The Black Country Geological Society

NEWSLETTER No. 188
APRIL 2008

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.

In this edition:

COPY DATE FOR NEXT NEWSLETTER IS MONDAY 2ND JUNE 2008

FUTURE PROGRAMME

Lecture meetings are held at Dudley Museum, St James's Road, Dudley.
Phone (01384 815575)
7.30 for 8 o' clock start unless stated otherwise.

SATURDAY 19TH APRIL 2008 (*Field meeting*)

Field excursion to Hanter Hill. Leaders: Sue Hay and Geoff Steel.

Hanter Hill is on the Powys/Herefordshire border, north of Hereford. Meet at 10.30am in the lay-by at Burlingjobb on the B4594 (SO251583).

This will be a circular walk up, around and down Hanter Hill. I estimate about 4 miles total distance much over quite rough moor land. Please wear suitable boots and bring the usual all weather gear just in case, plus a packed lunch and drink.

MONDAY 28th APRIL 2008 (*Indoor meeting*)

Jan Zalasiewicz, University of Leicester:
Extinctions Past and Present

Gordon Hensman and Andy Harrison

OTHER SOCIETIES

NORTH STAFFORDSHIRE GROUP OF THE GEOLOGISTS' ASSOCIATION

Saturday 26 and Sunday 27 April:

The Yorkshire Coast based at the Raven Hall Country Hotel, Ravenscar, near Scarborough. Leaders, Eileen Fraser and Peter Rawson.

On Saturday Eileen Fraser will take us to Staithes for the sedimentary sequences and fossils of the Lower Jurassic, On Sunday Peter Rawson will take us to see the Speeton Clay in Filey Bay for the only continuous exposure of the whole marine Lower Cretaceous sequence in Britain, and Flamborough Head for the chalk in Selwicks Bay where the main interest is structural – one of the so-called 'shatter zones'.

Ref: Geologists' Association Guide No. 34 "The Yorkshire Coast" by P.F. Rawson and J.K. Wright.

Sunday 18 May:

North Stiperstones, Pontesbury to Poles Coppice.Leader: Andrew Jenkinson

A joint meeting with the Shropshire G.S. based on the Poles Coppice Geotrail that is currently being prepared.

Meet at 10.30am at the Habberley Lane car park at the south end of the County Council's Poles Coppice nature reserve (Grid ref. SJ385042). Directions; take the A488 (Bishops Castle road) off the Shrewsbury by-pass; go through Pontesbury and just before the roundabout in Minsterley turn left up Habberley Lane, and it's a mile and a bit up on the left.

We will visit the Granhams Moor unconformity, the Poles Coppice Quarry and Callow Quarry looking at the Stiperstones Quartzite, its structures and relationships to the Habberley Shales and the Mytton Flags.

Sunday 15 June:

Malvern Leader: Professor John Winchester

A field trip to illustrate features of the Late Precambrian basement of Central England visiting a number of quarries and exposures along the Malvern Hills. From the Precambrian inlier, rocks of the Malvernian and Warren House Group and from the Lower Palaeozoic, rocks of the Cambrian and Silurian periods.

Sunday 20 July:

Crummack Dale, Austwick, Yorkshire. Leader: Alan Diggles

A walk of about 9km into Crummack Dale from Austwick (situated to the SE of Ingleton) for rocks of the Silurian (Austwick Formation Sandstones), Carboniferous Limestones and Ordovician Siltstones. Features to include the Norber erratics, Nappa scars and Moughton Whetstone Hole. A minibus is planned (subject to numbers) leaving from the Earth Sciences Car Park at Keele at 7.30am.

Saturday 16 August:
Leader: Dr Patrick Cossey
Provisional, either following a section of the Hamps/Manifold Trail or on the Roaches.

Saturday 27 September:
Calton Hill Quarry, nr. Buxton Leader: Dr Chris Arkwright
Meet at 10.00am at Miller's Dale Station Car Park, Grid Ref: SK137733 (parking fee payable). To investigate Carboniferous igneous intrusions and lavas and their associated limestones in the Buxton area. Overall length of walks about 5km, limestone succession and interbedded lavas in Miller's Dale Quarry then, driving into Tideswell for a dolerite quarry to examine lithology and thermal effect on surrounding country rocks. Packed lunch at picnic site in the quarry. After lunch drive to Calton Hill, park at SK112710 to examine the structure and lithology of a Visean volcanic complex and dolerite intrusion in the disused quarry.

For further information contact NSGGA Field Secretary **Gerald Ford,** 01630-673409 or e-mail: g.ford@ukonline.co.uk
For contact with the **Field Secretary** on the day of a field trip the mobile phone number is 07789 826807 when there is a chance that it will be switched on

MEETINGS REPORTS

MONDAY 28th JANUARY 2008 (*Indoor meeting*)
Dick Crofts (British Geological Survey)
The Limits of the Devensian Glaciation in the West Midlands and its Regional Setting within the Cheshire Plain and NW England

Dick Crofts split his talk into five parts:

What is the Devensian?
Oxygen isotope ratios, from deep ocean cores, show that over the last 2.5 million years there have been several cooling and warming events. They show that the Devensian Glaciation lasted some 100,000 years from around 115,000 to 10,000 years ago and was preceded by a warm period, or Interglacial, known as the Ipswichian. The Devensian is divided into the Early, Middle and Late and Oxygen isotope ratios also show fluctuating temperatures during this time. Four peak cooling events, recognised within the Devensian, correlate to periods of high lithic grain deposition known as Heinrich Events – H1 to H4. This increase in lithic grain deposition is believed to come from northern ice sheets releasing sediment laden icebergs that as they drifted southwards melted and deposited their sediment.

During the Devensian and the earlier Anglian Glaciations ice covered much of the West Midlands, the Welsh borders and north Shropshire, where the Wenlock Edge acted as a natural barrier stopping the advancing ice. Glacial deposits from the Devensian occur over much of the Cheshire Plain, the northwest Midlands and Wales and comprise the Stockport Formation (including the Shrewsbury Formation and the Severn Valley Formation) and the Chelford Formation (including the Four Ashes Formation).

What form did the Glaciation take?
The Devensian Glaciation took the form of an ice cap, the British Ice Cap, covering Britain which grew from four main areas of ice build up - the Scottish Highlands, the Lake District, Wales and Ireland. It is uncertain whether or not the British Ice Cap joined up with the Scandinavian Ice Cap to the east. Bedrock underlying the Scotland Ice Cap was so cold that the ice froze to it resulting in little or no movement. However, further south where the underlying rocks were warm basal melting of the ice gave rise to ice flows and surges, especially through the Irish Sea region.

What did it leave behind?
In places like the Alps glaciers typically fill valleys and tend to be streaked by eroded rock debris within the body of ice and on top of the glacier. However, modern ice caps tend to be clean and free of rock debris since erosion only takes place at the base of the ice which is how the British Ice Cap would have appeared during the Devensian Glaciation. As the glacier moves down slope

and reaches its terminus the nose of the glacier travels at a slower rate relative to the body of the glacier behind it. Consequently rafting up of debris from the base of the glacier into the ice mass results and is termed Lodgement Till. During warm periods, i.e. summer, the glacier retreats and debris at the front of the glacier is left behind as large linear structures up to 40m high known as Terminal Moraines. These moraines typically comprise sandy gravels and pebbles, often lineated, and during the Devensian Glaciation, were sourced from Ireland, Wales, Scotland and the Lake District. As the ice continues to retreat it leaves behind a mixture of sandy gravely clays and boulders called Glacial Till and structures like drumlins, kames and eskers. During its retreat the glacier also releases volumes of sediment laden melt water, from within, which deposits sediments to produce outwash fans of sand and gravel. These sands and gravels also contain a high proportion of fines from rock flour ground up by the moving ice.

The sequence of events
Glacial deposits show that during the Devensian Glaciation the British Ice Cap advanced and retreated three times. The first advance, of the British Ice Cap, began with the rapid growth of the Welsh Ice Cap which was later overridden by ice from the Lake District advancing through the Cheshire Gap. Consequently the ice was able to advance across the Cheshire Plain into Shropshire and as far as Wolverhampton and the West Midlands and to leave a line of terminal moraines and glacial deposits called the Wolverhampton Line. Lithic grains found in three of these terminal moraines correlates to material deposited during two recognisable Heinrich events (H2 and H4) during the Middle Devensian. The second advance reached as far as Ellesmere and Whitchurch along the Mid Cheshire Line and third advance reached as far as Preston, Cumbria, along the Kirkham Line.

New evidence
There is some doubt as to the position of the Wolverhampton line through the West Midlands and gaps occur through lack of evidence. Dick Crofts completed his talk with some examples of new evidence that goes part way to filling these gaps. Such as a number of linear features which have been found to the north of the Iron Bridge Gorge and running parallel to it. These features are believed to have formed at the base of a glacier whilst the British ice cap was present and have been interpreted as meltwater channels which, as the ice retreated, acted as an outpouring for a lake on the Welsh Borders. Before the Devensian Glaciation the River Severn flowed northwards to join the River Mersey. However, during the Devensian Glaciation these meltwater channels redirected the River Severn to flow eastwards along its present course through the Iron Bridge Gorge.

Andrew Harrison

SATURDAY FEBRUARY 16TH 2008 (*Field meeting*)

Warwickshire Field Visit. 'Quaternary Geology in Warwickshire'

Leader: Martyn Bradley - Warwickshire Geological Conservation Group/University of Warwick

We met at Glebe Farm, Bubbenhall, Warwickshire on a sunny and crisp morning. Martyn Bradley, our leader for the day, split the trip into two parts with a pub stop for lunch. The morning took in three existing and former sand and gravel pits, near Bubbenhall, starting with Waverly Wood Quarry (working), followed by Wood Farm Quarry and finally the Ryton Pools Country Park.

Each site illustrates the association of the Thrussington Till overlying the Baginton Sand and Gravels. At Waverly Wood Quarry, Martyn told us about earlier infilled river channels underlying the Baginton Sand and Gravels and showed us examples of conservation work carried out by members of the WGCG and through the University of Warwick. Within the Baginton sand and gravels WGCG members have discovered examples of flint tools, a piece of tusk and a tooth from a long straight tusked elephant called Palaeoloxodon.

At Wood Farm Quarry WCGC we saw a pilot soft rock conservation scheme, funded through the Aggregates Levy Sustainability Fund (ALSF), of a protected profile of Thrussington Till overlying the Baginton Sand and Gravel. The aim for the WCGC has been to monitor this section periodically as part of its next ALSF funded project that would extend to other local soft-rock conservation schemes. Unfortunately rising water levels from an adjacent pool has submerged the bottom parts of the profile obscuring the contact between the two units and leaving only the Thrussington Till visible above water. To raise the profile of their soft-rock conservation schemes the WGCG's conservation sub-committee have produced and distributed several leaflets to a variety of outlets and additionally delivered talks to local residents. They have also erected a

geological information and interpretation panel at Ryton Pools Country Park. Conservation funding for these schemes has currently run out and the WCGC are now looking for new funds from the quarry owners and from Natural England.

After lunch Martyn took us to three sites in north Warwickshire – Ryton-on-Dunsmore sand pit, Wolston Village and the headquarters of the Warwickshire Wildlife Trust. In the past these sites were worked for their sand and gravel deposits and at Ryton-on-Dunsmore is an ongoing project to conserve a profile of the Dunsmore Gravel overlying the Wolston Clay. The village of Wolston gives its name to the Wolston Clay from the where, in the 1950's, Fred Shotton undertook research on local rivers and mapped the glacial sands and gravels of N. Warwickshire. Shotton believed that glacial deposits located between Coventry, Leamington and Rugby came from a vast lake which he named Lake Harrison. Later work suggests that Lake Harrison is not one vast lake but many smaller marginal lakes. As with the Ryton Pools Country Park the WGCG have put up a geological information and interpretation panel in Wolston village. The headquarters of the Warwickshire Wildlife Trust lie within a designated SSSI and here the WGCG have a presence in the form of information panels and geological displays.

In Warwickshire during the early Anglian Glaciation, around 500,000 years ago, a large river - the Bytham River, flowed eastwards from Stratford to the Norfolk Coast. As the Anglian Glaciation continued ice sheets advanced southwards, temperatures dropped and increased melt water caused the Bytham River to start depositing sands and gravels (Baginton Sand and Gravel). Animal fossils and primitive tools, believed to have belonged to Homo heidelbergensis, discovered within the Baginton Sands and Gravels have helped to date them. The advancing ice lasted around 50,000 years advancing and retreating twice and deposited sandy gravely clays (Thrussington Till) over the Baginton Sands and Gravels. Eventually the advancing ice sheet overwhelmed the Bytham river valley blocking off the Bytham River, in the vicinity of Coventry and forming the bodies of water referred to as Lake Harrison. By 450,000 years ago an ice sheet 1km thick had reached the outskirts of London. Deposition of the Wolston Clay and Wolston Sands, identified by Shotton, followed, in Lake Harrison, and later outwash sands and gravels during the later Devensian Glaciation deposited the Dunsmore Gravels and the River Avon Terrace Deposits.

I would like to take to opportunity to thank Martyn and the WGCG very much for another extremely interesting Warwickshire fieldtrip which I hope will be repeated next year.

Something this fieldtrip highlighted was what role the BCGS had in geoconservation projects in and around the Black Country. This has been discussed with the committee and potential projects are being looked at for getting BCGS members involved and raising the profile of the Society on geologically important site around the Black Country.

Andrew Harrison

SATURDAY 29TH MARCH 2008 (*Field meeting*)

Joint trip with the North Staffs Geological Association to the Lapworth Museum, University of Birmingham. Leader: Jon Clatworthy – Curator.

This was a joint meeting with and arranged by the North Staffs' Group of the Geologists Association. Around 20 of us met at the Lapworth Museum for tea and biscuits around 10:30 and at 11:00 were given an introduction to the museum by John Clatworthy, our leader for the day. The museum dates back to the 1880's and is named after Charles Lapworth who was the first Professor of Geology at the then Mason College, the forerunner to the University of Birmingham. The collections at the museum contain over 250,000 specimens including rocks, fossils, minerals, large collections of early geological maps, equipment, models, photographic material, and also zoological specimens and stone axes. Historically one of the main aims of the museum was to support teaching and research in the Earth Sciences and natural history within the University and the West Midlands region. This tradition continues today and also supports universities abroad through loaning of specimens and supporting foreign researchers.

After his introduction John led us into a next door laboratory where we were able to look at some examples of collections held at the museum. These included Samuel Allports' petrology collection – the museums earliest collection, Rev P.B.Brodies collection of fossil insects, Jasper Mores' mineral collection from Shropshire, the Ketley archive of fossils from the Wenlock Limestones and

Coal Measures of Dudley and other fossil collections including Lapworths' graptolites which formed a crucial part of his mapping NW Scotland.

Around 12:00 the group was split in two and whilst one group ate their lunch the second were shown round, the rather cramped, Lapworth Archive store. Here we were shown examples of fossils included in the Charles Holcroft collection from the mines of Wren's Nest and Coseley. We also took a look at Holcroft's fossil register where he had recorded each specimen in his collection including those brought and sold - a practice of many miners of the time to supplement their income. John also showed us examples of ore minerals collected by Dr John Percy and an interesting collection of fake fossils – mostly trilobites with bits obviously added to them. Once the first group had finished we headed off for lunch and let the second group view the archive store.

After lunch we were given a chance to look inside the newly opened map archive. The archive is located within the Shotton Room named after Fred Shotton, who did much research into Anglian glacial deposits in Warwickshire, and is built around four main map collections – those of Charles Lapworth, Fred Shotton, Professors Boulton and Wills (other former heads of department) and miscellaneous maps. The archive also acts as a store for early and current British Geological Survey maps which are used by the students. Lapworths maps included ones he produced whilst mapping in NW Scotland around Durness and Lake Eriboll. Lapworth also worked as an engineering geologist and we were shown a photographic record of the construction of the Howden Dam, across the Derwent Valley. When Lapworth took over as Head of department all his maps and collections went with him. Other maps we got to view included early maps of the Silurian drawn up by Murchison, early geological maps of Scotland and the Southwest. Finally we were shown maps identifying soil types and groundwater sources also produced by Fred Shotton, during the Second World War, of the Normandy Coast and North Africa.

After a fascinating visit we finished our tour of the museum at around 16:00. I would like to thank John Clatworthy for showing us round and Gerald Ford (North Staffs' Group of the Geologists Association) for inviting us along. We hope to run more trips with the North Staffs' Group in the future.

Andrew Harrison

MONDAY 31st MARCH 2008

ANNUAL GENERAL MEETING

The detailed minutes of the AGM will be published in due course, but it was agreed that Alf Cole and Alan Cutler would share the position of Chairman for the forthcoming year. Sarah Worton stepped down from Secretary after several years' excellent service to the society and her place is taken by Barbara Russell. Continuing committee member Les Riley will be joined by Bob Bucki and Peter Twigg. The other officers are as on page 1 of this newsletter.

Professor Paul Smith: Head Earth and Environmental Sciences: University of Birmingham.

Charles Lapworth and the Highland Controversy - Maps, Mountains and Madness!

Charles Lapworth has always been considered one of the great geologists of the Victorian age, but after this stunning presentation by *Prof Paul Smith* I realised that he was a giant: a genius of the geological world. He was a self taught scientist who became the first professor of geology at Birmingham in 1881, and is probably best known as the man who proposed that a new system, the Ordovician, should be put in between the Cambrian and Silurian.

He did a great deal of pioneering work and mapping in the North West Highlands, but it is only because of the discovery of his original field notebooks in a wrongly labelled box in the department at Birmingham that it is now known that he was the first geologist to recognise and name a thrust, and to use the terms mylonite and metamorphism, and so initiate the modern theory of orogenic belt formation. The pictures of his hand drawn sections brilliantly illustrated how his ideas developed.

We are now familiar with mountain chains consisting of stacked up slices of rock, separated by thrusts, with older rocks regularly sitting on younger, but in the early 1880's this type of structure was explained by extreme overfolds. As Prof Smith explained this was one of the great 'paradigm

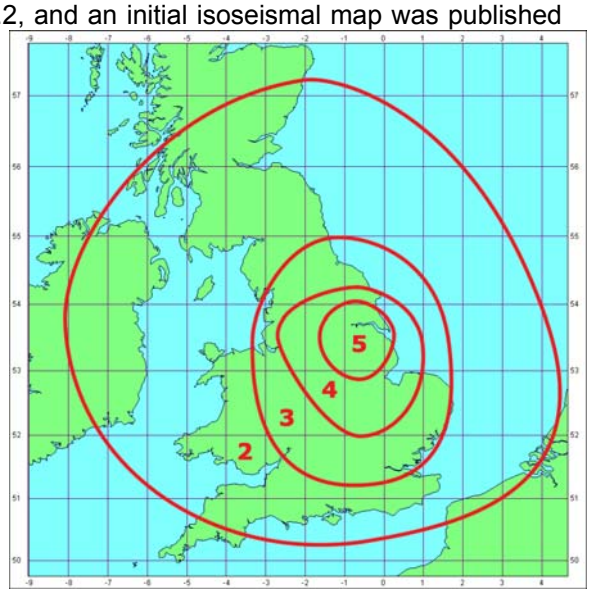
shifts' of the geological world. A paradigm shift is a radical revolution when a new way of organising existing recorded facts is proposed and the science makes a great leap forward. The most recent example is probably the emergence of plate tectonics, and as with plate tectonics, the geological establishment did not readily accept Lapworth's new interpretation, and he had to go back to the Highlands in 1883 to get more evidence. It was here that he had a complete breakdown, pathetically shown by his childlike attempts at field sketches in his notebooks.

It was thought that he never returned to the Moine Thrust such was the effect of this breakdown, but Prof Smith put on the screen a picture taken in 1912 of a geological party in the highlands, led by Peach and Horne, and there in the front row is Charles Lapworth. This material is yet to be published, but when it is it will be more that a 'good read'.

Bill Groves

EDITORIAL

The Market Rasen earthquake does not seem to have the same ring about it as 'The Dudley 'quake', but as the United States Geological Survey reported, at 00:56:46 GMT on Feb 27 2008, a magnitude 4.7 earthquake occurred at latitude 53.32N; longitude 0.31W (30 miles S of Kingston upon Hull, England, UK) This report was on Friday 29th Feb, and on the same day the British Geological survey was putting its magnitude at 5.2, and an initial isoseismal map was published based on recordings both instrumental and human. The USGS had 10,663 responses, and our area recorded effects consistent with shocks of between 2 and 4.



Some people from the Black Country felt the earthquake, although I slept through it as most people seemed to have done. The magnitude was recorded as 4.7 by the USGS but a higher figure of 5.2 by BGS. The epicentre was at 18.6km depth and there were three aftershocks on the 27th with a maximum magnitude of 2.2.

The press became very excited about this event, but its interest is really because of its location, not on a plate boundary, rather that its magnitude. For that week there were a great many shocks worldwide, 32 of them with a magnitude of over 5. A quick look at the USGS website shows that their concentration was very much in the Far East, on the subduction zone of the Western Pacific. But we did at least have an earthquake, and we all now know where Market Rasen is!

Bill Groves

ARTY-CRAFTY GEOLOGY

Is wood carving an art? Well, if you have visited some of the Alpine towns and villages that have a tradition of producing attractive carvings you would certainly argue that it is a very skilful craft. The small model in the photograph is 12cm high and was made in Penryn, Pennsylvania. It depicts a 'typical' geologist and was made as a retirement memento. He is at least wearing a hard hat and the inscription on the front reads 'GEOLOGY ROCKS'. If you received this newsletter by the way of an email attachment, you will see that he is holding up a very red and sore looking thumb. His mouth is open wide, so he is obviously shouting out a geological

expletive such as 'Oh bother' or 'silly me', or maybe you would utter something else!

Bill Groves

GEOBABBLE

It is very interesting to try to find the origin of words that we now take for granted. *Geology* comes from the Greek, 'geo' meaning earth. Although the actual word 'geology' was not used until much later, in the fourteenth century Richard de Bury used a similar word to denote 'the science of earthly things'. You then have to wait until 1686 when Robert Plot, a naturalist who travelled extensively, and did much 'geological' work in Staffordshire, wrote *'Geologica Norwegica,* which described the eruptions of Hekla. In 1690, a paper by E Warren appeared with the title of *'Geologica: a discourse concerning the Earth before the deluge'. I*

However, it was with the Enlightenment of the eighteenth century that geology was used as a definite word. In 1735, Benjamin Martin in a discourse of natural philosophy said that '*geology was divided into two subordinate branches, geography and hydrography';* I like that definition. But it was James Hutton in 1795 who first used the term in its modern context, and so it goes on until the present day.

When looking through the history of terms of a science, you come across some very interesting things. Early on there were two terms for someone practising geology, a geologist or geologer. Also, how about this for a 1619 definition of a geode; *'a stone being hollow, having earth within the hollownesse thereof, and being put to a mans eare, it maketh a kinde of sound'* Try putting that in an A-level answer!

Bill Groves

PLEASE CONTRIBUTE

We rely on all members to make the content of the Newsletter more interesting. If you are sending photographs, can you please reduce them as suitable for documents. The Newsletter is kept below 1MB for the convenience of members. In order to include material in the June Newsletter, please send or give it to me by ***Monday 2nd June 2008***

PLEASE SEND MATERIAL FOR THE NEXT NEWSLETTER to

Bill Groves
bill.groves@dudley.gov.uk
billgroves300@btinternet.com

Why not have a look at our excellent website at:

www.bcgs.info