most commonly used species to reconstruct Pleistocene climates are the Coleoptera beetles. There are 300,000 known species of this beetle. They are suited to this method of dating because they are a varied group with distinct tolerance ranges. Beetles are extremely abundant as they comprise over a third of insect species. The high preservation rates allow them to be identified as belonging to a living species. Beetles are very well preserved due to their hard chitinous teguments. When found within anoxic soft sediments they can be easily identified to species level. The male genitalia are often used to correlate beetle remains as far back as the early Quaternary compared to modern equivalents. This indicates that there has been highly stable morphology of beetles for the past 70 million years. There has been little evolutionary change of insect species on the continental masses.

The beetles provide an accurate indication of temperatures, and therefore reflect the thermal climate of each hemisphere. The temperature ranges between summer and winter can be deduced by studying the fossil species assemblages. Beetles are extremely sensitive to temperature change, for example in the Netherlands beetles have responded to climate change since 1890, ie within decades.

Beetle populations can indicate palaeoclimate using the mutual climatic range (MCR) method. The theory for this technique is: assuming that present day climatic tolerances for a beetle species are known, then fossils of that same species indicate a palaeoclimate within the same tolerance range. ►

Data provided by beetles include the warmth of the summer and temperature range between summer and winter. Where a majority of the coexisting species lie is the mutual climatic range. The accuracy can be tested using living communities of Coleoptera; in most cases there is excellent agreement between them. An example of this is seen in major rapid warming periods around 13,000 years BP, and also around 10,000 years BP with cooling in-between. The warming is associated with a northward migration of Southern Mediterranean beetle species. In this example the climate is estimated to have average temperatures up to 18°C, annually ranging between 9°C and 30°C. Precision varies for the radiocarbon dating of beetle remains from ± 45 to ± 325 years with an average of ± 120 years.

Evidence collected from beetle remains assisted with reproduction of temperatures from the Pleniglacial dated at 22,000 to 18,000 years BP. During the glaciation, summer temperatures have been interpreted as less than 10°C and below -16°C through the winter months. Controversially there is an argument that radiocarbon dated fauna indicate much warmer winters during the glacial maximum in the UK about 20,000 years BP. This argument is supported by an increase in snowfall.

At La Grande Pile in France, a 20 metre deep core was taken, supplying pollen and beetle proxy data. The remains contained a continuous record from the present to about 130,000 years ago. The results showed consecutive vegetation changes with a high beetle biodiversity. 394 beetle taxa were identified with 5 diversity peaks throughout Quaternary Stratigraphy. These are likely to correlate with the interglacial periods. They suggest the earliest sediments were deposited in a climate about 2°C warmer than present during the Ipswichian, followed by a dramatic cooling from 100,000 years BP. Cooling was possibly by up to 10°C in the early Devensian. The remainder of the core displays three interstadials including the Holocene, and two glaciations. The overall Northwest European trend shows an abrupt warming around 13,000 years ago. Global temperatures rose by up to 1°C per decade to a total of 7°C in the summer months. The winter months may have warmed by up to 20°C. The warming phase can loosely be synchronised with the GRIP ice core record around 14ka BP, followed by a cooling trend until 12,000 years ago, significantly affecting terrestrial biota. This cooling was not the start of the Younger Dryas as previously thought. It was followed by a short, sharp warming recorded in the GRIP ice cores. This event is not evident in much of the terrestrial proxies, possibly due to the ecosystems lag in response time. The brief warming was too short for the ecosystem to recover from, before cooling of the Younger Dryas affected the Northern Hemisphere.

Conflicting data



At Quinton, near Birmingham a selection of fossiliferous sediments have yielded beetle and pollen proxies spanning an interglacial period dated as Holsteinian. The lower assemblages contain *Hydraena riparia* and *Riolus* beetles to name a few. The significance of these is because they thrive near fresh running water suggesting a climate warmer than present, with standing water becoming more common in the upper sequence. Both proxies match well at the onset of the Wolstonian Glaciation around 195,000 years ago, but do not completely match during the Devensian. The beetle spectrum implies the presence of an intense but sudden cold phase during the 40,000 to 25,000 years ago interglacial. The cold phase has been named the Quinton Cold Interlude. This cooling dropped the warmest month temperatures by at least 5°C and coldest month by 10°C to conditions similar to present day Siberia. A return to a more temperate thermal climate followed. Evidence for this event is due to the presence of *D. arctica*, which is a circumpolar species. Other species found during this period are today seen in alpine areas and high latitudes. A number of warm climate species were also recovered and are thought to have been deposited following a period of post-depositional disruption.

The pollen data collected does not support the Quinton Cold Interlude, as there is little response to any cooling that may have occurred. *Abies* is a temperate plant which is present throughout the proposed Quinton Cold Interlude, arguing that there was little climate change. This is supported by the presence of Mediterranean beetle species *P. oxyurus* dependant on *Abies*, which may only be present due to the lag response time of the *Abies* plant species. The main supporting evidence for the cold phase is the disappearance of *P. oxyurus* in the upper sequence while *Abies* continues to thrive. Therefore it is highly unlikely that the departure of *P. oxyurus* from the record is due to loss of its host plant, and is probably the result of thermal climate change. ■



(The beetles are by Nicholas Caffarilla, Wikimedia Commons.)

More Glacial Erratics in the Birmingham Area

Map References are to OS First Series Sheet 139.

Julie Schroder's welcome article concerning the Birmingham glacial erratics (Newsletter No. 206) prompts me to share with readers information I have been gathering over several years on the same subject. As a new BCGS member I should perhaps explain that I have no scientific background and my interest in geology largely lies in its thought provoking power. For me the Birmingham erratic boulders do this magnificently.



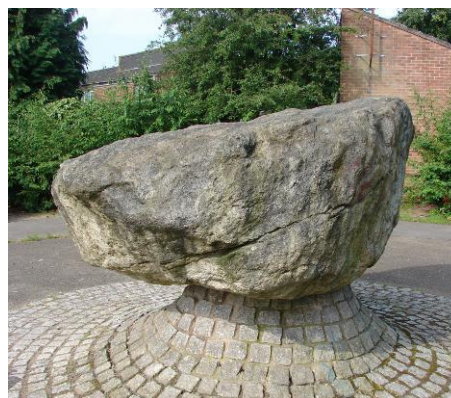
Glacial Erratic in Cotteridge Park

Most of the boulders are in south Birmingham but I have come across them under Barr Beacon, in an allotment plot in Erdington, at Quinton and Yardley. I understand that a glacial erratic can be any size of stone so long as it is an ice-carried intruder on the bedrock where it is found. I am aware that not all intruder stones are ice-carried and I accuse landscaping companies for any confusion on my part. My attention, however, has been confined to substantial rocks weighing anything from half a hundred weight to several tons. They are shaped from partly rounded, to well rounded, to slabs and blocks, seemingly untouched by their slow and lengthy journey. Some of them have thumb size holes on the surface.

I understand that nearly all of the Birmingham erratics, as distinct from the Wolverhampton variety, have been brought by an ice advance from their home in North Wales and that they are of volcanic composition. I have also come across large boulders well south of the city boundary: outside the entrance to Bromsgrove Cemetery, in the glacial spreads south of Tardebigge, in the Illey valley and at Frankley.

Julie Schroder has delightfully described the four 'iconic' boulders of Birmingham at Northfield, Cannon Hill Park, Blakesley Hall and Hockley, but notes that only the latter has a plaque to inform passers by what it is. This is a sad state of affairs and needs redressing. My own attempts to alert council officials to the significance of glacial boulders has not borne fruit so far. Apart from these better known glacial boulders there are others, some hidden away, all over south Birmingham in parks, public open spaces, cemeteries, church yards and on golf courses; there for the seeing if you have eyes to see, but more often than not people pass without a second glance.

The boulder in Hole Lane, Northfield, is the only one I have found in a front garden (OS 032802). The small one in Church Road, Northfield, outside the Institute lies unnoticed by the pavement (OS 023797). I think it is an erratic! The one at the entrance to Hole Farm, Woodgate Valley (OS 993831) is painted white. A boulder in Selly Oak Park (OS 037826) is the only truly vandalized one I have found - it has been split in two by an iron spike. Also in Selly Oak Park view the massive 6' x 4' x 7' block stationed just above the canal cut (OS 039827). To see a great collection of boulders go to Cotteridge Park (OS 051802), and to nearby Bournville Lane (OS 050810). At Barn Piece, just south of Four Dwellings School, Quinton (OS 039827) admire the great 9' x 4' x 5' rock set on a plinth but without any descriptive panel.



*Mounted, but unlabelled at
Barn Piece, Quinton*

The boulders so far described lie on the surface of the ground and have probably been moved to their present position by human hand. However, I have found two boulders in situ, set well into the ground so that only the top surface is visible. The one at Shenley Pool (OS 030820), was about to be covered by the silt being removed by digger from the adjacent pool and I persuaded the foreman of the project to dig it out. It now stands beside the pool, hopefully immovably, two ton heavy. The other boulder lies on the eastern flanks of Frankley Beeches Hill (OS 002797), with just its surface exposed, under an oak tree beside a dried up water course. I think few people know it is there. The farmer allowed me to excavate around it and I dug down three feet but the surface went on, down and down. ►

None of the boulders I have mentioned in the above excursion are currently given any public recognition, yet many of them are referred to over a hundred years ago by self taught geologists, who expressed great excitement at their discoveries. The best account of these discoveries is contained in W. Jerome Harrison's "Bibliography of Midland Glaciology" (Proceedings of Birmingham Natural History and Philosophical Society, 1894 Vol 1X). In his article, Harrison reviews the relevant literature of discoveries going back to the early 19th Century. Of great interest is the inclusion of material from the reports of the Erratic Blocks Committee of the British Association who in 1872 appointed the Rev. H W Crosskey to be its Secretary. He was a Birmingham based Minister of the Church of the Messiah and so the Midland area is well covered by the annual reports of the committee until his death in 1893. It is interesting that belief in the great flood deposition of these boulders, of the agency of stupendous subsidences and marine transgressions, is sustained well into the last third of the century by H W Crosskey, C J Woodward and D Mackintosh. Dr Crosskey, writing to the Daily Post, 4th May 1875 referring to the Cannon Hill Boulder, refers to "the ages that have elapsed since it was dropped by the iceberg into the depths of the Midland Sea ...".

One delightful reference to glacial boulders occurs in the 1875 Bristol Report of the Committee: "A group of felspathic boulders has been discovered between Northfield and Kings Norton just above the letter 'd' of the name Northfield on the Ordnance Map." (OS One inch, Sheet 72, revised 1912). Today, this precise location is exactly where the boulders are to be found in front of the Masefield Square Community Hall (OS 034795). The 1876 Glasgow Committee Report refers to the boulder at Hole Farm, Woodgate Valley in these terms: "a compact almost hornstone like matrix containing distinct included fragments and porphyritic felspar crystals".



The Masefield Square Boulders

However, to my mind the greatest debt for raising the public profile of the South Birmingham boulders is owed to Louis Barrow FGS, Chief Engineer at Cadbury's in the early 20th Century, who preserved intact numerous boulders uncovered during site excavations at the works. Without his fascinated intervention the boulders would probably have been either reburied, being in the way, or smashed for road stone.



*Lapworth and the Birmingham University boulder
Lapworth Museum collection, with permission*

Louis Barrow's university tutor had been Professor Lapworth and every time a large stone was revealed, (he had instructed his workmen to report all such finds to him) he invited the Professor to inspect and give an opinion. All these events are recorded in issues of the Cadbury Works Magazine of the period. There is a very large boulder on the campus of Birmingham University at Edgbaston (OS 049834) and there exists a wonderful photograph of Professor Lapworth sitting beside it at the time it was discovered. The stone is still there, but obscurely positioned, and may be moved so as to give it more prominence.

I suppose that residents of South Birmingham generally have no inkling of the ice sheets that buried their area so relatively recently. They pass the great boulders that lie around without a second glance. Many, I think would be interested to know the truth about them. I asked some of the people who use the Masefield Square Community Centre about the boulders outside and the suggestion made was the one commonly but incredibly made, that they were from outer space. I think there is folk lore along these lines still held by many people. What a pity the ice which brought the south Birmingham boulders was not the ice which brought the Wolverhampton boulders. There is such a disappointing age gap between the two ice advances. For me, to think that the boulder clay of my garden in south Birmingham was deposited only a few tens of thousand of years ago, would be cause for both sober thought and wonder but alas, I understand it was left half a million years ago - which reduces its impact on my thoughts and feelings. ■

Roland Kedge

Field Meeting Report

Sunday 13th March 2011: Erasmus Darwin House. Led by Tom Hobbs, Erasmus Darwin House.

We met at Erasmus Darwin House (EDH), for 12:00 pm. It is a Medieval timber-frame building, which Erasmus altered and extended during his years there. He added an impressive Palladian frontage and a wooden bridge over a ditch at the front of the house. EDH is located on Beacon Street, Lichfield, opposite the imposing sandstone structure of Lichfield Cathedral. Our guide was Tom Hobbs who, after greeting us at the reception provided a PowerPoint presentation about Erasmus Darwin and his role in geology.



Erasmus Darwin (ED), the youngest son of four, was born to a wealthy lawyer, Robert Darwin, at Elston Hall, near Newark, Nottinghamshire on the 12th December 1731. His father's discovery of a fossil reptile, possibly a Plesiosaur which he gave to the Royal Society, may have sparked Erasmus' interest in geology. Erasmus showed an interest in mechanics and botany at school and went on to study medicine at St John's College, Cambridge and Edinburgh. His university notes featured a lot of fossils and the animal kingdom.

After establishing an unsuccessful medical practice in Nottingham, Erasmus moved to Lichfield in 1756. He met and married his first wife, Mary Howard, known as Polly, in 1757 and they moved into EDH in 1758, where they had five children. Their fourth son, also Robert, father of Charles, was born in 1766 and would go on to practice as a doctor in Shrewsbury.

In Lichfield Erasmus became a highly respected physician and influential man becoming known as the greatest polymath of the 18th century. He became a leading poet whose poetry greatly influenced the 1790's romantic poets: Shelley, Coleridge and Wordsworth. He strongly believed in encouraging the education of women and was also a great inventor and scientist with interests covering an astounding array of subjects. His many inventions included a copying machine, a box that could produce words and a horizontal windmill, which he designed and installed for Josiah Wedgwood at his Etruria works in the Potteries. However, for all his inventiveness he never took out a patent, saying he preferred his patients. He never lost his love and interest in the natural world and constructed his own botanic garden at The Abnalls, close to EDH.

Erasmus also developed close working relationships and friendships with the likes of Matthew Boulton, James Watt and John Whitehurst. Together they founded the Lunar Society in 1765 and held meetings at EDH and Boulton's House in Soho, Birmingham.

After Polly died in 1770 a governess, Mary Parker, was hired to look after Robert. By late 1771 Erasmus and Mary had formed a relationship and had two illegitimate daughters. By 1783 Erasmus had met and married Elizabeth Pole, with whom he had seven children, and they moved from EDH to a house in Derby where Erasmus lived for the remainder of his life. He died on 18th April 1802, seven years before the birth of his famous grandson upon whom he would have major influence.

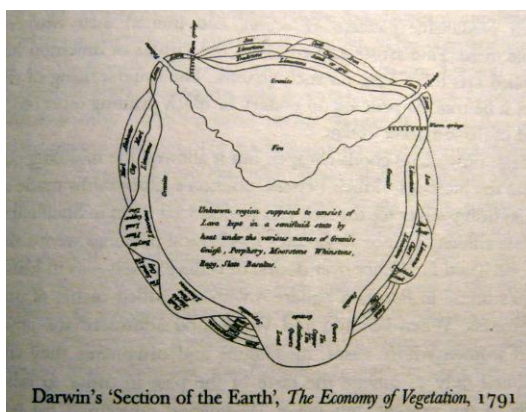
Erasmus Darwin's Contribution to Science and Geology.

ED's friendship with Wedgwood and John Whitehurst spurred on Erasmus' geological interests and 1767 became known as Erasmus' year of geology. During the 1750's Wedgwood and Boulton collaborated with James Brindley to develop a canal network through the Midlands to boost trade. In the early 1760s Wedgwood wanted to develop and extend the Grand Union Trunk Canal to Liverpool and connect the River Mersey with the River Trent. With help from Erasmus this project commenced in 1766, which prompted him to write two essays on inland waterways which he sent to Wedgwood. Spotting Erasmus' growing interest in rocks and fossils, Wedgwood sent him a box of fossil bones and plants from the Harecastle Tunnel, which Erasmus could not identify. Erasmus consequently wrote to John Whitehurst in 1767 joking that the bones belonged to a Patagonian ox and asked if he could identify what strata they came from. ►

John Whitehurst was a watchmaker from Congleton who spent much of his time exploring the mines and caves of Derbyshire. He gained his geological knowledge from mining and canal building and made substantial contributions to geology describing long extinct fossil sea creatures and speculating on the formation and age of the earth and the idea of stratigraphy. In 1778 Whitehurst published '*An Inquiry into the Original State and the Formation of the Earth*'. However like many from this time he had great problems reconciling geology and his faith.

Erasmus learnt much about the developing subject of geology, in particular stratigraphy, from Whitehurst. He realised that the fossils Wedgwood had sent him came from distinct stratigraphic horizons such as glacial till and the Coal Measures. Putting this evidence together Erasmus realised that over time animals change, or evolve. He wrote several texts on plants and the natural world including 'Economy of Vegetation' (1791), 'Zoonomia' (1794-1796), 'Phytologia' (1800) and numerous poems including 'The Temple of Nature' (1803), in which he vividly described the creation of the Universe and the development of life through evolution:

*“Organic Life beneath the shoreless waves
Was born and nurs'd in Ocean's pearly caves;
First forms minute, unseen by spheric glass,
Move on the mud, or pierce the watery mass;
These, as successive generations bloom,
New powers acquire, and larger limbs assume;
Whence countless groups of vegetation spring,
And breathing realms of fin, and feet, and wing”.*



In 'Economy of Vegetation' Erasmus steered a middle course between the Neptunist and Vulcanist views of the time. He speculated on the processes forming limestone, coal and oil, and also included a diagram showing a reconstruction of the form of the Earth. However, during his lifetime, Erasmus published little on his evolution idea through fear of the affect it might have on his reputation as a physician.

Several members of the Lunar Society had an interest in geology. So, like Matthew Boulton, did they all have private collections? Matthew Boulton's collection now resides at the Lapworth Museum. But what happened to the specimens sent to Erasmus by Wedgwood? Surely a geologist like Whitehurst would have compiled his own collection. No doubt they are, hopefully, residing in the dusty vaults of a museum somewhere.

I would like to thank Tom and the staff of Erasmus Darwin House for a fascinating visit. More information can be found at their website www.erasmusdarwin.org and from numerous books including: '*The Collected Letters of Erasmus Darwin*' and '*The Lunar Men*', by Jenny Uglow. (See also '*The Lunar Society*', below. Ed.) ■

Andy Harrison

Information for members

From time to time, the Society is emailed copies of other geological societies' newsletters. If you would like to be emailed a copy when they are available please email the Newsletter Editor at the address below. You may, of course, ask to be removed from the list of recipients at any time.

The Lunar Society

In 2009 (Newsletters 193 & 194 'Some Thoughts on Darwin'), I referred to some of the best known members of this unique 18th century, West Midlands society made up of industrialists, doctors, experimenters, intellectuals, scientists and thinkers. This loose association met on the night of the full moon once a month, the moonlight facilitating their travel. It appears to have originated from the initiative of Erasmus Darwin, maybe as a result of Erasmus' friendship with Benjamin Franklin who had founded a similar society in 1743, the 'American Philosophical Society' in Philadelphia, then in the British Colonies of North America. ►

Erasmus Darwin's house in Lichfield was the usual venue. Matthew Boulton's home, Soho House in Handsworth and Josiah Wedgwood's home, Etruria Hall, Stoke on Trent were alternative venues. Other members were: Joseph Priestley, William Small, William Withering, James Keir, William Murdoch, Richard Lovell Edgeworth, John Whitehurst, Dr. John Bridge, William Strutt, Dr. John Pigot, Thomas Day, and Samuel Galton, whose house was also one of their venues.



*Etruria Hall,
Wikimedia Commons, © Steven Birks*

One of the difficulties in studying this fascinating group is their decision not to keep minutes of their meetings, and not even a list of members. Although the membership fluctuated, it seems that there were never more than fourteen at any one time. It is difficult to assess the importance of the society; its members had very diverse interests, producing much original and pioneering work and I think it would be fair to say that the Lunar Society underpinned the intellectual, industrial and scientific progress of the Age of Enlightenment in the 18th and 19th centuries, even though it only lasted about 70 years. In this article I have featured three of the less well-known members of the Lunar Society.

William Small



It is thought that William Small introduced many members to the group. He was interested in engineering, chemistry and metallurgy, and was regarded as one of the best contributors to the Society's debates. He was a Scot, born in Aberdeen where he attended the Marischal College. In 1758 he was appointed Professor of Natural Philosophy at The College of William and Mary, Jamesburg, Virginia, (still a leading American university), where he taught the young Thomas Jefferson, who was the main author of the American Constitution, and President of the United States in 1801. Jefferson wrote the following tribute to William Small in his autobiography (1821):

"It was my great good fortune and what probably fixed the destinies of my life that Dr Wm Small of Scotland was then professor of Mathematics, a man profound in most of the useful branches of science, with a happy talent of communication, correct and gentlemanly manners & an enlarged and liberal mind. He most happily for me, soon became attached to me & made me his daily companion when not engaged in the school; and from his conversation I got my first views of the expansion of science & the system of things in which we are placed."

Small came to the West Midlands in 1765 with a letter of introduction from Benjamin Franklin to Matthew Boulton. Following Boulton's advice, he started a medical practice in a house shared with Dr. John Ash in Temple Row, Birmingham. The site of this house is now marked by a blue plaque in the entrance to the House of Fraser store. Small was by all accounts very civic minded and was instrumental in the creation of the General Hospital. He died in 1775 at the age of only 45 after a long illness which was thought to have been malaria, caught during his sojourn in Virginia.

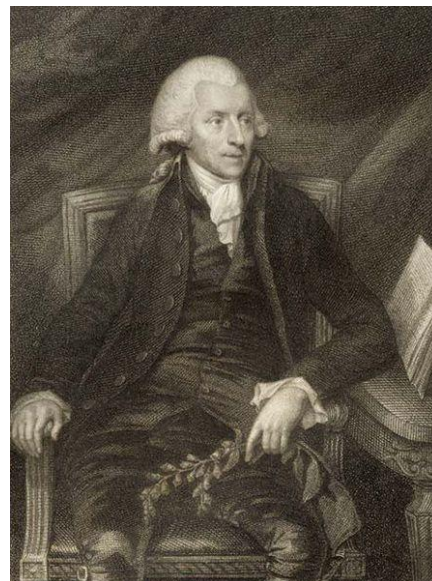
William Withering

William Withering was born in Wellington, Shropshire, in 1741. He studied at Edinburgh Medical School. Following the death of William Small, Matthew Boulton invited him to become a member of the Lunar Society. He was reputedly a rather shy, pedantic man with a "tendency to irascibility", but his diligence and ability resulted in his appointment as the chief doctor in Birmingham General Hospital, and this brought him sufficient wealth to build a large house in Union Street in Birmingham, now demolished. He also purchased a lease on Edgbaston Hall which is now Edgbaston Golf Clubhouse.

In 1776 he published a treatise on all the vegetables grown in Great Britain, using the Linnaean system of plant classification. His opus magnum was a larger treatise on British plants published in 1787. This impressed Erasmus Darwin, despite the long cumbersome title which apparently took up nine lines! A further volume was published in 1792. ►

Withering adopted a new scientific approach to medicine and was a pioneer in examining folk remedies to ascertain their validity. He published his findings in 1785. His greatest claim to fame, however, was his diligent work on the foxglove, digitalis. He worked out a safe dosage for its application for dropsy, despite not being aware that this condition was a symptom of heart disease. The plant had been known since ancient times and its dangers were well known, causing purging and vomiting if taken in excess.

His friendship with Joseph Priestley (discoverer of oxygen and fizzy drinks), apparently encouraged his interest in chemistry and mineralogy. He was the first to study the chemical composition of the rocks making up the Rowley Hills, the 'Rowley rag', an ancient dolerite lopolith. He described the dolerite as "a highly fractured, brown-coloured stone." In fact this dark blue stone does weather to a lightish- brown colour.



We know that he read a couple of papers on mineralogy to the Royal Society, and he had a mineral, 'Witherite' named after him in 1790. It is white, colourless, or tinged with yellow, brown or green, formed in low temperature hydrothermal veins, and found by Withering in Alston Moor, Cumberland. It is found fairly widely in places such as Illinois and California, France and Turkmenistan. It is a carbonate: BaCO_3 , hardness 3-3.5, white streak, fracture uneven and brittle, vitreous lustre and specific gravity 4.3. It is a source of barium for use in making specialised glass. Withering died in 1799 after a long illness.

James Keir



James Keir was born in Edinburgh in 1735, and later studied medicine at Edinburgh University. He joined the army, rising to the rank of Captain by the time he resigned in 1768. He then moved to West Bromwich and before long was involved with the Lunar Society. It was at this point that he met Joseph Priestley and helped him with his experiments. However, at this time Priestley was still a staunch supporter of the 'phlogiston' idea. Eventually Keir rejected this after Erasmus Darwin realised that the 'French Heresy' of Lavoisier in which 'dephlogistecated' air was called oxygen and phlogiston declared not to exist, was correct.

Keir ventured into industry and co-established a glass making business in Stourbridge in 1771. He also started up the Tipton Chemical Works in 1778 making alkali from the sulphates of potash and soda. The alkali made there was particularly suitable for the manufacture of soap, and before long the Tipton works was producing a million pounds weight annually of soap, making

Keir a rich man. He was also a partner in the successful Tividale Colliery. James Keir was elected to the Royal Society in 1785 and died in 1820. (See also the report on Erasmus Darwin House above. Ed.) ■

Gordon Hensman

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Geobabble

Fieldwork is an essential part of geology. 'The best geologist is the one who has seen the most rocks' is a well used saying, and whether you are visiting geological localities as a keen amateur, as in our society, or as part of the training for future professionals, fieldwork is essential. But how has teaching geology in the field changed over the last 60 years?

In the quarry on the west side of the Wren's Nest there is an old sign, on rather a high pole that says in faded lettering, "NO HAMMERS", and it is a common feature when visiting a geological site to find that you are no longer allowed to hammer the rocks. Yet that has not always been the case; you could generally visit anywhere of geological interest and break open rocks with a hammer. I remember being with a university party of geology students, freely using hammers in the Wren's Nest. When you take field parties to sites valuable for teaching, you often notice how good exposures have been abused. You take your group to a corner of the quarry saying that there is a good exposure of ripples/footprints/whatever around the corner, only to find that someone has removed it with hammer and chisel or even jack hammers. Since then SSSIs and protected sites have come into being, and hammering has been restricted.

However, there is another factor concerning the way geology fieldwork is conducted. Up until the 1970s it was generally 'Cooks tour geology', you moved from locality to locality looking at interesting features, the leader explains what it is all about, you hammer around a bit to find samples for your collection, take a few notes and then move on. This was often done using a minibus or coach and although you were seeing lots of different rocks, for many they remained unconnected exposures, if they could remember where they were! Today, parties tend to spend more time at a quarry, looking, measuring and recording; collecting scientific data to be analysed later. Eventually they must make a geological map, always thought of as the ultimate test for a geologist.

Many exposures do not require a hammer. Fossils are often best seen on weathered surfaces; experienced palaeontologists will be looking through the scree rather than trying to prise pieces from rock faces, and it is a good habit to leave fossils and structures in place for the next visitor to see. If you are looking at features in soft sediments as in the Bridgnorth Sandstone, a small trowel is more useful than a hammer so you can clear the weathered surface away. When you come to hard igneous and metamorphic rocks of course, a hammer is essential, simply to get a fresh surface to look at. I wonder if those reading this own a hammer and use it. The professional geologists will, no doubt, but is the trend away from breaking up rocks and more towards looking and recording?

To get myself updated, I contacted some students who are studying for geology degrees at university, and I got varied responses. It seems that the hammer is not used too much in the first year but they need to own their own. As they progress hammering is more common, often depending upon the view of the teacher who may take a view that if teaching requires students to break open rocks to see fresh faces, so be it: ignore any notices. Others have an emphasis on looking and recording. Many teachers emphasise that you can see a great deal on the weathered surface of a rock. Students can be put off hammering if full safety procedures are adopted, i.e. wear goggles and be on your own. The most common practice is to hammer only when necessary, and it seems the male students enjoy vigorous research, hammering where no damage can be caused.

Have the localities visited changed over the years? Graham Worton and I both did geology degrees, Graham a little while ago, myself rather longer. The areas we visited were very similar; Dorset, Pembrokeshire, the Lakes and various other British localities. The furthest we travelled was to Scotland. I did my field mapping in County Durham while Graham went to Derbyshire.

I posed similar questions to some present day undergraduates and the common field areas in this country are still used, but some more exotic places now occur; Cantabrian Mountains in Northern Spain, Almeria in Southern Spain, the South of France, Cyprus, and field mapping areas are also further afield in Europe; France and Spain being common.

These young geologists are seeing a lot of rocks, and quite appropriately too. Professional geologists are so often globe trotters, especially those looking for hydrocarbons and other minerals, and amid all the sophisticated new research instruments, the hammer remains a basic tool. ►



Here are two pictures of students in the field: one taken in 2002 shows students closely looking at graded bedding in the Aberystwyth Grits, the other is of a student party in 1964 collecting graptolites from



Ordovician shales. I could say that this shows the changing nature of fieldwork: hammering in the 60s and recording now, but that would be fatuous. Both pictures show what geologists have been doing since the science began. What is interesting is that the earlier students have no hard hats or safety equipment such as goggles, and are at a site which is now protected with no hammering or collecting, but that is probably a topic for a future Geobabble.

My thanks to Alex Biddle (Cardiff), John Cooper (Manchester), Mark Jeffs (Birmingham) and Sandy Bashford (Royal Holloway) for some insight into today's University geology teaching. ■

Bill Groves

Members' Forum

The Calcot Hill Farm Boulder *(Email to the Editor)*

I've just read your excellent article on local erratics (Newsletter No. 206, p.14) and am particularly interested in the one by Calcot Hill Farm. I have walked past this every few weeks for the last 50 years and did a short article about it in 2006 (Newsletter No. 179, p.7). I agree with you that it is too far south to be deposited by the last ice age but several other features puzzled me: (a) it is at a height of approx. 220 metres; (b) there are no others in the vicinity (as far as I know); (c) it is not mentioned in the Dudley & Bridgnorth Memoirs although many others are; (d) its precise location is at a junction with an ancient bridle path and the entrance to the farm; and (e) given its elongated shape I would have expected this to have been deposited horizontally. Each one on its own I would find plausible to account for it being from a much earlier ice age but taking all the points together I think it is questionable. I believe it is a genuine erratic and as far as I can tell its structure appears to be that of a pyroclastic conglomerate, consistent with the Arenig mountains but I find the above features difficult to explain.

I have therefore come to the conclusion, particularly after hearing Mike Williams' talk during our visit to Wolverhampton last year (*see the Field Report in Newsletter No.201, p.7*) and reading his article in the last Newsletter (No. 206, p.13), that this particular erratic may have had its journey enhanced by man. As Mike says, the Victorians did seem to like moving these around and I suggest some previous owner of Calcot Hill Farm acquired it, possibly from the Wolverhampton area, and placed it at the entrance to his farm. I checked an old map I have (1832) which shows that the farm existed then and the lanes were as they are today. As Mike has pointed out, even in Victorian times much larger ones than these were moved about! Any comments? ■

Peter Twigg

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