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# CHARNIA



Members at the Christmas Meeting 12.12.12

The newsletter of the Geology  
Section (C) of the Leicester  
Literary & Philosophical Society

January 2013

[www.charnia.org.uk](http://www.charnia.org.uk)



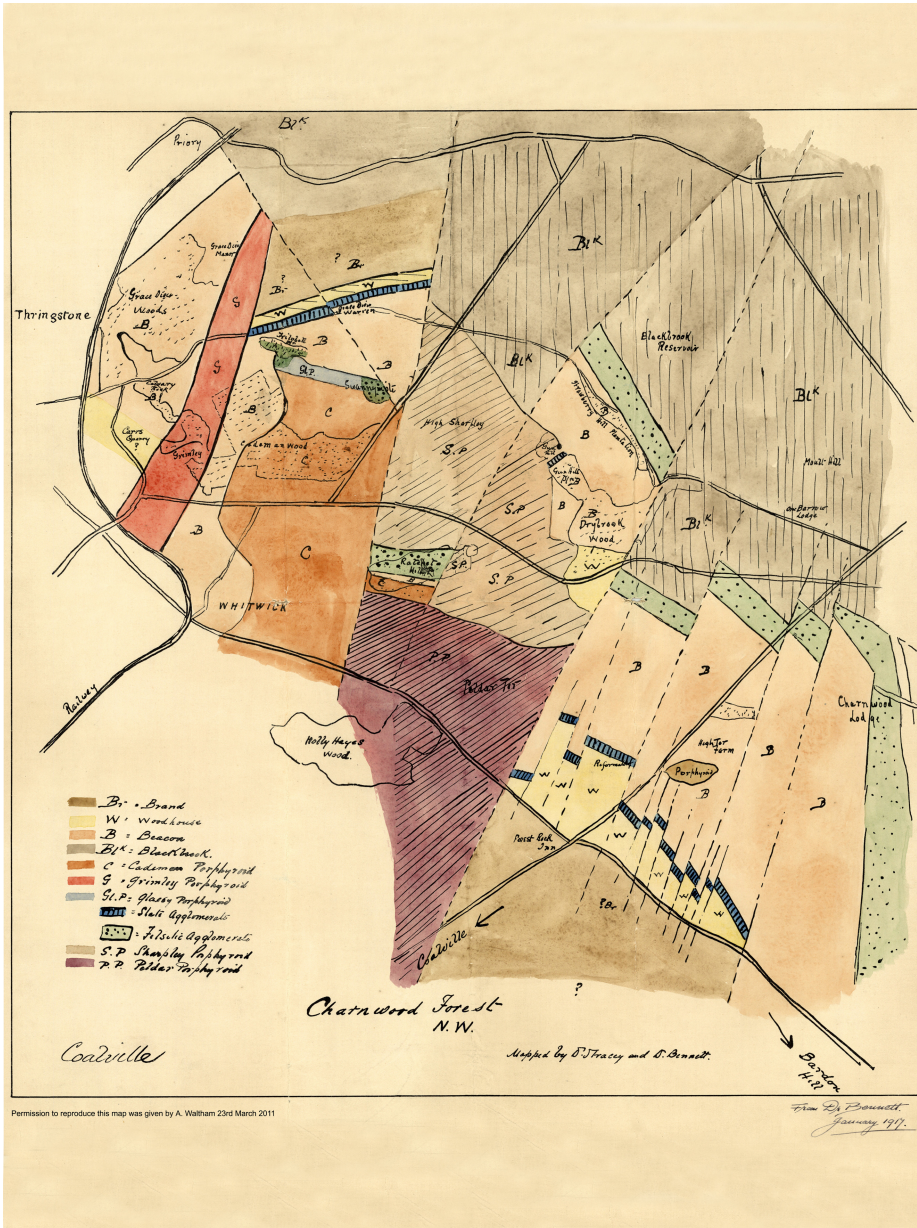
## Editorial January 2013

What does the keen geologist do when finding him- or herself in a part of the country that has little solid geology on show, say, a county in England like Norfolk. Well, the Chairman and I are now faced with that situation, and are presently spending most of our time in Norwich, where Joanne now works. The situation may or may not be permanent, at this stage we simply don't know, but we'll be there I suspect at least into the summer. Now I've always had a fallback to the 'no proper geology' scenario, and that is a consuming interest in churches. Some of that interest is certainly historical and architectural, but a goodly proportion is geological, and church building stones can prove to be very diverting and informative.



Church Langton St Peter, a Lincolnshire Limestone and ironstone building

In Leicestershire we are lucky to have several stones hard and workable enough to use in church building, for example in the west and north west of the county we see predominantly sandstone churches of several tones of grey, while nearby in Charnwood, despite the extreme difficulty of working its hard igneous rocks in medieval times, we have many churches constructed of that stone. To the east and south east we see largely ironstone and limestone



The original colour version of Stracey & Bennett's pre-1911 geological map of Charnwood. See Gamble & Ford, Charnia Sept 2011

buildings, amongst the most attractive in the land. The builders of the early churches had to be very careful with their expenditure and wanted to avoid having to import stone due to the difficulties of transport, so generally speaking they used the first suitable stone to hand, thus a study of the fabric of a church can tell us much about the local geology. This is particularly true in Leicestershire and Rutland. So I encourage you to get out and look at your local churches, see if their fabric and stone confirms the local geology, and if not, why not? In Norfolk of course there is little hard stone around, so the interest comes in working out where the stone of a church came from, and how it arrived at its destination. However, most of the time, flint cobbles had to suffice, together with other cobbles from the Drift, while Carstone was used in the west to a certain extent. Only the richest abbeys and monasteries could afford to import and dress stone. If churches are your thing, and especially those of our own county, I hope you will forgive a little self-promotion when I tell you that I have written a two-volume book on the parish churches of Leicestershire, due to be published shortly.

Back to Section business. Very soon we will be having our two most important meetings of the year, firstly the annual Saturday Seminar. We are particularly excited about this year's, as it is dedicated to the Section's very own doyen of geologists Trevor Ford, his life and works. I make no apology for repeating my exhortation to you not to miss this one on March 2<sup>nd</sup>. The next important meeting is the AGM on March 20<sup>th</sup>, when once again we will be treated to an exposition from our Chairman, hear about the doings of the Section over the past year and elect our officers and committee for another one. As ever, the Section invites applications from its members for any post in the administration that they have an interest in taking on. In particular, we are always looking for committee members. Contact the Chairman or Secretary if interested.

Andrew Swift

## **Winter Programme, remainder of 2012-13**

### **Wednesday January 23rd**

Dr Andrew Howard (British Geological Survey, Keyworth). **From 2D maps to 3D apps – geological surveys for the 21<sup>st</sup> century.**

### **Wednesday February 6<sup>th</sup>**

Members Evening, New Walk Museum, Leicester.

grounds of Curlew and some were seen at our second stop of the day whilst looking at the shales.

Our many trips into Derbyshire have often given us sightings of unusual birds. On the excursion to the Bakewell area in May 2010 we came across a Dipper down by the river and the visit to Monsal Dale in June 2000 gave the group good views of Wheatear. When we have a weekend away at the coast, sea birds are the order of the day with gulls and sea ducks aplenty. On our fieldtrip to Yorkshire in 2001 we had sightings of Guillemot, Common Scoter, Kittiwake and Eider. Hunstanton later that same year let the group see Fulmar on the cliffs and Gannets passing by on the sea. A group taking refreshments on the quayside at Woodbridge, Suffolk, saw a Honey Buzzard circling above, and two members who went to Lyme Regis in 2002 to this day think they saw a Bee Eater in the trees as they walked through the park at dusk. I could continue with Redstart at Trevor Rocks near Llangollen and Little Owl on the way down to Blockley but we should not forget the other wildlife that's been seen.

With our field trips taking place over the summer butterflies are very often found. We commonly see the Peacock, Speckled Wood, Tortoiseshell, Painted Lady, Orange-tip and Red Admiral on many of our visits. Sometimes we get to see the not so common, with Small Copper, Gatekeeper and Wall butterfly being recorded. It was nice to sit in the sunshine on a grassy bank in the quarries at Duns Tew, near Banbury in July 2006 and watch the many Marbled Whites flitting about just in front of us. Seeing a Clouded Yellow drinking from a small pool of water in Stewartby Pit, Bedfordshire, in August 2000 was memorable.

Wildlife is everywhere on our field trips and we should keep our eyes open to look for the unusual like the rare sighting of a Slow worm at Bembridge cliffs, Isle of Wight in 2010. Quarries are excellent for wild flowers with places like Leckhampton Hill giving a display of three different Orchids in flower at the same time. The large grassy areas are usually full of meadow flowers, as at Welton-le-Wold, and the working parts of the quarry can be interesting too, an example would be the "weeds" growing around the scrap equipment at the entrance to Guiting Quarry in 2008.

Geology is the reason we are out and about but it would be a shame if it was our only interest. Whilst in the countryside we should try to take in the sights and sounds of the amazing flora and fauna that surrounds us.

Dennis Gamble



the same come from different families, whereas pebbles which you and I can see are totally different turn out to be granites with different dyes or preservatives used in their manufacture.

What we need is none of this. We just need to find out what is the main stone in the area we're in. Luckily there is a simple method – go straight to the nearest/oldest church and hammer off a bit to take home and identify at leisure. All geological formations can then be re-classified 'churchstone'.

A word of warning: cathedrals are useless as they use imported churchstone, and are often too well guarded. It might be wise to have the following certificate in your pocket even for churches.

'From the Society for Entry into Rural Churches

*To the Rev concerned*

*Hi! Today I, the undersigned, attempted to visit your charming little church, but found it locked. I am trying to make a new entrance. I hope this meets with your approval.*

*Love and Peace'.*

Works every time!"

Dennis, relax – this is a JOKE

Tim Johnson

## Not Just Geology

In the May 2012 edition of Charnia Andrew wrote a nice report on the Section's visit to The Roaches in Staffordshire. We all enjoyed ourselves looking at the very interesting geology and the spectacular views across the countryside. Something not mentioned in the report though was that the group was treated to close up views of five or six Green Hairstreak butterflies coming to the flowers of the Bilberry growing along the paths on the hillside. This put me in mind of the many glimpses of wildlife that we get when out and about visiting quarries and outcrops.

As an example, many people regard the Peregrine falcon as rare, but we see this spectacular bird every two or three years. We saw one this year on the Staffordshire trip in April and before that on our visit to Croft Quarry. Other uncommon birds seen on the Roaches this year were Stonechats singing from the tops of bushes and rocks and a lone Raven gliding over the summit and down into the valley beyond. The boggy areas in the valleys are the breeding

## Wednesday February 20<sup>th</sup>

Dr Howard Falcon-Lang (Royal Holloway, University of London): **Darwin's lost fossils found.**

## Saturday March 2<sup>nd</sup>

Annual Saturday Seminar, University of Leicester. **Dr Trevor D. Ford O.B.E: 60 years of geological achievement.**

## Wednesday March 6<sup>th</sup>

Dr Richard Walker (Department of Earth Sciences, University of Oxford): **Earthquakes on an urban planet: challenges for the 21st Century.**

## Wednesday March 20<sup>th</sup>

Annual General Meeting and Chairman's Address by Dr Joanne Norris, (Halcrow Group Ltd, A CH2M Hill Company, Norwich). **Engineering the Broads for the future**

## Abstracts for Winter Programme talks

## Wednesday January 9<sup>th</sup>

### The Bytham River reconsidered

Professor Phil Gibbard

Department of Geography, University of Cambridge

The English Midlands is one of the most important regions for British Pleistocene geology. The Middle Pleistocene glacial sediments of the region, termed the Wolston Formation, overlie deposits of a pre-existing river system, the Baginton Formation. The latter are characteristically composed of quartz-rich sediment derived from underlying Triassic bedrock. This SWeNE aligned proto-Soar system was overridden by the Wolstonian ice. Its lack of terraces or discrete sedimentary units implies that the river can only have existed for a limited period. The deposits accumulated during a period of climate change from boreal (?interstadial) to subarctic conditions. A reinterpretation of these sediments as the headwaters of a pre-Anglian 'Bytham river', aligned towards East Anglia across the Fenland, where they were linked to the Ingham Formation deposits, found favour for two decades. This was especially so when the Wolston Formation sediments were reassigned to the earlier, Anglian Stage. However, recent work has shown



that the 'Bytham river' could not have existed in the form suggested by some authors since pre-Anglian-age fluvial sediments are absent from the eastern Fenland margin, except possibly certain deposits at High Lodge, Suffolk. Therefore a re-examination of the evidence is required.

It is concluded that the Wolstonian glaciation (late Saalian, Marine Isotope Stage [MIS] 6) indeed postdates that during the Anglian Stage (Elsterian, MIS 12). In addition, it appears that the Baginton (proto-Soar) stream, as originally conceived, almost certainly did not exist before the early Wolstonian (early Saalian) Stage, following a significant period of fluvial incision. Rather than being aligned towards East Anglia, the substantial proto-Soar flowed into south Lincolnshire and thence potentially to the North Sea via the Wash and the Silver Pit depression. By contrast, the pre-Anglian Ingham Formation deposits of central East Anglia were almost certainly deposited by a separate proto-Trent river that drained the East Midlands over an extended period as a left-bank Thames' tributary. Together these conclusions reinforce the view that the main drainage alignment in southern England during the pre-Anglian period was NW to SE parallel to the regional tilt of the landmass.

**Wednesday January 23<sup>rd</sup>**

**From 2D maps to 3D apps - geological surveys for the 21st century**

Dr Andrew Howard

Director of Geoscience Survey and Monitoring, British Geological Survey

William Smith's world famous geological map of England and Wales has been a source of inspiration for geologists for almost 200 years. Like any professional geologist today, Smith had a thorough understanding in his mind of the geology in 3 dimensions, an insight of the geological history, and an appreciation of the value and impact of geology on the contemporary needs of society. His map, revolutionary at the time, was in effect the first attempt to communicate at national scale a 3D geological model using the best available technology at the time, the printed geological map.

In the 21<sup>st</sup> century, geologists are faced with ever more challenging questions concerning how we manage and adapt to our changing environment. Where and how, for example, can we safely store hazardous materials in the subsurface? How can we develop and sustain supplies of mineral, energy and water resources? What will be the impacts of man-made development and climate change on hazards such as ground instability,

levels, failure at Copenhagen and all later conferences, damning due diligence of the IPCC itself.... None of these seem familiar to the authors, but take one example. Surely no-one else still extols Michael Mann and his 'hockey stick', purporting to show that the Medieval Warm Period never took place – long a wish of the IPCC. Mann's integrity was trashed in the leaked emails and then his statistical analysis was skewered by two heavyweight statisticians in US Congress hearings.

Such a shame: if they had taken a more balanced approach then the book as a whole could have been great. But, as they say themselves (p257) "one cannot convince anyone whose mind is made up". It is this type of blinkered analysis which has led to Europe trying to ban fracking for shale gas, while the USA has used these techniques to transform its energy sector. As they themselves end their book: – "Crazy, isn't it?"

Tim Johnson, [TFNJ@talktalk.net](mailto:TFNJ@talktalk.net)

## Basic Geology

*I liked this guide, by Miles Kington, and thought I'd share it with fellow sufferers!*

"Geology is that branch of natural history which claims that everything beneath our feet is either igneous or non-igneous rock – the only science which divides nature into smoking and non-smoking departments. It uses the following two phrases:

'these rocks were formed by upheaval and under immense pressure buckled to form the complex formation we see today'.

'these rocks were formed from sediment, then overlaid to form the complex formation we see today'.

Geologists seem to be excited by events billions of years ago, and rather bored by what's lying around now. To hide this they resort to tricks. Calling everything, even sand and mud, 'rocks'. Colouring their maps with garish colours. Using poetic names like millstone grit, boulder clay, lower greensand. And captioning their time charts strangely – 'Cretaceous Era, great lakes in UK, sea creatures deposited, invention of fishing rod, half-day closing in Africa'.

Reality is different – rocks aren't brightly coloured, but brown/brown-grey/grey-grey/grey-brown and off-yellow. They never look like their names – never go out to look for lower greensand. And, worse, stones that all look

the time the Saturday staff put the quarry to bed for the weekend. However, mine manager John Allen, who was most helpful during our stay, was keen to host us for another visit soon. Leader Andrew Swift thanked both John and Noel for their invaluable contributions to the day.

With a finishing time somewhat in advance of what we are used to, we were free to experience the flesh pots of nearby Elston, and some of the party found their way to the Chequers Inn, which proved to be a fine hostelry which had its own dedicated micro-brewery. Afterwards, the leader and Chairman visited the village church to examine the building stone, and were pleased to find Darwin family memorials inside the church, including one to Charles's grandfather, the well-known Erasmus.

Andrew Swift

## Book Review

*The Goldilocks Planet, the four billion year story of earth's climate.*  
Jan Zalasiewicz & Mark Williams, OUP 2012, 303pp.

This book, by two local geologists, covers first the geology relating to climate over 4.5 Gyrs, then the United Nations climate change forecasts.

The authors neatly combine geological terminology and the main climate changes, showing the slow decline in global mean temperature to about 1Gyear ago, and the increasing frequency of ice age episodes. They have astronomy forcing the main temperature changes, then warmth degassing CO<sub>2</sub> from oceans (with subsequent positive feedbacks), and then rainfall washing out the CO<sub>2</sub>, resulting in its sequestering as limestone. Sometimes volcanism releases enough CO<sub>2</sub> or methane to initiate strong warming. Other mechanisms are not discussed. Seawater pollution by CO<sub>2</sub> is raised, but, again, other views are ignored.

The current ice age in the North has lasted for 2 Myrs or so, and ice core analysis has shown a surprising number of sharp changes, any one of which would have knocked Goldilocks for six. At present we are in a fairly stable warm period, although millennial warmer and colder stages seem to occur, inexplicable by either Milankovich, CO<sub>2</sub> levels, or volcanism.

This leads on to the second half of the book, clearly based on the United Nations scientific 'consensus' of around the latest 'Assessment Report' of their climate committee ('IPCC'). Since then the IPCC has suffered several body blows – whistleblown emails, the standstill of temperature and sea-

flooding and coastal erosion? To help address these questions, national geological surveys like the BGS are deploying ever more sophisticated and diverse survey techniques and information systems to model and predict the properties and processes of the subsurface, and communicate this knowledge to other specialist users, decisions makers and the public. This talk will describe some of these new technologies, and present a vision of some of the maps, 3d models and 'apps' that William Smith might have used to publish his geological model and associated insights, were he alive today.

**Wednesday February 20<sup>th</sup>**

### **Darwin's lost fossils found**

Dr Howard Falcon-Lang  
Royal Holloway College, London University

The British Geological Survey is home to more than three million fossils collected over two centuries and catalogued with enormous precision. However, as generations of curators have come and gone, a few collections have lain forgotten and their significance has gradually passed out of memory. In March 2011, I pulled open some drawers marked 'unregistered fossil plants' in one of the Survey's windowless vaults in Keyworth, in central England. What I found inside made my jaw drop. Contained within were hundreds of beautiful thin sections of fossil wood dating from the early nineteenth century. The collection was assembled by botanist Joseph Hooker (Darwin's best friend) while he was briefly employed by the Survey in 1846. The material includes some of the first thin sections ever made by William Nicol, the pioneer of petrography, in the late 1820s, as well as specimens picked up by Darwin and Hooker on their round the world voyages in the 1830s and 1840s. The collection is particularly interesting in the way it sheds light on the vibrant and sometimes murky world of early nineteenth century science. This talk introduces the story of these fascinating fossils.

**Wednesday March 6<sup>th</sup>**

### **Earthquake science in the 21st century**

Dr Richard Walker  
Department of Earth Sciences, University of Oxford



The recent disasters in New Zealand and Japan exemplify the threat posed by earthquakes. Sadly, as global populations increase, and as people migrate to urban centres, the exposure of humans to earthquake hazard is set to increase - generating an urgent need to identify areas at risk from earthquakes and to identify how often, on average, earthquakes occur in these regions. Join us to explore the science behind earthquakes and the methods used to study them. We will describe the background to some recent earthquake disasters before focussing on the particular challenges that face the developing world.

**Wednesday March 20<sup>th</sup>**

### **Engineering the Broads for the future**

Dr Joanne Norris

Halcrow Group Ltd, a CH2M Hill Company, Norwich

The Broadland Flood Alleviation Project is a 20 year project funded by the Environment Agency which is being delivered by Broadlands Environmental Services Limited (BESL). BESL is a joint venture between BAM Nuttalls Ltd and Halcrow Group Ltd. The main aim of the project is to return flood defence levels back to those set in 1995 with an allowance for settlement and sea level rise. The project is well underway, and has provided new defences in some areas, improved existing defences in others and also created new and improved wildlife and faunal habitats, as well as protecting the livelihoods and homes of the Broads' residents.

This talk will review some of the challenges faced by geotechnical engineers working in the Broads and the work being done by BESL to maintain the current standard of flood defence since the defences were constructed or improved.

### **Provisional Summer Programme 2013**

Please note that permissions have yet to be granted for certain localities and some dates remain unconfirmed. Later changes may be made due to unforeseen circumstances. Finalised arrangements and full details will be circulated to members in good time for each trip. All enquiries to the Field Secretary.

Closely supervised children may be welcome at certain events. All enquiries to the Field Secretary prior to the trip.

close similarity with later Jurassic ammonite-bearing levels. All units of the sequence are beautifully exposed, a situation not repeated anywhere else in inland Britain.

Much interest devolves onto the Penarth Group beds, which are very rarely seen in exposure, and if so, usually only in short, weathered sections. Here, both the Westbury Formation and Cotham Member of the Lilstock Formation are unusually thick and offer an enormous amount of interest, not least the presence of an enigmatic and intriguing fossil assemblage in the Westbury including vertebrate remains in fissures at the base. Above the Cotham Member is a single bed of porcellanous even-grained micrite with a conchoidal fracture, which probably represents the upper Langport Member of the Lilstock Formation.



**In the Chequers, Elston**

After examining these higher beds we descended to the bowels of the quarry to look at the quarry's *raison d'être*, the gypsum-bearing levels. These are not great in number and thickness is variable, so the extraction of the gypsum requires no small degree of skill on the part of the quarrymen. At this point we were given a comprehensive and illuminating introduction to gypsum and its properties by ex-Chief Geologist at BPB, Dr Noel Worley.

By this stage the group was well and truly 'getting into' the quarry so it was very disappointing to be told that we had to leave by 12.00, but that was

We had to have two attempts for our excursion to Bantymock Quarry. The first, on July 7<sup>th</sup> (yes, July 7<sup>th</sup>, height of the summer ..... ) the quarry was filled with water and the sides were caving in. All work had to be suspended, so naturally our trip had to go too. But the guys of British Gypsum aka BPB Formula these days, were most accommodating and we arranged to try again on September 29<sup>th</sup>. The weather was much kinder on that day and in fact it was very pleasant.



**The sequence at Bantymock Quarry**

A party of 16 assembled at 10.30 at the quarry offices. Bantymock Quarry is a bit of hidden secret amongst the top echelon of British geological localities, but it is right up there with the best. The geology is all late or latest Triassic and the sequence exposes a complete section from the gypsiferous beds of the Mercia Mudstone Group through the Blue Anchor Formation, the Westbury and Lillstock formations of the Penarth Group ('Rhaetic' as was), to the basal beds of the Lias Group exposed at the top of the quarry. These bottom-most Lias beds do not contain ammonites, so according to the current biostratigraphical scheme they are classified as latest Triassic, despite their

**Saturday May 4<sup>th</sup> or 11<sup>th</sup>** Lea Quarry, Much Wenlock. Leader: ?Mike Allen. TBC.

**Saturday May 25<sup>th</sup>** Welton le Wolds. Leader Helen Gamble. This trip will be held in memory of the late John Aram. Confirmed

**Friday May 31<sup>st</sup> – Sunday June 2<sup>nd</sup>** Weekend excursion to the Vale of Wardour. Leader John Needham. Confirmed.

**Wednesday June 19<sup>th</sup> (evening, meet 6.00pm)** Measham Brickworks. Leader Albert Benghiat. TBC.

**Saturday July 13<sup>th</sup>** Jurassic localities in Warwickshire. Leader John Crossling (joint meeting the the WGCG). Confirmed.

**Tuesday 30<sup>th</sup> or Wednesday 31<sup>st</sup> July** Blockley Quarry, near Paxford, Glos. Leader: Andrew Swift. TBC.

**Saturday August 10<sup>th</sup>** Limestone localities in Derbyshire. Leader: Peter Gutteridge. Confirmed.

**Saturday September 7<sup>th</sup>** Cloud Quarry, Breedon. Leader: Frank Ince.

**Saturday October 12<sup>th</sup>** East Leake or Barrow on Soar gypsum mine. No further details.

## **Field excursion reports**

### **Volcanic rocks of the Peak District, Saturday 8<sup>th</sup> September 2012**

All the best trips start in lay-bys and this excursion was no exception! Mike Allen, our leader for the day, had suggested an itinerary of serious volcanic sites or as one member put it; 'the lollipops of Derbyshire'. It was always an ambitious task to visit all six localities in one day and so it proved when the first location, Calton Hill Quarry offered up its secrets.

Quarried for roadstone the quarry appears modest and shallow until your eye alights on the columnar jointed analcite-basalt. The mineralogy of the site is a result of multiple volcanic events which are recorded by lavas interbedded into the Miller's Dale Limestone. The above ground columns stand about one metre high and are regular in shape and well defined. The multiple events have resulted in a wide range of mineralogical variation within a short distance including large amounts of vesicular lava and vugs containing pockets of crystallisation. Various minerals were found in crystalline form together with Olivine and possibly Spinel and a lively and long lived debate ensued as to the sequence of events that had led to the terrain and geology we see today.



The second stop was Raven's Tor, a popular climbing crag of Miller's Dale Limestone which overlies the Lower Miller's Dale Lava. The irregular contact between the two suggests the lava was exposed to weathering before the deposition of the overlying limestone.

On to an old railway track bed near Litton, now part of the Monsal Trail, it is here that the terminal flow of the Upper Miller's Dale Lava can be seen. The contact is preceded by a marked increase in the dip of the limestone which has caused much debate and this continued on the day!

We again explored the contact between the lava and the limestone at the next stop, Shothouse Spring Tuff. A natural spring flows freely at the contact of the eponymous tuff band and the limestone. The contact was difficult to see as the exposure is overgrown however we all sampled the spring water. It was at this point that the Field Secretary thanked Mike for sharing his insight into the volcanic episodes in this part of Derbyshire. The party broke up with some members heading home and others moving on to the next location, Ible Sill.

Helen Jones

### **British Geological Survey, Keyworth, Saturday 11<sup>th</sup> August 2012**

Traditionally, we have an annual joint meeting with the Warwickshire Geological Conservation Group and this year, as hosts, we invited them to join us at the BGS. Consequently some fifty members of the two groups converged on the remodelled BGS. We were ably shepherded and instructed by Phil Wilby and Mike Howe.

When we arrived we were made very welcome with coffee and biscuits and after a brief introduction the sheer number of attendees dictated that we split into two groups. Each group was to have a presentation by Phil introducing what was an outstanding assembly of Ediacaran fossils from all over the world. These included both original fossils and casts including one of the entire surface from Charnwood area. It was a treat to see so many 'charnias' in one room and together we discussed and compared the characteristics of the frond and disc. Were we looking at juvenile stages or sub species? Debate ensued ably guided by Phil. Excellent geology on all levels.

Next came a tour of the BGS, which to me, was unrecognisable since my last visit maybe five years before. Gone are the vestiges of its religious past and in their place a high tech modernist building which pays homage to this most fascinating of sciences. Geology deserves this place of pilgrimage. We

visited the collections, still in their mahogany cabinets and beautifully curated and ordered stratigraphically. Then, on to the vast core store where tons of rock are stored but can be retrieved at the click of a button; machinery whirrs into action to retrieve a particular core from a particular box on a particular shelf. The resources are readily accessible as and when they are needed. Further improvements are being made with the 'digitising' of specimens and uploading of images onto the web. Scans of individual specimens are taken to create 3D images and then uploaded onto the web. Whilst not replacing the need to handle and study specimens at first hand this major development has opened up the collection to anyone in the world who wants to take a look at a particular specimen without leaving their armchair.

Lunch was taken by the Rock Walk and we then worked in groups to complete a questionnaire using the Rock Walk as our resource. Each period of geological history or major event is represented by a magnificent specimen. The meeting closed at tea time and Mike Howe and Phil Wilby were thanked by Helen Jones, Secretary of the LLPS, Section C Geology and Ian Fenwick of the WGCG. I would also like to add my congratulations to the BGS on creating a resource which is open to all free of charge.

Helen Jones

### **Bantycock Quarry, Newark, Saturday September 29<sup>th</sup> 2012**



**The Bantycock Quarry party**