



# Manchester Geological Association

**President: Jane Michael**  
**March 2016** Founded 1925  
[www.mangeolassoc.org.uk](http://www.mangeolassoc.org.uk)

## MGA New Vice President

by **Jane Michael** – President

The MGA Council is very pleased to announce that Dr Cathy Hollis, from Manchester University, has kindly agreed to become our new Vice President. Some of you will remember Cathy from the trip that she led in 2013 to look at the Derbyshire Limestones around Middleton Top. She is also leading a trip for us this year; on Wednesday 20 July to Mam Tor. I would like to welcome Cathy to the MGA and thank her for agreeing to take this post (and becoming our next President in 2018). I hope you will all support her especially on her trip (which unfortunately I cannot attend).

## Obituary – Betty Whitehead

by **Sue Plumb**

Those of you who have been MGA members for a while may remember Betty Whitehead who passed away in May. Betty was a member of the MGA council, and was Minutes Secretary for many years; in recognition of her service to the organisation she was made an Honorary Member of the MGA. She took her degree at Manchester University; followed by a teacher training course. In 1951 Betty was appointed to teach Chemistry at Whalley Range High School for Girls in Manchester and eventually became Head of Chemistry and Deputy Head of the school. Betty loved walking and climbing. Her late husband Anthony's interest in archaeology together with her interest in geology made them a perfect match.

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## **Who's Who in the MGA Officers**

President: Jane Michael BSc (Hons)

Vice-President: Dr Cathy Hollis

General Secretary: Sue Plumb BSc

Membership Secretary: Vacant

Treasurer: Niall Clarke MSc

Indoor Meetings Secretary: Jane Michael BSc (Hons)

Field Excursions Secretary: Penny Heyworth MPhil

Newsletter Editor: Lyn Relph BSc (Hons)

Webmaster: Peter Giles MSc

Other elected members of Council

Nicola Fowler BSc (Hons)

Jennifer Rhodes

Ex officio members of Council

The Immediate Past President, Manchester Geological Association: Dr Ray Burgess

RIGS Representative: Chris Arkwright PhD

The Association's representative on the North West Geologist's editorial team: Peter del Strother MBE MPhil  
President of the Student Geological Societies of the University of Manchester

MGA Archivist: Derek Brumhead MBE

### **MGA email addresses**

To contact our President: [president@mangeolassoc.org.uk](mailto:president@mangeolassoc.org.uk)

To contact our Vice-President: [vicepresident@mangeolassoc.org.uk](mailto:vicepresident@mangeolassoc.org.uk)

To contact our General Secretary: [secretary@mangeolassoc.org.uk](mailto:secretary@mangeolassoc.org.uk)

For membership enquiries: [membership@mangeolassoc.org.uk](mailto:membership@mangeolassoc.org.uk)

For field visit enquiries: [outdoors@mangeolassoc.org.uk](mailto:outdoors@mangeolassoc.org.uk)

For indoor meeting enquiries: [lectures@mangeolassoc.org.uk](mailto:lectures@mangeolassoc.org.uk)

For newsletter correspondence: [newsletter@mangeolassoc.org.uk](mailto:newsletter@mangeolassoc.org.uk)

For other enquiries: [info@mangeolassoc.org.uk](mailto:info@mangeolassoc.org.uk)

# MGA FIELD TRIPS

## Upper Goyt to Shining Tor 19th June

Paul Aplin is leading a trip from Upper Goyt to Shining Tor. This trip will look at the sandstone scenery formed by the succession of upper Namurian rocks at the boundary with the Westphalian (Coal Measures); as a result of the presence of the Goyt Syncline. I'm sure it will be a great day out; especially if the nice weather continues!

If you would like to take part please **contact Penny Heyworth at:** [outdoors@mangeolassoc.org.uk](mailto:outdoors@mangeolassoc.org.uk)

## Penmaenmawr Quarry, Conwy 23rd June

News of another field trip, this one on **Thursday June 23rd**, so not our normal weekend time.



Penmaenmawr Quarry is situated between Bangor and Conwy on the North Wales coast. The quarry currently produces aggregates for use in ready-mix concrete, asphalt production and general construction uses and also rock armour in local coastal defence schemes. In the recent past, the site was an important supplier of rail ballast and historically it was used to produce 'granite setts' for cobbled streets of North West England.

The quarry works a large, Ordovician (Caradoc) age intrusion of quartz microdiorite. It is elliptical (approximately 3 kilometres by 2 kilometres) and is believed to have a laccolithic form. The base of the

intrusion was supposedly visible in the road tunnel on the A55 below the quarry. The microdiorite is intruded into the mudstones and siltstones of the Nant Ffrancon Formation (Arenig – Early Caradoc). The geochemical features of the intrusion support a volcanic ‘arc’ environmental setting.

Penmaenmawr is similar to the Aber-Drosgl, Carreg Y Gath and Bwlch Y Cwion subvolcanic intrusions to the south and is associated with the Conwy Rhyolite Formation, Foel Fras Volcanic Complex and Capel Curig Volcanic Formations, which outcrop to the east. The western edge of the present quarry workings is crossed by a (approximately 90 metre wide by approximately north-south trending) multiple shear zone. A similar, narrower shear zone is exposed in the haul road on the eastern edge and marks the boundary of an extensive area of weathered rock (over 10 metres in depth) that affects the southern part of the quarry. This weathered zone is believed to be a down-faulted ancient erosion surface.

The outer slopes of the mountain are extensively covered by quarry waste created during the sett making days. These were reworked and landscaped during the ‘dualling’ of the A55 in the 1980’s. There is a very interesting film of the old quarry workings on the British Pathe news website.



The Conwy Rhyolite Formation belongs to the earliest eruptive cycle of the Caradoc volcanism of Northern Snowdonia. As mentioned elsewhere, a suite of co-eval intrusive and eruptive rocks are believed to belong to the same magma source, having developed through fractionation to their final composition. The rocks form a distinctive, rugged area of the coast with a sparse vegetation of maritime heath. Outcrops show a variety of flow phenomena from linear, through contorted to brecciated with extensive development of tuffs and tuffites. These will be discussed within the context of flow regimes in viscous magmas.

As well as fine outcrop geology, the area displays interesting glacial and peri-glacial phenomena which we will also consider while enjoying an accessible, spectacular and thought-provoking excursion. If you would like to take part please **contact Penny Heyworth at:** [outdoors@mangeolassoc.org.uk](mailto:outdoors@mangeolassoc.org.uk)

## Mam Tor Area

Wed 20th July

The Mam Tor area – Winnats Pass provides an excellent opportunity to examine a variety of geology and geological processes; both ancient and modern. The rocks are of Carboniferous age and provide a range of rock types and fossils. These formed in different environments and erosion levels are perfect for appreciating the palaeogeography of this area 360-330 millions of years ago.

The area contains two different types of mineralisation (ancient lead and fluorite mineralization and recent bog iron ore) and there is also evidence of hydrocarbon migration.

The destructive Mam Tor landslip is both an example of a geological hazard and an opportunity to study some active faulting.

The oldest rocks in the area are Lower Carboniferous (Dinantian) limestones that formed on a shallow shelf in warm tropical seas. The limestones are highly fossiliferous, most commonly containing crinoids, but also abundant corals, brachiopods, and goniatites. Following the limestones came deposition of the early Upper Carboniferous (Namurian) mudstones and sandstones that progressively overlapped the carbonate platform and heralded the coming of deltas into the area.

If you would like to take part please **contact Penny Heyworth at:** [outdoors@mangeolassoc.org.uk](mailto:outdoors@mangeolassoc.org.uk)

## Halkyn Mountain

Aug 14

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 Norris: [pamandnodge@btinternet.com](mailto:pamandnodge@btinternet.com) for joining

## Fred Broadhurst Memorial Field Trip

Saturday 8 October 2016 led by Jane Michael

This year's trip is based on Walk 3 Edale and Kinder Scout from Fred's Rocky Rambles in the Peak District.

We will look at the Kinder Scout grit and also the geomorphology of the area. I am not intending to do the whole 12.5km walk but there is likely to be some steep ascent/descent.

Further information will be available shortly when the itinerary has been finalised.



# Manchester Geological Association Indoor Meetings 2016 – 2017

Welcome to this year's Indoor Meetings programme. We have arranged what should be a very exciting and interesting series of lectures over the winter.

Further information about the Broadhurst Day of Lectures in November will be circulated shortly together with a booking form. Tickets will be £10, which is the cost of the lunch, and includes tea or coffee during the breaks.

**Wednesday 12 October** 2016 at 7pm

“The geology of the Indian Himalayas: a view from our new Manchester student fieldcourse”

Dr John Nudds, Manchester University

**Saturday 19 November** 2016 The Broadhurst Day of Lectures 10am – 5pm Venue to be confirmed.

“The Climate History of the Earth”

6 speakers including Dr Catherine Rose (Trinity College Dublin) and Prof Michael Hambrey (Aberystwyth)

**Booking essential**

**Saturday 10 December** 2016 at 1.30pm

“Recent Discoveries in British Palaeontology”

4 speakers Cindy Howells (National Museum Wales), Dean Lomax (Manchester University), Dr Russell Garwood (Manchester University) and Dr Jenny Clack (TW:EED project)

**Saturday 21 January** 2017 at 1.30pm

“Rare Earth Elements: vital commodities”

3 speakers to include Prof Frances Wall (Exeter University)

**Wednesday 8 February** 2017 at 7pm

Annual General Meeting and Presidential Address

**Wednesday 1 March** 2017: Joint meeting with Manchester Geographical Association, time and venue to be confirmed

“Faulty Communications: Seismic Hazard in Istanbul”

Prof Iain Stewart, Plymouth University

**Wednesday 29 March** 2017 at 7pm

“Regionally Important Geological and Geomorphological Sites: assessment criteria and how they are selected”

Dr Christine Arkwright

A field trip to a Greater Manchester RIGS will follow this lecture: date, time and location to be confirmed.

Unless otherwise stated, all lectures are in the Williamson Lecture Theatre, Manchester University, Oxford Road, Manchester.

Any other questions, please contact Jane Michael by email: [lectures@mangeolassoc.org.uk](mailto:lectures@mangeolassoc.org.uk)

## **Fred Broadhurst Dairy** by Niall Clarke

Rosemary Broadhurst has brought this to my attention and I am sure many of you will find it interesting.

Fred Broadhurst wrote a diary when he was a Bevin Boy in 1946-8 and although he didn't want people to see the diary, because he thought it was very immature, he did use the drawings latterly. Rosemary was asked if it could be displayed in connection with an exhibition at Beswick library near to where he worked at Bradford colliery. The Bradford Pit Project has collected many oral histories from miners and their families and they are in the library until June 18th – the website says 11 June but that is wrong. There are also tools, artifacts and photocopies on display; during library hours. Beswick library, 60 Grey Mare Lane, Beswick, M11 3DS.

Selected parts and drawings from the diary are also on display (along with pictures of a brick made at the brickworks at Bradford which Fred mentioned in his diary), at Manchester Central library also until the 18th.

Anyone who is interested in the coal industry might like to look at the Manchester Histories festival.:  
[manchesterhistories.co.uk](http://manchesterhistories.co.uk).

## **Geology at the Wilmslow Guild – with Chris Arkwright**

### **Introduction to Geology**

In the 19th century the collection of fossil curios developed into the science of Geology and the study of the Earth. But even a little basic knowledge of rock types and how they are formed can help us make sense of our dynamic planet. We shall also investigate some interesting geological controversies such as the age of the Earth and plate tectonics, all milestones in our understanding of how the Earth works.

### **Autumn Term 2016 at Poynton Community Centre**

Weds 10.30 to 12.30      9 weeks plus a 2 hr field trip    Starting 21 September 2016    Cost £83

#### **Volcanoes Old and New**

Volcanic eruptions are spectacular and diverse. They can blast rock, ash and gas into the stratosphere or gently effuse runny lava. Where do you find active volcanoes? What causes them to erupt? Can we predict eruptions to reduce the risk to communities worldwide? To answer these questions and more we shall study the evidence found in rocks from past and present volcanic events.

### **Autumn Term 2016 at Dean Row Community Centre**

Wednesday 1.30 to 3.30    8 weeks plus a 4 hr field trip    Starting 21 September 2016    Cost £83

#### **Earth and Life**

Life on Earth began 3 billion years ago with marine algae that later developed into complex animals and plants – in the sea, on the land and in the air. The Earth's evolving atmosphere, oceans and rocks contributed to explosions of life and mass extinctions. We shall explore clues found in rock and fossil specimens to build up a picture of past environments and evolution of life.

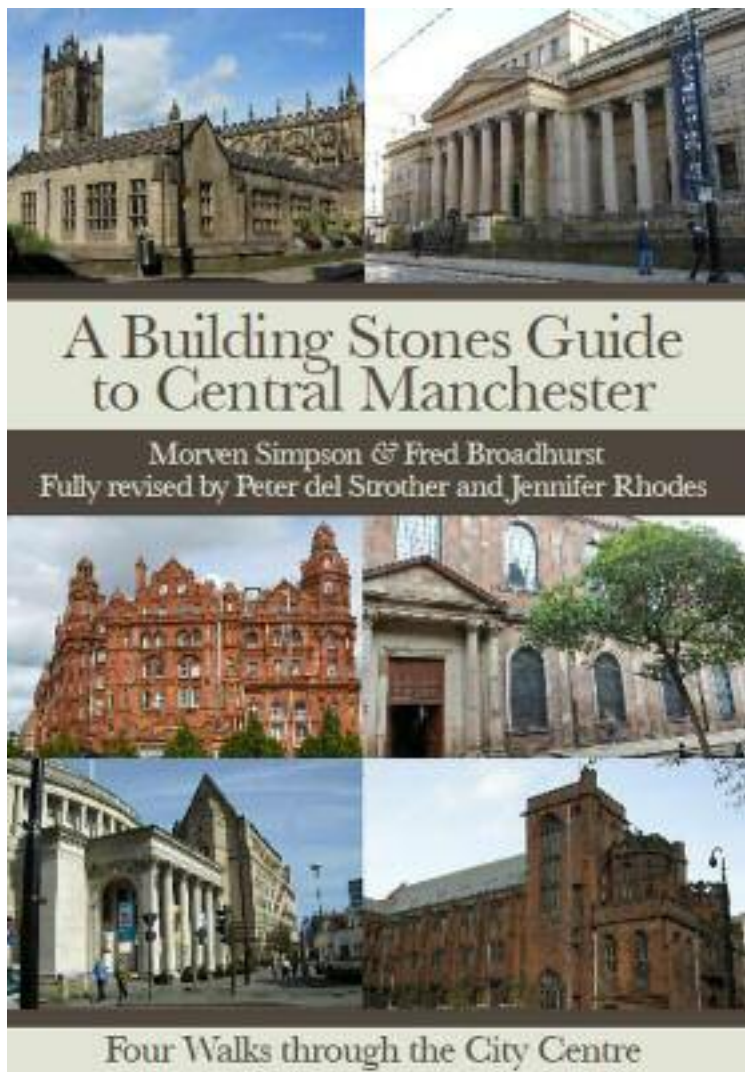
### **Spring Term 2017 at Dean Row Community Centre**

Wednesdays 1.30 to 3.30    8 weeks plus a 4 hr field trip    Starting 11 January 2017    Cost £83

#### **For booking and further details:**

[www.wilmslowguild.org](http://www.wilmslowguild.org)    or    [chrisarkwright1@gmail.com](mailto:chrisarkwright1@gmail.com)    01772 335316

## Revised model city guide, the Strategic Stone Study and Geotrails



When the original edition of *A Building Stones Guide to Central Manchester* was published 40 years ago it was the first publication to identify simply, for the benefit of the general public, the stones used in a city's construction.

It was revised in the 1970s, but a lot of building has taken place in Manchester since then, so a new edition was needed and it became clear that a simple reprint of an updated 1970s edition would not suffice. A complete revision was needed. Peter del Strother and Jennifer Rhodes, both active members of the Manchester Geological Association, volunteered to undertake the work. Now that it has been completed and the new edition of the Guide published, Jennifer, who also edits *North West Geologist*, a collaboration between Liverpool, Manchester and Lancashire geological societies, admits they had not realised in advance just what a mammoth task it would prove to be.

Peter and Jennifer have their fingers in several pies in both the Manchester Geological Association and GeoLancashire (the new name for the Lancashire Group of the Geologists' Association) and were two of the five people from GeoLancashire who worked on the county's contribution to the Strategic Stone Study.

The English Heritage-led Strategic Stone Study was carried out with the British Geological Survey (BGS) correlating the information that was gathered, often by local geological societies, and presenting it on the maps of a Geographical Information System (GIS) that is currently accessible free on the internet at: [bit.ly/SSS-BGS](http://bit.ly/SSS-BGS).

Gathering the information for the Strategic Stone Study began in earnest in 2008, starting with a number of pilot surveys to establish the methodology. The aim of the study was to identify the sources of all stones used in construction throughout the UK, connecting the source with the buildings in which it appears. English Heritage allocated £1million for the project. The money ran out when the Department of Communities & Local Government withdrew its financial support in 2011 before the project was complete. It remains unfinished, but has made a major contribution to identifying the sources of stones used in the main regions of stone construction in England. It has also resulted in the compilation of some excellent county atlases identifying the geology and some of the significant buildings of the counties.

An objective of the study was to prevent sources of important building stones from becoming sterilised as a result of local authorities or planning appeals allowing the development of such sites for uses other than the production of stone. Ideally, local planning authorities would check the BGS maps when planning applications are received and would protect areas where reserves of important natural stone have been identified. Routine use of the resource has not entered planning authority culture and some of the momentum for conserving sources of building stones seems to have been lost in the re-organisation of English Heritage that saw it split into two separate entities at the start of this month (April). One of the new entities retains the name of English Heritage and the role of protecting the built heritage of the country. The other is called Historic England, a charity intended to become self-financing that will manage the English Heritage historic properties.



Of course, while planning authorities might not be making much use of the BGS Strategic Stone Study resource, it is also available to those objecting to planning applications as well.

It was while GeoLancashire was working on the Strategic Stone Study that it realised it could do more than run evening talks and field excursions about the geology of the area. That sparked work on the production of Ribble Valley and Brun Valley Geotrails, which Jennifer is also integrally involved with.

*The Geotrails Pocket Guides* unfold from A6 size into A3 size sheets of paper. They are also walks, with the routes shown on simple maps with the stone features that will be encountered along the way numbered and some information about them included. There is also information about the underlying geology of the areas. These Geotrails are numbered one to 11. Numbers one to 10 are walks in the Ribble Valley, although numbers one to six only (covering Lancashire) have yet been published. Numbers seven to 10, covering the Yorkshire section of the Ribble Valley, have yet to be produced. Number 11 is a walk in the River Brun valley. All the Geotrail guides can be downloaded from the GeoLancashire website at: [www.geolancashire.org.uk](http://www.geolancashire.org.uk).

The Ribble Valley Geotrails have at least one background document each to support them, which are also available from the website. The guide to the River Brun valley walk did not have a background document as this issue of *Natural Stone Specialist* went to press, but one is promised. All the background papers are interesting, but one about lime kilns that explains clearly about lime mortar, hydraulic lime and cements, might be particularly interesting to NSS readers. But back to *A Building Stones Guide to Central Manchester*. The original Guide was compiled by geologists Dr Fred Broadhurst and Dr Morven Simpson. It became a model used by other towns and cities across the United Kingdom and abroad for their own guides to encourage visitors and residents to find out more about the stones that play such an important role in creating the significance of so many urban areas.

*A Building Stones Guide to Central Manchester* takes the form of four routes through the city centre, none of which is more than 2km long, so should be achievable by most people. The routes are identified on maps that fold out from the inside of the front and back covers. Numbers on the maps refer to stone features in the city that are explained in the Guide. They are mostly buildings but include other uses of stone as well – such as Kan Yasuda's *Ishinki Touchstone*, a public artwork in Carrara marble in Barbirolli Square, and the Welsh slate water feature in Exchange Square added as part of the reparation work following the IRA bombing there in 1996. Even stone paving and setts are identified, as well as some of the fossils that can be seen – for example in the Hopton Wood and Ashburton limestones on the interior walls of the Town Hall Extension built in 1938. The buildings included are not only those of historical significance, although such buildings are, of course, there. But modern buildings, which have used stones imported from all over the world, are also included in the Guide. A note is made of how construction methods have changed over the years and now mostly involve thin slabs of stone being used to clad steel-framed or reinforced concrete structures.

The Guide itself makes use of modern technology by including Quick Response (QR) codes that can be scanned on Smartphones to link to the Manchester Geological Association website for more information about the stones seen. The Guide does not over use geological terms but any that it does include are explained in a glossary. There is also a brief appendix to identify geological time divisions and their ages and another identifying the rock types mentioned and where they can be found in the Guide.

First published in the *Natural Stone Specialist* April 2015.

## **CHESHIRE'S LION SALT WORKS MUSEUM – THE COUNTRY'S ONLY SALT MUSEUM – WINS SIXTH AWARD IN LESS THAN A YEAR**

On the 18th May the Lion Salt Works Museum, near Northwich, Cheshire won its sixth prestigious award since opening less than a year ago. The Museum, in partnership with BECK, one of its exhibition fit-out contributors, won the hotly-contested Restoration and Conservation category of the 2016 Museum + Heritage Award for Excellence.

The award was given in recognition of the “first class conservation techniques and science-led solutions to sensitively restore and conserve a very fragile building, in a challenging environment, which was not even originally built to last.” Now in its fourteenth year, the Museum + Heritage Awards recognises projects of excellence and innovation in museums, galleries and visitor attractions from around the UK.

One of the world’s last open-pan salt-making sites, the Museum is an Ancient Scheduled Monument, with the same protection listing as Stonehenge. The four-year £10m restoration of the Museum, was undertaken by Cheshire West and Chester Council and was made possible thanks to a £5m award from the Heritage Lottery Fund, as well as grants from other organisations.

Councillor Louise Gittins, Cabinet Member for Culture, Leisure and Wellbeing at Cheshire West and Chester Council, said: “The Museum faced stiff competition from organisations such as the National Trust, Lincoln Castle and Bodleian Libraries and I am very proud that the quality and excellence of the Lion Salt Works Museum’s restoration shone through and was acknowledged nationally with this award. This sixth award in less than a year is further evidence that the Lion Salt Works Museum is poised to become one of the country’s foremost industrial heritage sites.”

The Museum tells the story of salt through fun and interactive displays, including a light and sound show that imitates the large steaming salt pans. The Museum hosts an exciting year-long programme of activities and for this and more details of the first anniversary weekend, visit: [westcheshiremuseums.co.uk](http://westcheshiremuseums.co.uk).

The refurbished Museum was designed by Donald Insall Associates with restoration and fit-out being undertaken by Wates Construction and BECK Interiors respectively. RFA Design designed the exhibition. Archaeological work on site was carried out by the Council’s in-house archaeologist.

The Lion Salt Works features not only the large museum but free access to a café, shop butterfly garden and imaginatively themed play area. Parking is also free. The Museum is adjacent to the Trent & Mersey Canal and has its own moorings.

For further information, contact: Fiona Young, Marketing Cheshire, 01244 851867  
Rachel Ashley, Press Office, Cheshire West and Chester Council on 01244 973025

Previous Awards The Lion Salt Works was Highly Commended in the Building Conservation category of the Royal Institution of Chartered Surveyors (RICS) North West Awards in April 2015. On the first day of opening to the public (Friday 5 June), the Lion Salt Works won the Heritage Award at the 2015 North West Regional Construction Awards, given to projects that can demonstrate the highest quality restoration and building re-use. In November, 2015, the Museum won ‘Best Newcomer’ Award in Cheshire Marketing’ Awards and in the same month, the Award for Community Conservation from the Chester Civic Trust. In March 2016, at The Globe in London, the Museum took first prize in the hotly-contended Conservation Category of the Civic Trust.

## Visitor Admission prices to Lion Salt Works Museum

Adult £6.25 Concession £5.50

Child £4.00

Family ticket (adult and two children) £16.40

Family annual pass: £50.00

Other family and concessionary prices available

Free access to Café, Gift Shop, Butterfly Garden, Play Area and Car Park

Website: [westcheshiremuseums.co.uk](http://westcheshiremuseums.co.uk)

Twitter @cwacmuseums Facebook: Weaver Hall Museum and Lion Salt Works

## Where in the World Quiz

Where was this photo taken and what does it show. There are a few people for scale, in the middle of the photo, at the side of the road. Photo by Peter del Strother. Replies to: [newsletter@mangeolassoc.org.uk](mailto:newsletter@mangeolassoc.org.uk)



# Other Society Events

**North Staffordshire Group of the Geologists' Association.** <http://www.esci.keele.ac.uk/nsgga/>

Wednesday 15 June : 19:00 Evening Walk Around Buxton  
Leader: Albert Benghiat : NSGGA with EMGS

Saturday 23 July 2016 : 10:30 Day Trip to Brassington Area. Leader: Jim Riding (BGS).  
Sunday 11th September 2016 : 10:15 The Ashover Area. Leader: Colin Bagshaw.

Enquiries regarding field trips should be addressed to:  
Steve Alcock, Longfields, Park Lane, Cheddleton, Leek, Staffs, ST13 7JS  
Tel: 01538 360431 or 07711 501028.  
Email: steves261@aol.com

**Black Country Geological Society** <http://bcgs.info/pub/>  
16 July, 10:00 Cross Hands Quarry  
20 August, 10:00 Field meeting - Wren's Nest  
10 September, N/A Field meeting - Brown Clee Hill  
19 September, 7:30 Indoor meeting - TBC.

**NWGA** <http://www.ampyx.org.uk/cdgc/rhaglen.html#agm15>  
Sunday 3rd July 2016 Cader Idris Volcanism 2 Leader: Graham Hall  
Sunday 14th August 2016 Cader Idris 2 Leader: Richard Birch

## **OUGS North West**

Jul 30, 2016 Ingleton Waterfalls geological walk. Leader: Hilary Davies (OU tutor)  
Oct 09, 2016. Liverpool . Rocks and Building Stones around Liverpool City Centre - DIY  
Nov 06, 2016. S. Manchester Winter Lectures and Social afternoon at Heald Green, near Cheadle.

## **Force Crag Mine**

Force Crag Mine has it all, history, engineering, geology, geography, archaeology you name it. The last mineral mine worked in the Lake District it was once a hive of industry, mining lead, zinc and barites for over 200 years. Production ceased in 1990 yet you could almost believe the miners had just left for the day as the complete processing plant still exists.

We offer a guided tour to explore the processing mill and surrounding remains, to get a feel for the harsh lives of the miners working away on the side of the fell. The tour takes about 1 hour, all tickets are £6 and we do provide transport up to the site.

So, here are this year's dates to get into your diary:

- Wednesday 6 April
- Sunday 8 May
- Sunday 12 June
- Sunday 7 August
- Thursday 1 September

To find out more visit <http://bit.ly/ForceCragMine> call 017687 74649 or email [northlakes@nationaltrust.org.uk](mailto:northlakes@nationaltrust.org.uk)