



# The Black Country Geological Society

## Newsletter No. 197 October 2009

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.

**Copy date for the next Newsletter is  
Monday 7<sup>th</sup> December 2009**

### Committee

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

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## 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.

**Monday 26th October (Indoor meeting)** **The Physical Geology of High Level Magmatic Systems: from Plumbing to Puffins.** **Speaker: Nick Schofield, Aberdeen University.** Nick has recently (September), been working on basalts, on and offshore, on the Faeroes, where a large new oilfield has just been discovered. This should be a very interesting lecture, packed with the very latest information on this important region.

**Monday 30th November (Indoor meeting) Members' Evening.** This is the annual opportunity for members to make their contributions: bring along specimens and photos, exchange views and experiences, question the experts, and learn of members' specialisations. Maybe you could give a short talk on an area of geological interest, or holiday experience? The **buffet is free**, and we hope that as many members as possible will attend. To enable Gordon to produce a programme, please email him with your contribution: [gwjhensman@aol.com](mailto:gwjhensman@aol.com)

**Monday 25th January (Indoor meeting) Les Nichol Memorial Talk: The Legacy of Past Mining - Stabilisation by Drilling and Grouting.** **Speaker: Steve Rule (M&J Drilling Services).** This is a joint meeting with the West Midlands Regional Group of the Geological Society, arranged by their secretary, Adrian Collings.

**January date tbc (Field meeting) Visit to the Lapworth Museum.** Led by **Jon Clatworthy.** This is a chance to view new collections from the Birmingham Museum and Art Gallery, including the Matthew Boulton collection.

**Monday 22nd February (Indoor meeting)** The Carboniferous Period. Speaker tbc.

**February date tbc (Field meeting) Visit to Compton, Wolverhampton.** Led by **Graham Worton.** To look at local Permo/Triassic features and glacial erratics.

**Monday 29th March (Indoor meeting) Brymbo and the Clwydian Range Area of Outstanding Natural Beauty.** **Speaker: Dr. Jacqui Malpass.** Jacqui has spoken to us before, and many members have been to see the remarkable Carboniferous fossil site at Brymbo. She will tell us of the progress made to protect and preserve this important place.

**Monday 26th April (Indoor meeting) Lapworth Museum: West Midlands Fossil and Mineral Collections.** **Speaker: Jon Clatworthy.** Jon will speak about the contribution of these collections to the developing science of geology in the 18th, 19th and early 20th century.

*Andy Harrison, Gordon Hensman*

Those interested in coming to field meetings please contact our Field Secretary, Andy Harrison, mobile: 0797 333 0706 or email: <a href="mailto:andrew_harrison@urscorp.com">andrew_harrison@urscorp.com</a>
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## Other Societies

### Shropshire Geological Society

**Wednesday 14th October:** Speaker: Dr Ian Cope: African iron ore mining.

**Wednesday 11th November:** Speaker: Dr Stuart Black: Forensic geology.

**Wednesday 9th December** 7.00pm start: AGM and lecture: Darwin in Llanymynech. Speakers: Gordon Hillier and Jeanette Bolton.

All lectures are held in the Shire Hall, Shrewsbury, 7.30pm. Room open from 7pm for a chat or look at the SGS library collection. A nominal charge is levied for attendance by non-members. Website: [www.shropshiregeology.org.uk/](http://www.shropshiregeology.org.uk/)

### North Staffordshire Group of the Geologists' Association

**Thursday 12th November, 7.30pm** The Professor Wolverson Cope Annual Lecture. Speaker: Professor Peter Worsley (University of Reading) 'Charles Darwin, the Beagle and Quaternary geology'.

All lectures are held 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/](http://www.esci.keele.ac.uk/nsgga/)

### Geological Society, West Midlands Regional Group

**Tuesday 10th November** 'Stabilisation of the Severn Valley Landslips at Ironbridge', Speaker: Neil Rushton (Telford Wrekin DC) Venue: Wolverhampton University.

**Tuesday 15th December** 'Limited Life Geotextiles' and AGM Speaker: Professor Bob Sarsby (School of Engineering and the Built Environment, University of Wolverhampton) Venue: Birmingham University.

Further information at: [www.geolsoc.org.uk/gsl/groups/regional/page387.html](http://www.geolsoc.org.uk/gsl/groups/regional/page387.html) or contact the Secretary, Adrian Jones: 0121 746 5724 [adrian.a.jones@uk.mwhglobal.com](mailto:adrian.a.jones@uk.mwhglobal.com)

### Woolhope Naturalists' Field Club - Geology Section

**Friday 4th December** 6.00pm Woolhope Club Room of the Main Library, Broad Street, Hereford, HR4 9AU. Member's evening: Bring a specimen, some pictures etc.

Guests are welcome, but must take day membership of the Club: £1.00. For further information: contact Sue Hay on 01432 357138 or email [svh.gabbros@btinternet.com](mailto:svh.gabbros@btinternet.com)

### Lapworth Lectures

**Monday 19th October:** Professor M. Petterson. Dept of Geology, University of Leicester: Transpressional tectonics in the SW Pacific and consequent controls on magmatism and mineralisation: Solomon Islands examples.

**Monday 2nd November:** To be confirmed.

**Monday 23rd November:** Mineralogical Society Distinguished Lecture Programme. Professor D. Manning. University of Newcastle Upon Tyne: Minerals in biological systems.

**Wednesday 2nd December:** Shell University Lecture Series. Dr Tina van de Fliert. Imperial College London: Reconstructing the history of the Antarctic ice sheet: Clues from the past for the future.

All lectures commence at 5.00pm in the Dome Lecture Theatre, Earth Sciences, University of Birmingham. Each lecture is followed by a wine reception in the Lapworth Museum; all are welcome! Further information at: [www.lapworth.bham.ac.uk/](http://www.lapworth.bham.ac.uk/)

## New Black Country Geology Leaflets released.



Two new free leaflets on the theme of "Scorching Deserts and Icy Wastes" have been released, one for Sandwell and one for Walsall. They were produced by Alan Cutler who also wrote the text in his capacity as Project Co-ordinator of the Black Country Geodiversity Partnership. Funding was via Defra's Aggregates Levy Sustainability Fund administered by Natural England.

The title reflects the association of local sources of sand and gravel which are either Permo/Triassic sediments (the deserts) or glaciofluvial deposits (the icy wastes). The primary purpose of the leaflets is to raise awareness amongst local communities of the climates and landscapes of two very different and distinct episodes, which have affected what we now call the Black Country, in the

past. The leaflets are being distributed via the respective Libraries Services and Countryside Services of the two boroughs. In addition the leaflets are available from Dudley Museum, the Lapworth Museum and the Thinktank (Birmingham Science Museum).



There has been a very pleasing response, especially from those without a geological background, to the design and content of the leaflets which include simplified geological maps of the respective boroughs.

Subject to further funding it is hoped that similar leaflets for Dudley and Wolverhampton will be produced in due course. The new leaflets join those for Barrow Hill -The Dudley Volcano (2005), and Norton Covert (2008). All the leaflets include the Society's logo thus sharing some of the kudos.

Dudley MBC has also released an updated reprint of the free Wren's Nest NNR leaflet. Although the choice of cover illustration is controversial (look hard to see any rocks), this is a welcome updated version of a popular leaflet which has been out of print for some time. Copies are available from the Wren's Nest wardens and from reception at Dudley Museum and Art Gallery. ■



## Editorial

This 'bumper' edition of the Newsletter is to catch up with the wealth of new and backlog material received from our members, and I'd like to thank all contributors for their excellent articles, reports and shorter items. There was no room for the **Members' Forum** this time, but please keep sending your suggestions, short items, photos or letters for the next edition.

With the increase in email contact with other societies, we are now receiving emailed Newsletters from several societies. We have been forwarding the NSGGA Newsletter to members on our email list, but this has caused confusion in some cases. To avoid unnecessary 'information overload', in future we will print in our Newsletter the programmes and contact details for other societies, and will only email full Newsletters to members by request to me.

Please note: for all Field Trip queries please contact the **Field Secretary** (*details on P.2*), for all Newsletter business contact the **Newsletter Editor**, and all other business contact the **Honorary Secretary** (*details on P.14*). ■

# The Dudley Bug

## Welcome

Hello and welcome to October's issue of the "Dudley Bug". Since the last "Dudley Bug" we have spent a week on the Isle of Skye reliving the memories from our six weeks mapping project which we undertook during the summer of 2008. The weather was typical for Scotland – wet and windy but that certainly didn't stop us exploring. Sadly we didn't do much Geology but we got to see the fantastic scenery which Skye boasts from every angle (when it wasn't shrouded in low cloud!). So we thought, why not bring some of our Skye experiences to you! This month we present you with a quick guide to Skye and its Geology!

**If you want any more information on anything, or have comments on how to improve the Dudley Bug then please email us at... [thedudleybug@hotmail.co.uk](mailto:thedudleybug@hotmail.co.uk). We will try our best to help!**

*Alison and Chris*

## A Quick Guide to the Isle of Skye, Scotland

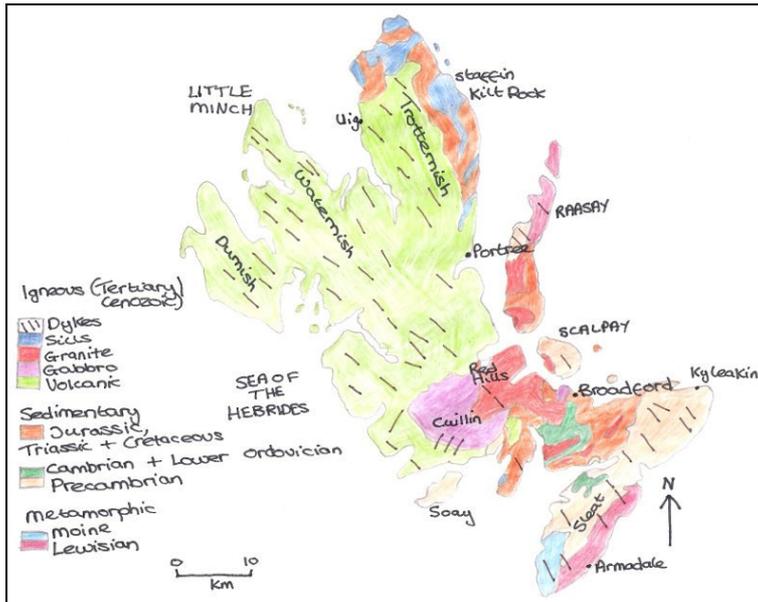
- The Isle of Skye is the largest of the Inner Hebridean Islands with an area of 3000Km<sup>2</sup>. Portree is the largest town on the island.
- The northern part of the island is formed from volcanic activity which is represented by the lava flows which dominate the landscape. Basaltic columns are a popular feature here and can be seen at Kilt Rock. Macleod's Tables display the flat topography formed by the lava flows. In some places these dip slightly, particularly at Quirang. Skye's volcanic activity occurred during the Cenozoic Period (previously known as the Tertiary Period) and is associated with the opening of the Atlantic Ocean 60 million years ago.



*View of the Black Cuillins from Torrìn near Broadford*

- Central Skye is known as the 'Skye Central Complex' and is home to the world famous Cuillins which are formed from two very different igneous units. The 'Black Cuillins' are predominantly made from gabbro and peridotite whereas the 'Red Cuillins' consist mainly of granite.

- The southern part of the island displays the sedimentary units, some dating back to the Precambrian with the youngest types being glacial deposits from the two glaciations which affected Skye between 13,000 and 26,000 years ago.
- The limestones of the Durness Group display some of the best limestone pavements and related features in the UK. These can be found in the Strath Suardal area, immediately south of the Red Cuillins.



- The majority of the dykes trend in a general NW-SE direction.
- The oldest rock found on Skye is the Lewisian Gneiss which dates back to the Precambrian when it was formed from the metamorphism of older rocks. The oldest sedimentary rock is the Torridonian Sandstone.
- Due to the vast amount of igneous rocks there has been a lot of metamorphism altering the sedimentary rocks. The most distinct unit to have been metamorphosed is the limestone from the Strath Suardal Formation of the Durness Group which is Ordovician in age. This has been metamorphosed not only by the volcanic activity of the Red Cuillins but also by the nearby Beinn an Dubhaich Granite. This has formed the famous Skye Marble which is currently being quarried at the Torrion Marble quarry near Broadford, the second largest town on the island.
- The Moine Thrust which is one of the most important faults in Northwest Scotland runs from the Shetland Islands to the Sleaic Peninsula on the south tip of Skye.
- Many of the geological units which crop out on Skye can be seen in the Northwest Highlands. These include the Applecross Formation and Diabaig Formation of the Torridon Group, the False-bedded Quartzite Member and the Pipe Rock Member of the Eriboll Sandstone Formation and finally the Fucoïd Beds Member, the Salterella Grit Member and the Ghrudaidh Formation of the An t-Sron Formation.

**References**

Gillen, C. 2003. *Geology and Landscapes of Scotland*. Terra Publishing: England. 10, 60-61, 152, 155, 194, 204 pp.  
 Roberts, J. L. 2004. *The Highland Geology Trail*. Bell and Bain Limited: Glasgow. 69-78 pp.  
 Stephenson, D. 1994. *Skye: A Landscape Fashioned by Geology*. Scottish Natural Heritage and British Geological Society: Edinburgh. 2-3 pp.

**Note from Newsletter 195**

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

In this issue we commented on the status of the Plio-Pleistocene Boundary. It has now been confirmed that the Quaternary and the Plio-Pleistocene boundary now begins at 2.6Ma rather than its previous 1.8Ma. For more information see [www.stratigraphy.org](http://www.stratigraphy.org)

**Answers from Coal Swamp word search in Newsletter 196.**

## Rock & Fossil Festival - September 2009

The Black Country Geological Society's input into the R&F Festival went well, thanks to many willing helpers. Many thanks to Alan Cutler and Mike Williams, who gave welcome pre-Festival advice and practical help in setting up our stand and then played a valuable part in promoting the Society. Thanks, too, to Graham Worton for the varied selection of hands-on fossils and minerals he provided. The young people found them interesting and the even younger ones (and others!) liked the (w)rubbery wriggly squid.



We had a good team to answer questions and use their specialist knowledge to the good of the Society. It was good to have so many enthusiasts: Bob Bucki, Alf Cole and Joy Duckworth; Andy Harrison, Gordon Hensman and Steve Murphy; Les Riley, Julie Schroder and Peter Twigg.

We had many enquiries on both days, from secondary school children as well as adults. Most took away 'enquiry' sheets and said that they were prepared to attend a meeting, with the possibility of joining. A good couple of days; thanks to you all. ■

*Barbara Russell*

## Field Meeting Report

**Sunday 31st May: Field trip to the Castleton Area, Peak District** led by Chris Arkwright (OU).

A small group of BCGS members met Chris Arkwright at the abandoned road car park near the Blue John caverns entrance, under the shadow of Mam Tor. Chris started with an overview of the regional and local geology and explained what was planned for the day.

### Local and regional Geological Setting

Most of southern Derbyshire (the White Peak) comprises a vast limestone dome (The Derbyshire Dome), which formed during Lower Carboniferous times. The edge of this descends into a vast basin that extends southwards from Castleton. In Upper Carboniferous times the basin was filled and the Derbyshire Dome buried beneath a very deep sequence of sediments from an immense tidal delta to the north. During the early Variscan Orogeny in the Late Carboniferous, regional uplift and faulting of the area resulted in fracturing and fissuring of the Derbyshire Dome and mineralisation by hydrothermal fluids, or mineral rich groundwater, that was forced upwards through the limestone under pressure.

Various stages of uplift and erosion followed, and during the last Ice Age the tundra landscape was shaped into the topography seen today. One consequence of the Ice Age was the development of large landslips in the region associated with old faults and the bedding planes of the deltaic sediments. A good example of this is Mam Tor and the backscar, our first stop.

### 1. Mam Tor Landslip Backscar

Mam Tor rises to 517m and the Mam Tor landslip backscar looks like a large gouge in the eastern side of the hill. The backscar reveals a succession of sedimentary layers starting with shale (Edale Shales) at the base, continuing through a thick sequence of (Mam Tor) Sandstone and siltstone, and finishing with layers of shale and gritstone, all of Namurian (Upper Carboniferous) age. The succession is typical of a fining upward, or Bouma, sequence, which ►

*Goniatite*

was deposited by waning turbidity currents. The sandstone and siltstone layers are rich in flakes of muscovite mica and also contain flute and load casts. These indicate that the predominant current direction of deltaic material of the Mam Tor Beds is from the NE, but we saw local variations at Mam Tor with flute casts indicating currents from the east. These deltaic materials were transported by big river systems, ie braided rivers on the delta plain, rather than by flash floods from the Caledonian mountains, which were located to the north east during the late Carboniferous. The mudstone and shale layers contain plant remains and fossil Goniatites - early relatives of cephalopods and ammonites. These sediments are evidence of the shallow marine delta to the north and are indicative of quiet marine conditions. Discreet layers of ironstone nodules are also seen within the shale/mudstone layers. These formed from the precipitation of iron oxide into concentric layers round a core of plant or algal origin.

## 2. Windy Knoll Cave, Back Reefs and Boulder Beds

We headed south from Mam Tor past the Blue John caverns entrance, to a small limestone quarry and the Windy Knoll Cave. The bottom of Windy Knoll Cave is covered in rubble and many animal bones have been found there. It is at the edge of the Derbyshire Dome and formed as a result of falling sea levels and weathering during the Lower Carboniferous. In the last Ice Age limestone rubble and boulders were washed into the cave by fast flowing meltwater along with animal remains, many of which are on display in Manchester Museum.

Horizontally bedded limestones in Windy Knoll represent the Back Reef facies (ie oolites, broken fossils and algal mats, resulting from agitated waters at the edge of the lagoon), whilst the limestones seen further down in Winnats Pass represent the talus slopes, which here dip at 20° to 30° towards the east. These form the edges of the Derbyshire Dome where broken reef fauna and talus were deposited as the slope descended into the abyssal depths. At the top of the Fore Reef is the Main Reef formed of algal mats, or stromatolites, and fine grained carbonate mud. These are lined by other reef building

*Mam Tor*

organisms, including bryozoans, sponges and tabular corals. Behind the Main Reef is the Back Reef, formed of rounded clasts, corals, crinoids, brachiopods and some ooliths, and beyond this is the Basin, or Lagoon, filled by carbonate rich mud. Deposition of talus and fossil debris on the Fore Reef is evidence of high-energy conditions whilst in the Lagoon complete fossils indicate deeper and calmer conditions.

On the Windy Knoll outcrop we saw broken corals, brachiopods, algal mats and evidence of mineralised deposits, such as purple fluorite, shining grey galena and even hydrocarbons on the top of the outcrop. We saw an example of an ancient fissure filled with angular clasts and dark muddy limestone. Chris told us this was once believed to be a Neptunian dyke, ie filled underwater. Today these features are regarded as fossil grykes or palaeokarst resulting from falling sea levels and weathering of the exposed limestone during Carboniferous times.

## 3. Winnats Pass, Treack Cliff Cavern and Odins Rake/Cave (Disused Mine)

From Windy Knoll we headed east through the steep sided limestone gorge of Winnats Pass. Chris pointed out former patch reefs and talus slopes formed at the front of the ever advancing Fore Reef. Unlike other passes in the area, Winnats Pass is not the result of a collapsed cave system but is believed to have formed in stages, initially during the Carboniferous as a shallow channel cutting through the Fore Reef, and later carved by glacial meltwater during the last Ice Age. Fossil reef debris washed down through the pass now forms beach beds at the foot of the Pass near to Speedwell Cavern. ►

Emerging from the eastern end of the pass, we looked down the Fore Reef talus slopes into the vast bowl shaped depression of the Carboniferous basin, towards Castleton. It was noticeable how the edges of the basin rose steeply upwards from relatively flat low lying ground. Chris mentioned that in the nearby Cave Dale, layers of dolerite lava and ash are found interbedded with the limestone beds and are evidence of quiet, submarine volcanism on the fringe of the Caledonian Orogenic belt. No dolerite or ash layers occur in Winnats Pass. However, dolerite has been found there and is believed to have been transported and deposited there.

From Winnats pass we followed a footpath northwards traversing the Fore Reef to Treak Cliff Cavern visitor centre and shop. Here we stopped for lunch and saw some examples of Blue John for sale. This is a variety of fluorite that the area is famous for. Fluorite occurs in many shades of green, yellow, blue, purple and even black. Blue John can be identified by its yellow and purple banding and is often mistaken for blue fluorite, which was also on sale.

After lunch we followed the road north from Treak Cliff Cavern to Odins Rake/Cave, a disused mine believed to be a trial adit sunk to look for lead ore, galena. The minerals taken also included fluorite, calcite and barytes. These would have been of secondary importance to the galena. The presence of these minerals is indicative of low intensity metamorphism. Mineralisation involved mineral rich ground water being forced upwards under pressure through cracks and pores in the limestone during burial. As the mineral rich water was forced higher the pressure dropped and mineralisation occurred on the walls of cracks and cavities within the limestone. The overlying Edale Shale formed an impermeable cap, or aquiclude. This kept the mineralisation within the limestone at approximately 1km depth. According to Chris, mineralisation was not restricted to cracks and cavities but occurred throughout the limestone. With the sun at the right angle this makes the limestone look purple. The unique banding pattern of Blue John indicates where it formed in the mineral vein and is dependent on the cavity shape and water flow rate.



*Remains of the old A625 below Mam Tor*

Across the road from Odins Rake/Cave we saw some of the area's lead mining legacy, including a horse drawn crushing mill for extracting galena, a stream stained orange by bog iron, and covered vent shafts from an old lead mine. Patches of a small white flower called leadwort, which thrives on lead rich soils, was testament to the lead in the soils around us.

Looking to the north and east, a large area of relatively flat fern-covered ground masked the debris making up the lobe of the Mam Tor landslide. Heading north along the old A625 towards Mam Tor we learnt more about the landslide and its effects. Work carried out by Skempton, A.W. et al in the 1980's show the landslide to be low and shallow with an average angle of 13° and a stable angle of 11°. Chris told us that a programme of slip movement surveying and monitoring had been ongoing since 1996. This has shown that movements are not connected to the mine workings or to truck movements, especially since the mines occur within the limestone strata, which show no sign of instability. Most slip movements occur during wet periods, i.e. during the winter months but also during the particularly wet summer months of 2007 and 2008. Consequently it has been shown that the main forces behind the landslide movements are high levels of groundwater and elevated pore water pressures. The programme also shows that the slip movements can be split into three zones: two at the western and eastern ends of the landslide where the slip mass is affected by compressional forces, and a central zone where the slip mass is affected by extensional forces.

The old A625 was first constructed by The Sheffield Turnpike Company in 1819 from waste produced by the nearby Odin Mine. The road crosses the main body of the Mam Tor landslide twice as it makes its way upwards. It saw constant repairs and reconstruction for 160 years following its initial completion. By 1977 the road was restricted to single carriageway because of the landslide movements and in 1979 was closed to traffic altogether. ►

Making our way up towards Mam Tor we saw how the moving landslip had deformed the road making it buckle, crack, subside and break up. Bulging of slip material could be seen intruding on to the road, and every 2 to 3 years repairs are undertaken along the over-steepened edge of the road to stop it collapsing. At the highest part of the road, overlooked by the Mam Tor backscar, we could see how landslip movements had totally destroyed the road, breaking it up into subsided and tilted blocks of layered road construction. (See *photo above*.) An old drain suspended some metres in the air showed where the road originally used to be.

I would like to thank Chris for an extremely interesting and educational trip and look forward to organising another one to the Derbyshire area in the future. ■

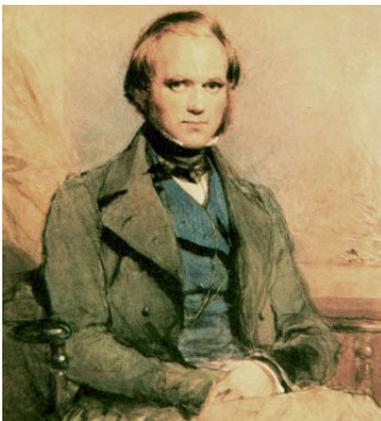
Andy Harrison

### Geology Books for Sale

Roy Starkey is currently disposing of an extensive library of geological/earth science books for an elderly friend. Any members who may be interested should contact Roy at:  
15 Warwick Ave, Bromsgrove, Worcs. B60 2AH  
Tel: 01527 874101, Mob: 07850 155300, email: [roystarkey@dsl.pipex.com](mailto:roystarkey@dsl.pipex.com)

## Geologist explorers

I give no apologies for making the last of my geologist explorers Charles Darwin. His credentials as a geologist are well known, and in Victorian scientific society he was recognised in the 1830s and 1840s as a leading geologist. I would also argue that he was also an explorer; he braved many different environments in order to make his scientific observations and data collection. His voyage aboard the *Beagle* was his great trip of exploration, although the itinerary could read like a modern day luxury cruise: depart from Devonport 27<sup>th</sup> January 1831; three months in Rio, over three months in Valparaiso, a six week excursion into the Andes, only five weeks in the Galapagos Islands and finally returning to Falmouth on 2<sup>nd</sup> October 1836.



Charles Darwin

The great majority of his notes were geological, and he returned with fossils of large extinct mammals, including *Megatherium*, a giant sloth. These finds prompted him to question the current ideas about the Creation and particularly the Flood. These thoughts were compounded by his work on coral atolls in the Cocos Islands. Finding that living coral could only survive in 120ft of water or less he proposed the well known theory of a sinking reef atop submerged volcanoes. On his excursion into the Andes from Valparaiso he found fossil sea shells at 12,000ft along with petrified pine trees. Sea level change was becoming the obvious explanation, and that could not be explained by the existing biblical explanation of natural phenomena. He thought that you would require at least one million years. In February 1835, in Valdivia, southern Chile, he experienced an earthquake and noticed land a few feet higher than before, so maybe many earthquakes could produce

much more uplift. Was there molten rock underneath the Earth's surface expressing itself in surface phenomena such as volcanoes and earthquakes?

On his return he wrote a two part book on the geology of the voyage. The first part published in 1842 was 214 pages on the 'Structure and distribution of Coral Reefs'. In his explanation of coral atolls he says, "...*there is but one alternative, namely, the prolonged subsidence of the foundations on which the atolls were primarily based, together with the upward growth of the reef-constructing corals.*" The second part dealt with, 'Geological Observations on the Volcanic Islands visited during the voyage of H. M. S. *Beagle*...' He describes and seeks explanations for the evolution and origin of volcanoes, mountain chains and dykes and so often the ideas of vertical movements of the Earth's crust are not far away. ►

When writing about Darwin as a geologist it is all too easy to fall into the trap of devaluing his expertise as a zoologist and botanist. He was a Victorian scientist, one of many, who were asking questions such as why does this occur? and how can it be explained? Darwin applied his scientific method to all phenomena; observe, measure, record, hypothesise and talk to, and listen to other scientists. We would call it geological method, and no doubt the techniques he learnt in his geological training, and the influence of his friend Charles Lyell, could be applied to all his studies. It is all part of Darwin's evolution as a scientist which culminated in the genius of the Theory of Evolution. ■

*Quarterly Journal of the Geological Society 1845; v. 1; p. 381-389; p. 556-558.  
Alan Moorehead; Darwin and the Beagle; 1969*

*Bill Groves*

## Geobabble

Living near Dudley we are all well aware of the role tunnels play in the canal network, and can marvel at the engineering expertise and knowledge of the original builders. If you are cutting through rock you have to have considerable appreciation of the behaviour of that rock, and so understand the geology. This summer I was in Norway and their road network depends on good tunnels in many areas. It is not the first time I have visited the country as I have a good friend who lived there in the seventies and eighties. I often travelled by road to the north, and it was a long and tortuous journey. There were many ferries which handily broke up the journey; the roads were often narrow with a poor surface and closed for much of the winter.



This year I visited Tromsø, a city of 50,000 people 400km north of the Arctic circle. Beneath the city is a network of underground tunnels complete with roundabouts, road junctions and traffic lights. It eases transport particularly in the winter months. Later in my trip I visited Flåm, much further south in the fjord coast and was amazed to see the entrance to the longest road tunnel in the world. The Laerdal tunnel was completed in 2000 after six years of construction. It is just under 25km long and the mountains above reach 1810m (5940ft). The rock it is cut through is the ubiquitous Precambrian gneiss, a beautiful rock used for street furniture in many of the Norwegian west coast towns. Up to date engineering techniques and machines were used in the construction but one of the most difficult problems was the disposal of 2.5 million cubic metres of gneiss. The total cost of about 125 million U.S. dollars was met by the Norwegian government, and it was not the only tunnel built at this time; the whole road system seems to have been updated to eliminate the ferries and the tortuous mountain roads that were so often closed. Whether under Dudley 200 years ago or in the modern world, engineering geology never fails to impress me. ■

*Bill Groves*

**Please send material for the next Newsletter to:**

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## Meet your Committee

### **Gordon Hensman, Chairman and acting Meetings Secretary**

Gordon taught Geography in a variety of secondary schools until he took early retirement from Head of World and Social Studies at Holly Lodge High School, Smethwick.

His lifetime interests have always been the Earth Sciences, especially Meteorology and Climatology. He did research into noctilucent clouds for the Royal Meteorological Society, and Cryopedology for the Royal Geographical Society in northern Iceland on the Vindheimerjokull. He established the Oakham Weather Station on the summit of the Rowley Hills (dolerite basalt), and has 30 years of records. He then went on to establish Dudley Weather Station at his present address (etruria marl). He is a fellow of the Royal Meteorological Society and the British Association, and writes a weekly feature article on the weather and related topics in the Black Country Bugle newspaper.

After several years as the BCGS Lecture Meetings Secretary, he relinquished the post last March when he became the Society's Chairman.

*Following the resignation of Paul Trower, Gordon has temporarily resumed the post of Meetings Secretary until this vacancy is filled. A volunteer is urgently needed. Anyone interested should contact the Secretary, Barbara Russell (contact details below). Ed.*

### **Alan Cutler, Vice-Chairman**

Alan gained a B.Sc (Physics) from the University of Birmingham in 1968 and a Diploma in Marketing (Dip.M) 1973. His career has been mostly in Marketing, specialising in publicity, exhibitions, conferences and hospitality events. He has been self employed since 2005.

In 1974, with 5 other enthusiasts he formed a committee for the establishment of a local geological society and became a founder member and Chairman of the Black Country Geological Society (July 1975-2000) and Vice-Chairman from 2000 to date.

In 1987/88 he was instrumental in the formal acceptance of geological sites into the SINC system (Sites of Importance for Nature Conservation) in Birmingham and the Black Country. He prepared the geological criteria for SINCS, which also served as a model for the RIGS initiative launched in 1990.

In 1977 Alan initiated a campaign for the appointment of a geological curator at Dudley Museum. This resulted initially in a number of short term contracts funded externally. Following the Geological Curators Group visit in 1985 the momentum and backing of local Councillors increased, culminating in the appointment of Colin Reid in 1987, succeeded by Graham Worton in 2000. In 2004, together with Graham Worton, Alan began work on the development of a Black Country Geodiversity Action Plan (the first for an urban area) which was subsequently launched in 2006. He currently serves as Project Co-ordinator for the Black Country Geodiversity Partnership and represents local, regional and sometimes national geological and environmental interests on numerous committees. This includes the executive committee of UKRIGS.

Alan has organised several Geological Conservation conferences in Dudley, and publications include several local trail guides and leaflets. *(See article on new leaflets, P.4. Ed.)*

### **Mike Williams, Honorary Treasurer**

Mike was educated at Wednesbury Boys' High School & University of Liverpool, graduating with BSc Hons. in 1969. He joined Tube Investments as a Graduate Trainee and subsequently GKN, Smith-Druce and finally W. J. Handrahan Timber Importers. After a 30 year career in the timber industry he took early retirement in September of last year. ►

Mike joined BCGS in the 1990's, becoming Treasurer in 2003. He has always retained an interest in Earth Sciences and now divides his time between The Black Country and a retirement cottage in Shropshire.

#### **Barbara Russell, Honorary Secretary**

Barbara has worked in various jobs: milk technology, gas technology, foam plastic, research. She left work to raise her family and then resumed work at Wolverhampton Polytechnic (now the University) as a laboratory technician, followed by many years doing the same job in schools. She has had a 70 year interest in astronomy, and, as Earth is a planet, took up geology when she retired.

#### **Andrew Harrison, Field Secretary**

Andy has been a BCGS member since moving back to the West Midlands in 2001 and was a committee member prior to becoming Field Secretary in 2007. He currently works as an engineering geologist for the URS Corporation in Birmingham, has a BSc in Geological Sciences (from Oxford Brookes University), an MSc in Applied Environmental Geology (from the University of Wales, Cardiff) and is a Fellow of the Geological Society (FGS), working towards becoming chartered.

Between University and his current position Andy worked for the Oxford Archaeological Unit, spent 12 months in Australia and spent some time working in gold mines in Western Australia and for the Department of Land and Water Conservation in Sydney. On returning to England he worked temporarily for the BGS Hydrogeological Group in Wallingford before moving to permanent positions with AIG Consultants in Wolverhampton, Atkins and Soil Mechanics.

Andy has had a keen interest in geology and natural history since a young age, and helped with excavating the Shropshire Woolly mammoth found at Conover in 1986. His interests in geology and natural history have taken him to many interesting places around the globe, including Europe, The Rockies and Alberta Badlands, Egypt, Ecuador and the Galapagos. Other interests include human history and astronomy.

#### **Les Riley**

Les joined BCGS about 4 years ago when he returned to the West Midlands, after a 38 year absence! He has been a committee member for about 18 months. He gained a BSc in Geology at London University, a PhD from Nottingham, and an array of subsequent qualifications including FGS and C. Geol. He is a Scrutineer/mentor for the GS, advising, supporting, and evaluating young geologists working towards Chartered Geologist status.

From 1973 - 1993 he worked for three consultancy companies in North Wales, Aberdeen, then London as a palaeontologist/stratigrapher. He then founded Riley Geoscience Ltd. based in Walsall. This is an independent palaeontological/stratigraphical consultancy to the oil & gas exploration and production industry. Current client base: mainly North Sea and offshore Eastern Canada, with occasional consultancy work in Yemen and Morocco.

Les has authored/co-authored 38 papers on various aspects of Mesozoic (Jurassic - Cretaceous) palynology, biostratigraphy, regional stratigraphy, and North Sea and offshore Canada oil fields.

#### **Bob Bucki**

Bob first became interested in Geology at primary school when he thought he had found a fossil on the old 'Blue Billy' chemical tips at the rear of his school in Langley. It wasn't, but the spark had been struck. This led to the local library, books on dinosaurs, and then a bicycle trip to the Wren's Nest. At secondary school his Geography teacher Stan 'Spike' Millington ran a Geology Club during the lunch hour for a few pupils who were interested and some sat for the GCE 'O' level. (Good times and a brilliant teacher.) ►

Bob joined the BCGS around the end of the 1980's and enjoyed the lectures and field trips they organised but left when he went to live and work in Moreton in Marsh at the Fire Service College. When he returned to Dudley he rejoined the Society around the end of the 1990's and volunteered to join the committee. After retiring from the Fire Service he decided to renew his interest in Geology on a more formal basis and applied for a place on a Degree course at Birmingham University, as there would be more access to fieldwork and laboratory work than was available through the Open University.

Bob is still there, now in his fourth year doing an M Sci in Geology as well as working part time as a Fire Risk Assessor to pay the fees. He says: "For all of you of advancing years out there I would thoroughly recommend the experience. The rest of the students are great and I got on well with them even though I am older than their parents! Don't worry about academic ability; the fact that you are there because you want to be and love the subject area will more than carry you through the programme (provided you like reading, late nights and a few deadlines)." ■

## Obituary

**It is with great sadness that we have to report that BCGS member Tom Rounds has died of cancer. Those who knew him will surely share the warm sentiments expressed in the tributes below.**

Tom was a unique man; his interests were wide and varied, ranging from industrial heritage, engineering, caving, new technology, wildlife, geology, photography and film making, nutrition, walking etc. He made his own television for his family to watch the coronation. He made a tandem for his wife and himself. You name it, Tom would design it and make it. He would always offer to help without question and would never expect or accept reward. Tom was a true gentleman. He loved his wife and sons. He lived a very full life and I don't think he could have fitted any more into it: Tom would have disagreed.

*Peter Monk*

Tom was a very unassuming man and knowledgeable about so many things. He was always happy to share his knowledge and invited people round to his home, not only for a tour round his unique collection of all sorts of historic artifacts but he provided an excellent cooked meal to finish with. His house was crammed from attic to every corner of every room with historical items that would be the envy of any museum. It would be a great shame if these were not placed somewhere that all could share. He will be greatly missed.

*Karen Greenwood*

**[Why not visit our website at: www.bcgs.info](http://www.bcgs.info)**

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