Newsletter No. 211

February 2012

The Black Country Geological Society

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Copy date for the next Newsletter is

Sunday 1st April 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

Saturday 11th February: ***(Conservation field work with Black Country Living Landscape)*** **Barrow Hill Local Nature Reserve Geodiversity Work Day, 11.00 - 3.00.** Your help is needed to cut back vegetation to keep the quarry rock faces open. All welcome. Meet at the entrance on Vicarage Lane near St Marks Church. Contact Andy Harrison (details above) if you are able to participate.

Saturday 18th February: ***(Field Meeting)*** **Guided walk of the new 'Ripples through Time' Trail at Wren's Nest, Leader Jessica Welch** (Wrens Nest Learning and Community Development Officer). Meet at 10.00am at the Wardens' offices on the Mons Hill College campus. Jess is going to inform them that we are coming, so parking should not be an issue. The walk should only take a couple of hours.

Monday 20th February: ***(Indoor Meeting)*** '**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.

Saturday 25th February: ***(Conservation field work with Black Country Living Landscape)*** **Springvale Park, Wolverhampton, Geodiversity Work Day, 11.00 - 3.00.** Your help is needed to cut back vegetation to open up geological interest. All welcome. Meet at the end of Ettingshall Park Farm Lane just off A459. Contact Andy Harrison (details above) if you are able to participate.

Sunday 4th March: ***(Field Meeting)*** **Exploring the geology around Stourbridge. Led by Alan Cutler.** Meet at Ketley Quarry, Kingswinford at 10.00 am. The quarry entrance is on the A4101 Dudley Road near Pensnett Trading Estate but on the opposite side of the road. (The same road as for Russell's Hall Hospital and Barrow Hill, between Dudley and Kingswinford). Part of Ketley Quarry is a SSSI as it shows the junction between the Etruria Marl and Halesowen Formations, both Carboniferous. Then travel south towards Stourbridge and mostly Triassic age rocks, stopping at Wordsley to see how the Western Boundary Fault has affected the landscape. Probable stops will be made at the Forester's Arms, Wollaston and other outcrops in the town. A visit to Norton Covert on the southern boundary of Dudley Borough to look at glacial sands and the ecology is also planned.

N.B. Hard hats are required for Ketley Quarry. We have access to a small number of hats but members **must** indicate need well in advance. **It would also be useful to know who is attending even if you have a hard hat**. Wellingtons or other waterproof boots are advisable for the quarry but other sites should be reasonably dry. **For this trip please contact Alan Cutler:** tel. 01384 443644 or email geoconservation@btconnect.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.

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)*** **'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.

Sunday 29th April: ***(Field Meeting)*** **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 'CommunitHickmany Earth Heritage Champions' group. Meet: 10.15 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. Probable afternoon visit to the Clent Hills. Leader and details for this tbc.

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: ***(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

Nature's Treasures 4 (Oxford)

Saturday 3rd March 10.00 - 4.30. A day of talks, displays and demonstrations aimed at the amateur geological/mineralogical community, at Oxford University Museum of Natural History, Parks Road, Oxford, OX1 3PW. Fee: £20.00 (under 16's £10.00) including refreshments and a sandwich lunch. Poster at: www.rockwatch.org.uk/docs/natures-treasures-2012.pdf You can register on-line at: www.minersoc.org/pages/meetings/nature4/nature4.html, contact Kevin Murphy: kevin@minersoc.org

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

Events at Dudley Museum and Art Gallery

Rock and Fossil identification. Bring your rock and fossil finds along to the Museum and Art Gallery and have them identified by resident experts from **11.00am - 1.00pm** on **Wednesdays:** 15th February (Half term), 11th April (Easter Holidays), 1st, 8th, 15th, 22nd, and 29th August (Summer holidays), and 31st October (Half term), or the same time on **Saturdays:** 17th March, 12th May, 23rd June, 7th July and 24th November.

Saturday 22nd September 10.00am - 4.00pm: Magical Minerals and Fossil Fair. Admission free. ***(N.B. Date Changed from 25th August)*** This event will be held entirely in the Museum and Art gallery, and will be a smaller event than the two day Festival held last September. Aimed at collectors, this is a chance to meet some of the country's leading fossil dealers and purchase from the amazing array of mineral specimens.

Lapworth Lectures

Monday 13th February Dr David I. Schofield, Chief Geologist, Wales, British Geological Survey. Title of lecture to be advised.

Monday 27th February Living with our changing Earth - drivers of change and global challenges from a geoscience perspective. Professor John Ludden, Executive Director, British Geological Survey.

Monday 12th March The forensic use of micropalaeontology. Dr Haydon W. Bailey, Director, Micropalaeontologist Network Stratigraphic Consulting Ltd.

Lectures commence at 5.00pm in the Palaeontology Lab (G21), Earth Sciences, University of Birmingham and are open to all. For further info phone: 0121 414 7294 or visit web site: http://www.lapworth.bham.ac.uk/events/lectures.shtml

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 **must** contact Helen Kokelaar, e-mail: herdman@liverpool.ac.uk
More info at: http://www.liv.ac.uk/environmental-sciences/NewsItems/HerdmanSymposium2012.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.

Herefordshire and Worcestershire Earth Heritage Trust

'An Introduction to Geology'. A course of 6 evening classes to include: introduction to the rock succession as an essential component landscape; key geological processes (igneous, sedimentary and metamorphic) and their influence on the landscape. The course will be supported by practical work in class using rocks, minerals and fossils and will include two full day field excursions.

Course dates: Tuesday evenings from 7.00pm to 9.00pm on 17th April, 24th April, 1st May, 8th May, 15th May and 22nd May 2012.
Venue: The Visitor Centre, Lickey Hills Country Park, Warren Lane, Rednal, Birmingham B45 8ER
Field trips: Wrens Nest, Dudley on Saturday 5th May. Malvern Hills on Saturday 26th May.
Course fee: £60.00

For further details and to book a place on the course contact: Natalie Watkins, H&W Earth Heritage Trust. Email: n.watkins@worc.ac.uk. Phone: 01905 542014

On-line 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?**

The H&W EHT are exploring methods to unravel the stories behind several stone built structures in Herefordshire and Worcestershire. Central to this study is consultation with the public. They would be grateful if you would take the time to complete their short online Building Stones Survey: http://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

There is still time to complete this survey! *It only takes a few minutes. Ed.*

Manchester Geological Association

Wednesday 15th February at 19:00. AGM followed by Presidential Address: Geology and the Geologist in Crime and Mystery Fiction - Dr Tony Adams, University of Manchester

Wednesday 7th March at 18:30. Joint Meeting with the Geographical Association: Natural Hazards in the Caribbean: Causes and Impacts - Dr. Servel Miller, University of Chester

Visitors are always welcome. MGA meetings are held in the Williamson Building, Manchester University on Oxford Road, opposite the Manchester Museum. Further information about meetings at http://www.mangeolassoc.org.uk/ or email lectures@mangeolassoc.org.uk

Woolhope Naturalists' Field Club - Geology Section

Friday 16th March Archean Nickel Sulphide Deposits in Australia. Talk given by Dr Chris Fletcher.

Sunday 22nd April Geology of the Llangorse Basin and middle Usk Valley. Led by Duncan Hawley.

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

Wednesday 14th March: Mineralization in the Triassic rocks in the Cheshire Basin, mainly at Alderley Edge, but with a little about occurrences nearer Shrewsbury, around Clive (guest speaker: Geoff Warrington)

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/

North Staffordshire Group of the Geologists' Association

Thursday 8th March: Chairman's Address: David Osborn. The Statfjord field.

Thursday 29th March: Volcanoes and Society: Speaker: Prof Steve Sparks (Bristol 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/

Warwickshire Geological Conservation Group

Wednesday 15th February: Prof. Chris Stringer (Natural History Museum). Director of Ancient Hominid Occupation of Britain Project. The Origin of Our Species. Venue: The Studio, Royal Spa Centre, Newbold Terrace, Leamington Spa, CV32 4HN

Wednesday 21st March The mineralogy of Scotland, a personal view by Roy Starkey (Russell Society) Venue: Jubilee House (Old Police Station), Smalley Place, Kenilworth, CV8 1QG

Wednesday 18th April Coal Forests and Climate Change by Dr. Howard Falcon-Lang (University of London) Venue: Royal Spa Centre, Newbold Terrace, Leamington Spa, CV32 4HN

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/

Mid Wales Geology Club

Wednesday 15th February: Colin Humphrey and Julien Lovell on 'The tragically short life of Joseph Bickerton Morgan'.

Wednesday 28th March: Talk by Andrew Jenkinson on 'Offa's Dyke, a geological political boundary'. This talk to be held in the Welshpool Methodist Schoolroom.

Meetings are normally 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: http://midwalesgeology.org.uk

Please send material for the next Newsletter to:

julieschroder@blueyonder.co.uk

42 Billesley Lane, Moseley, Birmingham, B13 9QS.

A look back at 2011 from the Chairman

What a year of contrasts! From riding high in the first tiring, but satisfying six months, to a fight for the Wren's Nest which ended in disappointment - despite all our efforts.

The BCGS has continued to work hard to develop an awareness of our existence in the minds of Black Country and Birmingham folk. We put in appearances throughout the region at seven exhibitions starting at 'The Public' in West Bromwich on 18th May. In June from 17th - 19th we manned our own stand within the marquee sponsored by the Geologist's Association at the Three Counties Show in Malvern. During August we were very busy attending 4 venues organised by 'Black Country Living Landscapes'. First came Northycote Farm, Wolverhampton on 7th; then Moorcroft Wood LNR on 10th; Sandwell Park Farm on 14th; and finally Bumble Hole LNR Netherton on 16th.

Embedded in all this activity, on 15th July, was the highly successful visit of the International Subcommission on Silurian Stratigraphy under the auspices of UNESCO, to the Wren's Nest and Dudley Castle Hill. We sponsored and hosted their party of 50 top world geologists from 12 countries through the Earl of Dudley's limestone mines, and our Vice Chairman Alan Cutler addressed them in a reconstruction of Sir Roderick Murchison's famous speech of 1842 in the Singing Cavern. The comment, "this is the best" from the Canadian Chairman, was very gratifying, and they were further impressed when we satisfied their hunger and thirst in the nearby Park Inn, where traditional Black Country food was eagerly consumed!

Two more events were highly successful: at the Dudley Rock and Fossil Festival on 24th/25th September, our Treasurer actually doubled our membership! This was followed by the 'Ripples through Time' launch event at the Wrens Nest on 27th September, which was attended by members of the BCGS committee.

Unfortunately, hanging like a black cloud over us from mid-summer was the proposal by Dudley College to build an estate of 80 houses on the existing Mons Hill College site. Despite all our efforts and objections, we were unsuccessful in stopping this philistine proposal in spite of the Wrens Nest's status as an SSSI, National Nature Reserve for Geology and Scheduled Ancient Monument. We intend to make the Local Government Ombudsman aware of the situation. ■

Gordon Hensman, Chairman

Editorial

Firstly, please note the imminent field visits on our programme which have been confirmed since the last Newsletter. I hope, in spite of the short notice, that there will be a good response for the geoconservation meetings at **Barrow Hill on 11th February** and **Springvale Park on 25th February** (see above for details). Between these events is the guided walk in the **Wren's Nest on 18th February** (led by Jessica Welch) to see the latest developments in the 'Ripples through Time' project.

The BCGS year got off to a good start on 23rd January with Dr. John Powell's fascinating and well-attended talk on the 'Geology and Geoarchaeology of Jordan'. Then came our first field visit of the year to two Cotswold quarries. Twenty members braved the cold and long drive for this trip, which was ably led by Neville Hollingsworth, and provided rich rewards in Jurassic fossil hunting - plus a salutary lesson in the dangers of being over-enthusiastic! (See the 'Dudley Bug' below.)

We have a rich mix of items in this issue, reflecting the wide range of expertise and experiences from our members, and I thank them all for their excellent contributions. You will see that our on-going pursuit of the subject of Glacial Erratics continues apace (see 'Raising the profile...' on p.12) and has even attracted attention beyond our borders (see 'The Geddington Erratic' on p.11).

Although we start (above) on a rather sad note from our Chairman about the impending fate of the Wren's Nest through the proposed Mons Hill site development, we should not forget to celebrate the face lift which the 'Ripples through Time' project is giving to the Wren's Nest. We should give this all the support we can, and I look forward to a good turn out in support of this on 18th February. ■

Julie Schroder

The Dudley Bug

The Black Country Geological Society... Probably the most stylish geological society in the world!

Last year we had an extremely interesting lecture by Dr Imran Rahman of the University of Birmingham entitled 'Seeing inside the stones'. This talk revealed the new cutting edge techniques which use hospital CT scanners to scan fossils (mostly very ancient starfish, sea urchins and sea lily type creatures) and these have allowed us to look inside the stones to reveal their secrets. Imran also came with a pair of stylish glasses for every member. He said it was to allow us to see the 3-D images, but I wasn't so sure it was the only reason as you can see below. To the untrained eye we may look like a bunch of plonkers, but to hardcore geologists this is the pinnacle of rock tapping style, few geologists are privileged to sport such eyewear in publications of this calibre. In the future look out for these members showing off their specs in a quarry near you!

Coming next time….Silly hats for all!

"It is with sad regret"

In previous editions of "*The Dudley Bug*" I have warned about the risk of geologists becoming over excited at rock out crops and refusing to move. It is with sad regret I inform you that this sad, sad occurrence struck one of our very own members on Saturday 28th January 2012. The incident took place in Shorncote Quarry, Cotswold Water Park, where the jolly geologist in question became so over excited she refused to leave the mud, claiming she was STUCK! Personally I am all for a quick game of stuck in the mud but when the quarry is locked in 30 minutes and we had no key, my playful side was at a premium, yet she still refused to move. As you can see in the photo, three other members did decide to play in the mud too. Who might you ask caused this mayhem? Yes that's right our very own Alison Roberts! ►

After some time Ali was eventually prized out of her wellies, but one of those stubborn wellingtons was still so excited it wouldn't budge. Help swiftly arrived in the form of a huge pick axe; I must remind you at this point that we were in a race against time to get out of the quarry before we were locked in. Group leader Dr Neville Hollingworth finally persuaded the boot free in the nick of time on his last swift wellie rescue attempt. Following this shocking incident the group left the quarry to a short verse of "These boots are made for walking", and with some fantastic fossil finds I should add.

Alison is currently being held on trial by the committee on the suspicion of over excitement in the presence of rocks; she will be dealt with accordingly. (*Images by Julie and John Schroder)*

For a more detailed account of the day please visit www.geologymatters.org.uk and search the blogs.

No geologists or wellington boots were harmed in the making of this "Dudley Bug", all were returned to their normal hunting grounds and will not be playing stuck in the mud in the near future.

The Silurian Period (440 - 415Ma) in a nutshell

At the start of the Silurian Period, the Iapetus Ocean was in its final stages of closing. The closing caused major deformation in Scotland with a transition from marine rocks including limestones to a terrestrial environment. The southern part of the UK at this time was part of Avalonia which continued to move northwest towards Laurentia which contained Scotland.

Life began to thrive during the Silurian. The land became dominated by plants and animals, which were far more complex than those seen before. The colonisation of land plants altered sedimentation rates because plants bind sediment together and alter sedimentation and deposition rates.

Today Silurian rocks outcrop in the Midland Valley of Scotland, the Southern Uplands, the Lake District, Wales and the Welsh Borderland, including the Wrens Nest, Dudley. The Southern Uplands contain thin shale sequences with graptolites and thick turbidite sequences. Today many of these turbidites have been heavily deformed and in places are almost vertical. The Welsh successions are thicker towards the North where they can be up to 4.6km thick. The Silurian sequences of the Welsh Borderland are one of the classic areas for studying sequences of this age. This is where the Silurian System was first recognised and defined. The international reference standards for the Wenlock and Ludlow rocks are found in the Welsh Borders. It was here where Sir Roderick Murchison studied the fossils found within the Silurian and used them to write his Silurian System book. The Wrens Nest is one of the best examples of Silurian rocks within the UK and has the greatest variety of fossil species found. ■

The fossil reef at the Wrens Nest, Dudley

"The Dudley Bug" is written by Alison and Chris.

Strange Quartz?

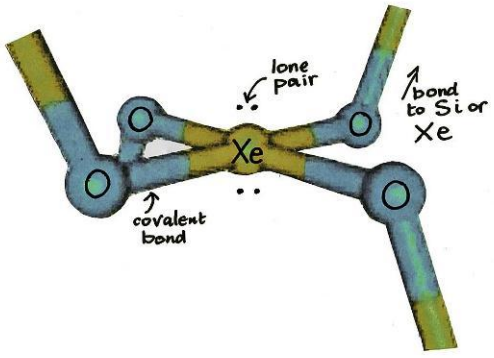
Is Earth's missing xenon hiding in quartz?

Xenon, named from the Greek word for *stranger* or *guest,* is a member of the 'Noble Gas' group of elements: helium, neon, argon, krypton, xenon and radon. Once thought to be completely inert, they were earlier known as the 'Inert Gases'. The first compound of xenon was made in 1962. Since then over eighty xenon compounds, usually with oxygen, fluorine or platinum-fluorine compounds have been reported. The other noble gases form a few compounds, for example krypton forms a difluoride, KrF_2. As a research fellow I prepared xenon dichloride, $XeCl_2$, and recorded its Raman vibrational spectrum. The compound was pretty unstable and had to be kept at -269°C with liquid helium. What on earth has this to do with geology you may ask? Well, read on!

The noble gases are present in our atmosphere in small quantities (a combined total of about 1%). Studies of meteorites suggest that the general abundance of xenon throughout the Solar System should be roughly the same as the other noble gases. However, since the 1970s it has been known that xenon is about 20 times less abundant (about 0.1 part per million) in our atmosphere than the other noble gases. Numerous theories abounded over the years: perhaps the xenon was lost into space; frozen in ice caps or trapped in sedimentary deposits. Such processes, calculations suggest, could possibly account for about one fifth of the missing gas.

It has recently been discovered that at high pressures and temperatures xenon seems to be able to displace silicon in crystalline silicon dioxide, or quartz. The results suggest that the xenon atoms exchange places with silicon atoms. If this were the case, it could account for the loss of atmospheric xenon in the distant past, possibly at a time of heavy bombardment of quartz rich meteorites. Recent research published in 2011 lends credence to this hypothesis. When the well known compound, xenon tetrafluoride, XeF_4, is added to dilute sulphuric acid at 0°C a yellow-orange solid is produced. Spectroscopy showed the solid to be xenon dioxide, XeO_2, which was hitherto unknown. The compound has a chain like structure with each xenon atom involved in single covalent bonds to each of four oxygen atoms.

The geometry around each xenon atom is square planar, which translated, means that the four oxygen atoms are arranged in a square and with a central xenon atom and all atoms lie in the same plane. This arrangement arises because in XeO_2, and also XeF_4, each xenon atom has two lone pairs (unused electron pairs in the outer shell of the atom). The xenon atom in XeO_2 thus has 6 electron pairs in its outer electron shell, comprising two lone pairs and four bond pairs (the four Xe—O bonds). Electron pairs repel one another and arrange themselves around an atom to be as far away as possible in order to minimise repulsion and achieve the lowest potential energy. In quartz each silicon atom is covalently bonded to four oxygen atoms, which are arranged tetrahedrally around the silicon (there are no lone pairs on silicon). The ability to be able to form single covalent bonds to four oxygen atoms may indicate that xenon could be similarly bound in a quartz lattice with the local square planar environment of xenon similar to that in XeO_2. In other words, xenon atoms could replace some of the silicon atoms in quartz and still maintain the bonds to four oxygen atoms. This would of course lead to some distortion in the crystal lattice in the vicinity of the xenon atom because of the square planar geometry arising from electron pair repulsion, as outlined above. Since the number of xenon atoms in quartz is miniscule compared with those of silicon such irregularities would be very difficult to spot.



The arrangement has a square planar geometry locally. Each lone pair is represented by ●●

The group that first suggested the quartz solution to the missing xenon problem is enthusiastic about the new findings. Noble gas abundances are widely used by geochemists to assess the processes and timings of major terrestrial processes, including atmosphere formation. However, their basic assumption is that the noble gases remain inert under all conditions. To quote a member of the group: 'the present findings throw the last rock at this assumption'. ■

Pete Stamper

The Geddington Erratic

A question was posed by 'Down to Earth' reader Maureen Pritchard about this erratic boulder which sits on the pavement near Eleanor Cross in the square in Geddington (near Kettering). Editor/publisher Chris Darmon had noticed our ongoing observations on this theme, and posed the following challenge: "Our good friends at the Black Country Geological Society have been gathering data and doing research about erratics in the Black country area, perhaps they can throw some light on to this problem". Bill Groves took up the challenge and we reproduce his findings, first published in Down to Earth Issue 77. 'Down to Earth' is a division of Geo Supplies Ltd. tel: 0114 245 5746
email: downtoearth@geosupplies.co.uk web site: www.geosupplies.co.uk *(Ed.)*

We as a society have been recording glacial erratics in our area, but we had the advantage of being able to visit them. My first reaction to the request in 'Down to Earth' was to say that from Maureen's photograph it seems to have the size, about a metre in width, and the spherical shape of an erratic; it looks coarsely crystalline and the red colour suggests feldspar which would probably make it granite.

However, I do not know the area, which led me to a little investigation; and the techniques involved could be used in other aspects of field investigation. Firstly, Google Earth showed me the village of Geddington, northeast of Kettering in what looked like gently rolling countryside. I located what could be the square but clarity is lost when trying to get in too close. I next turned to Google Maps where I could find the square in Bridge Street, and the breakthrough came when I turned to Street View. I could 'drive' around the square, and there up against a wall, outside a cottage, next to a waste bin and some wheelie bins, was the erratic. I am pretty sure of it although half was obscured by a parked car, and I could not get a close up, in focus, view.

So what about the geology? The BGS website's *Geology of Britain Viewer* - a must for anyone with a geological interest - shows that Geddington sits on rocks of the Jurassic Inferior Oolite, with its familiar mixed lithology of limestones and mudstones, giving, I assume (I have not been there, remember) scarps with mudstone vales. The BGS says there is no glacial till in the Geddington area, but a little to the north east, towards Corby there is a superficial till over what looks like a more extensive vale area. There are no igneous intrusions nearby which might supply a granite boulder; ice must have brought it there.

Photo : Maureen Pritchard

The last glacial event, the Devensian, from about 120,000 to 18,000 years ago did not reach this area. The maximum extent was some distance to the west and north. The BGS have the till as being of mid-Pleistocene age which ties in with it being from the Anglian glaciation which was from 350,000 to 280,000 years and covered England to well south of Lincolnshire. The exact origin of the boulder is always difficult. There are some experienced igneous petrologists who can recognise and identify the provenance: common ones are easy, and most can recognise Shap granite. The intriguing thing about the Geddington erratic is that it is quite likely to have been brought from Scandinavia. The Anglian ice sheets crossed the North Sea bringing many rocks from Norway. My only suggestion would be that you scrub a small area clean, and with a scale visible, take some close up photographs of the mineralogy and perhaps find someone who might identify it.

One thing we have found in the Black Country is that the erratic will not have been moved very far by human agency; they are too big and heavy. They are usually moved out of the way, or an enterprising local council will put them in parks, play areas or schools, as they are great for sitting on and chatting. The Devensian ice sheet reached the Black Country at Wolverhampton and left thousands of erratics there, and these hindered the development of the familiar Victorian municipal building of the late nineteenth early twentieth century. The enterprising Victorians, ever interested in science decided to put some of them into West Park in the city, where they remain to this day. ■

Bill Groves

Raising the profile of our forgotten Glacial Erratics

The various articles on glacial erratics written by Bill Groves, Mike Williams, Julie Schroder, Alan Cutler, Peter Twigg and myself reveal a widespread interest in glacial geology among members. This all raises the question of how this interest can be communicated to members of the general public for whom a pebble is simply something to throw into the sea. The ignorance of the public concerning glacial erratics is surprising seeing that many of the greatest of them are located in parks and public open spaces. The reason for the ignorance is, of course, as our contributors have commented, the widespread lack of information at the site of a glacial boulder. The two I have come across that do have information about them are worth reproducing. The War Stone referred to and photographed by Julie Schroder in Hockley (Newsletter 206 p.15) has a metal plaque set in masonry below the brick plinth on which it is set. It reads: 'THE WAR STONE'. This felsite boulder was deposited near here by a glacier during the ice age being at one time used as a parish boundary mark. It was known as the Hoar Stone of which the modern warstone is a corruption".

In the cemetery behind the stone is a sign directing visitors to the stone and explaining that the word hoar means frost. The true meaning is of course old, hoary, grey haired. *(In research for my item in Newsletter 206 I discovered this definition of 'hoar' in the OED: "Used as an attribute of stones, etc. marking a boundary line. Hence in place names". This meaning is clearly the correct one here. So the cemetery sign is doubly wrong: 'hoar' is a type of frost, not a synonym for it, and this is the wrong definition anyway! Ed.)* There is a 'Warstone Farm' in the Illey valley south of Halesowen and true to name there is a large erratic in the bank of a tributary to the Illey Brook.

It is a delight to come across an erratic in an unexpected place and to find an information plate. Such is the case with the erratic at the cross roads in Madeley Heath three miles to the East of Belbroughton, Worcestershire (above). Here the small metal plate is screwed into the top of the boulder itself and reads: "Boulder from Arenig Mountains in North Wales. Brought here by the Welsh ice sheet in the glacial period." Another erratic is brought to public attention at Broom Hill south of Belbroughton. It is located on a rough island where two country lanes meet, one of them named Waystone Lane, and opposite the entrance to Waystone Farm.

On-site information about a glacial boulder raises some questions about the nature of the information provided and how the information is provided. Regarding the latter, it is important to reflect respect for the erratic by not defacing or tampering with the stone itself. Far better, as at the Warstone, to place the information alongside the erratic, and set in the ground so as to escape being vandalised. The Cannon Hill Park erratic is polished smooth by the feet of generations of children clambering all over it. I like that. Mike Williams (Newsletter 210 p.17) tells us about the erratics used in times past as anvils and one understands this practice. What is more questionable is the use made of glacial erratics around the Norbury Canal junction area three miles North East of Gnosall. Here farmers retrieved large erratics from their fields in support of a Millenium Trail of boulders around the villages. Each stone was engraved MM, cleaned up and set in place. These stones were simply used to serve a completely different purpose but I am pleased to say that information about them was displayed as follows. "This stone is one of five which have been erected around the parish of Norbury to mark the year AD 2000. It is a glacial boulder deposited in this neighbourhood at the end of the last ice age around 10 millennia ago. The stones are sited at:- I. Norbury Village Hall. II. Oulton. III. Norbury Junction. IV. Loynton. V. Weston Jones. ►

Turning to the kind of information to be given on site, I think it should be calculated to set the casual passer by wondering about the natural world, and perhaps come to be a little disturbed that we live in an ice age even as we globally warm the earth. I wonder how park walkers felt and thought as they passed the great erratics set up by Louis Barrow (Cadbury's Chief Engineer), in Cotteridge Park Birmingham, a hundred years ago? (See Newsletter 207 p.9 for photo.) Beside them he erected a stone pillar, the base of which survives, and on top of the pillar he fixed an engraved metal map showing by the use of arrows the direction of movement of the ice sheets encroaching on Birmingham. I think they would have been amazed. Can we still amaze the public of today?

Of course, for anything to happen we need to persuade local councillors, council officials and Friends Groups that glacial erratics are interesting objects that should be preserved and publicised. We need also to have qualified geologists who are willing and able to assist the council with the provenance and description of the boulders, seeing that councils rarely employ geologists themselves. This is important. A few years ago the guide to Cannon Hill Park still referred to its erratic as dropped from an ice berg when the land was covered by sea. Experience tells me that it is not an easy thing to engage the attention of local authorities about erratics. Witness the glazed looks as the topic is broached. I for one will keep at it! ■

Roland Kedge

Libyan Desert Silica Glass

This mysterious material was 'rediscovered' in December 1932 by Patrick Clayton whilst leading an expedition for the Egyptian 'Desert Surveys Department' across the Great Sand Sea of the western desert, near the Libyan border. It was found lying around in some quantity in the open 'streets' between ranks of high longitudinal dunes and has since been located across a rectangular area between longitudes 25°24' and 25°55' east, and latitudes 25°02' and 26°13' north (approximately 130 x 55 km - the size of Devon!). Mentioned scientifically by Fresnel as early as 1848, it was also known to the ancients, as it turns up in Tutankhamun's treasure as a carved scarab centrepiece, as well as worked artefacts in the archaeological record.

Tutankhamun's pectoral,
Jon Bodsworth, Wikimedia Commons

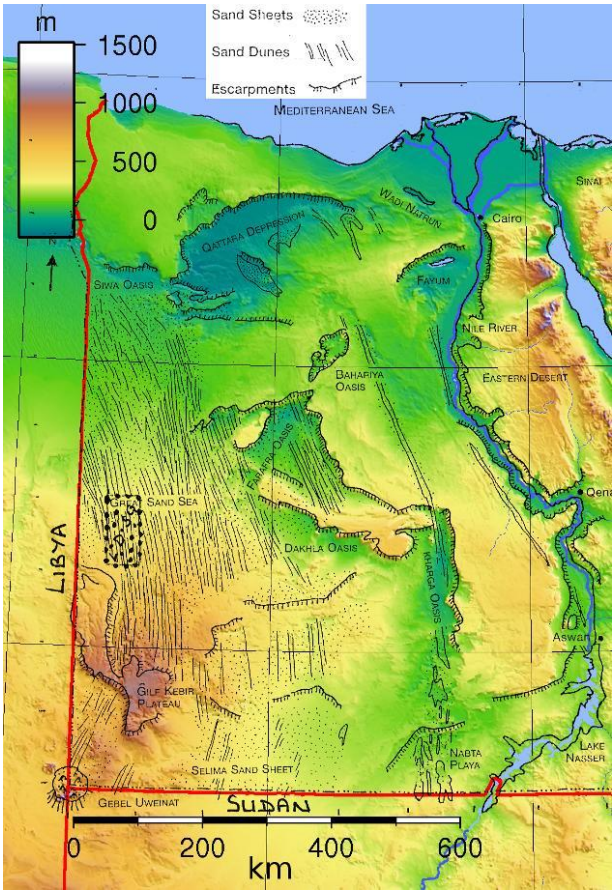
Its most common appearance is of greenish-yellowish 'plastic-looking' transparent rock, much of which has been worn smooth and polished by desert abrasion. Buried material however retains a jagged and angular shape, may often be frothy due to bubble inclusions and may also be bluish-grey through carbonaceous impurities. It is essentially amorphous and has the surprising composition of some 98% silica, 1.5% alumina with small amounts of alkalies and water. This sets it well apart from all other occurrences of natural glass such as volcanic rock, tektites and the also rather odd 'Darwin Glass' from Australia.

Weight 22g, width about 55 mm
Wikimedia Commons, H. Raab

Not surprisingly, therefore, this glass has been much talked and written about, with whole expeditions dedicated to its study alone. Some authors have reported banded varieties in which dark layers have elevated 'unearthly' iridium contents; others report dust particle inclusions of certain elements in proportions similar to chondrite meteorites. Studies of gas bubble inclusions report their having proportions of inert gases, as well as beryllium and aluminium isotope characteristics, consistent with an earthly atmospheric origin. Just one (it seems) research team has claimed the inclusion of Neogene microfossils (mainly of plant affinity). ►

One of the few points of general consensus now appears to be the age of this material. At first dated around 26-29 Ma (million years), a fission-track age of 33.8 Ma is now widely reported. A concordance between the composition of the glass and the surrounding Nubian Sandstone bedrock is also seemingly established without demur, even down to such niceties as the germanium content.

Regrettably, however, there is still little consensus regarding its origin. Most theories seem to invoke an extra-terrestrial involvement, but this has to overcome the difficulty of there being no credible impact crater in the neighbourhood. This has been explained by removal through erosion - a shade suspicious for such a young age (there are plenty of much older impact craters still recognisable on earth today). A more credible alternative might be a Tunguska-like fireball event; a mighty atmospheric explosion associated with the break-up of an object from outer-space in the upper atmosphere. The most prosaic explanation has come from the group who report the enclosed microfossils as well as a relatively high water content. This is consistent in their eyes with a wholly terrestrial explanation of solidification of colloidal silica gel deposits formed from siliceous micro-organisms living in shallow lakes'. But if so simple... then why not more often? ■



Dotted area shows where the glass is found

Mike Allen

Geobabble

Most people use a computer in their daily lives and most will also use some sort of search engine to find out information; it can answer all sorts of questions, particularly useful when you are watching a film or play on television and someone asks the question; “Who is that actor? Wasn’t she in .....” A search engine is also a useful tool when looking at scientific topics, and one of the most commonly used is *GOOGLE,* in fact there is now a new verb in the English language, to google. There is also a new expression *GOOGLE DOODLE*. If you google, ‘*google doodle*’, and go to images you will see what I am rather clumsily trying to explain. The google home page has *GOOGLE* written in large letters, and they change the format of the type to celebrate certain events.

One of the recent doodles (http://www.google.com/doodles/nicolas-stenos-374th-birthday) shows the letters representing a sequence of sedimentary rocks with the Earth’s surface at the top, complete with vegetation, a mammoth skull and even birds. The rock sequence contains representations of fossils, ammonites, bivalves and a skull. It is to commemorate the 374th anniversary of the birth of Nicolas Steno, called by some the father of geology along with James Hutton; or perhaps he was a father of stratigraphy along with William Smith. I am never sure when these labels are applied to people.

He was born in 1638 in Copenhagen, a Lutherian, he converted to Catholicism in 1667, was active in the Counter-Reformation and in 1988 he was made a saint by Pope John Paul II. Oh! So he was a theologian was he? Well, he studied medicine at university, travelled widely and met many academics, rather like the conference circuit today. His early work was in anatomy, then palaeontology and finally stratigraphy and mineralogy. Geologists would know of him as the originator of the Law of Superposition, and related principles. And Steno’s law of constant angles in crystallography: angles between faces are always the same for every specimen of the same mineral. He died in 1686 when only 48 years old. ►

So what was he, an anatomist; palaeontologist; mineralogist? I prefer the broader term ‘scientist’. He questioned ‘facts’ when there was not much evidence for them and would prefer to do his own testing and observations. He was in dangerous times as he was questioning some basic religious beliefs of the time but seems to have been very careful and saw no conflict between science and his personal faith. I think the best word to describe him is simply a scientist. But ask yourself, if someone asks you: “What do you do?” How do you answer? I now find it convenient since I retired to say: “I am retired”, but my qualification was in geology, so I might say that I am a ”retired geologist”. Graham Worton was recently interviewed on Central News and when the caption came up it had him described as “Geologist, Historian”, and why not? His knowledge of Black Country history is abundant although I do not think he has any formal qualification in the subject.

Within our society we have members highly qualified in all sorts of disciplines: Chemistry, Physics, Metallurgy, Meteorology, Social Sciences, Languages, Music. I am sure that there are many more, and other members who have no formal qualifications but have a great expertise and knowledge none the less that has not been formally recognised. Every member is linked by a great interest in geology and related topics and will apply the scientific method and way of thinking to solving problems. It is dangerous to divide science into discrete compartments as the methods used are the same and disciplines overlap; the use of fluid mechanics in sedimentology and magma movement is one example.

Some years ago I was working in Dudley Museum in a little cubby hole, sitting at a table with a tray of fossils, cataloguing them. It was an airless room so I was sitting next to an open door, looking at specimens with a hand lens. A group of year 5 pupils were visiting that morning, and as they passed the door, one excitedly said to his friend; “Look! There’s a scientist”. This made me sound a bit like Professor Calculus from the Tintin books or Professor Farnsworth in the Futurama cartoon series, but this broader term is being used more often. Perhaps we should be using ‘Scientist’ to describe occupations and interests. Steno was a scientist because of the methods he used rather than his areas of expertise. ■

Bill Groves

Members' Forum

'Volcanic Experiences' visit to Santorini

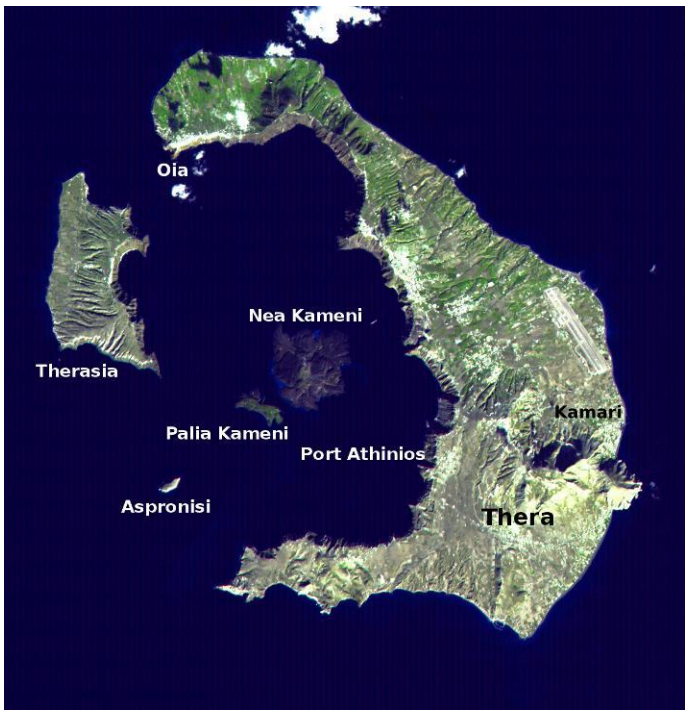
In the last Newsletter (No. 210, p.11) Alan Clewlow gave a description of his two 'Volcanic Experiences' escorted tours to Sicily and the Aeolian islands in June and November 2011. In September, BCGS member Ananda Thompson joined another one of his tours, this time to the Volcanic and Archaeological sites of Santorini, based in Kamari. She kept a diary, and the following is her report of one memorable day from that trip. Ed.

Boat trip across the waters today. We're going to the new volcanic islands in the middle of the Caldera. We drive right across the Island now to Port Athinios where the ferries go from. Good views of black lava chunks right on the edge - you wouldn't call it a beach. Landing on the larger volcanic island Nea Kameni (its name means New Burnt Island), we disembark and start a slow walk up the more recent lava flows, onto the older layers, passing craters and fumaroles on our way. Eventually we reached the top, marked by a concrete post.

I would like a rock. I haven't collected any yet. The Mineral Kingdom is infinitely generous, but the Human Kingdom is getting more and more prohibitive where geology is concerned. In some countries, especially in SSSIs you're not allowed to take anything now, but I decided on one rock.

We left Nea Kameni and sailed round to Palia Kameni (0ld Burnt Island). We didn't land here, but there is a place in the shore waters where underwater fumaroles bubble up, a bit like 'I Fanghi' at ►

Vulcano, Lipari in the Aeolians. The boat dropped anchor here, and a few of us swam in towards the area, about 50 yards, to luxuriate in the hot brown mineral-rich water. Then we motored on to the smallest of the Santorini Ring, Aspronisi. You can't land here and no-one lives here, but there are some good strata and caves. Then across to Therasia, the other main island in the Ring. This is less developed than mainland Thera, but we moored up here and went ashore for lunch at a seafront café.



Now we sail off towards the north end of the inner caldera ring and, starting at Oia, we sail all the way along the caldera wall, viewing and snapping: spectacular strata; the red rocks of Oia; lava flows; ash deposits; dykes everywhere; the high cliffs of Fira; Minoan ash deposits with pumice layers on the top further back. All the way back to Athinios - what a feast! I've taken nearly a whole film today! What a breathtaking exploration! ■

Ananda Thompson

A future attraction for the next Dudley Rock & Fossil Festival?

A new role for Dudley Museum and Art Gallery's very own woolly mammoth perhaps? Ed.

I came across this image and just had to send you all a link. A woolly mammoth that in 2006 rampaged down Second Street, San Francisco, California, for several miles before being subdued by some cool (i.e. cold looking) early Homo Sapiens wearing surprisingly modern footwear and wrist-watches:

www.mccullagh.org/photo/1ds-6/wooly-mammoth-bay-to-breakers-2006

This would draw the attention of the crowds in Dudley and wouldn't cost too much... apart from dignity perhaps! ■

Graham Hickman

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