Newsletter No. 202

August 2010

The Black Country Geological Society

Contents:

Copy date for the next Newsletter is

Monday 4th October 2010

Committee

Chairman
Gordon Hensman B.Sc., F.R.Met.S.

Vice-Chairman
Alan Cutler B.Sc., M.C.A.M., Dip.M., M.CIM.

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Graham Worton M.Sc., C.Geol., F.G.S.

Field Secretary
Andrew Harrison B.Sc., M.Sc., F.G.S.

Newsletter Editor
Julie Schroder B.Ed. B.A.

Other Members

Bob Bucki

Les Riley Ph.D., B.Sc., F.G.S.,C.Geol., C.Sci., C.Petrol.Geol., EuroGeol.

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, mobile: 07973 330706 or email: andrew_harrison@urscorp.com

Wednesday 18th August (*Field Meeting*) Evening walk around the Wren's Nest led by Graham Worton. The walk will start at **7.00 pm** and will last about 2 hours. Meet in the car park of Mons Hill college.

Sunday 19th September *(Joint field meeting with the Woolhope Club)* Martley area led by Dr. Paul Olver (*Postponed from 24th July).*** Meet at Martley Village Hall (SO 753 599) at 10.30am. Martley is on the B4197 about 4km north of the A44 (Worcester to Leominster road). If approaching Martley from the south on the B4197, the Village Hall is on the right about 50m after sign at the start of the village. Pub lunch. We will see: the Precambrian/Cambrian basement in Martley Pit, complex folding and faulting of the Silurian successions, and quarries in Martley village where Triassic Sandstones were extracted for building.

Monday 20th September *(Indoor Meeting)* Geological Conservation in the Black Country. Speakers: Alan Cutler and Graham Worton. They will talk about current projects and opportunities for members to be involved. Further to requests from members to become engaged in active conservation field work, and the timely occurrence of the Wildlife Trust for Birmingham & the Black Country's 'Living Landscapes' project, opportunities for BCGS members to roll up their sleeves and get involved have happened! This meeting will explain the current situation and describe several site projects in which our members might play a part, and which can be tied into field visits before and after the work to see our achievements.

Monday 25th October *(Indoor Meeting)* Is Man's role in Climate Change significant? Speaker: Colin Knipe (Senior Partner, Johnson, Poole & Bloomer). This meeting will be a geological review of past climates and processes that created them with an eye to understanding what is happening to the climate in our time. The significance of human activities which add CO_2 to the atmosphere and natural additions of CO_2 to the atmosphere will be discussed and debated.

Monday 29th November *(Indoor Meeting starting at 7.00pm)* BCGS Members' Evening and Christmas Social. We are now taking offers of short talks and displays for the meeting. Refreshments will as usual be provided in the convivial atmosphere of the festive season.

Andy Harrison, Graham Worton

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.

Woolhope Naturalists' Field Club - Geology Section

Sunday 3rd October: Big Pit underground tour and Blorenge Led by Tom Sharpe, National Museum of Wales. Limited numbers for underground tour. Booking essential.

Guests are welcome, but must take day membership of the Club: £1.00. For further information: contact Sue Hay on 01432 357138, email svh.gabbros@btinternet.com or visit their web site: www.woolhopeclub.org.uk/Geology_Section/default.htm

North Staffordshire Group of the Geologists' Association

Tuesday 7th September: A September Evening Trip to the Apedale Gallery Section of the Apedale Mine. Leader: Les Mason. Those wishing to attend must contact the field secretary, Nick Hulley at either nicholas.hulley@btinternet.com or 01538 722017 and places will be allocated on a first come/first served basis. NB: there will be a £4 Field Fee charge for this event.

Thursday 14th October: The genesis and evolution of sulphate evaporites in the Midlands. Speaker: M. Noel Worley (Saint-Gobain).

All lectures are held at 7.30 in the School of Earth Sciences and Geography, William Smith Building at Keele University unless otherwise stated. Further information at: www.esci.keele.ac.uk/nsgga/

Manchester Geological Association

Saturday 4th September: Dovedale led by Jane Michael. A day trip, this will follow the 9 mile Dovedale Walk (No 7) from Fred Broadhurst's "Rocky Rambles in the Peak District". The first part of the walk climbs up Thorpe Cloud. (Participants not wishing to do this can join the party further on.) On return from Ravens Tor, there is more ascent above the valley (with a low level alternative for this too.)

Anyone wishing to attend must contact Jane Michael in advance to book in. There is no charge for visitors from other societies at lectures or field visits. Jane Michael's email address: outdoors@mangeolassoc.org.uk Further information at: http://www.mangeolassoc.org.uk/

Shropshire Geological Society

Monday 16th August: Rockhop meeting, commencing 18.30pm. Fossil hunting at Lea Quarry led by Chris Rayner. Walking (half a mile); some rough ground; bring your own refreshment, if required. (Booking to reserve a place and obtain joining instructions from Keith Hotchkiss by email: kah22@btinternet.com; telephone: 01694 723 130.)

Tuesday 21st September: Rockhop meeting, commencing 10.00am. Caer Caradoc led by Peter Toghill. Looking at the Ordovician. Walking (two miles, starting from Willstone Farm); some rough ground; bring your own refreshment, if required. (Booking to reserve a place and obtain joining instructions from Frank Hay, preferably by email: frankhay@waitrose.com; telephone: 01694 724 723.)

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

Warwickshire Geological Conservation Group

Wednesday 18th August - 6.30pm: Rock Mill & Coton End Quarries led by John Crossling & Ian Fenwick. Meet SP 3016 6613 (Rock Mill Lane) - Please park in adjacent streets as approaches to Rock Mill are private areas.

Saturday 4th September: Whittlesey - Cambridgeshire. This year our joint field trip is being organised by the Geology Section of the Leicester Literary & Philosophical Society.

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

Mid Wales Geology Club

22nd August: Field trip to View Edge and the Onny Valley Section.

15th September: Talk by Dr. Gareth Owen (CCW) "South Wales Limestones."

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

Editorial

Geoconservation - Further Developments

In my last Editorial I outlined the Society's historical involvement with geoconservation in the Black Country, and gave preliminary details of some forthcoming volunteer opportunities. Things have been moving fast since then. The Moorcroft Wood Nature Reserve is one of 4 geological sites identified for improvement within the 'Black Country Living Landscape Community Involvement Programme'. Julia Morris is the Programme Team Leader and Liaison Officer for Walsall, and has given more details of this programme in the article below. The other sites identified as potential geoconservation projects are Barrow Hill, Saltwells, and Spring Vale Park in Wolverhampton.

Julia is particularly interested in enlisting the help of BCGS members to help with the conservation work at these sites, which will involve some clearance, exposure cleaning, possibly setting up viewing points, and helping with interpretation boards when and where they are required. Detailed Volunteer Information and Enquiry forms are included with this Newsletter for BCGS Members. These can be printed and should be sent to the address on the form. Alternatively, Julia will be happy to send printed copies if required, and copies will available at our Indoor Meeting on 20th September. Please contact Julia Morris or Andy by phone or email if you have any other queries.

I hope that we can collectively make a real success of this. Even if you do not have much spare time, or have problems with transport, put your name forward and the logistics can be worked out when dates for this work have been determined. Be sure to come along to the first Indoor Meeting of the new season on 20th September, when Graham Worton and Alan Cutler will tell us more about this exciting project and provide an opportunity for us to ask questions.

Please note the separate box requesting volunteers for the Wren's Nest. This is a separate project for which you should register your interest with Andy, but Moorcroft Wood, mentioned in the last Newsletter, comes within the wider project outlined above.

I'll look forward to receiving news of your summer holiday geological experiences for the next Members' Forum, and don't forget to enter those summer holiday photographic masterpieces for the 'Dudley Bug' Geo-photo competition! ■

Julie Schroder

Please send material for the next Newsletter to:

julieschroder@blueyonder.co.uk

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

Bringing Communities and Wildlife Together...

Black Country Living Landscape Community Involvement Programme is an exciting new project that works in partnership with local people and communities across the Black Country to forge new links with their local wildlife sites and green spaces, enabling them to care for and improve local green spaces for people and for wildlife. Black Country Living Landscape Community Involvement Programme has been awarded £442,438 by Natural England as part of its Access to Nature Programme, funded by £25 million from the Big Lottery Fund's Changing Spaces Programme.

Led by the Wildlife Trust for Birmingham and the Black Country, the project offers opportunities for everyone to get actively involved with their environment. The project aims to deliver:

- An improved natural environment
- To build stronger communities
- To promote healthier lifestyles and active volunteering
- To deliver lifelong learning through environmental education
- To highlight the region's geological heritage

Whether you are an individual, community group, business or school, if you want support or advice on environmental or wildlife issues or would like to: create opportunities to get involved with nature; encourage participation with events and activities; or would like help in planning environmental projects; finding funding; resources or volunteers, Black Country Living Landscape Community Involvement Programme will help and support you.

In partnership with the Black Country Geological Society, Black Country Living Landscape Community Involvement Programme is currently planning volunteering opportunities to help improve and maintain geological features. We hope these volunteering days will highlight the region's geological heritage and engage and educate local people about the wealth of geology in the Black Country. If you would like to participate in future volunteering opportunities to help us in protecting and preserving some of the region's geological features please contact Julia Morris (contact details below), Andy Harrison (Andrew_Harrison@urscorp.com) or Alan Cutler to find out more.

If you would like further information, would like support or would like to be involved with the project's activities please contact Julia Morris, Black Country Living Landscape Community Involvement Programme Team Leader and Liaison Officer for Walsall on 0121 505 4429 or 07791 070895 or email Julia.m@bcll.org.uk or take a look on the website www.bcll.org.uk ■

(With this Newsletter Members will also receive Volunteer Information and Enquiry forms. See also Editorial above for more information. Ed.)

NATURAL ENGLAND

black country living landscape

The Black Country Geological Society

BIG LOTTERY FUND

LOTTERY FUNDED

Volunteers Please!

The Wren's Nest wardens are seeking volunteers to help with maintenance work from late October onwards. The work would involve scrub clearance from rock faces and possibly hedge laying in January 2011. It will involve 3 weekdays in October, November and January.

If you think you can spare time for either of these projects please contact Andy Harrison and state likely availability (weekdays and/or weekends), mob: 07973 330706 or email: andrew_harrison@urscorp.com

The Dudley Bug

Welcome

Hello and welcome to the August issue of the Dudley Bug. It's summer but sadly the weather isn't that great at the moment! For those of you jetting off somewhere exotic, or to those staying a little closer to home and prefer the feel of home rocks below your feet, may we take this opportunity to wish you all a great summer! This issue we are going back to basics and giving you a quick introduction to clastic sediments. We are also giving you a guide on caring for your collections whether it may be a few bits you picked up recently or your large collection in the loft! And finally we welcome back the word search and give you on an update on the 'Dudley Bug Geo-photo Competition!' We hope you enjoy this issue!

Alison and Chris

Clastic Sediments

Clastic sedimentary rocks are formed by the amalgamation of small fragments of different minerals. Quartz is one of the most common minerals found in clastic sediments. The minerals have come from rocks which have been broken down through the process of weathering. The majority of clastic rocks form under water.

Fine grained clastic sediments make up between 45% and 55% of sedimentary successions. They vary in size from <4µm (clay) to 4-64µm (silt). Mud is a mixture of both clay and silt. Four main rock types make up the fine grained clastic group. These are mudstone, shale, argillite and slate. They are more commonly referred to as 'mudrock' between geologists. These four do have their differences. Mudstone tends to be blocky and non-fissile whereas shale is laminated and fissile (breaks along a plane). Argillite is indurated between shale and mudstone and finally slate is indurated so that it develops a cleavage.

Within a mudrock various structures can form. If the sediment was deposited in a pro-glacial lake then very fine laminations may form known as varves. But laminations can also occur in other, non-glacial environments such as estuaries and flood plains. Quite often a mudrock can have massive structures due to slumping, bioturbation, dewatering and various forms of flow.

The colour of mudrocks can give you a clue to their history. For example a dark grey, almost black mudrock will have a high amount of organic matter within it whereas a mottled grey mudrock may have been affected by bioturbation.

Here in the West Midlands we can pick up strange bits of red, very fine grained rock which has a strange appearance. At first glance it looks like leaves or feeding trails. This is known as cone-in-cone structure. Geologists aren't 100% certain what forms cone-in-cone because it only forms under certain conditions. It is believed that when a fine grained mudrock is put under high amounts of stress it will reach a point when it suddenly deforms. This movement creates small faults which form the strange surface seen on cone-in-cone. Another theory is that calcite grows in its fibrous form and forces the sediment in which it is located out of the way. ■

Clastic Rock Word Search

Can you find the following words?

- Clastic
- Clay
- Cone-in-cone
- Fine
- Grained
- Mudrock
- Silt
- Varves

Answers in the next issue of the Dudley Bug!

S	E	V	R	A	V	T	F	I	M
H	S	V	Y	S	G	L	O	B	U
A	I	S	G	R	A	I	N	E	D
E	K	A	R	Y	S	S	B	N	R
P	F	F	A	N	N	V	A	I	O
O	U	L	E	G	R	O	C	F	C
L	C	L	A	S	T	I	C	O	K
C	O	N	E	I	N	C	O	N	E

Caring for Your Collection

Most of us have probably picked a rock or fossil up from somewhere and never written down where it was from. Well here is a quick 'what to do' guide to caring for your collection, no matter its size.

1. Put the specimen in a sealed bag or specimen box. These can be picked up cheaply at craft shops or online.
2. Always label the box/bag with what it is and where it came from. It is also useful to put a date of when you found it. If you can give the location a grid reference this is very useful too.
3. Inside the box/bag put a small card with the following information on it –
   a. Specimen name e.g. Calymene blumenbachii (trilobite)
   b. Location e.g. Wrens Nest, Dudley
   c. Stratigraphy e.g. Much Wenlock Limestone Formation, Nodular Member
   d. Age e.g. Silurian
   e. Date collected
   f. Specimen number (more detail on this below)
4. Record in a notebook or if you fancy being a bit more technical use a spreadsheet, the information about the specimen. Again this must include where and when it was found and more importantly what it is. It is also useful to write a brief description so if you were to hand your collection on to someone else or drop your box, you will be able to re-identify your collection and match it to its original box.
5. Always give your specimen a number. This will help link your collection to your list on your computer or in your notebook. Mark this specimen number on the specimen using a small line of tip-ex and a black waterproof fine liner pen.
6. Always store your collection in a clean, dry environment because humidity can cause your specimens to decay. In particular if you have anything with pyrite it is recommended that you place it in a sealed box with a small pack of silica gel.
7. If you have a fossil which is in two halves, wrap the two halves up individually in tissue paper and place them in the same box/bag. This will stop any fragile bits getting broken off.
8. If you have something which you aren't sure about, such as what type of brachiopod you have found then there is plenty of help at hand. Dudley Museum & Art Gallery hold regular ID sessions throughout the year. Or take a look at the many guides to rocks fossils and minerals which can be found in the shops at reasonable prices.
9. Finally enjoy your collection! ■

Photo frenzy!
The Dudley Bug Geo-photo Competition!

This summer we are holding the first ever 'Dudley Bug' photographic competition. The aim is to involve as many members as possible and to see the geological environments as an art form as well as a piece of interesting Earth history. This is open to anyone with a camera, whether it is a compact or something more professional, plus it's open to all abilities. The subject of the photo can be anything geology related.

The rules are:

- The photo must have been taken after the 1st June 2010.
- The photo must have been taken in the UK.
- Entries are limited to two images per person.
- No computer editing is permitted, other than cropping the images or for black and white.
- Judging will be by the front of house staff at Dudley Museum.

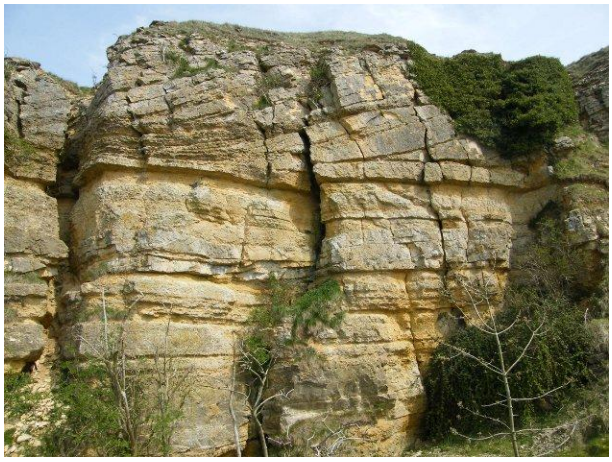
The images will be on display before the first indoor meeting in September, and prizes will be awarded to the top three photos. We have already had a couple of entries so get yours in to us as soon as possible.

Please send your entries to thedudleybug@hotmail.co.uk by Monday 13th September 2010 stating your name, photo title, where and when it was taken.
GOOD LUCK!

Field Meeting Report

Saturday 24th April: Field Visit to **the Cotswolds - Cleeve Hill and Cleeve Common**. Led by Dave Owen, Gloucestershire Geoconservation Trust.

This field visit followed the Rural Geology Trail Guide for Cleeve Common, which covers 2.5kms visiting numerous quarries and exposures of Middle Jurassic Aston and Birdlip Limestone Formations. We met Dave Owen at around 10:30am at the start point, a very busy car park, Wickfield Quarry, at Cleeve Hill golf club where he introduced the local geology and the trail guide.

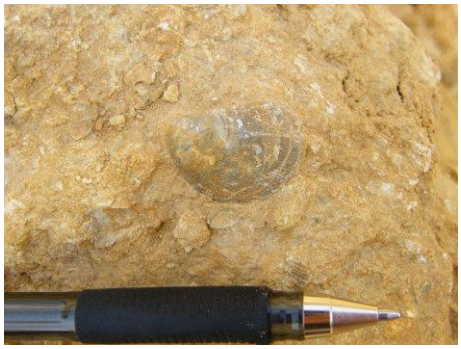


Cross bedding at Cleeve Cloud (Site 8, below)

Wickfield Quarry (Site 1), exposes the Lower Freestone or Cleeve Cloud Member (Birdlip Limestone Formation), a yellow, orange, white and grey oolitic limestone deposited under tropical shallow marine/shelf conditions where current and wave activity washed ooliths back and forth. Ooliths and the larger related pisoliths are concentric spherical grains of precipitated calcium carbonate around shell fragments, sand grains or, in the case of pisoliths, algae. Deposition, exposure, hardground formation and further deposition gives the limestone its yellow and orange colouration, whilst bleaching makes it white, and exposed surfaces weather hard and grey. Unlike the general shallow, southeastly regional dip of the Cotswolds these beds dip into the hillside as part of a rotational landslip block at the edge of the Cotswolds escarpment. Landslips are common around the periphery of the Cotswolds, as shown on BGS maps, They result from the erosion of older and softer underlying Lower Jurassic strata, activating old faults and lines of weakness. The Lower Freestone, so named because of an absence of fossils, is easily cut and has been quarried and mined since Roman times. Quarrying reached its height in the mid 19th Century and the rock commonly used as a building and ornamental stone across Gloucestershire and Worcestershire, where yellow village buildings are common, was mined at nearby Winchcombe. It was also used to build much of Cheltenham.

From Wickfield Quarry the trail climbed southwards to the grass and gorse covered summit of Cleeve Hill, which is pock marked by quarries including **Site 2, Grass Grown Quarries**. Here the top of the Lower Freestone is exposed and unconformably overlain by the Harford Member (upper Birdlip Limestone Formation) an orange, calcareous sand indicating slight environmental changes possibly from fluvial deposition or shallowing shallow marine conditions. The unconformity results from the missing Scottsquar Member, and is marked by erosion surfaces and bioturbation from worms within the underlying Lower Freestone. Vertical soil filled grykes cut across bedding. These result from water erosion and infilling during glacial times followed by calcium carbonate cementation and crystallisation.

Next, the trail headed southwest across Cleeve Common to **Site 3 looking westwards** over a deeply incised glacial meltwater valley with Postlip Quarry on the far side. This was also worked for Lower Freestone. The northwest Cotswold escarpment was covered by ice caps during the last Ice Age, with meltwater draining east and westwards eroding deeply incised valleys. West of the Cotswolds the meltwater accumulated behind a wall of ice which blocked the Bristol Channel, and flooded the southern Severn Valley forming a body of water called Lake Harrison. The flood water eventually breached a weak point just north of the Cotswolds allowing it to drain eastwards into the Moreton Gap near Moreton-in-Marsh, where the Vale of Moreton lies. Erosion by ice and water has removed the Cretaceous and Jurassic strata across the region. Current thinking suggests that these strata once continued from the Cotswolds westwards across the Severn Valley, over the Malverns and into Wales. Daylighting springs within the incised valley indicate where the underlying Lower Jurassic strata have also been cut by the glacial meltwater. Cleeve Hill and Common have been common grazing land for centuries. This, along with the golf course, helps conserve the area which is a designated SSSI because of its biodiversity. ►



Fossil Bivalve, Lower Trigonia Grit

West of Site 3 was Whiteway Cutting, excavated by the Gloucestershire Geoconservation Trust to look at the underlying geology, where exposures of Lower Trigonia Grit (base of Aston Limestone Formation) overlie Snowshill clay and the Harford Member Sands. The Snowshill Clay is grey and rich in microfossils, suggesting lagoonal conditions. The Lower Trigonia Grit is orange/brown and contains abundant brachiopod, echinoid, belemnite and worm burrow fossils and fish/shark teeth, indicative of quiet shallow marine conditions. This unit is hard weathering and used for dry stone walling. On the eastern side of the cutting these units have been downthrown and smeared against the Lower Freestone by one of many roughly east to west trending faults that cross the Cotswolds, and the fault plane was clearly visible with evidence of slickensides and scratches.

The trail continued due south to **Site 4, Sand Mine Quarry,** where exposures of large, rounded calcareous pillow shaped masses known as 'doggers' occur at the boundary of the Harford Member and underlying Snowshill Clay. Doggers are a post-depositional feature, formed by calcium carbonate precipitation within the sands, through which groundwater has percolated from overlying limestone strata. Similar features also occur within the Lower Jurassic clays. The sands of the Harford Member are pure, fine quartz, and were ideal for glaze in the Staffordshire Pottery Industry during the 18th and 19th Centuries. The sand was carried downhill by donkey to local canals and then transported up to the Potteries.

Roadstone Quarry, Site 5, exposes the lower and middle parts of the Aston Limestone Formation - the Notgrove Member and underlying Gryphite Member, which overlie the Lower Trigonia Grit. The Gryphite Member is a yellow and grey shelly limestone containing the fossils of *Gryphaea*, hence its name, and worm borings associated with relatively quiet conditions, ideal for colonial growth. The Notgrove Member is a yellow, fine, crystalline, bedded Limestone with few fossils, indicative of more energetic conditions and sifting by wave activity.

Rolling Bank Quarry, Site 6, exposes the youngest rocks of the trail from the Rolling Bank and overlying Clypeus Members. Two faults, as seen at the Whitbury Cutting, dropped these rocks against the older Lower Freestone strata, forming a graben. The Rolling Bank Member comprises the Phillipsiana Beds and underlying Bourgetia Beds, which are only exposed at this site. The Phillipsiana Beds comprise orange, yellow and grey, thinly layered, crystalline limestone occasionally interbedded with thin red brown mudstone bands/lenses and contain fossil oysters and worm borings. They were probably deposited by a local small channel feeding shallow marine conditions. The Bourgetia Beds are an orange thickly bedded clastic, fossiliferous limestone. Both units were used in the past for roadstone and possibly dry stone walling. An absence of limekilns in the area suggests that they were never used for industrial purposes. The overlying Clypeus Member is represented by the Upper Trigonia Grit, an orange and yellow, fine to coarse, crystalline shelly limestone, sitting unconformably over the Phillipsiana Beds. This rock was also used for dry stone walling.

After lunch we followed an extension of the trail in a southwards loop along the base of the escarpment to **Site 7, Castle Rock** and **Site 8, Cleeve Cloud,** before returning to the top of the escarpment and back to Wickfield Quarry. Backscars, rotated blocks and landslip lobes line the escarpment. Exposures of Cleeve Cloud and Crickley Members (Birdlip Limestone Formation) are seen along the escarpment and represent the oldest rocks seen on the trail. The Castle Rock backscar associated with the fault seen earlier, had downthrown fine grained oolitic marls against the Lower Freestone and Crickley Members. ►

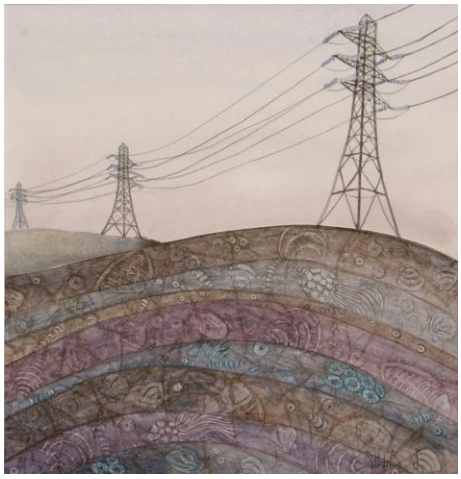
Landslips on Cleeve Common Escarpment

At Cleeve Cloud, Lower Freestone is exposed overlying Pea Grit (Upper Crickley Member), with cross beds of sub-marine oolitic dunes indicating shallow shelf conditions with associated tidal and wave activity. This exposure, a large landslip backscar, also shows tension cracks and washed out gullies. Looking westwards across the hazy Severn Valley towards May Hill the landscape is underlain by Lower Jurassic clays and Triassic Mercia Mudstone, represented by a ridge of Arden Sandstone. Further along the escarpment the final exposure was the base of the fossiliferous Crickley Member resting on Lower Jurassic grey clayey sand. We returned to the top of Cleeve Common via a steeply sloping path up through a tension crack opened up by ground movements, before following the top of the escarpment back across the golf course to Wickfield Quarry.

I would like to thank Dave for another very interesting trip and look forward to the next one. ■

Andy Harrison

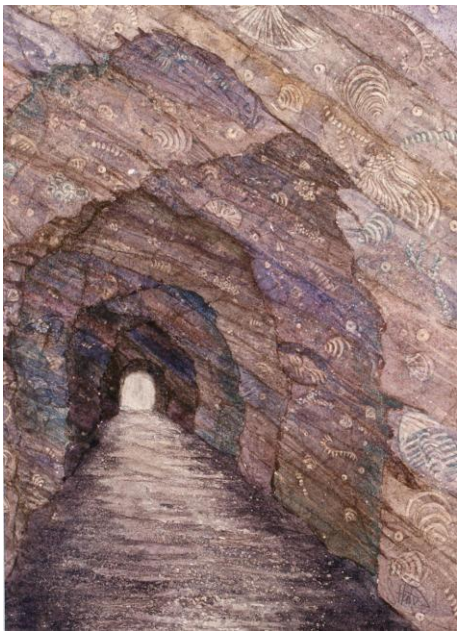
Land lines - GeoArt Exhibition



Land lines, Sue Halstead's exhibition of paintings based on the geology of Dudley, is still on at Dudley Museum and Art Gallery until the 19th September. *Land lines* features paintings inspired by visits to the Wren's Nest Nature Reserve and the caverns underneath the town.

Sue grew up in and around Matlock, on the edge of the Peak District, and has been fascinated with rocks and fossils all of her life. "As a child, I walked past caves and cliff faces everyday on my way home from school. That landscape has become part of my identity. I am interested in how landscape and geology shape our lives".

Visits to the Wren's Nest began as the bid to win the Peoples' Millions got under way back in 2007, with the aim of turning the site into a visitor attraction. "I had heard about the bid, and went just out of curiosity. I was amazed at what I found there. The dramatic landscape and the sheer number of fossils, some of them so tiny and detailed, inspired me straight away. I began thinking about what else might be under there".



The *Land lines* paintings are the result. Many show cross-sections of the earth underneath Dudley, and Sue has also been inspired by geological maps and diagrams in her interpretations of the strata in the rock. Trained as a textiles designer, the paintings also reflect Sue's interest in the subtle colours, patterns and textures of the rocks. Sue now teaches Textiles Design at King Edward VI College in Stourbridge.

Sue will be working in the gallery during the Fossil Identification day on 18th August, when she will be available to talk about her work. She also offers a range of greetings cards and limited edition prints of her paintings.

For more info see www.suehalstead.co.uk or e-mail suehalstead@hotmail.co.uk ■

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

Snowball Earth 2 - the alternative views

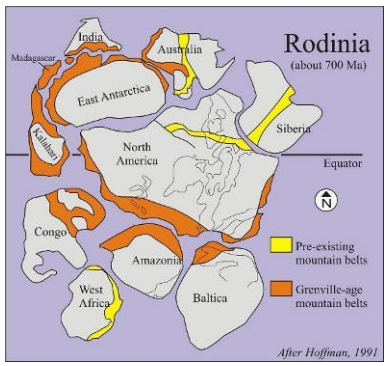
In the last Newsletter I outlined the evidence put forward for a worldwide glaciation in the Neoproterozoic, supported by geophysical and geochemical evidence. However, as with all ground-breaking developments, other geologists look at the exposures and geophysical data and come to rather different conclusions.

The basis of the idea is generated by the Neoproterozoic diamictites which have been described as being glacial tillites, but others believe them to be the results of mass flow, turbidites and even volcanic lahars. There is no denying that there was an extensive glaciation at the time, and the evidence of striated pavements and boulders cannot be explained in any other way, but this does not mean that the glaciation was worldwide. The Port Askaig formation in Scotland has been interpreted in two different ways by different geologists; glacial and sub-aqueous mass flow.

The palaeomagnetic data which fixes the position of these rocks in tropical areas is also questioned. Igneous rocks may give a palaeomagnetic direction as they cool through the Curie point, which is over 500°C. If in any subsequent tectonic activity the rock is heated above the Curie point, this initial direction may be lost and replaced by a more recent direction. We are also dealing with the Earth over 570mya; can we be sure that the magnetic field was the same as today, a dipole close to the axis of rotation? The core would have been hotter, which may have led to multiple poles. The further we go back in geological time the more difficult it becomes to interpret the behaviour of the Earth. The Earth's tilt could have been considerably more than now, and as has been pointed out, if the tilt was more than 45°, the tropics would be less exposed to insolation than the poles and so more prone to glaciation.

The geophysics of the dating has also been questioned; minerals containing uranium that decays into lead are used, mainly in the mineral zircon. But diamictites do not contain these minerals and so geologists use suitable igneous rocks found in the same sequence, often volcanic ash. Snowball Earth demands synchronised ice cover, but the dating could better match multiple glaciations spread over time. There is no denying that this was a time of severe glaciation, but it is argued that there is a great deal of evidence for moving and floating ice, striated boulders and surfaces, and dropstones for example. The phrase 'slushball Earth' has been used.

Rodinia, the ancient super-continent, is the key to the alternative model. The glaciation(s) occurred at a time when this landmass was breaking up by rifting. This would create big fault scarps, with unstable areas and down-slope mass movement giving the diamictites, turbidites and other sedimentary rocks deposited under water. The rifting would also give large uplifted blocks which would be high enough, and so cold enough to give more local glaciations, and so the glacial sediments and structures are neatly explained. This happens even now, to a lesser extent, in high tropical regions. The rifting would not all happen simultaneously, and so the problem of the exact timing of the events is overcome.



This debate will be resolved as more research is carried out, hypotheses tested, and as geophysical and geochemical techniques develop. But the Snowball Earth controversy illustrates one of the attractions of studying geology. We do not know all the answers; our knowledge expands and ideas adapt, and every so often there is a big shift in our interpretation and knowledge that causes tremors in the established understanding of the subject. ■

Sources and references

There are some good sites on the internet covering the topic:

www.snowballearth.org has a comprehensive explanation of the main theory. The BBC put out a very good Horizon programme in 2001 and this can be followed up on www.bbc.co.uk/science following links to Horizon. They also have an interesting news item from 2001, about the Port Askaig tillite on http://news.bbc.co.uk/1/scotland and follow links to snowball Earth related items. ►

The academic papers concerning the topic are:

Proposing snowball Earth:
Paul F. Hoffman and Daniel P. Schrag: *The snowball Earth hypothesis: testing the limits of global change. (*In Terra Nova, 14, 129-155, 2002)

Questioning snowball Earth:
Nick Eyles: *Glacio-epochs and the supercontinent cycle after ~3.0 Ga: Tectonic boundary conditions for glaciation. (*In Palaeogeography, Palaeoclimatology, Palaeoecology 258 (2008) 89-129)

For a very good overview:

Ian J. Fairchild and Martin J Kennedy: *Neoproterozoic glaciation in the Earth System. (*In Journal of the Geological Society, London, Vol. 164, 2007, pp. 895-921.)

Ian Fairchild's research on this topic can be seen on the University of Birmingham web site; Schools and Departments → Geography, Earth and Environmental Sciences → Staff.

Bill Groves

Further Fine Fossil Facts From Forests

Following my article in Newsletter 200 for April 2010, I have discovered a few more interesting features concerning the three trees which were first known from their fossils.

Ginkgo Biloba

Fossilised parts of this tree have been found in coal seams dating from 250mya. There were quite a few other members of the ginkgo family, but ginkgo biloba is the sole survivor. It is unique in the way it reproduces. Fertilisation is effected by free swimming male sperm which reach the ovules through a film of water. This is the reproductive habit of modern ferns, but it occurs in no other known tree. This raises some interesting questions, as male and female flowers grow on separate trees, so how does the sperm reach the female flower? I need to do some more research into this interesting problem.

The tree survived for centuries by cultivation in temple gardens in China. Its generic name ginkgo is said to be derived from the Chinese "xinkuo", meaning the "silver fruit" that the tree sometimes bears. Incidentally, on a recent visit to Dartmouth I noticed a fine specimen in the park in the centre of the town. There is also another in the grounds of Haden Hill House, Beauty Bank, Old Hill, as well as my small sapling.

Metasequoia Glyptostroboides, or **Dawn Redwood**

Until 1941, the dawn redwood was known to scientists only from fossil remains, and was believed to have been extinct since the Pliocene era, which ended about 2 mya. Chinese botanists discovered many specimens in Hupei and Szechwan Provinces. In 1948 seeds were collected from a natural and planted stand of about 1000 trees in the Shui-Sha valley in Hupei Province and sent to botanical gardens and arboreta all over the world. It can be reproduced easily from cuttings, so it is widely distributed in Britain except for Scotland where summers are too cold. The bark is pale orange-brown peeling off in brown plates or fibres. The trees come into leaf in early May. The leaves are straight or sickle shaped, about 10-35mm long, bluish green above, ashy green beneath and they turn red in autumn before leaf fall.

Incidentally, its near relative, the Swamp cypress (Taxodium distichum) grew in Britain 2mya ago, as traces of it have been found in rocks near Bournemouth. ►

Wollemi Pine

Now for the good news! Guess what! There is a wine called Wollemi. It is a cabernet shiraz and comes from south-eastern Australia. It is "full of lovely blackcurrant and plum fruit flavours that are complemented by a hint of spice. A smooth medium bodied wine that is a great accompaniment to spaghetti bolognese, or peppered steak." Alcoholic content is 13.5% by volume. Sainsbury's 'ave it!

On the label: "The Wollemi Pine (pronounced Woll-em-i), is one of the world's oldest and rarest trees. Thought to be extinct, it was re-discovered in Australia in 1994." ■

Gordon Hensman

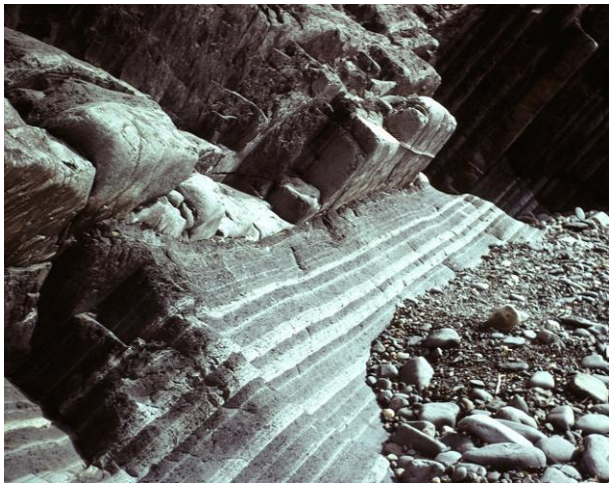
Geobabble

As we get older we notice how the language we use, both technical and everyday, evolves and changes; I still find myself referring to the radio as the 'wireless'. Geological terms also change, quite rightly, as knowledge and techniques develop. I learnt my basic geology in the late fifties and early sixties and I first visited the Wren's Nest in 1961 as part of a University field trip. I wondered what a report on that visit would look like, if I had been asked to write one: Perhaps something like this:- (*Words and phrases in italics have now been changed or re-interpreted.)*

Visited the Wren's Nest in Dudley, a classic locality for the *Dudley* or *Wenlock Limestone.* This rock of Silurian age sits between the *Wenlock Shale* below and the *Lower Ludlow Shale* above. It is a crystalline limestone, unlike the Chalk. When looked at under a microscope we see good calcite crystals in the *Dudley Limestone,* whereas the Chalk is mostly *a fine grained calcite mud with occasional fossils* .The limestones in Dudley are world famous for their fossils, particularly trilobites, *a type of Crustacean,* and Calymene blumenbachi is a symbol of the town, usually called the *"Dudley Locust".* Corals are abundant; this was once a coral reef, and my favourite is the big, rugose cup coral, *Omphyma.* There are also many *sea mats,* now called Bryozoa.

The beds are folded into a sharp anticline by great earth movements in the Devonian. The mechanism for such great pressures to fold and fault rocks is not entirely clear, although there are some interesting theories developing. One is *that as the Earth cooled down it contracted and so the crust has folded, like the wrinkles on the skin of an old apple.* Alternatively it may have something to do with continental drift, *as the continents slowly move across the ocean floor.*

From Dudley we travelled westward to Church Stretton, and to the Long Mynd which is of *Pre-Cambrian* age. The Cambrian started *600 million years ago,* and rocks older than this *contain no fossils and are devoid of life,* although recently there have been some peculiar marks found in *Pre-Cambrian* rocks, in particular a leaf like structure found in the rocks of Charnwood forest. From a viewpoint we could look westward, across the Church Stretton Fault and after it the Welsh Basin or Lower Palaeozoic *Geosyncline.* A geosyncline is a basin of thick sedimentary rocks deposited in deep seas, so they are mostly muds and shales. Graptolites can be found in graptolitic shale. If we travelled further ►



west to the coast we would be able to see the Aberystwyth Grits, (see photograph above) a sequence of alternating sandstones and mudstones. *It has been generally accepted that you can only find sandstone where there is energy to move the grains, and the shales are formed in quiet, deep water. This means that there must have been several changes in sea level to give shallow water for the sandstone and deep water for the mudstones.*

Silurian stratigraphical terminology has been changed, as have many of the fossil names; Omphyma is now called Ketophyllum. Plate tectonics was about to emerge as sea floor exploration and sophisticated geophysics developed. Similarly the electron microscope was waiting to have its enormous impact on identifying both rocks and fossils, particularly the organic nature of the Chalk. It would also open up the research into Precambrian sediments and the organic material therein and radiometric dating would become more accurate, allowing the age of the start of the Cambrian to be revised several times. The concept of a geosyncline is not entirely redundant, there will always be thick sedimentary basins; the breakthrough paper interpreting the Aberystwyth Grits as a turbidite deposit appeared in February 1957. There are several anachronisms here, but for convenience I have put developments over a brief period into one hypothetical time slot.

There are so many ideas that have been reinterpreted because of new evidence. You may know of others, or you may have other comments to make. Please do so through the Members' Forum. The only problem is that by doing so you are revealing your relative, even if not absolute, age. ■

Bill Groves

Members' Forum

Letters/emails

The Bushbury & Bognop Glacial Erratics

Following on from the field trip to West Park, Wolverhampton earlier this year, here are some details on how to find further examples of the extensive glacial erratics to be found to the north of the City.

Bushbury Church

Follow the Stafford Road (A449) north from the City Centre looking out for the crematorium signs which will lead directly to Bushbury. The church is on your right hand side immediately past Bushbury Nursery School. Plenty of parking spaces are available outside the church and the erratics are obvious in the middle of the grassed area. Also look along the stone walls immediately opposite this little green as further erratics have been incorporated into the stonework, the majority of which is made up of Permo-Triassic dressed blocks, presumably from the long closed Bushbury Hill quarries.

Old Warstones Lane

This site is some 6 miles from Bushbury Church but is easy to find by turning right out of the churchyard and following Bushbury Lane until the first turning on the right, Underhill Lane, immediately identifiable by Northicote Park Farm buildings on the corner. Continue along Underhill Lane to the junction with the Cannock Road (A460). Turn left and proceed along the A460, under the M54 until Shareshill sign is seen on the left. Take the next right turn, Hilton Lane, also signposted Hilton Hall. Carry on along Hilton Lane, and after passing over the M6, look for the next turning on the left which is Old Warstones Lane. It is possible to park alongside a small field entrance on ►

the right hand side. Erratics can be found immediately on the corner as you turn into the lane, in the entrance to the farm buildings on the left hand side and also on the right hand side of the field entrance. A further two fine examples can also be seen just a little further along Hilton Lane on the right hand side, although other boulders here being used to block off an old quarry entrance are obviously not of glacial origin.

Essington - Bognop Road

If you retrace your steps to the A460 and return back under the M54, at the second island after passing under the motorway turn left into Bognop Road. Climb up the hill and look for the buildings on the right hand side where erratics have been collected together to form an impromptu display (along with one or two other spurious pieces, it has to be said). Easy parking is on the left hand side about 50m past the display.

The Old Warstones Lane collection is probably best seen when little vegetation or tree foliage is present, and at Bognop there is a remarkable panoramic view across cornfields back to Wednesfield with the Rowley and Dudley hills dominating the background. ■

Mike Williams

The Martley Tornado!

Our destination in September will be the little village of Martley, postponed from July - where an unusual event took place at about 8.30pm on 13th July, the day before St. Swithin's Day when it is supposed to rain for 40 days and nights if it rains on that day.

The 'Express and Star' newspaper on July 15th 2010 reported the event as follows:

"A freak mini-tornado threw a quiet Midland village into chaos uprooting a large tree and even lifting a dog from the ground. Families were stunned when winds began whipping around Martley, near Stourport. Seconds later a black funnel swept through St. Peter's Drive uprooting the tree and sending it flying through the air. It landed on the road just a short distance from an old people's home. Roof tiles and garden furniture were also hurled into the air by the tornado which lasted about a minute."

So when we go next month we must look out for St. Peter's Drive. ■

Gordon Hensman

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