Newsletter No. 238
August 2016

The Black Country Geological Society

Copy date for the next Newsletter is Saturday 1 October

Contents:

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

Future Programme

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

Visitors are welcome to attend BCGS events but there will be a charge of £1.00 from January 2016.

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

Vacancy for Meetings Secretary

BCGS needs a volunteer to take on the job of Meetings Secretary. If you can help or if you'd like to know more about the responsibilities involved please contact secretary@bcgs.info.

Saturday 20 August *(Field meeting):* Wren's Nest, led by Graham Worton. Meet at 10.00. Parking at the Harty Building of the old Mons Hill college site which you get to along the access road that leads into the new development adjacent to the Caves Pub on Wrens Hill Road. Finish around 12.30. We will wander around the reserve to re-examine the classic localities and up-date the science that we now know about the rocks here. It will provide an opportunity to collect from a couple of locations and discuss what we find in different places and what the palaeontological evidence tells us about the conditions in which these rocks were formed and deposited.

Saturday 10 September *(Field meeting):* Titterstone Clee Hill, Shropshire: 'From Carboniferous Limestone to the Coal Measures'. Joint meeting with Shropshire Geological Society. Meet at 10.30 in the view-point car park by the cattle grid on A4117, on the east edge of Clee Hill village (GR: SO 594753). Part car tour, part walking, looking at limestone quarries down the hill at Knowle Gate, Cornbrook Sandstone (= Millstone Grit) in the Cornbrook Valley and Coal Measures plus the dolerite intrusion (Dhustone) towards the summit. Fantastic views over the Welsh border country (weather permitting!). Sites might include working quarries (to be negotiated). Bring hard hats and high-viz vests if possible (a few are available for loan), and suitable footwear. Some collecting will be allowed from waste tips, so hammer and hand lens advisable. Considerable industrial archaeology interest as well as purely geological. Bring picnic lunch, or pub lunch possible in Clee Hill village**.**

Monday 19 September ***(Indoor meeting):*** **'Iron Ore Mining in the Pilbara; a focus on Rio Tinto Iron Ore.' Speaker: Rachel Cornah.** Rachel will include other projects in which she was involved with reference to other mining companies and operations. *(Pilbara is in the north of Western Australia.)*

Saturday 1 October ***(Geoconservation Day):*** **Saltwells Nature Reserve, Brewin's Cutting Canal Section.** Meet at the Nature Reserve car park (GR: SJ 934868) on Saltwells Lane for 10.00. Wear old work clothes, waterproofs and stout footwear or wellies. Please bring gloves and garden tools; loppers, secateurs, forks and spades if you have them. Either bring packed lunch or hot food can be acquired from the Saltwells Inn adjacent to the car park. Finish at 14.30.

Monday 17 October ***(Indoor meeting):*** **Update on the Black Country Global Geopark. Speaker: Graham Worton.**

Saturday 5 November ***(Geoconservation Day):*** **Sedgley Beacon.** Meet at the Sedgley Beacon car park entrance (GR: SO 923943, off Beacon Lane for 10.00. Wear old work clothes, waterproofs and stout footwear. Please bring gloves and garden tools; loppers, secateurs, forks and spades if you have them. Also bring lunch. Finish at 14.30.

Monday 14 November ***(Indoor meeting):*** **Optical Mineralogy. Speaker: Frank Wells.**

Saturday 3 December (*Geoconservation Day):* **Portway Hill, Rowley.** Meet at St. Brades Close at 10.30. Directions: from Birmingham New Road (A4123) turn left onto Tower Road if coming from Birmingham, right if coming from Wolverhampton. Just after Bury Hill park, turn left onto St. Brades Close. Wear old work clothes, waterproofs and stout footwear. Please bring gloves and spades, brushes and trowels in order to excavate and expose more of the dolerite. Bring packed lunch. Finish at 14.30.

Monday 12 December ***(Indoor meeting):*** **Members' Evening.**

Procedures for Field Meetings

Insurance

The Society provides public liability insurance for field meetings but personal accident cover is the responsibility of the participant. Details can be obtained from the Secretary, and further helpful information can be found in the Code for Geological Field Work published by the GA and available on our website. Schools and other bodies should arrange their own insurance as a matter of course.

Health and Safety

If you are unsure about the risks involved or your ability to participate safely, you should contact the Field Secretary. Please take note of any risk assessments or safety briefing, and make sure that you have any safety equipment specified. The Society does not provide hard hats for use of members or visitors. It is your responsibility to provide your own safety equipment (eg. hard hats, hi-viz jackets, safety boots and goggles/glasses) and to use these when you feel it is necessary or when a site owner makes it a condition of entry. Hammering is not permitted unless specific permission has been sought and granted. Leaders provide their services on a purely voluntary basis and may not be professionally qualified.

Other Societies and Events

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

East Midlands Geological Society

Sunday 14 August, 10.15: Monsal Head. Led by Vanessa Banks. Meeting place: Monsal Head Car Park (MR. SK18494 71501). To investigate formational influences on styles of mass movement in the Peak Limestone Group. It will provide the opportunity to consider data in the National Landslide Database, how individuals might contribute and how the British Geological Survey classifies and maps landslides. We will conclude by comparing mass movement in the limestone with that in the Millstone Grit Group.

Sunday 11 September, 10.15: The Ashover Area. Led by Colin Bagshaw. Meeting place: Ashover Village Hall. Ashover is situated within an inlier of Carboniferous rocks of Visean and Namurian age outcropping along the valley of the River Amber. Numerous exposures contribute to the area being ideal to study the sedimentary sequence of limestone, shale and sandstones and pyroclastics typical of those found within the Peak District. The area has been folded, faulted and hydrothermally mineralised, providing the basis for a number of extraction industries in the past, including lead mining and the use of building stone. Series of short walks in and around the village. Stout footwear is advised. For lunch, pub refreshment and food will be available if required.

Non-members are welcome. Further info at: www.emgs.org.uk or email: secretary@emgs.org.uk

Warwickshire Geological Conservation Group

Wednesday 17 August, 6.30 (prompt): Stratford Building Stones walk. Led by Julie Harrald and WGCG members. Urban walking tour around Stratford-Upon-Avon looking at the local building materials with a bit of history added. Meet in the car park accessed by the road called Swans Nest, between Stratford Butterfly Farm and Stratford-Upon-Avon Boat Club, CV37 7LS on the east side of the river. The WGCG leaflet on Stratford-upon-Avon, its geology and building materials can be found at http://www.wgcg.co.uk/wp-content/uploads/2015/11/Stratford-trail-guide-web-version.pdf.

For more details visit: http://www.wgcg.co.uk/ or email: WarwickshireGCG@gmail.com. There is a charge of £2.00 for non-members.

Shropshire Geological Society

Saturday 10 September, day meeting: Titterstone Clee - from Carboniferous Limestone to Coal Measures. Led by Andrew Jenkinson. *(See BCGS programme above for details.)*

Some events have an attendance charge, indicated where known. An additional daily membership charge of £3 is levied for attendance by those who are not existing Members of the Shropshire Geological Society. Further info at: www.shropshiregeology.org.uk/

Mid Wales Geology Club

Wednesday 17 August: 'Glacial Features in the Severn basin'. Guest Speaker: David Pannett.

Sunday 21 August, field trip: A Fossil Foray at Shakey Bridge near Llandrindod Wells. Led by Dr Joe Botting.

Wednesday 21 September: 'Mesozoic Mammals'. Speaker Dr Sara Metcalf.

Sunday 25 September, field trip: An ancient seashore in volcanic rocks near Builth Wells. Led by Tony Thorp.

Further information: Tony Thorp (Ed. newsletter & Hon. Sec): Tel. 01686 624820 and 622517 tonydolfor@gmail.com Web site: http://midwalesgeology.org.uk Unless otherwise stated, meetings start at 7.15 (tea/coffee & biscuits) with talks at 7.30 at Plas Dolerw, Milford Road, Newtown.

North Staffordshire Group of the Geologists' Association

Sunday 11 September, 10.15: The Ashover Area. Led by Colin Bagshaw. *Details under EMGS (above).*

Non-members pay £2 to cover temporary membership giving them insurance cover. A field fee of £2 per head is normally charged for members and non-members to cover the leader's expenses. For field trip enquiries: Steve Alcock, Longfields, Park Lane, Cheddleton, Leek, Staffs, ST13 7JS. Tel: 01538 360431 or 07711 501028. Email: steves261@aol.com Further info: www.esci.keele.ac.uk/nsgga/

Manchester Geological Association

Sunday 14 August: Halkyn Mountain. Joint trip with OUGS. Halkyn Mountain is just off the A55, not far from Chester. Morning with John Watson and Rachael Watson (Mountain Ranger): summarise the mining/quarrying history and legacy issues pertaining to Halkyn Mountain. Looking at shafts, kilns and quarries with additional information provided by the Mountain Ranger. Afternoon with Tony Kirkham: Examine the stratigraphy and sedimentary characteristics of the following formations: Loggerheads and Cefn Mawr Formations (Dinantian), Pentre Chert Formation (Namurian) and Holywell Shale Formation (Namurian). If you would like to take part please contact: pamandnodge@btinternet.com

Contact Penny Heyworth: email outdoors@mangeolassoc.org.uk For further information about meetings go to: http://www.mangeolassoc.org.uk/ Visitors are always welcome.

GeoFest 2016

'GeoFest' is a three-month long celebration of the geology, landscape and associated heritage of the Abberley and Malvern Hills Geopark. Events are hosted and run by the members of the Geopark Forum. Through the months of June, July and August there will be guided walks, talks, children's activities, tours and exhibitions and 'Ask the Expert' sessions.

To view or download the full programme go to: http://geopark.org.uk/pub/category/geofest-2/ For more information email: amhg@outlook.com or phone: 07547 481440 or visit: www.Geopark.org.uk

The Geologists' Association Annual Conference

Friday 21 - Saturday 22 October: 'Jurassic Coast - Geoscience and Education' at the Portland Heights Hotel, Yeates Road, Isle of Portland, DT5 2EN.

Friday talks include: Triassic: Mike Benton - vertebrates; Rob Coram - Otter sandstone; Richard Scrivener - Permo-triassic boundary. **Jurassic:** Richard Twitchett - research overview; Malcolm Hart - Oxford Clay 'squid' micropalaeontology. **Cretaceous:** Rory Mortimore - Jurassic Coast chalk. **Quaternary:** Tony Brown - research overview and Jurassic Coast Anthropocene. **Geomorphology:** Denys Brunsden - coastal geomorphology; Richard Edmonds - landslips in the Undercliffs NNR. **Education:** Anjana Ford - education on the Jurassic Coast; Ashley Cahill - teaching with the Jurassic Coast; Sam Striven - Jurassic Coast interpretation.

Saturday excursion: Museum of Jurassic Marine Life and visit to Kimmeridge Bay or Purbeck dinosaur tracks. Portland walking excursion.

For more information and to register visit: www.geologistsassociation.org.uk
or email: conference@geologistsassociation.org.uk

The Geologists' Association - Festival of Geology

Saturday 5 November, 10.30 - 4.30: Entrance free. University College London, Gower Street, London WC1E 6BT.

Exhibitors from the World of Geology: Fossil and mineral displays, stonecraft, books, maps, geological equipment, jewellery, Building Stones walk around UCL with Ruth Siddall, Tours of the UCL Earth Science Laboratories and more...

Discovery Room: Rockwatch with activities for children of all ages with fossils, racing trilobites, Jurassic dioramas and more....

Geological Talks: Prof Iain Stewart - 'Sustainable Geoscience - Geology for Global Development'
Jim Richards - 'Gold Rush: Prospecting and Small Scale Mining for Gold and Diamonds now'
Dr Howard Falcon-Lang - 'Marie Stopes: passionate about palaeobotany'
Prof Joe Cain & Sarah Butterworth - 'Iguanodon and the Restaurant'

Sunday 6 November - Festival Trips

GeoWalk in the City of London. Led by Diana Smith
Gilbert's Pit Charlton - exciting new exposures. Led by Jackie Skipper
The Crystal Palace Dinosaurs - Bringing Extinct Worlds to Life (suitable for families). Led by Ellinor Michel of Friends of the Crystal Palace Dinosaurs.

Amateur Photographic Competition: Any geological topic: 1st Prize £100, 2nd Prize £50, 3rd Prize £25

Further Festival details: www.geologistsassociation.org.uk

Editorial

Field visits - your opinions please

Field visits dominate our summer months, but it has been noticeable over the last year or two that these are not always as well attended as we might hope. Our field secretary, Andy Harrison, works hard to organise the programme of visits and the leaders normally provide their services free of charge. So far this year we have been to the Churnet Valley in Staffordshire, the Oxford Museum of Natural History, and most recently a two-centre trip to Warwickshire, visiting the Burton Dassett hills and Cross Hands Quarry - a huge variety of experiences which those present always seem to find enjoyable and informative. There is nothing like 'hands on' geology to gain a true feeling for the world around us, and provide a very tangible aid to learning and remembering all those rock formations and complicated names which (speaking from experience!) don't always sink in when simply reading or listening to a talk.

If you haven't been able to attend any field trips recently, we'd like to know why. Do you have transport problems? Would you prefer field visits to be more local? Are they simply not at convenient times? If that's the case, would you like us to organise some evening trips in the summer months? Do you have any places or sites which you would especially like to visit? Please let us know - either by writing to me for your ideas to be included in the next Newsletter, or directly to Andy (all contact details above). This is your Society, and we want to make it work for everyone.

Likewise, our geoconservation days could sometimes benefit from a little more support from our members. At these sessions there is always a good feeling of camaraderie amongst the 'workers' and there is a great feeling of satisfaction when a rock exposure is revealed once again in all its glory.

Our next field visit is on home territory - The Wren's Nest on 20 August, and the next geoconservation day is at Saltwells on 1 October. Even if you can't do much, come along and do what you can. Everyone is welcome and it really is fun! To whet your appetitie, Andy's reports of the geoconservation sessions appear regularly in these pages, and are then added to the web site under 'geoconservation posts' here: http://bcgs.info/pub/local-geology/geoconservation/posts Andy also writes comprehensive reports of each field visit for our Newsletter, serving to inform those who were absent, and as a reminder to those who were there. I'd like to take this opportunity to thank Andy for his sterling efforts.

We look forward to seeing some more of you at forthcoming events, and please remember to contact us with your queries, opinions, and any other items for the Newsletter. ■

Julie Schroder

Geoconservation and Field Meeting Reports

Saturday 21 May (*Geoconservation):* Portway Hill Quarry, Rowley

The day was warm, cloudy and windy with periodic rain showers. A handful of us met at the usual location off St. Brades Close at 10.30. Once again we were joined by members of the Friends of Rowley Hills group.

Mike, from the Friends Group, told me about how the hill had been sold off into plots long after the quarries had finished being backfilled. The Birmingham and Black Country Wildlife Trust's site is just one of these plots. The owners of other plots apparently acquired them with a view to developing them with housing. However, planning permission is fortunately preventing this. ►

Part of the Friends Group's work has been to clear hawthorn and bramble from the Wildlife Trust site. This has allowed many wildflower species to flourish, including oxeye daisy, bush and common vetch, meadow buttercups, mouse-ear hawkweed, red clover and ribwort plantain. The Friends Group have also planted yellow rattle, which helps to prevent the various wild grasses from taking over. Given the nature of the underlying fill and its engineering, this means that no deep rooted or big plants are able to get a foothold at the site. In the fifty years since filling ceased the largest plants to have colonised the site are hawthorn and gorse. The hawthorn was full of blossom on the day of our visit, which along with the other flora makes the site attractive to around twenty eight species of butterfly and moth, including the green hairstreak, and numerous bird species.

Portway Hill Quarry before clearance

The Friends Group have also been working at improving the footpaths through the site using fallen rock scree from the dolerite exposures. The aim of our visit on this occasion was to excavate downwards and clear the rock scree and vegetation from the base of the exposures. The scree was partly used for creating a platform at the exposure base, but also taken away to help improve more footpaths crossing the site. Our efforts have helped to reveal more good examples of spheroidal weathering within the dolerite and also other features that could be dolerite columns. More work needs to be done to expose these.

Portway Hill Quarry dolerite columns

According to Graham the site has been put forward as one for the Black Country Geopark bid.* We made good progress clearing enough exposure ready for an important Geopark evaluation meeting in June. However, much more clearance is required, including keeping the vegetation in check and improving the footpaths for better access.

The Friends of Rowley Hills Group, along with the Wildlife Trust, have a calendar of events and a very good website which can be visited at: friendsofrowleyhills.org for more information. Once again I would like to thank Paul Stephenson and the volunteers, and hope to see more attendees on our next visit.

**The proposed Geopark 'Geosites' are listed in the Geopark application dossier. This can be downloaded from the Geopark website: www.blackcountrygeopark.org.uk/sites-to-see/*
The quarry on Portway Hill is referred to as 'Blue Rock Quarry' and is listed as Geosite No. 23 on p.21. Ed.

Sunday 5 June (*Geoconservation):* Rubery Cutting.

The day was warm and sunny. A handful of BCGS members joined the Lickey Hills Geo-Champions for a clearance session on the Rubery (A38) road cutting.

The exposure comprises Silurian sandstone overlying Ordovician Lickey Quartzite with a prominent contact between that represents a major unconformity. These rocks also represent the basement sequences for the Birmingham and Black Country region. In the past this site was an important one for visiting university students, but has been somewhat neglected in recent times. The exposures are along the former Leach Green Quarry wall and the adjacent road cutting, both of which in the past ►

Rubery Sandstone/Lickey Quartzite unconformity Highlighted photo courtesy Prof. Ian Fairchild

provided very good views of the two rock strata and the unconformity in between. However, since the quarry ceased working it has been developed into a housing estate and much of what could be seen is now inaccessible because of fly-tipping and thick vegetation. Today only a small section of exposure is visible, which results from the construction of the A38 and associated fly-over after the quarry closed.

Our day was spent clearing scrub and litter from the exposure face to make the strata and unconformity more visible. Within the Silurian sandstone strata distinctive finer muddy layers and cross bedding could be seen. The contact between the two strata shows a clear erosion surface where the sandstone strata were deposited on a landscape of the Lickey Quartzite.

Like all the sites we visit this one is in need of on-going maintenance to keep it clear and protected. More information regarding the Rubery Cutting site and the Lickey Hills Geo-Champions can be found on the BCGS web site at: http://bcgs.info/pub/local-geology/sites/4-rubery-cutting/ and the Herefordshire and Worcestershire Earth Heritage Trust's Champions web site at: http://ehtchampions.org.uk.

Rubery Cutting after clearance

Have a look at our web site: http://bcgs.info/pub/local-geology/black-country-geology for more information on several of the sites we visit. All of Andy's geoconservation reports since February 2014 are collected here: http://bcgs.info/pub/local-geology/geoconservation/posts. Ed.

Saturday 11 June (*Field Visit):* Return to Oxford University Museum of Natural History.

Led by Museum Staff.

Previous BCGS Visit, May 2014

Iguanadon Skeleton in the Central Court

Newly appointed Museum Director Paul Smith gave BCGS members a tour of the Oxford University Museum of Natural History (OUMNH) in May 2014. Over tea and coffee Paul provided a brief introduction to the history and origins of the Museum. Based on Victorian neo-Gothic style, the museum building is Grade 1 listed and was designed as a 'Cathedral of Science'.

Our first stop was the Central Court with its then recently restored glass and iron ceiling. Here, specimen cases and reconstructed skeletons inform the general public about natural and earth history. The main purpose of our visit was to look behind the scenes at on-going research and the collections not on public display. The tour included the Wytham Room and the ecological studies of Wytham Woods, the Entomology research laboratories, the former science library, the fossil and museum archive and the Mesozoic vertebrate stores (or vertebrate compactor room). Several of these places we would return to on this visit. ►

History of the Museum and Collections

The origin of the museum collections dates to the 1670s when Elias Ashmole, founder member of the Royal Society, gave his substantial collection of 'curiosities' to Oxford University. To house the collection the first 'Ashmolean Museum' was built, opening its doors in 1683 to become Britain's first purpose-built public museum. The first keeper of geology at the Ashmolean was Dr Robert Plot, known for his two books 'The Natural History of Oxfordshire' (1677) and 'Staffordshire' (1686). His successor was Edward Lhwyd, who became the first person to document the Ashmolean collections in 1699.

In 1845 Henry Acland, Reader of Anatomy at Christ Church College, had a vision for a museum that would serve his belief for every educated man to learn something of the sciences. He campaigned for a new museum to house the University's research and teaching facilities, whilst bringing together the many collections dispersed across the University. In 1853 and 1857 land was purchased from Merton College and the Museum opened its doors in 1860, remaining a centre for learning and teaching ever since. The first Museum keeper was John Phillips, the nephew of William Smith – the 'Father of English Geology'. At this time the Ashmolean collections were relocated to the new museum and today they are split into two groups - the Earth and Life collections.

The Return Visit, June 2016

Our recent visit started in the museum's Central Court where members gathered around 10.00. It was split between three departmental Heads of staff; Monica Price (Head of Earth Collections), Dr Mark Carnall (Collections Manager, Life Collections) and Dr Hilary Ketchum (Collections Manager, Vertebrate Palaeontology).

The Corsi Collection

Minerals and Decorative Stones Archive

We started with a look at the minerals and decorative stone archive, part of the Earth Collections, with Monica Price. The archive contains the ancient building stone collection of Faustino Corsi, a nineteenth century lawyer with a fascination for minerals and decorative stones used in ancient times, particularly in Rome. Corsi's collection comprises one thousand polished stone blocks, approximately 2 by 5 inches. At first he collected specimens of carbonate rocks (marble, limestone and travertine), but eventually expanded the collection to include more exotic Mediterranean specimens, including granite, serpentinite and jasper. Corsi eventually sold the collection to Stephen Jarrett, a wealthy young student who purchased it as a gift for the University in 1827. The collection was always intended for use as a reference to help identify polished stone and Corsi stressed the importance of recording each quarry location.

Next we visited the mineral archive, which according to Monica is divided according to colour, reflecting the chemistry of each mineral group, i.e. aluminosilicates, carbonates, sulphates, sulphides, etc. Between the displayed specimens and the archive, the museum holds over 31,000 specimens of minerals and gemstones. One of the oldest collections is that of Lawrence Wagner, a leading early twentieth century petrologist who became Professor of Geology at Oxford in 1950. His collection includes over 200 rock specimens collected from Tibet during an expedition to Mount Everest in 1933. Other interesting collections include those of Dr Richard Simmons, son of a physician to George III. He spent his inheritance purchasing minerals, which he left to the University on his death in 1846. ►

Monica showed us various mineralogical specimens, including copper-rich corundum, franklinite and pyrite, and iron rich stibnite, spinel and haematite. For all collections throughout the museum and elsewhere, preserving specimens is a major problem and we saw several examples of degrading pyrite and discoloured stibnite (antimony sulphide). Minerals reach a state of chemical equilibrium under particular temperature and pressure conditions within the crust. Exposure to light and air, and changes in humidity and temperature cause them break down over time and discolour, making preservation difficult.

The archive also contains an array of gemstones, including diamond, ruby, sapphire and tourmaline. Colour reflects the chemistry and chemical variations within the gemstone. Chromium makes rubies red and emeralds green, however subtle chemical variations will vary the colour. For example, sapphires are not always blue, but may also occur as red, pink or yellow varieties depending on chemical differences.

Life Collections Archives

Dr Mark Carnall (Collections Manager, Life Collections) led the second part of our tour, which he started with a brief history of the museum and the origins of the Life Collections. These collections are split into three groups reflecting the mode of preservation, i.e. taxidermy, osteology (bones) and fluid preservation. The Life Collections contain over six million specimens, covering a huge diversity of animals and is the oldest collection of zoological specimens in the country.

We started with a look at examples of the oldest taxidermy specimens held in the museum archive, which includes the curiosities of John Tradescant collected in 1656. This collection was originally housed at the Ashmolean Museum before ending up in the ownership of Oxford University in the 1880s. We also saw this collection during our last visit. It includes skulls, bones, horns, and remains of elephant, hippopotamus, cape boar, and most memorably, the only soft tissue remains - a mummified head and foot - of a Dodo. Taxidermy represents the earliest method of preservation. This varied in quality often leaving specimens in a sorry state, leading to many being destroyed in the past. Also, taxidermy does not preserve the internal organs and soft tissues of the animal.

Next we visited the Bone Store, which represented the second method of preservation - osteology. This was another early way of displaying specimens, examples of which can be viewed in the museum's Central Court. Dr Carnall explained that early folklore and myth, combined with not knowing a specimen's history, had led to misinterpretation and misidentification of many specimens in the past. The store includes the bones of cattle, sheep, goat and whale and holds the type specimens for many species, such as the Plains Zebra, rhino, snakes and birds. Like taxidermy, this method of preservation only provides an idea of the structure and morphology of an animal, but does not preserve the soft organs or tissues.

Fluid Preserved Specimens

Finally we visited the Vertebrate Spirit Store, which we also saw last time. The store is arranged in order of ►

mammals, birds, reptiles, amphibians and fish with some specimens dating back to the 1860s. Specimens are preserved in industrial methylated spirits or a solution of formaldehyde, which is the best method of preserving the whole animal - soft body parts, organs etc. The only drawback is that the fluids tend to discolour the specimens.

Like the Earth Collections, all the Life Collections are used for research, education and display purposes by universities, schools, scientists and artists. The specimens are generally supplied by collectors from around the world who have nowhere to store them.

Palaeontology Archive

After lunch the third and final part of our visit was led by Dr Hilary Ketchum (Collection Manager of Vertebrate Palaeontology). Starting in the palaeontological archives - another part of the Earth Collections - Dr Ketchum provided a brief history of the archive, how it came to be and developed over time. The origin of the archives evolved from the describing and cataloguing of the Ashmolean Museum collections by the first Keeper, Dr Robert Plot, and his successor Edward Lhwyd. Both men also added their own specimens and in 1860 it was all transferred to the newly opened OUMNH. Since then the collections have been continuously added to and catalogued.

Plot misidentified many of his vertebrate specimens, believing them to be petrified human organs. Unfortunately his specimens have been lost; however his descriptions and illustrations survive in his book 'The Natural History of Oxfordshire'. In 1699, Edward Lhwyd published his 'Lithophylacii Britannici Ichnographia', which represents the earliest documentation of surviving specimens in the museum's collections. The book is full of illustrations and descriptions of fossil bones, teeth, echinoids, molluscs, corals and sponges.

Marine reptile remains

Dr Ketchum showed us many fossils kept in the archive, including the first plesiosaur flipper to be illustrated by Henry de la Beche, friend of Mary Anning and first Director of what is today the British Geological Survey. We saw many specimens from the Stonesfield Slate, an important building stone for Oxford. A mid-Jurassic muddy limestone, it is known for its fossil molluscs, fish, insects and animal remains. Dr William Buckland was well known for paying miners for the fossils they found in the Stonesfield Slate. We were able to see some of his collection, some replicas, which included the first described Megalosaurus jaw bone, and early mammal teeth and jaws. Buckland also described the remains of flying reptiles, rhamphorhynchus, and coprolites. The archive also holds the fossils of fish, pterosaurs and coprolites collected by Elizabeth Philpot and her sisters, who were great friends of Mary Anning. Many of their finds they passed on to Dr Buckland.

After the Palaeontological archive, our final stop was the vertebrate compactor room, which we had seen during our previous visit. The room contains several sliding shelf units that hold the bones of many large fossil vertebrates. These include the world's first described sauropod, 'Cetiosaurus', or 'Whale Dinosaur' and specimens of Hylaeosaurus and Iguanodon, discovered by Gideon Mantell and used by Sir Richard Owen to describe his 'Dinosauria'. The bones of many marine reptiles - plesiosaurs and ichthyosaurs - are also held here, including those collected by Tom Hawkins, whose ambition was to become the world's best fossil collector. Not only have these collections revealed new species, but they have also helped with the development of new techniques for extracting information about these fossils from the clay that contains them. ►

We finished our museum tour around 16.00 with a little time left to look around before closing time. I would like to thank Paul, Monica, Dr Carnall and Dr Ketchum for their time, and another very interesting visit. More information about the Museum and its collections can be found at http://www.oum.ox.ac.uk. ■

Andy Harrison

The Lapworth Museum of Geology revitalised

The Lapworth Museum of Geology at the University of Birmingham was closed for around 18 months for a £2.7 million redevelopment. It reopened on 10 June and the end result looks superb - smart modern lines blending with the stylish Edwardian interior, all brought bang up to date by top class display cases, great graphics and a diverse range of excellent displays.

A smart new entrance doorway leads through to the new lobby area and the reception desk, shop and cafe, from where you get your first glimpse of the new displays. A dramatic dinosaur cast greets visitors to the Museum's main hall - the Evolution of Life Gallery. The story of the Evolution of Life starts with the Precambrian display and follows on in sequence through the various geological periods charting 4500 million years of earth history.

The Active Earth Gallery tells the story of Earth processes, such as volcanoes, glaciers, and earthquakes. Interactive displays help visitors to understand geological concepts and theories. Dramatic lighting and bold graphics engage the visitor, and a state-of-the-art projection globe runs a selection of video programmes.

At the entrance to the Active Earth Gallery can be found the floor to ceiling Rock Wall, which showcases more than 125 different rocks, all on open display, allowing the visitor to get up 'close and personal' with a wide range of different rock types. Just beyond the rock wall is a display about Professor Charles Lapworth (1842-1920), after whom the Museum is named, featuring his desk and some of his scientific equipment.

A stylish staircase leads up to the new Mineral Wealth Gallery where the visitor is 'wowed' by the colourful and beautifully illuminated floor to ceiling 'Mineral Wall' display case running down the length of the gallery. Local associations with the mineral and gemstone industries are presented in a display of specimens from Matthew Boulton's collection and a fine display of cut gemstones and agates.

At the end of the Mineral Wealth Gallery is an open balcony from where the visitor can enjoy great views across the Main Hall and the Rock Wall below *(see front page photo)*.

There is an interactive display of fluorescent minerals where the visitor can select 'daylight' and long wave or short wave ultraviolet light to display the dazzling array of different colours presented by fluorescent minerals. This is sure to be a hit with younger visitors especially. ►

Beyond the Active Earth Gallery is the Temporary Exhibition space which will feature regularly changing special exhibits on a variety of themes, and there is a state-of-the-art Education Room which will be available for bookings by groups such as geological societies and mineral clubs in addition to school groups.

Admission is FREE! You can find out more details about opening times, directions, access etc. on the Museum website here: http://www.birmingham.ac.uk/facilities/lapworth-museum/index.aspx ■

Roy Starkey

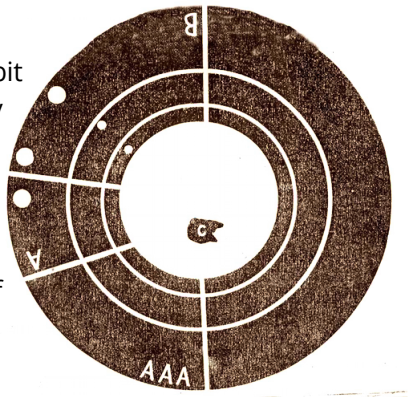
The above is an extract from an article by Roy for the 'Mindat' web database. We are grateful to Roy for sharing this material for publication here. To read the full article with an an extensive gallery of photos go to: http://www.mindat.org/article.php/2372/Lapworth+Museum+of+Geology+reopens+after+an+extensive+%C2%A32.7+million+redevelopment

Mike's Musings No.4

The Oldest Geological Maps - William Smith and more besides

I imagine most people, especially in Britain, have heard about 'the map that changed the world' - the epithet used by Simon Winchester for his 2001 book on William Smith and his great work. This culminated in 2015, the 200th anniversary of Smith's original publication, with a whole series of events across the country to mark the occasion, not least by our own society who were treated to the unveiling of an original copy of the map in Dudley Museum *(see Newsletter No. 232, August 2015)*.

Now, far be it from me to suggest that this map was anything but momentous in the development of geology as a fully fledged scientific subject in its own right (rather than just one strand of 'natural philosophy'), nor would I wish to reduce the magnitude of Smith's life achievements to any degree; but (there's always a 'but', isn't there?) I believe that this overwhelming focus detracts from the labours of others who also made substantial contributions in this area of activity.

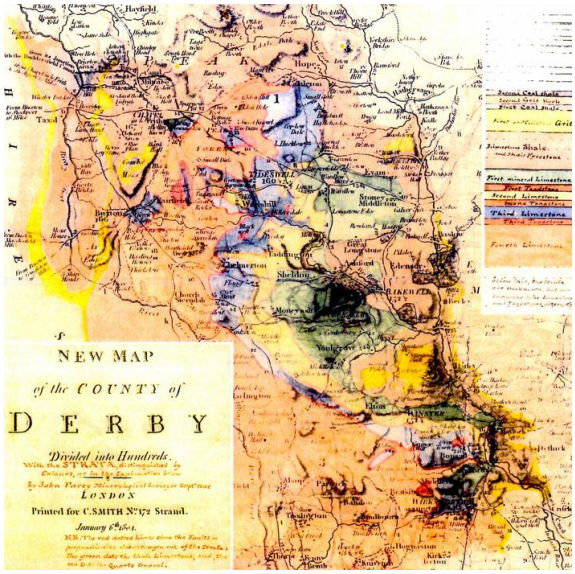


Several years ago now, Dudley Museum had a small, unsung exhibit featuring the so-called 'oldest geological map in the world'. If my memory serves me correctly (and I'm sure I'll be put right otherwise!) this consisted of a small diagram of Castle Hill drawn by Dud Dudley in 1665. It resembled an archery target with some superimposed dots and letters showing 'Castle Hill and its Mineral Seams' - specifically, I think, referring to Coal Measures ironstones and coal seams. This, of course, was all tied in with the development of the area and its foremost place in the Industrial Revolution that was to come.

This example well illustrates the point that the subject we all care about grew not solely for reasons of scientific advancement, but equally, if not more so, for practical and material utility. William Smith himself approached the whole subject from the perspective of a man earning a living from understanding the land and the rocks beneath his feet.

As far as 'the oldest' geological map is concerned, much may depend on your definition. The Turin Papyrus, dating from around 1160 BC(!) depicts a 15km stretch of the Wadi Hammamat in the Eastern Desert of Egypt. Clearly recognisable are the Pharaonic gold mines dating a century or more further back in time to the 19th dynasty of King Seti I, but the additional depiction of various rock types by different colours, and information on both mines and quarries in the area surely allow us to regard this as a geological map of sorts. ►

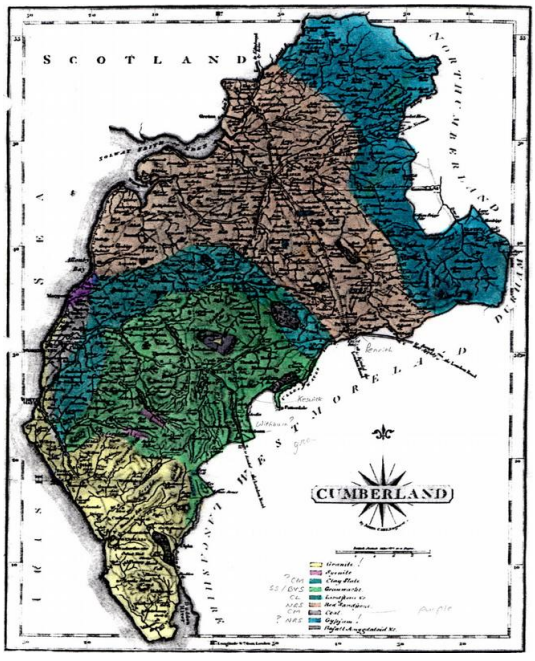
There may be other esoteric examples of 'early geological maps' dating from before the 1800's (the publication of Hutton's fully formulated and revised 'Theory of the Earth' in 1795 might be a good date to take as the beginnings of 'modern geology'), and notwithstanding any such, it is during the early years of the 19th century that modern-looking geological maps began to get published in any quantity. Thus William Smith's map is merely the one that has received greatest attention in recent times.



Part of Farey's 1808 map

To give a few examples of remarkably prescient maps that emerged during this period, we find that some even preceded Smith's map. Close to home, certainly my home (in Derby), we have the works of White Watson. He specialised in presenting the surface rocks of Derbyshire as inlaid tablets depicting a variety of cross-sections, selecting decorative stones to serve his purpose, against a background of the famous Ashford Black Marble. OK, so these weren't maps in any sense of the word, but they fulfilled much the same purpose in presenting a modern stratigraphic understanding of the relationships between the rocks. Most of his work dates from 1785 to 1821, contemporary with John Farey's 1808 'New Map of the County of Derby'. It is interesting to note that Farey is described as a 'mineralogical surveyor' - the age of the geological surveyor had not yet arrived.

Likewise, a remarkable geological map of the Lake District from 1814, was produced by Joseph Fryer, surveyor, geologist, but principally a mining engineer from Newcastle. There seems to be no information about him at all on the Internet - a name almost lost to history, it seems. The threefold series of strata crossing the region was clearly understood through the earlier work of the likes of Jonathan Otley, a native of Keswick, but was here presented in map form for the first time - and by an 'outsider' at that!



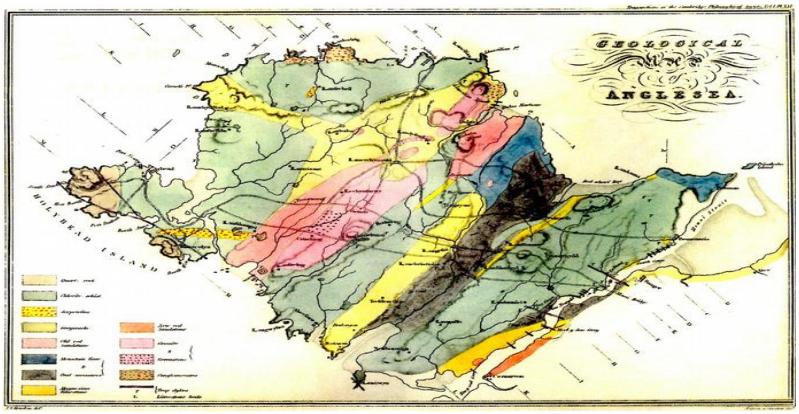
Joseph Fryer's 1814 map

Another remarkably modern-looking map, this time of Anglesey, dates from 1822, prepared by John Stevens Henslow. If the name seems familiar, that may be because he is best remembered as one of Charles Darwin's mentors; a botanist, geologist, but foremost a clergyman - as so many 'natural philosophers' of this period were. He seems to have had a predilection for offshore Britain, visiting the Isle of Wight with Sedgwick, as well as conducting geological studies on the Isle of Man and Anglesey. For Anglesey he produced the first detailed geological map, which holds up well against Greenly's famous production nearly a century later.

At about the same time another famous name in the early years of professional geology began to produce various geological maps. Henry de la Beche is well known for his run-in with Murchison over the Devonian strata of, well, er, Devon! In 1822 he produced a geological map of southern Pembrokeshire, while a map of the whole of the south-western peninsula of England appeared in 1839. ►

Meanwhile, north of the border, the formidable outings and researches of John MacCulloch are well known to geological historians. This culminated in what might be regarded as the Scottish equivalent of Smith's map, a geological map of all Scotland published in 1836. Some earlier maps of parts of Scotland had previously appeared for Inverness-shire (1808) and Arran (1819), but these were more focussed on soil types. Arran, of course, has been much mapped by undergraduates learning the ropes in more modern times.

A glance at 'early geological maps' images on the Internet can add to these, arguably, more noteworthy examples. And I haven't even mentioned anywhere overseas, where work was no doubt gathering apace as various geological surveys were established in the wake of our own geological survey. This was established in 1835 as part of the Ordnance Survey (with de la Beche as it's first director).



John Stevens Henslow's 1822 Anglesey map

I was slightly surprised in researching this article that pretty much the whole of Canada had been mapped, at least to some degree, by 1864, when William Logan produced the first such map.

So - let's hear it for some of the less known, and positively unknown, pioneering producers of geological mapping. They were as able as William Smith who, eventually at least, enjoyed full recognition by his peers in his own lifetime, while their names faded into varying degrees of obscurity and only recognised again with the luxury of modern historical research. ■

Mike Allen

Members' Forum

Birds, Diaphragms and Dinosaurs - *a response to Paul Truelove's question (see Newsletter 236, p.16).*

It's not much of a contribution, as I'm no zoologist or anatomist! But the article in Wikipedia 'thoracic diaphragm' does address the differences between animals, including birds, and their modes of breathing. It also comments on the view that the absence in birds of a true diaphragm has been used to argue that birds are not descended from dinosaurs (especially from a fossil called Sinosauropteryx).

Pertinent, seems to be a comment about the origins of the mammalian lung, from a position different in relation to the diaphragm than in reptiles and amphibians, i.e. thoracic (above) rather than abdominal (below) the diaphragm. This is in response to the additional respiratory requirements of warm-blooded creatures.

Birds have no diaphragm, breathe using air-sacs, and developed along completely independent lines from both reptiles and mammals, so that the question posed may actually be a non-sequitur. Perhaps your correspondent might make more of that article than I'm able to do! ■

Mike Allen

Time for the 'BABES'?

The note in the previous BCGS Newsletter by Adrian Wyatt *(Issue 237, p.17)* about the glacial erratics at Bromsgrove Cemetery has prompted me, somewhat tongue in cheek, to float the idea that we should consider forming an off-shoot, or sub-group, of the BCGS. Some of you will no doubt remember Roland Kedge's interesting presentation on the glacial erratics to be found around Birmingham, at the Members' Evening in 2014.

Mary and I live in Bromsgrove, and we regularly enjoy walking/cycling outings to the famous Tardebigge flight of locks on the Worcester and Birmingham Canal. It is the longest flight of locks in the UK, made up of 30 narrow locks in a distance of only 3.6 km. Near the top of the flight is a reservoir, and a bridle way runs along the ridge above this. I have often noticed a large boulder in an overgrown depression (possibly a former clay pit or quarry) just below the bridle way but never bothered to scramble down and investigate it further.

Glacial Erratic in shallow quarry near Tardebigge Reservoir (SO 988 683)

One day in April, as we were walking past, I decided to push my way through the vegetation and go and have a closer look. The boulder is pretty impressive and looks like some sort of fine-grained volcanic rock – perhaps a tuff from the Arenig area.

I contacted Roland and sent him a photo of the boulder – he was most surprised that I had come across it, but was already aware of its existence.

More recently, whilst ferreting around in the literature in connection with research for my forthcoming book on the Minerals of the Midlands I found an intriguing account of yet another, even larger boulder, only about five minutes cycle ride from our house. It lies across a field that we have cycled past perhaps a hundred times, over the past thirty years or so, but have never spotted it.

Very large glacial erratic at Finch End Farm, Finstall (SO 975 688)

We sought permission from the farmer, Philip Harper of Finch End Farm, and were able to make our way around the margin of the field, following 'tractor damage' in the field of cereal, to a gateway on the far side. The boulder is of truly impressive size, and is a similarly tough, fine-grained rock, probably of volcanic origin, and again, possibly from the Arenig area of North Wales.

If you feel the urge to go and visit the Finch End Farm erratic, please leave it until the autumn, when the crop has been harvested, and be sure to obtain permission from the farmer before you venture onto his land.

So, it may indeed be time to consider launching the Birmingham And Bromsgrove Erratic Society (BABES) – any takers? ■

Roy Starkey

Some of our members may take issue with the exclusion of the Black Country with its vast collection of erratics though the acronym BBCABES would not be quite so catchy! This item also raises awareness that Adrian Wyatt posed a question in the last Newsletter and there have been no responses so far. Any ideas? Ed.