

Newsletter No. 210

December 2011

The Black Country Geological Society

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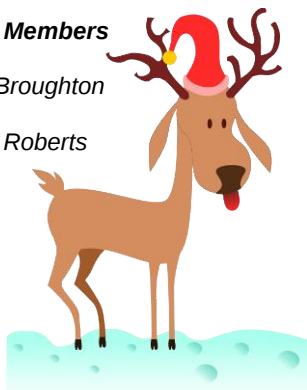
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**Copy date for the next Newsletter is
Wednesday 1st February 2012**

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

Monday 23rd January 2012: (Indoor Meeting) 'The geology and geoarchaeology of Jordan'. **Speaker: Dr. John Powell**, British Geological Survey. John has spent many years working overseas for the British Geological Survey. In particular this talk will focus on the geological influences on the spectacular archaeology in the region called 'Petra to Pella' - which became famous as one of the most amazing locations used for making the film 'Raiders of the Lost Ark'.

Saturday 28th January: (Field Meeting) Visit to Round House Farm Quarry and other Cotwolds quarries. **Led by Neville Hollingsworth**, Science and Society Team, Science and Technology Facilities Council. Meet at 10.00am in the parking area near some outbuildings next to the entrance to Round House Farm, Marston Meysey, Wiltshire. Grid Ref: SU132965. Nearest pub: Old Spotted Cow. Round House Farm Quarry (owned by Moreton C. Cullimore) is a working sand and gravel quarry exploiting floodplain terrace gravels of the Upper Thames Valley. The sand and gravel sequence overlies the Oxford Clay Formation, Weymouth and Stewartby Members (Middle and Upper Oxford Clay) which yields a rich and abundant pyritised ammonite fauna as well as other Oxford Clay fossils. Subject to weather conditions and exposures, participants will be able to dig for their own ammonites so please bring a garden spade. Wellington boots are essential at this site as it can get very muddy. A handout will be provided on the day.

Monday 20th February: (Indoor Meeting) N.B. Change of Speaker. 'Turning up the heat on Snowball Earth'. **Speaker: Professor Ian Fairchild**, University of Birmingham. There is evidence to suggest that some past ice ages were so severe that they led to ice and snow cover reaching almost to the equator and covering the globe. This talk will look at these events and their possible causes, and will highlight current researches at the University of Birmingham (focussing on the island of Svalbard in Norway) which help us to reconstruct continental environments during extreme glaciations in the context of theories of extreme ice ages.

Sunday 4th March: (Field Meeting) Exploring the geology around Stourbridge. **Led by Alan Cutler.** (Full details in the February Newsletter.)

Monday 19th March: (Indoor Meeting, 7.00 for 7.30 start) AGM followed by 'The Permafrost'. **Speaker: Dr. Richard Waller**, Keele University. Following on from last year's introduction to ice ages, glaciers and glacial landscapes, in this talk Dr. Waller will focus on the permafrost as a facet of the world's past and present frozen environments (the cryosphere). It will look at the evidence in and around the Midlands for permafrost environments and landscapes of the past. This talk also links with last month's, adding another dimension to our understanding of the permanently cold areas of our planet.

Monday 23rd April: (Indoor Meeting) N.B. Change of Speaker. 'Midges, Ticks and Smelly Goats: Exploring the Geology and Earth Heritage of the Palaeogene Staffa Lava Formation, Isle of Mull'. **Speaker: Dr Ian Williamson** formerly British Geological Survey & Natural England. This talk will initially concentrate on describing the results of recent research into the Staffa Lava Formation. It will put the geological story of this magnificent landscape into context with the palaeogene events associated with the opening of the Atlantic ocean and will describe the wonderful Earth Heritage of this amazing place as well as showing some of the more practical aspects of working in the field on Mull. Ian has also very kindly offered to lead a trip for the Society later in 2012 for 10 -15 BCGS members, particularly focussing on the geology of the Ross of Mull.

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 29th April: Visit to the Lickey Hills, 'Champions Project' Quarries and the Clent Hills. Led (in the Lickey Hills) by Julie Schroder and other members of the Lickey Hills 'Community Earth Heritage Champions' group. Meet: 10.15am for a 10.30 start at the Lickey Hills Country Park Visitor Centre, Warren Lane, Birmingham, B45 8ER. Light refreshments available at the Visitor Centre, or bring a packed lunch. Afternoon visit to the Clent Hills. Leader and details tbc. *(Full details in the February Newsletter.)*

Monday 15th October: (Indoor Meeting) 'The Geological Photo Archive of the Geologists' Association'. Speaker: Dr. Jonathan Larwood, Natural England, Peterborough. The Geologists' Association has a long history stretching back to 1858. Throughout much of that history it has recorded its activities through written documents and captured its field excursions in many photographic formats including glass plates. This talk will reveal some of the forgotten images of geology through the last century with particular reference to the Black County and its surroundings.

Monday 19th November: (Indoor Meeting) 'Next Steps for the Development of the Lapworth Museum of Geology'. Speaker: Jon Clatworthy of the Lapworth Museum of Geology, University of Birmingham. During 2010 and 2011 the Lapworth Committee have been drawing up plans for a major re-fit and re-display of the Lapworth Museum. Jon will share this vision with us and focus on some of the new initiatives of the redevelopment, and will also give some insight into the gemstone collections on loan from the Birmingham Museum and Art Gallery.

Monday 10th December 2012: (Indoor Meeting, 7.00 for 7.30 start) BCGS Members' Evening and Christmas Social. This will comprise the usual eclectic mix of short presentations, sharing of geological knowledge and experiences, members' collections to be envied, and pleasant conversations within a convivial festive atmosphere embellished with a lovely buffet.

Other Events and Information

Herdman Society Symposium



Saturday 18th February - 'Geoscience Frontiers 3'

A day of lectures at the Sherrington Lecture Theatre, Department of Earth and Ocean Sciences, University of Liverpool. The full programme with abstracts, times, location of the Lecture Theatre and ticket charge will be circulated in December. The charge to non-students will, subject to sponsorship, probably be ~£10, which includes programme, buffet lunch, tea/coffee and wine reception.

Prof. Jon Gluyas (Durham): 'Carbon dioxide: friend or foe? - storage, sequestration and utilisation'.

Dr. Bryan Lovell (Cambridge): 'A pulse in the planet: hot blobs in the mantle and yo-yo tectonics'.

Prof. John McCloskey (Ulster): 'Evolution of stress on the Sunda megathrust, West Sumatra: Implications for future earthquakes and tsunamis'.

Dr. Clive Oppenheimer (Cambridge): 'Mount Erebus: an exceptional volcano laboratory in Antarctica'.

Dr. Richard Shaw (British Geological Survey): 'The disposal of radioactive waste - a geological perspective'.

Dr. Jan Zalasiewicz (Leicester): 'Exploring the Anthropocene'.

The Herdman Society is the undergraduate society of the Earth and Ocean Sciences Department at Liverpool University. William Herdman was the founder and benefactor for the Department of Geology.

Persons interested in attending should contact Helen Kokelaar, e-mail: herdman@liverpool.ac.uk

Saturday 25th August 10.00am - 4.00pm Dudley Museum and Art gallery

Mini Rock and Fossil Festival

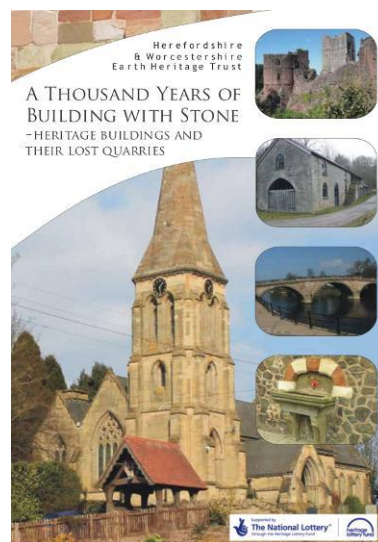
This event will be held entirely in the Museum and Art gallery, and although it will be a smaller event than the two day Festival held this year, there will be the usual mixture of experts, dealers, activities, special displays, and information about all things geological - something for everyone! So get the date in your diaries, and more details will follow when available.

Herefordshire and Worcestershire Earth Heritage Trust - Online Survey

A Thousand Years of Building with Stone - heritage buildings and their lost quarries... a story just waiting to be told. **But what do you think?**

There's a lot to be learned from our Stone Built Heritage - the evolution of architectural styles, stories of quarrymen, stone masons, architects and property owners. It is key to appreciating many aspects of our much broader history. Churches, castles and stately homes - all have witnessed secrets yet to be uncovered! What about the stone itself? Where did the raw building stone material come from? What role did the availability of handy building stones have on local developments? Our Stone Built Heritage provides a window to unravel a wealth of information about each stone structure... And let's not forget the significance of all those quarries that supplied the stones!

Over the next three months the H&W EHT will be exploring methods to unravel the stories behind several stone built structures in Herefordshire and Worcestershire. Central to this study is consultation with the public to gauge people's awareness, understanding and appreciation of our local Stone Built Heritage. They would be grateful if you would take the time to complete their short online Building Stones Survey: <http://79.170.44.138/earthheritagetrust.org/pub/category/building-stones-survey/>



For further information and enquires please contact Natalie Watkins
Email: n.watkins@worc.ac.uk or phone: 01905 542014

Although most of our readers live outside these two counties, your input still counts - this exciting project's viability and success depends upon the widest possible public support, and will surely have a far-reaching impact for us all to enjoy. So please do the survey! It only takes a few minutes. Ed.

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.

Shropshire Geological Society

Wednesday 11th January: Impacts of the Volcanic Eruption in Iceland 2010. (Guest speaker: Dr Andy Russell, Newcastle University.)

Wednesday 8th February: My house fell in a hole: soluble rock geohazards - and the inspiration for Alice in Wonderland. (Guest speaker: Dr Tony Cooper, British Geological Survey.)

Generally held at Shire Hall, Shrewsbury, commencing at 7.15pm for 7.30pm. A nominal charge is levied for non-members. Further info at: www.shropshiregeology.org.uk/

Woolhope Naturalists' Field Club - Geology Section

Friday 20th January: 'Catastrophe'. Talk given 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

Lapworth Lectures

Monday 16th January: Details of this and future lectures to be confirmed. It is advisable to phone or check the Lapworth Museum's web site before attending.

Lectures commence at 5.00pm in the Dome Laboratory, Earth Sciences, University of Birmingham. Further info at: <http://www.lapworth.bham.ac.uk/events/lectures.shtml> or phone 0121 414 7294

North Staffordshire Group of the Geologists' Association

Thursday 12th January: 'Ediacara: The evolution of Earth's first complex Life'. Speaker: Dr. Michael Montenari (Keele University).

Lecture meetings are held monthly during the autumn and winter, at 7.30 in the William Smith Building at Keele University. Further information at: www.esci.keele.ac.uk/nsgga/

Manchester Geological Association

Saturday 10th December: Talks starting at 13:30: A Look at the Triassic

Triassic Cheshire: An Overview - Fred Owen, Manchester Geological Association

The Alderley Edge Mines: Nigel Dibben, Derbyshire Caving Club

Chirotherium and the Triassic Environment: Dr. Geoff Tresise, National Museums, Liverpool.

Saturday 14th January: The Fossil Hunters

'Mary Anning (1799-1847) & Thomas Hawkins (1810-1889)': Prof. Hugh Torrens, University of Keele.

'James Powrie': Bob Davidson, University of Aberdeen.

'James Frederick Jackson (1894-1966)': Dr. Cindy Howells, National Museum of Wales.

Visitors are always welcome. Further information about meetings at <http://www.mangeolassoc.org.uk/> or email lectures@mangeolassoc.org.uk

West Midlands OUGS Day of Lectures

Saturday 21st January: 10.30 - 16.00 (approx.) Dome Lecture Theatre, University of Birmingham. Break for lunch around 13.00. There will be a charge of £5.00 for non-UGS members.

Dr. Emily McMillan (Birmingham University): "Snowball Earth - Investigating ancient ice ages in the present day Arctic."

Dr. Isabelle Ryder (University of Liverpool): "Stressful times following the 2010 Maule earthquake, Chile."

Dr. Chris Carlon: "The Salt Mines and Brines of Cheshire."

Dr. Matt Watson (University of Bristol): "Icelandic eruptions and their effects on aviation."

Dr. Will Gosling (The Open University): "The impact of Quaternary glacial-interglacial cycles on the tropics."

To book a place, please contact Linda Tonkin, west.midlands@ougs.org

Warwickshire Geological Conservation Group

Wednesday 18th January: Professor Ian Stewart (University of Warwick). A mathematician looks at Geology and Landscape. (To be held at the Senior Citizens Club, Southbank Road, Kenilworth)

Wednesday 15th February: Prof. Chris Stringer (Natural History Museum). Director of Ancient Hominid Occupation of Britain Project.

For details of venues/times contact Ian Fenwick swift@ianfenwick.f2s.com or 01926-512531. The WGCG mobile phone (07527 204184) 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/>

Stamford and District Geological Society

Wednesday 11th January: Cliff Nicklin, Oxford Clay - The Clay That Burns.

Wednesday 8th February: Prof. Mike Petterson Leics. University, Nuclear Disposal & Borrowdale Volcanic Group.

Meetings are held at Tinwell village hall at 7.30 pm. Visitors are welcome on payment of £3.00. Contact Bill Learoyd: billlearoyd@aol.com Further information at: www.stamfordgeolsoc.org.uk/

The Wren's Nest Fight

After a worrying six months since we learned of the plans by Dudley College to replace their sixth form accommodation at Mons Hill, Wrens Nest, with an estate of 80 houses, we now know that these plans are going ahead, despite the implacable opposition provided by the Black Country Geological Society. Despite our appeal, only a handful of our members attended the meeting at Dudley College, when the Principal - newcomer Lowell Williams - explained and illustrated their plans. I had grave doubts about attending such a propaganda exposition; however, it seemed that we had nothing to lose.

I regret to inform members that our opposition was undermined by the acquiescence of Natural England who dropped their objections (with conditions), and by the "sweetener" of replacement of the Warden's Quarters, when the site is abandoned in August 2012.

I must inform you that, as Chairman of BCGS, I, and a few others on the committee, strongly opposed this capitulation. However, many of you will have had experience of the Machiavellian machinations of local councils, and realise that we are not party to what is likely to have gone on behind closed doors. If the college (an autonomous corporation), can find a developer to buy the site, then the houses will be built.

I believe that in future when people express amazement that this development was allowed, the BCGS will be able to hold its head high in the knowledge that we resolutely opposed it. ■

Gordon Hensman, Chairman

Editor's Note

In this bumper Christmas edition there's room only for me to reflect briefly on the successful and action packed year which the Society has enjoyed, marred only by the desperate state of affairs at the Wren's Nest described in the Chairman's report above. On the bright side, we can look forward to many interesting talks and field visits planned for next year - and there are more in the pipe-line! It remains only to wish you all a Happy Christmas - and why not make a New Year's resolution to tell us all about your geological experiences, views, queries, and what sort of things you'd like to see the Society doing in the future? I'll look forward to lots of contributions for our next Newsletter. ■

Julie Schroder

The Dudley Bug



Welcome to the festive edition of "The Dudley Bug". We would like to wish you all a Merry Christmas and Happy New Year! This month we investigate how Christmas heavily relies on the Earth's natural resources and without 4.56 billion years of geology this Christian festival would be a whole lot duller.

Enjoy!

Alison and Chris

Digging for decorations

Excitement is building for the big day, you wake up every morning thinking it's time to rush down and open presents. Letters are flooding to the North Pole, advent calendars are opened every morning and Christmas songs are sung when you think nobody is listening (and that's just the adults!).

At this time of year, few people spare a thought for planet Earth and its natural resources when they decorate their homes with lights, decorations and overgrown fir trees. Not to mention the pointless tat we buy for our families, some of which we would never consider buying at any other time of year. As you read this, grannies nationwide will be finishing the obligatory disgusting Xmas jumpers, turkeys are happily eating until they are ready to burst, elves are planning a route to get Santa around the world in one night but most of all geologists are writing their lists for Father Christmas, starting with coal.



Native copper from the USA

The essential items used to make the Christmas period special would not exist without petroleum and mining resources. The increased demand for electricity to run the many Christmas lights and electronic novelties creates a spike in CO₂ emissions. Whether this is a significant contributor to climate change is another matter not addressed in this issue. Electricity derived from combustion of fossil fuels is one of many resources required to brighten up our fairy lights. Once, Christmas lights would have been candles but now the glass bulbs contain *Silica*, *Clay*, *Feldspar*, *Syenite*, *Trona* and *Nepheline*, while the tungsten filaments are created from the raw materials *Scheelite* and *Wolframite*. Natural metals such as Copper form the conductive wire. Wall plugs and wire insulation contain the usual plastics but also a number of other materials which you may not realise, for example: *Limestone*, *Feldspar*, *Vermiculite*, *Trona*, *Silica* and *Pumice*.

No house can be completely Christmassy without a fir tree brought indoors. We go to great efforts every year to ensure that we 'save a tree from the cold', often driving many miles to the nearest farm who grow small Christmas tree forests. Our trees could not grow to the same quality without the use of fertilizer, for which almost all of the *phosphates* and *potash* produce are used. With global water shortages set to increase over the coming decades, agriculture, including our Christmas tree farms consume vast amounts of ground water supplies and so put ever more strain on the water tables.

As if dragging a poor tree inside your house is not strange enough, every year we insist on disguising it with lights and tinsel. Many of the decorations contain similar raw materials as the lights, but can also contain *Lead*, *Aluminium*, *Iron* and *Borate* to name a few. If you're wealthy, precious metals such as *Silver* and *Gold* may be used, although for many of us a solid gold hanging Santa is still on our wish list. These metals are more commonly given as presents. If you're a sucker for colour, the paints used on the decorations contain *clay*, *mica* or *hydrocarbons*. Pigments used to provide colour are obtained from *Lithium*, *Titanium*, *Manganese* and other *Rare Earth Elements*. ►

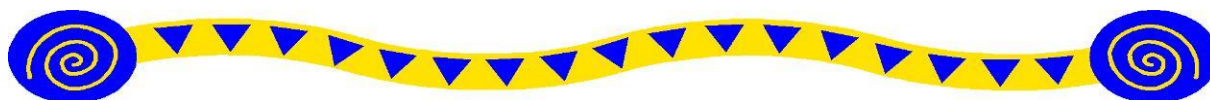


A botryoidal haematite specimen

With increasing pressure to become more environmentally friendly and an awareness of the limited reserves of our natural resources there is an alternative to the large Christmas tree farms and the many dead trees thrown out in the new year. If you want a real tree this year and want to limit your environmental impact, then renting a Christmas tree could be the perfect answer. There are companies springing up around the UK willing to drop off a tree in a pot to your door and pick it up after the New Year and nurture the tree for the following year. This reduces the need for fertilizers, lessens demand for water, and makes fewer dead trees, amongst many other environmental benefits.

So why not think about having an environmentally friendly Christmas for 2011? Remember it's not planet Earth we are saving, it's the human race.

Adapted from <http://www.mii.org/pdfs/xmastree.pdf>



Twas the tri-lo-nite before Christmas

**Twas the night before Christmas, when all through the house
Not a fossil was forming, not even a woodlouse,
The sample bags were hung by the chimney with care,
In hopes that a Geologist would soon be there.**

**Out of the house arose such a clatter,
I grabbed my rock hammer to see what was the matter.
Out on the lawn I saw a rock good enough to lick,
I knew right away, it was old St Nick.**

**He came down the chimney like a bat out of hell,
He couldn't believe that sulphurous smell,
Minerals and rocks arranged throughout the house,
"To prevent any weathering"! I whispered as quiet as a mouse.**



**A hard hat, a hand lens and some big boots too,
Every geologist knows what to do.
He filled our sample bags with coprolite and beer,
A big chunk of schist, and some rock hunting gear.**



Schist from Ireland

**He rose up the chimney with a thunderous fart,
Old St Nick blew the house apart,
Rocks and fossils flew all around,
Leaving the geologists a hole in the ground.**

**He shouted and cursed as he rode out of sight,
Shouting I'll be back next year,
Have a volcanic night!!!**

Merry Christmas!!!!!!

If you're looking for a brain teaser during the Christmas day TV repeats (yet again) or if you can't bear to see Steve McQueen fail to jump the fence to Switzerland and escape for another year (maybe one day he will) - then have a go at guessing what this Silurian fossil (2.5cm long) could be. Send your answers to: thedudleybug@hotmail.co.uk



**Geology
Matters**

Specimen images provided by:

www.geologymatters.org.uk



Field Meeting Report

Sunday 7th August: The Woolhope Dome. Led by Moira Jenkins & Rosamund Skelton (Woolhope Naturalists' Field Club)

The Woolhope Dome is situated between Hereford and Ledbury south of the A438. We met at 11.00am at Swardon Quarry car park, between Priors Frome and Checkley. Starting from Swardon Quarry, on the west side of the Dome, our day included a view point looking west into Wales, a wooded track leading to Prior's Frome Lane and Old Sufton, then Scutterdine Quarry and finally Sleaves Oak on the eastern side of the Dome.

The Dome represents a NW-SE trending single fold, or pericline, of Silurian strata, approximately 4km across. Numerous N-S and NW-SE trending faults cut across the Dome and a reverse fault, the Woolhope Fault, delineates its western boundary. Continuing west a relatively flat and low lying landscape represents the meeting point of the Rivers Wye, Lugg and Frome, beyond which are numerous hills and the Brecon Beacons in Wales. In the past this area was prone to major flooding, but after bad floods in the 1960s, defences were constructed and the flooding stopped. Today the area is used for arable farming.

The local landscape perfectly matches the underlying geology and the top of the Dome has been eroded to reveal three concentric limestone ridges, of the Woolhope Limestone Formation, Wenlock Limestone Formation and Aymestry Limestone Formation, separated by softer siltstone and shale vales. The Woolhope Limestone is the lowest and oldest of the three ridges and all strata dip downhill away from the centre of the Dome, at Haugh Wood, where the oldest rocks are found. The full sequence of strata found in the area is shown below. Not all these strata were encountered during our field visit. ►

Formation	Series	Age	Feature	Location	Description
Raglan Mudstone	Pridoli	Silurian / Devonian	Low lying land beyond the Dome boundary.	Prior's Frome Lane	Rippled thinly bedded brown mudstone and siltstone with occasional sandstone layers.
Downton Castle Sandstone or Rushall Beds				Prior's Frome Lane	Fine grey, orange and yellow brown fossiliferous mudstone
Upper Ludlow Shales	Ludlow	Silurian	Vale	Swardon Quarry	Fine thinly bedded purple fossiliferous mudstone and limestone, with green bentonite layers.
Aymestry Limestone			Ridge	Sleaves Oak, Markle Hill	Massively bedded cream/grey limestone
Lower Ludlow Shales			Vale	-	Not encountered
Wenlock Limestone	Wenlock		Ridge	-	Not encountered
Coalbrookdale			Vale	-	Not encountered
Woolhope Limestone			Ridge	Scutterdine Quarry	Yellow brown limestone with shale partings, overlying massive blue limestone. Green bentonite layers.
Haugh Wood	Llandovery			Centre of the Dome	Haugh Wood

Traversing the Dome from its centre to the outer edge and progressing upwards through the stratigraphic sequence, the environmental conditions change from tropical shallow marine, to more tidal/terrestrial. This sequence formed from the uplifting of the land surface in late Silurian/early Devonian times during the closure of the Iapetus Ocean. BCGS members who attended the Saltwells trip earlier this year will recall seeing a similar sequence at Brewin's Canal Section, where an unconformity between Carboniferous Middle Coal Measures strata and Downton Castle Sandstone represents approximately 100 million years of missing geological history.

During the Variscan Orogeny, at the end of the Carboniferous, around 250 million years ago, the Woolhope Dome was pushed up into its current pericline like form. The current landscape was then created by the actions of ice and water during and after the last Ice Age. According to Moira, during the Devensian Glaciation, glaciers only reached as far south as Hereford and the River Lugg. However, during the Anglian Glaciation they reached much further south.

Since then a combination of joints, faults, bentonite bands and dipping strata have led to several large land slipped blocks around the Dome perimeter. The Dormington and the 'Wonder' at Lower Markle are examples of such landslips that occurred hundreds of years ago, today very overgrown and not easy to see.



The view West from the Woolhope Dome

Location 1: Swardon Quarry. Formerly a quarry before becoming a Council owned car park, this site is one of the Woolhope Naturalist's Field Club's geological sites. In the quarry are two exposed beds of jointed Upper Ludlow Shale, comprising thin parallel layers of mudstone and limestone containing fossil corals, gastropods and brachiopods. A greenish band of bentonite clay can also be seen within a cleft near the top of the exposure. These deposits are believed to have been deposited under relatively low energy conditions within warm shallow seas. Above the quarry a view point provides a panoramic view westwards into Wales, with the Black Mountains, Hay Bluff and Sugar Loaf in the far distance, and Aconbury Hill, Dinedor Hill, Garnons Hill and Dinmore Hill in the middle distance. The confluence of the Wye, Lugg and Frome Valleys could be seen in the near distance, with Hereford on glacial river terraces between the Wye and Lugg Valleys.

Location 2: A wooded track leading away from Swardon Quarry where fine purple mudstone of the Upper Ludlow Shale was exposed. This strata was also fossiliferous, containing brachiopods: *Lepidena*, *Atrypa* and *Rhynchonellida*, and again represents low energy shallow marine conditions.

Locations 3 and 4 were outcrops along Prior's Frome Lane. The first exposure we looked at was a large roadside outcrop of fine grey mudstone overlain by orange and yellow brown mudstone, within which could be seen fossil shells and worm burrows. These units belong to the Downton Castle Sandstone Formation, also known as the Rushall Formation, which represent shallow marine, low energy conditions and mark a transition zone from the Upper Ludlow Shale to Pridoli age sequences. Further along the lane the next exposures were rippled thinly bedded mudstone, siltstone and occasional sandstone beds, overlain by head deposits. These strata are believed to show more terrestrial conditions, marking the base of the Raglan Mudstone Formation and the beginning of the Old Red Sandstone Formation. We eventually returned to Swardon Quarry and had lunch at the view point. After lunch we drove a short distance out of Mordiford to:

Location 5: Scutterdine Quarry, a designated SSSI. The quarry (now partly backfilled with only the upper parts of the exposures visible), is cut into the Woolhope Limestone. The exposures comprise yellow brown (impure) limestone with shale partings, apparently 7.5m thick, overlying 1.0m of massive blue (pure) limestone, which the quarrymen were after. Examples of brachiopods, trilobites and crinoids can be found within the exposure. Four bands of bentonite have been recorded within the Woolhope Limestone, one supposedly separating the pure and impure limestone in the quarry, but this was not obvious.

From Scutterdine Quarry we drove east, across the Woolhope Dome to our final location. Along the way we passed through Haugh Wood, the centre of the dome, crossed a ridge of Wenlock Limestone and ended up on a ridge of Aymestry Limestone at Sleaves Oak, Markle Hill, which forms the ►



The view East from the Woolhope Dome

eastern outer edge of the Dome. The exposures within the quarry comprised Upper Ludlow Shale overlying massively bedded cream/grey Aymestry Limestone. Here all the strata were inclined towards the east.

Looking east from Sleeves Oak, we had a view of a low lying landscape with the Malvern Hills forming the far horizon. Between Sleeves Oak and the Malvern Hills the underlying geology comprises Upper Ludlow Shale, Downton Castle Sandstone Formation and Raglan Mudstone, repeating the transition from shallow marine to more tidal/terrestrial conditions.

I would like to thank Moira and Rosamund for leading and organising this very interesting field visit and for their time. ■

Andy Harrison

BCGS Website update.

The BCGS website has recently been updated to include the "Scorching Deserts and Icy Wastes" geological leaflet series. These leaflets including Walsall, Sandwell, Wolverhampton and Stourbridge are all available to download and print or simply to view online: www.bcgs.info/download_leaflets.html

This month also sees the milestone of the BCGS Newsletter having reached edition 210, and this coincides with the completion of the scanning and digitisation of past editions. These past editions are also available on the website, **36 years' worth and over 1,500 pages!** The longer term goal is to provide an index, so past articles can be quickly found and referenced. If you are interested in reading past editions and learning more, the current and past newsletters can be found at: www.bcgs.info/newsletter.html

Members interested in learning more about the historical roots of our society will also be pleased to learn that a project to scan the transactions and proceedings of the Dudley and Midland Geological Society and Field Club has also begun. The editions scanned to date are available at: www.bcgs.info/dudley_midland_geological_society.html ■

Graham Hickman

Sicily and the Aeolian Islands 2011

Since 1998, I have been arranging escorted small-group tours for adults to volcanically active areas of the world. As a lecturer at a local college, I had been taking my students on overseas trips to volcanic areas in Italy for many years, and I thought this would be something my OU students (and other interested adults) would appreciate. Since then, I've taken groups to many places across the globe, but have always tried to get back to Sicily and the Aeolian Islands at least once every year.

This year, I've been fortunate to make two visits: firstly, in June, with individuals and couples from across the UK who had signed up to one of my trips, and then in November a specially arranged tour for members of the Oxford Geology Group. In both cases, our main base was the island of Lipari, the largest of the Aeolian Islands, a cluster of islands lying a short distance off the north coast of Sicily. The islands are all volcanic in origin, formed as a result of the subduction of the African Plate at a convergent plate boundary as ocean crust at its leading edge pushes northwards beneath the Eurasian plate.



The caldera and Fossa cone on Vulcano from Lipari

Most of the Aeolian Islands form a classic 'island arc'. The oldest rocks are found on Panarea, one of the smallest islands, and are dated at 330,000 years old. Today, only two of the islands are still active. These are Vulcano, which was in a state of almost continual eruption between 1888 and 1890, but ►



Fumaroles on crater rim at Vulcano

has not erupted since, and Stromboli, which sends out explosive bursts of pyroclastic lava bombs and ash several times every hour, and has done so throughout recorded history. Indeed, it was referred to as the 'lighthouse of the Mediterranean' by the Ancient Greeks and Romans.

A day on each trip was spent on Vulcano, a short boat-ride from Lipari. Vulcano is one of the youngest of the Aeolian islands. It began life as a submarine sea-mount around 100,000 years ago. Twice in the past it formed large andesitic strato-volcanoes, each followed by cauldron-subsidence resulting from the emptying of the magma chamber to create a caldera. After the formation of the second caldera, a new cone,

the 'Fossa Cone', started to develop about 10,000 years ago. From the harbour, the walk up to the rim of its crater takes about one hour.

The view from the crater rim is quite spectacular, the inside crater walls showing up clearly the layered structure of the cone, with alternating deposits of various ashes and coarser pyroclastics. The upper slopes are also littered with lava bombs from its last eruption in 1888-1890. It was this eruption which gave its name to the 'Vulcanian' type of activity. No lava flows were produced, but many explosive bursts, throwing lava bombs, some of them huge, hundreds of metres into the atmosphere. The island had to be evacuated, and some of the explosions were so strong the blast broke windows on Lipari island nearby! Also on the crater rim are the sulphurous fumaroles which belch out noxious gases, including SO_2 . Remaining upwind, it is sometimes possible to get close to these, and see the bright yellow needles of sulphur crystals which have formed from precipitating gases.

After viewing the crater and returning to the harbour area, the next port of call for most visitors are the 'fanghi' or mudpools. Those who choose to do so can bathe in warm mud, through which a constant stream of gases are bubbling. The most obvious is hydrogen sulphide, the smell of which permeates the whole environment. Bathers usually wash the mud off by bathing in the sea close by (which also has gas bubbles rising through it), but people can expect the smell to linger in the pores of the skin for several days!

The highlight of the area for many is the trip to Stromboli. This is the youngest island, at only 50,000 years old. The island has a classic 'volcano' shape, its outline rising from the sea to form an almost perfect triangle. Stromboli has given its name to the type of eruption it produces. As gas pressure builds up it causes an explosion, throwing a burst of lava bombs and lithic fragments high out of one of its four adjacent craters. Much material falls back into the crater, and there is then a gap of 10-15 minutes before the process is repeated. The repetition pattern is not perfect, however, and sometimes there can be a frustrating long wait before the next explosion.

Different craters also produce different types of explosion. One has a narrower conduit and seems to 'roar' rather than explode, creating more fine black ash. This is carried well away from the crater in the wind, often dropping on the heads of viewing spectators. One thing that cannot be discounted is the weather. On the June visit, a low-cloud base meant that the best views were seen by those who chose to follow a low-level path to a viewpoint at the base of the 'Sciara del fuoco', looking up the slope down which all the ejected material is deposited. Again, in November, weather conditions meant that the best viewpoint was at 400m, halfway up on the side of the Sciara.



Explosive eruption on Stromboli as seen from Panarea

Mount Etna, on the Sicilian mainland, is Europe's highest, largest, and most active volcano. There is no definitive agreement as to its origin. Some relate its formation to a straightforward plate collision, involving subduction, between the African and Eurasian plates, like the Aeolian islands. However, the huge volume of lava produced, and the fact that most eruptions are of basaltic lava suggests a magma source in the upper mantle. A second theory holds that the volcano lies on a long-lasting hotspot, which has held this position for at least half a million years, the age of the volcano. A third theory suggests that complex movements of sub-plates in the area are creating tension and crustal ►



The SE crater of Etna with main crater behind

stretching, allowing basaltic magma to rise from the mantle below. Certainly, Etna lies at an intersection of three lines of weakness, meeting at angles of approximately 120 degrees.

The volcano had erupted at least 17 times in 2011. All of these events have been short-lived, lasting just a day or few days in most cases. They were mainly effusive in character, producing flowing lava rather than explosive pyroclastics. All emanated from a fissure which has opened up on the flank of the SE crater. Some spectacular lava-fountains (up to 500m high) have been produced. All the lava has flowed in a south-easterly direction into the Valle de Bove, a huge basin formed by slope failure on the eastern flank of the volcano. There has also been a considerable amount of ash produced. Indeed, the November group could clearly see a trail of grey-brown ash stretching across the sky from the summit crater on first arriving in Sicily. Unfortunately, neither visit took place at a time when the volcano was actually erupting, but the journey by cable-car and 4W/D bus up to 2900 meters, just 400m from the summit enabled both groups to see some memorable sights. This included viewing the main crater and SE craters at close hand, walking around the rim of a 'Bocca' (*vent on the side of the volcano*) created only in 2002 as the source of a 4 km long lava flow. There were also steam-vents, recent lava bombs and ash deposits only a few weeks old.

I will be returning to the area in June 2012, on a visit open to all interested adults. I also have tours planned to Costa Rica in February, the north of Iceland in July, La Palma on the Canary Islands' hotspot in September, and New Zealand in November. Anyone wishing to find out more about any of the trips could visit the website at www.volcanic-experiences.co.uk or phone me on 01527-832578. ■

Alan Clewlow

Devensian or Anglian?

In all the articles written in the Newsletter about glacial erratics, there arise the problems related to age; which glaciation was responsible for their transport and deposition. Julie Schroder summed up what is known (Newsletter 206, p14). I thought that with a few days concentrated research I might throw some light on the problem with regard to the erratics that members of the Society have recorded, but I have just confirmed that "the more you know, the more you realise what you don't know". Indeed, perhaps the title of this article should be 'Devensian or Anglian or Wolstonian?' I must point out at the outset that I am no Quaternary specialist, but if there is one reading this, corrections and comments would be most useful.

The last glaciation was the Devensian which lasted from 110,000 or 120,000 years ago until about 18,000 years ago. During this glacial event there were four warm interstadials as well as small advances and retreats. These ice sheets removed or reworked sediments, including erratics, that may have been deposited by previous ice sheets, so that the Devensian diamicton (I shall use the term 'till') normally sits directly on the earlier land surface. The maximum extent of the ice sheet is indicated by the extent of till and erratics. The ice front was from Bridgnorth, through the area south of Bobbington, Highgate Common and Trysull, north of Wombourne to cross the Black Country through Bilston, Wednesbury, south of Walsall before swinging northwards. It did not, therefore, directly affect the main Birmingham area.

Theoretically, any erratics found to the south or east of this 'Wolverhampton line' are Anglian or Wolstonian. The base of the Anglian is at 350,000 years ago, followed by the Hoxnian interglacial at 280,000 years and then the Wolstonian glaciation at 250,000 years. There is some doubt about the extent of the Wolstonian and it is assumed that it did not reach our area with any significance if at all. Some books put the Anglian and Wolstonian together as the two main cold stages of the Anglian.

The next step was to consult the maps of the British Geological Survey (BGS). The 1:50,000 Dudley sheet 167, is based on an old survey; it marks Boulder Clay and Sand & Gravel with no differentiation regarding glaciation. The BGS Geology of Britain viewer names Devensian deposits as Devensian, but when it looks at the Birmingham area, it calls the glacial material 'Mid Pleistocene' which includes ►

both the Anglian and Wolstonian. The Wolverhampton sheet 153, produced in 2001 has Devensian deposits recorded in great detail, but there are no pre-Devensian glacial deposits in that area.

But to return to our erratics, we have to remember that although there is a definite line for the maximum front, the periglacial area of sand and gravel and river deposits are extensive, and we know that the rivers flowing out from beneath ice sheets can be very powerful at times, capable of moving large boulders. Small erratics have been found in glacial gravels in Kingswinford for example. There is also evidence that in very cold spells the ice sheet may push out small tongues of ice for a short time, and so carry boulders in that way. It was also pointed out to me by Alan Cutler during a conversation at the recent Rock and Fossil Fair that the BGS have found patches of till in some higher areas of Dudley but did not record them because they are too thin. Understandably a deposit has to be of a significant thickness to be recorded on a map.

Having spent my youth in Essex, the Black Country impressed me by its altitude, indeed there used to be a Pub Quiz question asking for the highest Football League ground in England, the answer being the Hawthorns in West Bromwich. Sedgley Beacon is 238m, Turners Hill 271m, Clent 315m and this north to south ridge would have been a considerable barrier to any ice sheet. Perhaps the ice never covered it, even in Anglian times but it does seem to divide the Devensian of the west, from the Anglian to the east, as far as remaining deposits are concerned. In Newsletter 206, Julie Schroder describes an erratic on Clent, and the great W. J. Harrison writing in 1907 describes probably the same erratic on the top of Romsley Hill at 273m, so perhaps there were some ice incursions over this high ground. Harrison called the Welsh ice sheet the 'Arenig Glacier' and many of the boulders still carry labels mentioning this Arenig origin.

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GLACIAL GEOLOGY OF THE BIRMINGHAM DISTRICT.



[Copyright.]

FIG. 12.—ARENIG BOULDER IN CANNON HILL PARK.
(From a Photograph by W. Jerome Harrison. Block lent by Messrs. Blackie & Co.)



Photo from Newsletter 206

So this article has not given any definitive answers, but I think we can safely assume that the Birmingham erratics are Anglian. Reading the works of Harrison have thrown up some interesting information and some very enlightening photographs. Above is his picture of the Cannon Hill Park 'Arenig' boulder, taken around 1900. It should be compared with Julie Schroder's photograph in Newsletter 206, which is taken from the almost identical spot. The similarity is remarkable, particularly with the trees on the far side of the lake; a similar line and both with some leafless trees higher than the rest. How ideas about glacial deposits have developed and been recorded in the last 150 years is a very interesting topic, perhaps the next one to pursue...? ■

Bill Groves

Any further thoughts and insights into this fascinating topic will be very welcome. Ed.

Please send material for the next Newsletter to:

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Geobabble

Visiting the Wren's Nest - now and 19th century style!

The Wren's Nest is a terrific place - easily accessible with good footpaths and brilliant exposure for studying many aspects of geology, be it structure, limestone formation and palaeoenvironments, and of course the Silurian fossils. There is also the heritage of the Black Country as indicated by the remains of mining and quarrying. It is also this that makes the site such a potentially dangerous place unless proper precautions are taken.

The Wardens will advise visitors on all aspects of the area and can arrange guided walks and talks, which are particularly valuable for young school children; a first introduction to the science of geology. But it is essential that some basic safety measures are taken, particularly when a steep slope is encountered, or near a vertical rock face as shown in the photograph. Hard hats are advisable as a stone could easily be dislodged and fall to the ground, or onto your head if you are standing below. Indeed, you must try to avoid standing at the foot of a vertical face, but of course it is unavoidable if you want a close up of the rock. Some of the more dangerous areas are fenced off, and as can be seen from the photograph these fences are strong and unlikely to be breached except by a determined, athletic and irresponsible individual. However, what must not be attempted is the climbing of the rock faces; you could fall off, but more significantly you will loosen pieces of rock which will endanger those below you.



That great Midlands geologist and educator W. Jerome Harrison was also familiar with the Wren's Nest. I found a short guide in his book '*Practical Geology*', published in 1878. It deals with geology by looking at each period in turn, so there is a chapter entitled '*The Silurian Formation*'. Here, there is a paragraph about visiting the Wren's Nest and it makes fascinating reading:

Silurian Fossils. Let the student who wishes to get a good idea of the old Silurian sea-floor pay a visit to the Wren's Nest Hill in the neighbourhood of Dudley. Here the beds of Wenlock limestone have a quaquaversal dip from the central boss or mass of the hill – that is, they form part of an elevated dome-like mass, from which they slant outwards in all directions at a high angle. The best limestone has been almost worked out for burning, but on the great bare faces of rock which have been left exposed, we find, literally, myriads of fragments of organised beings. Portions of trilobites, corals, shells, such as *Orthis*, *Orthoceras*, *Rhynchonella*, etc., form actually the greater part of the rock. The best plan is to be provided with a stout hammer and chisel, and then get a friend to let you down the sloping face from above by means of a cord tied round the waist. Choice specimens may then be bagged; but, for the ordinary visitor, a walk along the base will probably be sufficient. In the neighbourhood of Dudley, numerous men make a large part of their livelihood by the search for fossils. Perfect specimens even of the 'Dudley Locust' (*Calymene Blumenbachii*) are by no means common; and the stranger should be careful in purchasing from these 'Fossil Jacks,' as they are called, or he may get the head of one species of trilobite artfully cemented on to the tail of another.

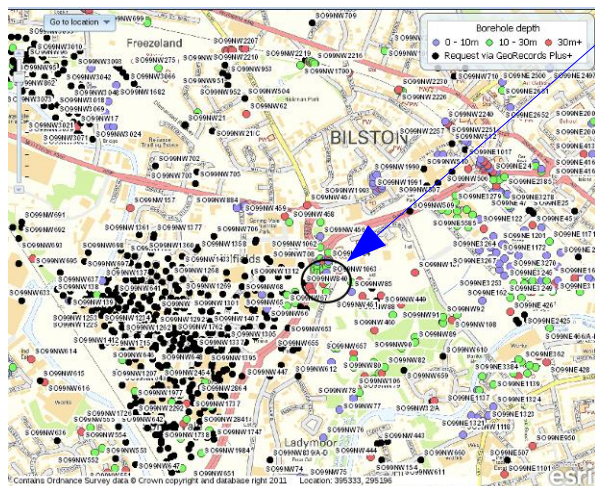
'Quaquaversal' means turned in towards a single point, and is still used in mathematics and astronomy. I was surprised to see '*Blumenbachii*' spelt with a capital *B*. Was this a convention in 1878?, or probably a simple typesetting error. I imagine the use of a cord today would be called a 'waist belay', but I am no climber and I don't intend to start now. ■

Bill Groves

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

Digging Deep – Free stuff during the government cut backs!

The government austerity measures are evident everywhere, with the constant erosion of benefits and stuff that used to be free or subsidised now being charged for. It was therefore a great surprise to discover something that used to cost £25 being given away... free! The British Geological Survey has digitised its large collection of borehole records and these are now downloadable at no charge.



Map and tables based upon records provided by British Geological Survey (NERC).

The example map above, shows the boreholes available around Bilston. The depths of the boreholes are shown by the different coloured dots. Blue: 0-10m, Green: 10-30m, Red: 30+m, Black is confidential and not available.

The example to the right shows the Bilston bore hole SO99-NW840 which is 45.9m deep. This, incidentally has an apparently almost complete "Thick coal" section, measuring around 9m or 29ft. 6ins. (Perhaps this was drilled through a pillar?) These data are very useful for understanding our local geology.

The data can be accessed through the Geoindex:

<http://mapapps.bgs.ac.uk/boreholescans/boreholescans.html> ■

Name of company: MIDLAND GROUTING & DRILLING LTD		Borehole No: BR/BS127.5	
Equipment & methods: DAVIS ROTARY AIR OPEN & CORED T.C. steel		Location: Black Country Route 5A 16/Jan 85	
Carried out for: WNOG TED CE/C/D		Ground level: 143.70m	
Main description		Depth	Sample tests
FILL		0m	Drill Water & Case
MUDSTONE		15m	6"
SANDSTONE		17m	100 70
MUDSTONE		19m	25
SANDSTONE		21m	100 80
SILTY MUDSTONE		23m	100 30
SANDSTONE		25m	100
SANDSTONE		27m	95 50
SANDSTONE		29m	100 35
COAL		31m	85 20
SPT:		Sample/test key	Remarks: Bridge design data
Depths:		Disturbed sample	hole to logged by BFB with
Water:		Water sample	Rock Mechanics package
		1-Piston (P), tube (S)	core logged
		S-SPT	C-Core recovery %
		V-Vane test	core stored & photographed
SUT 450/2		COUNTY HALL, 1 LANCASTER CIRCUS, QUEENSWAY, BIRMINGHAM B4 7DL TEL: 0121 300 2141	

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Carried out for: WNOG TED CE/C/D		Ground level: 143.70m	
Main description		Depth	Sample tests
COAL		35m	50
COAL		37m	95 90
SHALE		39m	95 50
MUDSTONE		41m	95 50
SHALE		43m	90 45
MUDSTONE		45m	
CLAY ?		47m	
MUDSTONE			
COAL			
MUDSTONE			
"WASTE"			
end of borehole			

Graham Hickman

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Members' Forum

They're Erratics, Jim, but not as we know them - they're Tackie Stones

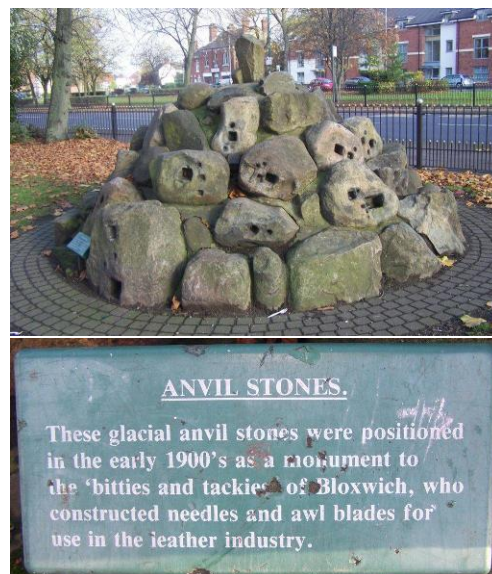
Each area of the Black Country has always been associated with its own specialised trade and Bloxwich is no exception, having long been a supplier of metal components to the Leather Industry of Walsall. In particular a small area to the north of Bloxwich known as 'The Short Heath' or 'Bloxwich Green' was associated with the production of awls, (a needle type tool used to punch holes through leather), plus bits and tackles used in the production of horse harnesses and headgear. What is not generally known is that Glacial Erratics collected from local fields were used by these metal workers as mounts for the anvil on which items were forged and honed.

This association is commemorated in the collection of Glacial Erratics displayed in the park at the north end of the High Street just before The Bell public house where the Wolverhampton to Lichfield road crosses the A34.



These Erratics clearly show the chiselled holes into which the anvils would have been mounted, and presumably by their weight and mass added extra stability to the anvil as it was used to form the metal components required by the leather trade.

Today these Erratics are preserved in an almost 'Gaudi-esque' sculpture and are yet again a reminder of the fact that for the Black Country industrial endeavour cannot be separated from its geological past



ANVIL STONES.
These glacial anvil stones were positioned in the early 1900's as a monument to the 'bitties and tackies' of Bloxwich, who constructed needles and awl blades for use in the leather industry.

For further information see: <http://www.thebloxidgetallygraph.com/anvilstones.htm> ■

Mike Williams

Subscriptions 2012

Your next subscription is due on **1st January 2012**. There has been no increase. Please pay at the next meeting on 23rd January or send your subscriptions to the Treasurer: Mike Williams, The Bungalow, Parkdale West, Wolverhampton, WV1 4TE. email: bungalowmike@blueyonder.co.uk

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