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**Copy date for the
next Newsletter is
Sunday 1 February**

Newsletter No. 228

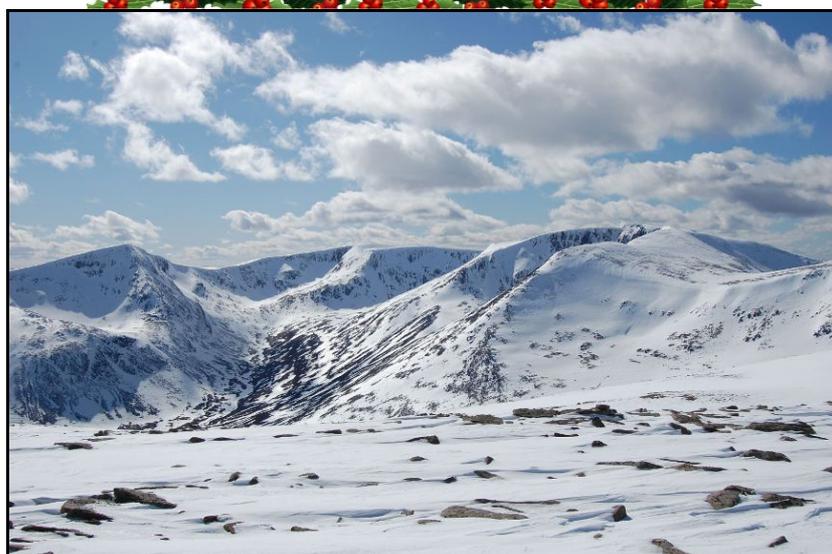
December 2014

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Season's Greetings to all our readers



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<p>For enquiries about field and geoconservation meetings please contact the Field Secretary. To submit items for the Newsletter please contact the Newsletter Editor. For all other business and enquiries please contact the Honorary Secretary. For further information see our website: www.bcgs.info</p>		

Future Programme

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

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

Monday 8 December (Indoor meeting, 7.00 for 7.30 start): BCGS Members' Evening and Christmas Social. This is our annual chance for members to share their geological experiences in a sociable atmosphere with a Christmas buffet provided by the Society.

Saturday 10 January (Geoconservation Day): Rowley Quarry, led by Paul Stephenson. Meet at St Brades Close at 10.30. Directions: from Birmingham New Road (A4123) turn in to Tower Road then left at St Brades Close. Wear old clothes and stout footwear. Please bring gloves and garden tools; loppers, secateurs, forks and spades if you have them. Also bring lunch. Finish at 2.30.

Monday 19 January (Indoor meeting): 'It's... a black.country time machine.' Speaker: Chris Broughton.

Thursday 29 January (Geoconservation Day): Rowley Quarry, details as 10 Jan. above.

Saturday 31 January (Geoconservation day): Barr Beacon and Pinfold Quarry, led by Andy Harrison and Helen Sanger. Meet at 10:30 at the entrance on B4154 Beacon Road, Grid ref: SP 060967. Wear old work clothes, waterproofs and stout footwear. Please bring gloves and garden tools; loppers, secateurs, forks and spades if you have them. Also bring lunch. Finish at 2:30.

Monday 16 February (Indoor meeting): 'A few volcanoes in Lanzarote'. Speaker: Les Drinkwater.

Monday 16 March (Indoor meeting, 7.00 for 7.30 start): AGM followed by 'Minerals and Gems of the Cairngorms'. Speaker: Roy Starkey.

Sunday 22 March (Geoconservation day): Barnt Green Road Quarry, Lickey Hills. Quarry clearance session in conjunction with the Lickey Hills Geo-Champions, directed by Steve Hinton, Senior Ranger, Lickey Hills CP. Meet at 10.30 at the Lickey Hills VC, B45 8ER. Bring hard hats if you have them, gloves and a packed lunch. (Some hard hats available at the VC for those who haven't got their own.) Wear old clothes and strong footwear. Tools will be provided. Finish at 2.00.

Monday 20 April (Indoor meeting): 'Dawn of the giants: how dinosaurs rose to dominate the Triassic world'. Speaker: Dr Richard Butler, University of Birmingham.

Procedures for Field Meetings

Insurance

The Society provides public liability insurance for field meetings but personal accident cover is the responsibility of the participant. Details can be obtained from the Secretary. Schools and other bodies should arrange their own insurance as a matter of course.

Health and Safety

If you are unsure about the risks involved or your ability to participate safely, you should contact the Field Secretary. Please take note of any risk assessments or safety briefing, and make sure that you have any safety equipment specified. The Society does not provide hard hats for use of members or visitors. It is your responsibility to provide your own safety equipment (eg. hard hats, hi-viz jackets, safety boots and goggles/glasses) and to use these when you feel it is necessary or when a site owner makes it a condition of entry. Hammering is seldom necessary. It is the responsibility of the hammerer to ensure that other people are at a safe distance before doing so.

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

Other Local Events

Sunday 14 December at 1.30: 'The Winter Mystery Boulder Walk'. Meet at the car park for Selly Oak Park (corner of Gibbins Road and Harborne Lane, Selly Oak, Birmingham, B29 6QR.) Walk sponsored by Northfield Constituency Environmental Forum. Around 3½ miles finishing by the Great Stone pub, Northfield. Catch 61 or 63 bus back along Bristol Road to Selly Oak triangle and walk a few minutes down Harborne Lane or Chapel Lane back to the car park. For more information call 0121 477 2629. **All welcome to join this free walk** to explore the geological wonders of the area.

Sunday 11 January 10.30 - 2.00: Lickey Hills Geo-Champions - Rubery Cutting site clearance day. BCGS members are warmly invited to come and join this session to continue the maintenance work at this important geological site. Meeting and other details as for 22 March above.

Sunday 8 February 10.30 - 2.00: Lickey Hills Geo-Champions - Rose Hill Quarry site clearance day. BCGS members are warmly invited to come and join this session. Much work is needed to re-expose the thrust plane exposed here, as described by Prof. W.S. Boulton in 1928. The quarry is at the southern end of Rednal Hill. Meeting and other details as for 22 March above.

Other Societies and Events

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

Warwickshire Geological Conservation Group

Wednesday 21 January: 'Sub-ice volcanism, ice sheets and the survival of Life - the importance of Antarctica's volcanoes'. Speaker: Prof. John Smellie (Leicester).

St Francis Church Hall, Warwick Road, Kenilworth CV8 1HL. Starting at 7.00 for coffee before a 7.30 start. For more details visit: <http://www.wgcg.co.uk/> or contact Ian Fenwick swift@ianfenwick.f2s.com or 01926-512531. There is a charge of £2.00 for non-members.

Lapworth Lectures

Monday 19 January: 'Ancient human impacts and Holocene climate change in the geoglyph region of south-west Amazonia'. Speaker: Dr John Francis Carson. University of Reading.

Monday 2 February: 'Building the Tyrannosaur Family Tree: New Discoveries of T.rex and kin'. Speaker: Dr Stephen Brusatte, University of Edinburgh.

Monday 16 February: 'Escaping from Snowball Earth'. Speaker: Professor Ian Fairchild, University of Birmingham.

Lectures at 5.00 in lecture theatre WG5, Aston Webb Block A, University of Birmingham. Entry via the main entrance from Chancellor's Court, as the Lapworth Museum is closed for a major redevelopment. All are welcome to attend and there is no admission charge. For further information phone: 0121 414 7294 or visit: <http://www.lapworth.bham.ac.uk/events/lectures.shtml>

Teme Valley Geological Society

Monday 19 January: 'Fissures and fountains: basaltic volcanic eruptions'. Speaker: Tom Jones.

7.30 at the Martley Memorial Hall B4197 by Sports Ground. £3 non-members. For more details visit: <http://www.geo-village.eu/> or contact Janet Maxwell-Stewart, 01886 821061

Manchester Geological Association

Saturday 17 January at 1:30: The Broadhurst Lectures: The Mineral World

'Minerals and Gems of the Cairngorms'. Speaker: Roy Starkey, The Russell Society.

'From Fluorite to Fluid Flow: an exploration of some iconic Northern Pennine Minerals'.

Speaker: Dr Brian Young, Honorary Research Fellow, University of Durham.

'The World Class Copper Deposits of Chile - Geology, Exploration and Discovery'.

Speaker: Dr Chris Carlon, Mineral Industry Consultant.

Wednesday 11 February at 7.00: AGM and 'Evolution of the Mars Atmosphere and Hydrosphere'. Speaker: Dr Ray Burgess, President, Manchester Geological Association.

Most MGA Meetings are held in the Williamson Building, Oxford Road, opposite The Manchester Museum. For further information about meetings go to: <http://www.mangeolassoc.org.uk/> or email lectures@mangeolassoc.org.uk Visitors are always welcome.

North Staffordshire Group of the Geologists' Association

Thursday 15 January: 'Dinosaur Embryos'. Speaker: Dr John Nudds (Manchester).

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

East Midlands Geological Society

Saturday 17 January at 6.00: 'Life just got complicated: the Ediacaran world revealed in Charnwood Forest'. Speaker: Dr Philip Wilby.

Non Members are welcome. Meetings will take place in lecture theatre B3 of the Biology building at the University of Nottingham. Further info at: www.emgs.org.uk or email: secretary@emgs.org.uk

Geological Society, West Midlands Regional Group

Tuesday 13 January 6:30: 'Geophysics'. Speaker: Simon Hughes Geologist/Operations Manager (TerraDat UK). Venue to be confirmed.

For further details and enquiries, please contact the Group Secretary, Daniel Welch at: geolsoc_wmrg@live.co.uk

Woolhope Naturalists' Field Club - Geology Section

Friday 23 January: 'Idar- Oberstein: a gem (stone) of a town'. Speaker: Dr Sue Hay.

All indoor events are held in the Woolhope Room, Hereford Library starting at 5.30 unless otherwise specified. 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

Mid Wales Geology Club

Thursday 15 January: AGM and 'The Grinshill Fossil' (from Grinshill Quarries, Shropshire), a short talk by Dr Sara Metcalf.

Further information: Tony Thorp (Ed. newsletter & Hon. Sec): Tel. 01686 624820 and 622517 jathorp@uku.co.uk Web site: <http://midwalesgeology.org.uk> Unless otherwise stated, meetings start at 7:15 (tea/coffee & biscuits) with talks at 7:30 at Plas Dolerw, Milford Road, Newtown.

Shropshire Geological Society

Wednesday 14 January: 'Ediacaran fauna of Charnwood Forest'. Speaker: Dr Phil Wilby, BGS.

Generally held at Shire Hall, Shrewsbury, commencing at 7.15 for 7.30. Note that the venue might have to be changed, depending on the possible sale of Shire Hall. A nominal charge is levied for attendance by non-members. Further info at: www.shropshiregeology.org.uk/

Editorial

Our geoconservation clearance programme for the winter season is well under way with particularly spectacular results after two visits to Saltwells Nature Reserve (see Andy's report on p.9). Next in line is Pinfold quarry at Barr Beacon, with its dramatically exposed sections of Kidderminster Conglomerate and underlying Bridgnorth Sandstone (clearance sessions on 6 December and 31 January). This site has already benefited from several visits from the BCGS geoconservation team since December 2012, but there is still much to be done.

The geoconservation 'team' is simply a group of those members who have made the effort to turn up and 'have a go'. Some are 'regulars' and others just come along when they can. More volunteers are needed! There is always a friendly atmosphere, time to chat, learn about the geology, and leave with a satisfying feeling that you've helped to make a difference in the on-going battle to preserve our local geological sites. There is no pressure - each volunteer does what he or she feels able to do, and all are made very welcome. Our Field Secretary and geoconservation co-ordinator, Andy Harrison, would be delighted to welcome some new volunteers. If you'd like more information before turning up to one of the sessions, contact Andy (contact details on p.2). Please also note the two Lickey Hills sessions in January and February which we're invited to attend in addition to the joint one on 22 March (details in 'Other Local Events' p.3). ►

We have welcomed several new members to our ranks during the autumn, and amongst them are Roy and Mary Starkey. In this issue Roy introduces us to the subject of the 'cairn gorm' gem stone and its fascinating history. This is also the subject of our scheduled indoor meeting in March, and of Roy's recently published book (see p.7).

Please note that subscriptions (for all but those who joined in the last 3 months) are due from 1 January. The renewal form is at the end of this Newsletter (p.12). Please help the Society by paying as promptly as you can.■

Julie Schroder

'Stone Science': an unusual Museum Experience

Visiting Anglesey recently I thought I would look up this establishment about two kilometres west of Pentraeth on the B5109 Llangejni road. I first discovered 'Stone Science' Museum some years back, and in the interim noted it was up for sale and therefore possibly no longer in business. Well, it's still there, but only open on a part-time basis as the sale never materialised (there being no takers). The owner has gone into partial retirement but keeps things going as best he can with limited assistance, mainly during the summer months and for pre-arranged visits. I found him most accommodating, and having paid the £5 entrance fee had the lighting switched on (I was the first, and perhaps only, visitor that morning), and was left to mosey around at my own pace while the owner returned to some chore in his garden.



Carboniferous scene, typical of the dioramas

The establishment is of modest dimensions on two storeys. Downstairs features a number of diorama-style displays broadly built around the different geological periods of the Phanerozoic: a Coal Measure swamp, a Permo-Triassic desert, Jurassic dinosaurs, a Cretaceous scene and an icy Pleistocene tundra. All are supported by appropriate fossil collections as well as a few less logical bits and pieces - why a chunk of augen-gneiss amongst the dinosaurs? Nevertheless, the specimens are fine examples, and the dioramas are well enough realised and constructed.

These are preceded by some Palaeozoic material including 'local' fossils such as trilobites and graptolites and there are also displays on themes such as horse and hominid evolution, modern marine life and a rather fine collection of shark jaws (with a giant Megalodon jaw forming an intimidating doorway into the 'Ice Age'/Craggs section). Finally there is a separate corridor offering archaeological material, a small mineral gallery and a display of Anglesey geology.

Upstairs is one large space that re-invents some of these themes (hominid evolution reappears for instance), but a series of ten further displays are chronological in nature, featuring more fossils from each geological period from Cambrian to Cainozoic.

These are augmented by fossil displays from various localities the owner has visited, notably Mount Lebanon (fish and plants) and the Ararape Basin in Brazil (fish). Basic rock types, minerals and their properties, how ▶



View through the 'Megalodon doorway'

fossils are formed, building stones, meteorites and tektites, pigments and everyday products derived from geological materials are all subjects of other displays to be found on the upper floor together with a large collection of artefacts to do with the native 'Red Indians' of North America.

There is no particular order to any of these displays, and you will have gathered by now that the whole museum is rather haphazard in nature. It very much represents a personal accumulation of geological (and archaeological/anthropological) material collected throughout a lifetime's hobby. However, it has been collected by someone with a clear love for, and extensive knowledge of, his subject material. A few of the reviews on-line are nonsensically negative, if not positively scathing, but most visitors seem to have enjoyed the eccentricity of the place. True, the place is a little dusty and faded in places, but at least one isn't distracted by swish electronics going beep that bedevil the so-called 'state-of-the-art' modern museums. Fusty collections in dark drawers are much more fun! And where else do you get the personal attention offered here if you wish to take advantage of the owner's anecdotes and background information (he returned later, chore completed to offer insights and guidance), or just to talk geology to anyone who cares to listen.



The hominid evolution display

Finally, the way out leads you through the shop area where there are plenty of inexpensive things on offer for a souvenir of a pleasant hour or two of 'comfortable education'. A couple of pounds for a rather nice piece of banded barytes with fluorite from Crich Quarry (on my back doorstep here in Derbyshire) seemed like a bargain, with another piece thrown in for free! ■

Mike Allen

'Cairngorm' - the Story of Scotland's National Gem



*Smoky quartz crystal
from Loch Avon*

We are delighted to welcome Roy Starkey as a new member of the BCGS. In this article he gives a brief introduction to the story of the minerals and gems of the Cairngorms, the subject of his recently published book. Roy will also be expanding further on this subject in his presentation at our indoor meeting on 16 March. Don't miss it! Ed.

The Cairngorms is an area of dramatic and rugged scenery, recognised formally by its designation in September 2003 as the UK's largest, and most northerly National Park. It is home to five out of six of Britain's highest mountains and the Queen's summer residence at Balmoral. The area has given its name to Scotland's most famous gemstone, the distinctive, smoky amber-coloured cairngorm quartz, a term recognised globally by the jewellery trade, and which has for centuries adorned traditional Highland dress.

Cairngorm quartz has been found in very large crystals and crystal groups (up to 20 kg in weight) and the value of these as mineral specimens, rather than gemstones has long been recognised. Much of the quartz is too dark (morion), to be used as gem cutting material, and the lapidary trade resorted to heat treatment of dark specimens, in the 1700s and 1800s, in an effort to improve their colour and commercial value. If this was successful, such specimens were commonly sold as citrine. ►

There is much confusion in early literature about 'cairngorm' and 'Cairngorm stones', between quartz (silicon dioxide) and topaz (a silicate mineral containing aluminium and fluorine). Brown or yellow quartz crystals were commonly described as 'topaz', perhaps because they might have been considered to be more valuable. Similarly, the mineral beryl (a beryllium aluminium silicate), was sometimes described as 'emerald', an optimistic description, which would not hold sway today.



Cairngorm scenery

My new book, 'Crystal Mountains - Minerals of the Cairngorms' unravels the story of the cairngorm, exploring the long tradition of hunting for 'Cairngorm stones', which saw individuals, and whole families, driven to search the mountains with a zeal akin to the lust for gold. Demand from the lapidary and jewellery trade was such that the supply of authentic local material could not keep up, and inevitably, imported material began to be passed-off as Scottish. It is now very difficult, if not impossible, to be certain of the provenance of cut stones and those mounted in jewellery.

The book traces the history of the cairngorm (and the associated topaz and beryl crystals which are found in the region, although of much less common occurrence than quartz), and also presents a very readable account of the geology and occurrence of the gem minerals, including an easily understood explanation of the cause of colour in smoky quartz.

The fascination of Queen Victoria and Prince Albert with Scotland's national gem, and the surviving legacy of their specimens, are explored using the Queen's personal journals and contemporary newspaper accounts, together with images of specimens from the collection at Balmoral Castle and Osborne House. A supply chain is traced from 'The Diggers' who sought raw material, through mineral dealers, lapidaries, seal engravers and jewellers who all earned a living trading 'Cairngorm stones'. The principal centres for the Scottish lapidary trade appear to have been Edinburgh and Aberdeen, but with several notable businesses also prospering in Inverness, and others in Dundee, Perth and Stirling. The story culminates in the Great Exhibition of 1851, which provided a shop window to the World for Scottish goods, including natural cairngorm crystals, and the jewellery and other artefacts fashioned from them.

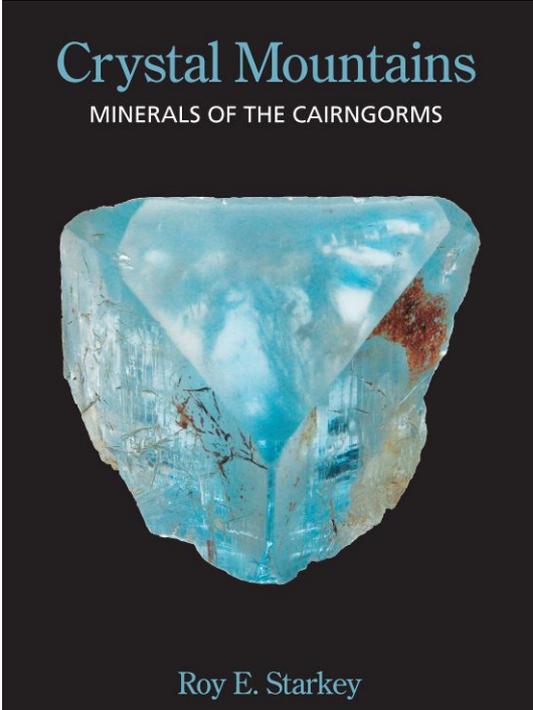


Faceted topaz and smoky quartz - Braemar Castle

The days of the 'diggers' and 'cairngorm miners' are long gone, but there may still be forgotten treasures scattered in attics and trinket boxes across the area, just awaiting discovery by the next generation. Queen Victoria's mountains attract thousands of visitors each year, and the links with Balmoral remain as strong as ever. Scottish pebble jewellery is now a highly collectible commodity, and an authentic Scottish cairngorm brooch would undoubtedly still make a most acceptable gift. ■

Roy Starkey

Newsletter front page photo: Cairngorm mountains: Sgor an Lochain Uaine (The Angel's Peak) and Braeriach (right), with Garbh Coire in the foreground. Viewed from Ben Macdui.



Crystal Mountains tells the story of the early crystal hunters who roamed the mountains and glens of the Cairngorms during the 18th and 19th centuries in search of Scotland's famous gem – the smoky quartz or cairngorm. The book provides a comprehensive history of this arduous and uncertain quest, and explains the geological background to the occurrence of the gem minerals. Lavishly illustrated with photographs of the wild and rugged scenery of the Cairngorms National Park, the text invites exploration and discovery. The author has been privileged to have obtained unprecedented access to both private and public collections, resulting in the inclusion of numerous previously unpublished photographs of mineral specimens, gemstones and artefacts made from them. The book will appeal to all those interested in the natural and social history of the area, to Park visitors, mineral collectors, gemmologists and members of the antique and jewellery trades.

184 large format pages (276 × 218 mm); 236 illustrations; over 300 references; comprehensive index. Paperback (ISBN 978 0 9930182 1 3) priced at £25 plus p&p. For further information, or to order a copy, go to www.britishmineralogy.com or email: roy@britishmineralogy.com

British Mineralogy Publications, 15 Warwick Avenue, Bromsgrove, Worcestershire, B60 2AH.
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BCGS Geoconservation Days

Saturday 6 September: Portway Hill Nature Reserve, Rowley Regis. Led by Paul Stephenson (Birmingham and Black Country Wildlife Trust).



The Portway Hill Nature Reserve, part of the former Rowley Quarry, is one of the newest sites belonging to the Birmingham and Black Country Wildlife Trust. Here the dolerite exposures show examples of spheroidal weathering and what appear to be two intrusive episodes. During spring and summer months the site is awash with colour from the variety of wild flowers and grasses that provide an important habitat for numerous butterfly and insect species. In February a dolerite cairn with associated seating was constructed in front of the former quarry exposures. A metal plaque sits on top of the cairn, which has already fallen victim to the vandals.

We met Paul Stephenson and members of the nature reserve's volunteer group at 10.30 on a breezy, cloudy and grey September morning, off St Brades Close. The dolerite exposures cleared the previous February were once again heavily overgrown with bramble and low lying vegetation. We were tasked with clearing as much of this as possible, not only to uncover the dolerite exposures, but also to open the area up and allow the rare wild flower and grass species to re-establish themselves. ►



Once the former quarry ceased operation it was back filled with waste, which included colliery spoil and blast furnace slag. According to Paul, there appears to be no clear correlation between the wild flower and grass species and the underlying fill material present. The rich variety of plant species encountered across the site does beg the question as to whether this is so. One thing is certain, fast growing plants such as bramble love the site and will soon return. So the nature reserve's volunteers, with the help of the BCGS will keep them in check.

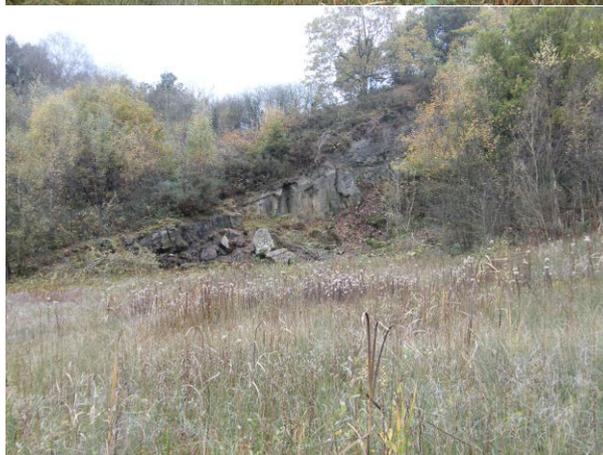
Sunday 5 October and Sunday 2 November: Doulton's Claypit, Saltwells Nature Reserve. Led by Alan Preece (Senior Warden).

This site is an important one for many reasons. Not only is it a three time geological SSSI, but it also holds a variety of habitats that provide a home for a variety of animal and plant species. BCGS has been there on numerous field visits in the past; however these two visits were our first for undertaking clearance work in recent years.

Doulton's Claypit is a result of fireclay extraction by Royal Doulton between 1870 and 1940. This has left behind high exposures of sandstone, clay and coal (Thick and Heathen Coals), which belong to the Middle and Lower Coal Measures. From the claypit the fireclay would be carried, by tub, up an incline known as the Old Tube Line, to the Dudley No.2 Canal and Brewin's cutting. During the Industrial Revolution the Dudley No.2 Canal formed part of a network that connected the heart of the Earl of Dudley's Estate with the Potteries and the rest of the Midlands.

The bottom of Doulton's Claypit contains a marsh that provides a home to a variety of marsh loving plants including rare orchid species, dragonfly and butterfly. According to Alan this is well worth a visit in late spring/early summer.

We met Alan and other reserve volunteers at the nature reserve's car park off Saltwell's Lane, on two cool, grey and damp Sunday mornings. In recent years the claypit has been somewhat neglected and overgrown with trees and low lying scrub. On our first visit we cleared scrub from the south eastern slopes of the claypit to expose the Coal Measures strata. During our second visit we cleared small trees and saplings from around the southern and western edges of the marsh to expose dipping sandstone beds and to open up the bottom of the claypit. ►



Doulton's Claypit before and after clearance

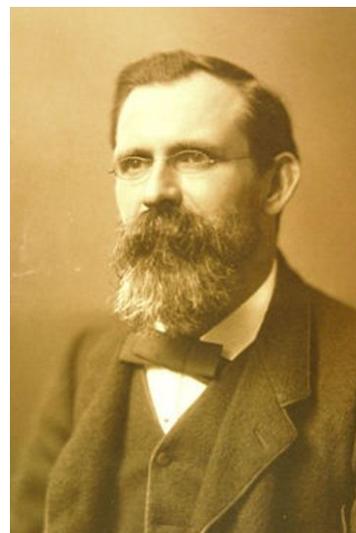


To keep it clear, regular vegetation clearance and maintenance are required within the claypit and there is still much to do. Other areas within the Saltwells Nature Reserve that require attention include the Upper Ludlow Shale beds of the incline, and the dolerite, Coal Measures and Silurian contacts within the Brewin's cutting. All require attention and all present their own clearance and management problems that will keep conservation volunteers busy for some time. ■

Andy Harrison

Geobabble

This has been a year of looking back at what was happening 100 years ago. Although many young geologists would have been lost in the Great War, there was certain stability about the situation in Birmingham, owing largely to Charles Lapworth, the first professor of geology at Mason College, that was to become the University of Birmingham. He retired in 1913 at the age of 70. Lapworth is quite rightly recognised as one of the great British geologists, with many achievements, and in the 1870s he proposed that there should be the Ordovician period between the Cambrian, championed by Sedgwick, and Sir Roderick Murchison's Silurian. They had argued, quite heatedly at times, over the rocks that we now know as the Ordovician.



Charles Lapworth

Lapworth did much of his research in the Southern Uplands of Scotland where there appeared to be a thick sequence of unfossiliferous mudrocks and shales. He found that it was not quite so thick, but was isoclinally folded, which had not been recognised by earlier geologists. It also contained fossil graptolites. He compared this sequence to other European outcrops, particularly in Scandinavia. His research in the field established a method of detailed mapping, using large scale base maps and detailed observations that the student of geology today would recognise.

His work on graptolites is of considerable interest, as he used them to establish the graptolite zones that we know so well today. When you investigate the research on graptolites you inevitably come to the names Elles, G.L. and Wood, E.M.R. who produced a large and definitive monograph between 1901 and 1918. It was published in eleven parts, and edited by Lapworth. Hidden behind the title 'Elles and Wood' is the fact that they were both women, researching science in a man's world.

They met at Newnham College, Cambridge, and Gertrude (Gertie) Elles conducted most of her research based in Cambridge, while Ethel Wood was mainly located in Birmingham. Elles wrote most of the text while Wood concentrated on the illustrations. Gertie Elles is described as being a 'striking' and 'vivacious' young woman, with deep blue eyes and corn-coloured hair. She played hockey for her college, and was later a coach. In WW1 she ran a Red Cross hospital for Soldiers in Cambridge. She never married and died in 1960.

Ethel Wood worked as an assistant to Lapworth in Birmingham and married a physics lecturer at the University and so is more correctly called Ethel Shakespear. She also devoted herself to helping on the home front in the war, working with disabled soldiers. She became a justice of the peace. These two women made a huge contribution to palaeontology, and their names will remain in references for many years to come. ►

