



# Newsletter No. 250

## August 2018

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**Copy date for the  
next Newsletter is  
Monday 1 October**

**To find out more about this photo - read on!**



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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](http://bcgs.info), Twitter: [@BCGeoSoc](https://twitter.com/BCGeoSoc) and [Facebook](https://www.facebook.com/bcgs).

## 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.*

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.

**Saturday 18 August (Field meeting): Visit to Wren's Nest and the newly opened Dudley Museum and Art Gallery, led by Graham Worton.** Meet at the Dudley Archives at 10.30. Bring a packed lunch and suitable footwear for indoors at the Archive and outdoors at Wren's Nest.

**Saturday 1 September (Field Meeting): Visit to Titterstone Clee Hill, Shropshire, led by Andrew Jenkinson** (Shropshire Geological Society). Joint meeting with the OUGS WM. Meet at 10.00 at Clee Hill village car park, situated on the A4117 immediately east of the village high street and cattle grid at grid ref. SO 595 754. This field trip will give an insight into the complete Carboniferous succession on the south flank of 'St. George's Land'. Basalt, coal, limestone and fireclay were quarried here and we will visit old quarries of geological and industrial interest. We will also observe a columnar basalt intrusion and discuss the structural significance of the Church Stretton and Malvern faults. Bring a packed lunch. Finishing time: 4.30 to 5.00.

**Monday 17 September (Indoor Meeting): 'Geological Highlights of South Devon'. Speaker: Alan Clewlow.** South Devon is renowned for the sheer diversity of its geology, including igneous, sedimentary and metamorphic formations, and fossils. Alan Clewlow will draw on his 30 years of experience of fieldwork in South Devon to describe a landscape which is not only diverse geologically but also very accessible to visitors, particularly along its coastal paths.

## 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.

**Saturday 6 October (Geoconservation Day): Portway Hill Quarry**, Rowley. Meet at St Brades Close at 10.30. Directions: from Birmingham New Road (A4123) turn left on to Tower Road if coming from Birmingham, right if coming from Wolverhampton. Just after Bury Hill park, turn left onto St Brades Close. Wear old clothes, waterproofs and stout footwear. Please bring gloves and tools: spades, brushes, trowels, loppers, saws etc. We aim to excavate and expose more of the dolerite. Also bring a packed lunch. Finish at 2.30.

**Monday 15 October (Indoor Meeting): 'Catastrophic Volcanoes'. Speaker: Sebastian Watt.**

**Saturday 3 November (Geoconservation Day): Wren's Nest.** Directed by the Reserve wardens. Meet at the Wardens' house on the Mons Hill College ground at 10.30. The day will involve scrub clearance followed by a fossil hunt a little walk from the Wardens' base. Bring gloves, stout footwear and packed lunch. Wardens will provide tools, hard hats if necessary and a hot drink. Finish around 2.30.

**Monday 19 November (Indoor Meeting): 'Abberley & Malvern Hills Geopark'. Speaker: Georgia Jacobs.**

**Saturday 1 December (Geoconservation Day): Saltwells Local Nature Reserve.** Meet at the Nature Reserve car park (Grid ref: SJ 934 868) on Saltwells Lane at 10.30. Wear old work clothes, waterproofs and stout footwear. Please bring gloves and garden tools: hand brushes, trowels, 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 2.30.

**Monday 10 December (Indoor Meeting, 7.00 for 7.30 start): Members' Evening.** Details TBC.

## 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 websites.

### Mid Wales Geology Club

**Wednesday 15 August: 'An Overview of San Francisco Geology.'** Speaker: Dr Chris Simpson.

**Sunday 19 August: Geological Walk to Rodney's Pillar, Welshpool.** Led by Tony Thorp.

**Sunday 9 September: Bala and Adam Sedgwick's rocks.** Led by Keith Nicholls (NWGA).

**Wednesday 19 September: 'Fossil Plants of the Carboniferous Period.'** Guest Speaker: Paul Lane.

Further information: Tony Thorp tel. 01686 624820 and 622517 [tonydolfor@gmail.com](mailto:tonydolfor@gmail.com)  
Web: <http://midwalesgeology.org.uk> Talks at 7.30 at Plas Dolerw, Milford Road, Newtown.

### Manchester Geological Association

**Sunday 19 August: Crompton Moor, Besom Hill and Oldham Building Stones.** Led by Stephen Darlington.

**Saturday 29 September: Fred Broadhurst Memorial Field Trip: Deep Dale and Magpie Mine.** Led by Jane Michael. The trip will be based round Walk 14, Ashford-in-the-Water and Magpie Mine in 'Rocky Rambles in the Peak District' by Fred Broadhurst.

Contact email: [outdoors@mangeolassoc.org.uk](mailto:outdoors@mangeolassoc.org.uk) For further information about meetings go to: <http://www.mangeolassoc.org.uk/> Visitors are always welcome.

### Warwickshire Geological Conservation Group

**Saturday 18 August: Wootton Wawen.** Led by John Crossling and others. Details to follow, but the plan is to include archaeological and botanical interest.

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

### East Midlands Geological Society

**Saturday 15 September at 10.00: Churnet Valley, Staffordshire.** Led by Dr Ian Stimpson of Keele University. (Joint trip with NSGGA.) Meet at Froghall Wharf, Foxt Road, Cheadle, Staffordshire ST10 2HJ. SK 0268 4765.

Non-members are welcome. Further info: [www.emgs.org.uk](http://www.emgs.org.uk) or email: [secretary@emgs.org.uk](mailto:secretary@emgs.org.uk)

## North Staffordshire Group of the Geologists' Association

**Saturday 15 September at 10.00: Churnet Valley, Staffordshire.** Led by Dr Ian Stimpson of Keele University. (Joint trip with EMGS.) Meet at Froghall Wharf, Foxt Road, Cheadle, Staffordshire ST10 2HJ. SK 0268 4765.

For enquiries: Steve Alcock, Longfields, Park Lane, Cheddleton, Leek, Staffs, ST13 7JS. Tel: 01538 360431 or 07711 501028. Email: [steves261@aol.com](mailto:steves261@aol.com) More info: [www.esci.keele.ac.uk/nsग्ga/](http://www.esci.keele.ac.uk/nsग्ga/)

## Shropshire Geological Society

**Saturday 29 September: Llanymynech.** Leader: Andrew Jenkinson (01938 820 764, e-mail: [andrew@scenesetters.co.uk](mailto:andrew@scenesetters.co.uk)).

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

## The Geologists' Association Annual Conference 2018 - The Geology of 'Mordor'

Exploring the incredible geology and mineral wealth of the Black Country, that powered the 'workshop of the world' and inspired iconic art and literature.

### Provisional Programme:

**Friday 19 October:** Lapworth Museum of Geology, University of Birmingham  
Pre-registration & behind-the-scenes visit to the Lapworth Museum  
Informal social gathering at local pub

**Saturday 20 October:** Talks relating to the world-class geological & cultural heritage of the region

Topics/speakers to date:

Keynote: People and rocks in the landscape of 'Mordor'

Graham Worton: The Black Country UNESCO Global Geopark

Speaker (tbc): BGS and the geology of the region

Colin Knipe: Mining and Industry in the Black Country

Ben Evans: Conserving Geoheritage in the Coalfields/Urban Area

Conference Dinner details to be confirmed

**Sunday 21 October:** Range of excursions to include:

The limestone geology and fossils of the Black Country

The Coal Measures geology of the Black Country Coalfield

The Building Stones of Birmingham City Centre

For further information and registration:

[www.geologistsassociation.org.uk](http://www.geologistsassociation.org.uk) or email: [conference@geologistsassociation.org.uk](mailto:conference@geologistsassociation.org.uk)

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For further information and registration:  
Visit: [www.geologistsassociation.org.uk](http://www.geologistsassociation.org.uk)  
or email: [conference@geologistsassociation.org.uk](mailto:conference@geologistsassociation.org.uk)  
Registration opens 1st April 2018

Dudley Black Country Lapworth Museum

## Abberley and Malvern Hills Geopark - Geofest

The 2018 Abberley and Malvern Hills Geofest is running from 26 May to 2 September with the usual variety of events and exhibitions. Click here to view or download the [Geofest programme](#). For further information go to: <http://geopark.org.uk/>

## Editorial

Alan Clewlow (Hon Treasurer) kindly offered to take over the job of Meetings Secretary from Roy Starkey on a temporary basis, and we thank him for the work he's done to assemble the autumn programme of talks. I am pleased to report that Keith Elder has now volunteered to take on this role and has already taken up the mantle. Known to some of you for his involvement with the 'Wild About Perton' community environmental group, we are delighted to welcome Keith onto the BCGS committee as Meetings Secretary.

The summer season brings our programme of field trips, giving us the opportunity to enjoy some first hand geological experiences, and to meet and get to know each other. We try to send reminders, but please don't rely on this! Summer absences mean that we can't always do this. It's best to make a note of all the dates from the Newsletter when you receive it. We now also have the autumn indoor meeting dates for you diary, and the geoconservation dates up to the end of the year. So please get these dates in your diaries now!

Many of you will have some geological tales to tell - or queries for our experts to answer following your summer holidays. Please send them for the Newsletter! We greatly appreciate our regular contributors, but would love to hear from more of you. ■

*Julie Schroder*

## Obituary: Joanne Kluessendorf

I recently heard from an old friend, Don Mikulic in Illinois, that Joanne Kluessendorf died on 1st June in Milwaukee. This news will be greeted with sadness by a number of HOGG, GCUK and BCGS members.

"Dr. Joanne Kluessendorf died in a Milwaukee area hospital on June 1, 2018 at the age of 69. Joanne was the founding Director of the Weis Earth Science Museum in Menasha, Wisconsin, and was widely recognized as an expert in the bedrock geology and paleontology of the Midwestern United States. In addition to her scientific research, she was long known for her education, historical, preservation, and museum activities."

It was through her historical work that I first knew her. In particular with Ed Landing and Don Mikulic. Joanne was one of the editors of 'Fabulous Fossils, 300 years of Worldwide Research on Trilobites', (bulletin 507), a collection of papers published by New York State Museum in 2007.

In that publication and of special interest to me, she was co-author with Don of the paper, 'Legacy of the Locust - Dudley and it's famous Trilobite, Calymene Blumenbachii'. ■

*Alan Cutler*

## Field Meeting Report

**Saturday 12 May: The Peak District – Calton Hill, Miller’s Dale and the Monsal Trail.** Led by Mike Allen (BCGS and WGCG).

### Introduction

BCGS members had previously visited the Buxton area in June 2010. This time, we met Mike at 11.00 in a lay-by off the A6 near Topley Pike, approximately 5km east of Buxton. Once gathered, Mike gave an introduction to the day and the Peak District’s regional geology. Throughout the day, conditions were slightly cloudy with some sunshine and a light breeze.

The visit covered three sites. Driving from Topley Pike, we spent the morning at Calton Hill Quarry SSSI. Then driving to the former Miller’s Dale station for lunch, we spent the afternoon on the Monsal Trail.

### Background

The geology of the 'White Peak' part of the Peak District typically includes limestone and volcanic rock sequences belonging to the upper part of the Carboniferous Limestone. The youngest strata seen are Brigantian Stage, Eyam and Monsal Dale Limestone. These overlie Albian Stage, Bee Low Limestone. Underlying the Bee Low Limestone are older beds of Holkerian Stage, Woo Dale Limestone.

During our visit we examined Monsal Dale and Bee Low Limestone strata. The Monsal Dale Limestone is split into Monsal Dale Beds; Priestcliffe Beds; Upper Miller’s Dale Lava; and the Station Quarry Beds. The underlying Bee Low Limestone is subdivided into Miller’s Dale Beds; Lower Miller’s Dale Lava and Chee Tor Beds. The sites we visited mainly focussed on the beds situated above and below the Asbian-Brigantian boundary.



*Calton Hill Quarry*

### Calton Hill Quarry SSSI

Calton Hill Quarry was worked from the 1920s for roadstone and has largely been restored as landfill. Now a SSSI, only one small corner contains decent rock exposures. The site generally forms a sub-circular dolerite intrusion with associated lavas and tuffs, that form one of four volcanic vents dotted around the Peak District. The volcanic vent is no longer visible, but exposures contain hard bluish-black columnar basalt and rubbly brecciated lavas and tuffs.



*Calton Hill Quarry*

Technically, the basalt is a basanite due its essential olivine content and has an alkaline character from being enriched in potassium and sodium. The Upper Miller’s Dale Lava is believed to have originated from this vent. Like many Peak District lavas it is tholeiitic in nature, i.e. the potassium and sodium have been replaced with calcium and magnesium. The basalt also contains mantle xenoliths that include olivine, chromium-rich spinel and pyroxene. ►

The brecciated lavas and tuffs are vesicular and amygdaloidal in nature and weathered to a brownish green colour. Minerals including chlorite, quartz, hematite and calcite can be seen infilling gas bubbles and voids within these rocks. The mantle xenoliths and geochemical/isotopic signatures contained within this intrusion indicate a primary deep mantle source from around 50km depth, whereas the tholeiitic Upper Miller's Dale Lava hints at magmas derived from crustal melts.



*Calton Hill Quarry*

The Upper Miller's Dale Lava forms a distinctive step in the hillside to the south of Calton Hill Quarry where it sits close to the Albian-Brigantian boundary. Radiometric dating places this lava at around 330 million years old, and where present it forms a useful marker horizon.

Intrusion and eruption of the Calton Hill vent, Upper Miller's Dale Lava and other lavas associated with the Peak District have been attributed to oblique continental collisions between Gondwana and Laurentia. This, combined with crustal thinning, caused localised crustal shearing/tearing and magma intrusion.

### **Miller's Dale Station and the Monsal Trail**

After lunch, at the former Miller's Dale station and along the Monsal Trail (see front cover photo) we examined exposures of horizontally bedded Miller's Dale Beds and Station Quarry Beds, that sit below and above the Albian-Brigantian boundary respectively. The exposure within the former Miller's Dale station car park was heavily vegetated, and the features present difficult to see. During our last visit, we also visited the former station quarry site at this location with its vast lime kilns used to make quicklime for agricultural purposes. Also on our last visit, the former railway tunnels had been sealed which limited what we could see. The tunnels have since been stabilised and reopened to make a popular route for walkers and cyclists. Therefore we were able to see more of the Miller's Dale and Station Quarry Beds that couldn't now be viewed down in the former station car park.

The Miller's Dale Beds generally comprise thickly-bedded light grey to white fossiliferous limestone, containing shells of brachiopods (*Productus maximus*), corals (*Lithostrotion junceum*, *Lithostrotion irregular* and *Palaeosmilia purchisoni*), and planktonic foraminifera. The overlying Station Beds were more thinly bedded, darker coloured and are known to contain nodules of chert and crypto-crystalline silica resembling flint.



*Pot Hole in Millers Dale Limestone*

At both locations are examples of infilled scours or pot-holes within the Miller's Dale Beds. However, these features were covered at the former Miller's Dale station car park exposure. The Monsal Trail pot-hole was only visible in one side of the cutting, suggesting that it was localised. Where they traversed these features, the overlying Station Quarry Beds sagged.

Formation of these pot-holes has been attributed to Lower Carboniferous tectonic uplift exposing ►

the limestone landscape of the Miller's Dale Beds. Scouring and erosion then followed prior to the resulting hollow being infilled with sediment. Follow on sea level rise allowed the Station Quarry Beds to form and bury these features before the Upper Miller's Dale Lava was erupted over the Station Quarry Beds.

Our final location on the Monsal Trail was near to Litton Mill. Here, we saw the dying-out, brecciated lava front of the Upper Miller's Dale Lava where it contacts overlying limestone strata. Here a rather ambiguous notice explains how the lava formed.

I would like to thank Mike for a very interesting field visit and hope that we can again visit this area to learn some more of this story in the future. Coverage of our previous visit to look at the Buxton area volcanics can be found in BCGS Newsletter No. 203, dated October 2010.

*Andy Harrison*

### **Saturday 9 June: Exploring the Palaeozoic of the West Midlands.**

Joint field visit for BCGS and The Geological Society: West Midlands Regional Group. Researched and documented by Ray Pratt (Geol Soc. WMRG) and led by Julie Schroder (BCGS) and Andy Harrison (WMRG and BCGS).

Six months of research and planning culminated in our 1 day field excursion around important Palaeozoic outcrops of The West Midlands. A diversity of keen geologists with associations to The Geological Society - West Midlands Regional Group (WMRG), The Black Country Geological Society (BCGS) and Birmingham University, came together to enjoy a full day in the field.



*The group at Saltwells Local Nature Reserve*

### **Lickey Hills Country Park - Warren Lane and Barnt Green Road Quarries**

The trip started at the Lickey Hills Country Park where the group visited 2 old quarries (Warren Lane and Barnt Green Road quarries) with exposures of the early Ordovician Lickey Quartzites laid down as shelf sandstones and later metamorphosed to quartzite. At the time of deposition the locality would have lain about 60 degrees south of the equator. There are a number of claystone beds interlaminated



*Lickey Quartzite chevron over-folding,  
Barnt Green Road Quarry*

with the quartzites, many of which contain volcanic ash. The Lickey ridge is an inlier with a mapped general anticline structure and a strike NNW-SSE. However, the beds in the upper (Warren Lane) quarry dip SSW therefore the strike is WNW - ESE (similar to the mapped trend). In the lower of the two quarries (Barnt Green Road) chevron folding is seen in the more reddish coloured (and probably older) quartzites, in an overfold to the south with a strike in a circa EW direction. ►

### Rubery Cutting

The second outcrop was at the Rubery Cutting (at the junction between Leach Green Lane and the A38 fly-over), where the eroded surface of the Lickey Quartzite is unconformably overlain by the early Silurian transgressive deposited Rubery Sandstone. (Borehole data shows that silts and muds overlie the Rubery Sandstone, indicating a deepening environment of deposition). At the time of deposition the locality would have been approaching 30 degrees south of the equator as part of the Avalonia plate that was moving northwards, narrowing the Iapetus Ocean.



*Rubery Cutting - the hammer marks the unconformity and a neptunian dyke is seen to the left side of the picture.*

A neptunian dyke is also present at this locality.

Both formations are seen to be dipping in the same direction at the same angle indicating folding of these beds was later than early Silurian.



*Examining a reefal assemblage within the nodular limestone beds at the Wren's Nest.*

### Wren's Nest

Our third stop was to examine 2 outcrops of Silurian Limestone at the world famous site of the Wren's Nest: the 'Snake Pit' and the NCC Cutting (Nature Conservancy Council, now Natural England). These locations are also anticline inliers, this time exposing the Wenlock Limestone, where we looked at both the Upper and Lower Quarried Limestones and the Nodular Beds which lie in between. These limestones are packed with fossils, some of which led to the international reputation of this SSSI location.

### Saltwells Nature Reserve - Brewin's Cutting

We continued with our upward traverse of the stratigraphic column of the region at our next location, Brewin's Cutting in the Saltwells Nature Reserve. Here we took a look at the late Silurian, Pridoli calcareous sandstones, indicating a closer to shore environment. Fossils here were dwarfed, indicating a less than ideal environment for life.

During the Devonian the Iapetus ocean closed and the region became landlocked. There are no Devonian outcrops in the region, so unconformably overlying the Silurian outcrops are basal conglomerates of Carboniferous, Westphalian age. These are fluvial deposits. The striking thing to note is that both the late Silurian and mid-Carboniferous deposits dip in the same direction at the same angle indicating a tectonic event later than Westphalian. ►



*In the picture the shadow follows the line of the basal conglomerate.*

Close to this location on our way to Doulton's clay pit we passed a late Carboniferous dolerite plug intruding into the late Silurian calcareous sandstones.

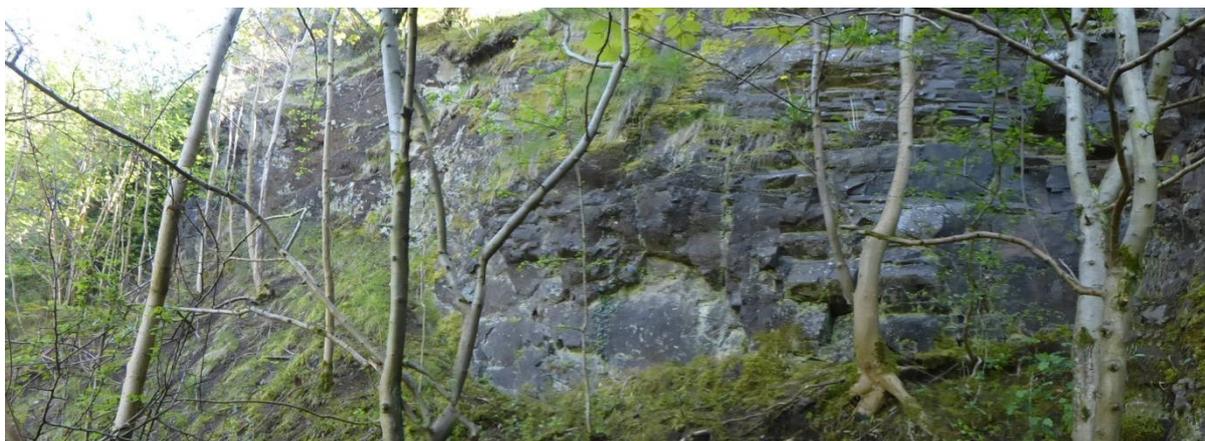
### **Saltwells Nature Reserve - Doulton's Clay Pit**

At Doulton's clay pit we examined fluvial cross-bedded sands, agglomerated channel sands, remnant kaolin-rich seat earth and occasional thin organic-rich coaly layers. Most of the fire clay (seat earth) and coal was extracted many years ago. The region was a low-lying deltaic swamp close to the equator with large river systems depositing thick channel sands. Deposition was thought to be cyclic although there is currently no evidence for this at this location.



*Channel sands with kaolinite rich clays.*

### **Barrow Hill**



The final outcrops visited were at Barrow hill where late Carboniferous basalt plugs, (remnants of volcanoes), represent the youngest of the Palaeozoic outcrops to be visited on this trip. Igneous intrusions and extrusions were common in many parts of the UK during the late Carboniferous as the Variscan Orogeny climaxed.

The Permian deposits of the region are represented by Clent Breccias, but we did not get to see these on this occasion. ■

*Ray Pratt, (Geol. Soc. WMRG)*

Note from Andy Harrison: Our Palaeozoic tour finished around 5.30. I would like to thank Ray and all the members who joined in the day. I look forward to our next joint meeting.

## Mike's Musings No. 16

### Taxonomy... not quite as dull as it sounds!

Human beings are a naturally inquisitive species. Once a question has been posed and a lot of facts gathered, the next step towards understanding is often assisted by categorising or classifying such facts in an effort to put everything into some sort of context: to look for relationships, if any, between diverse observations.

So, how do we go about the process of classification? One means of insight into this vexed question may be gained from watching contestants on 'Only Connect' (the BBC quiz show for the kind of brain that is able to comprehend the abstruse connections between seemingly unrelated people, groups, words or phrases - also a little like that bit in 'Have I Got News For You' where the 'odd one out' is sought). Anyone who has tried to arrange any kind of filing system will immediately recognise that 'diverse things' can be related in many and varied ways, necessitating a cross-referencing system to bring all such possibilities under control.



*Jacinto de Compostela (quartz), Wikimedia Commons*



*Amethyst (quartz), Wikimedia Commons*

For instance; beginners in geology are often confronted by 'introductory guides' to, say, minerals, whereby common minerals are arranged according to colour. This, to me at least, seems an entirely arbitrary and quite unhelpful way to go about a meaningful arrangement of minerals as soon as you appreciate that many, if not most, minerals come in all sorts of shades and colours (at least in real life, where trace impurities are often involved in producing such variety - think of quartz, for example). Colour is only diagnostic, or at least to some degree characteristic, in a minority of minerals (for which such a classification scheme has some merit and may help the beginner - but only if the limitations have been clearly stated, which is seldom the case). ►

As a novice when it comes to botany, I find texts in beginners' handbooks thoroughly unhelpful when plants are arranged by colour – at least in terms of a classification scheme that endeavours to find evolutionary relationships between different families of plants. However, guides seeking to help (would-be) gardeners find suitable plants that will add the right colour to a particular flower bed or border might indeed be pleased to have them arranged on the basis of this particular attribute - not caring twopence about their botanical relationship with the next plant in the bed. Other attributes, such as height of growth or season of flowering, might likewise be an important factor in making a suitable selection.

What all this boils down to is that any system of filing or classification has to be relevant to its particular purpose. It may also depend very largely on the culture that creates it. Take the following list, for example:

- a) those belonging to the Emperor
- b) those that have been embalmed
- c) those that are trained
- d) suckling pigs
- e) mermaids
- f) fabulous ones
- g) stray dogs
- h) those included in this classification (!)
- i) those that tremble as if they were mad
- j) innumerable ones
- k) those drawn with a very fine camel's-hair brush
- l) others (!!) (*my italics again*)
- m) those that have just broken a flower vase
- n) those that resemble flies from a distance

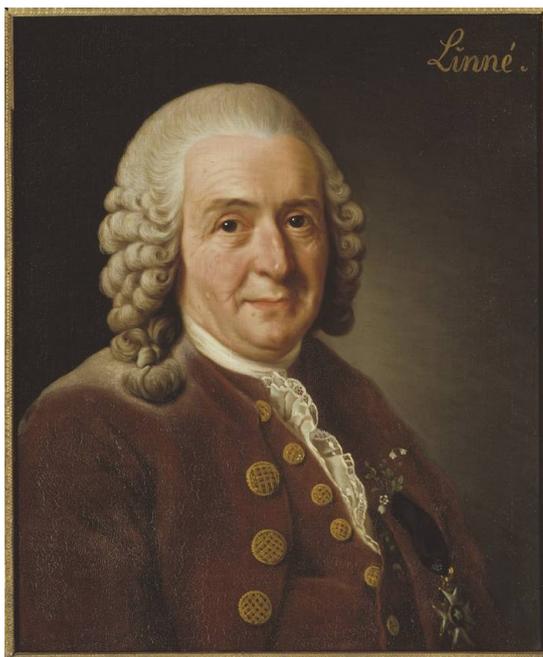
This scheme supposedly comes from an arcane text 'The Celestial Emporium of Benevolent Knowledge' seeking to classify all living things. It is, as you might have suspected, apocryphal - an invention by Jorge Luis Borges in an essay commenting on an early attempt to organise words in a system that could produce a single, universal language. (Esperanto, and similar attempts, came much later.) The point being made, in a most comical manner it must be said, is that any classification system is essentially arbitrary and can only be of value within a specific cultural context that must be understood by the user.

Staying with the subject of classifying the living world, we can now consider the, arguably, most famous example of a classification scheme, or taxonomy, of the biological world – that introduced to science by a certain Carolus Linnaeus in his 'Systema Naturae' of 1735, although he was following a method actually first posited by Willoughby and Ray some 60 years earlier. The most fundamental aspect of this system is its heirarchical nature. Like a set of Russian dolls, the method begins with the highest (or largest) rank that embraces every living thing, and proceeds through progressively lesser (or smaller) ranks to embrace ever fewer members as the number of common features becomes ever more closely defined. His method has survived to this day although the detail has, of course, been greatly amended as scientific knowledge has improved down the years. Indeed, some of the original arrangements strike us as odd, amusing or just plain wrong in the light of modern knowledge. But, unlike a scheme such as the 'Celestial Emporium', we can still understand the aims of Linnaeus' effort, however much his original taxonomy has been amended. ►

The advent of modern genetics has demonstrated in many cases that the relationships we think we can perceive in the outward form of an organism are actually quite misleading. At the molecular level (which Linnaeus can be forgiven for not anticipating in his time) we now find some surprising relationships between organisms which can only be explained in evolutionary terms at the very minutest level.

Linnaeus, incidentally, also offered a rather less successful taxonomy for minerals: you can see why this hasn't survived; the main groups being 'petrae', 'minerae', 'fossilia' and 'vitamentra' (no, I'm not sure what they were either).

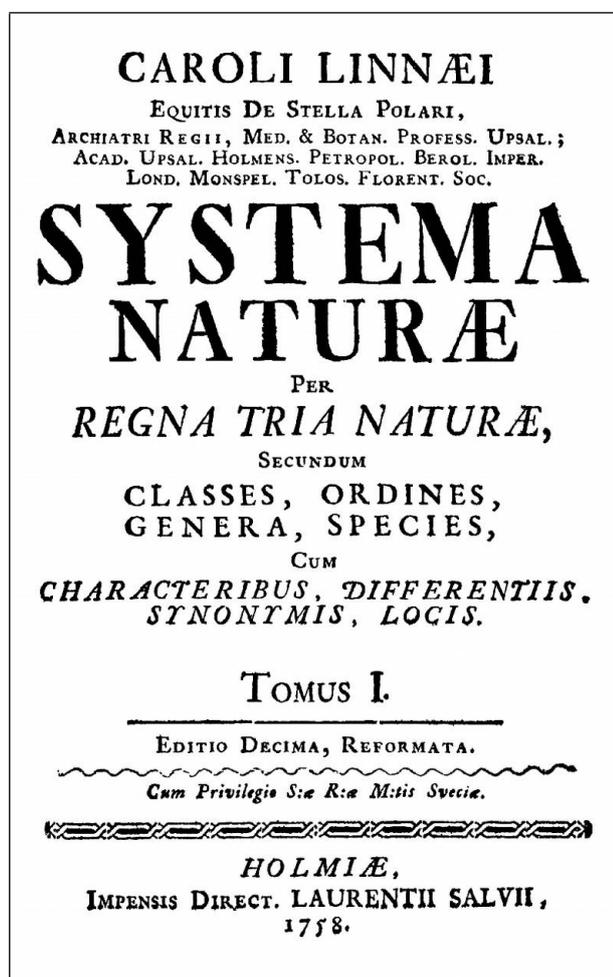
I once presented an evening class of students with a diverse array of just some 30 or so random items on a tray (actually four trays containing identical arrays). There was a nail and a pencil sharpener; a bobbin and some thread, string, tube of glue; a pebble and a ping-pong ball;



Carl Linnaeus, Wikimedia Commons

a matchbox (empty), a toothpick and a cocktail stick... and so on - anything I had lying around the house. You could make up a similar collection in no time, I'm sure. Dividing people into four groups, they were asked to sort them out into connected 'lots' according to whatever method they preferred. Needless to say the four results were all different. It demonstrated the different ways in which people saw the world. One group went for a system based on the type of materials (wood, metal, organic etc.); another group went with shape (square, round, irregular, long or short etc.). One group began with colour as the principal criterion, but never quite reached a satisfactory conclusion! I think you can imagine that one person's idea of logic is much at odds with the next. Logic probably doesn't have much to do with a winning scheme.

What to make of such an exercise? Basically just how difficult taxonomy really is - at least in arriving at a definitive methodology (and justification) for one's preferred scheme. Try applying your knowledge to a taxonomy of trilobites, or any other subdivision of the fossil record and you'll soon lose the will to live, unless this is being read by that extraordinary type who revel in such systematics and would walk away with the 'Only Connect' championship! ■



Title page of the 1758 edition of Linnaeus's Systema Naturae. Wikimedia Commons.

Mike Allen