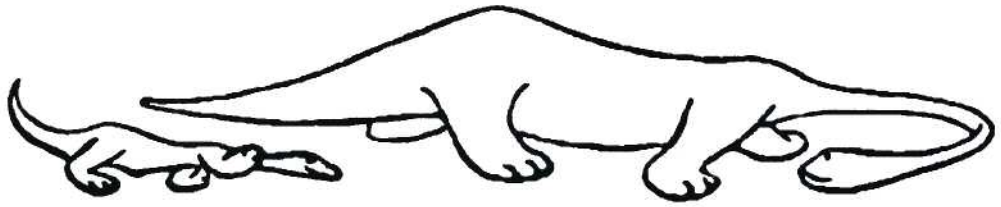

Manchester Geological Association

President: Dr Cathy Hollis
September 2018
www.mangeolassoc.org.uk
Founded 1925

Our last Field Trip of 2018

Outdoor Event: 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. We will be visiting the old lead mining area of Magpie Mine to learn more about its history and geology. We then visit the limestone area through and around Ddep Dale and the features that can be seen there. The walk is about 5.5 miles with 900 ft of ascent

Please book in with Jane as soon as you can (outdoors@mangeolassoc.org.uk)

Quick Diary

Saturday 29 September 2018 Fred Broadhurst Memorial Field Trip: Deep Dale and Magpie Mine

Wednesday 17 October 2018 7.00pm: Holiday Geology: members talks

Saturday 10 November 2018 Broadhurst Memorial Lectures 1.30p Earth's Distant Past:

Thursday 22 November 2018 6.30pm: Joint Lecture with Manchester Geographical Association:
"Melting Ice - Rising Seas: Antarctic Climate Change and the Environment"

Saturday 8 December 2018 1.30pm: Some Aspects of the Quaternary:

Thursday 17 January 2019 6.30pm: Joint Meeting with Geological Scoiety North-West Region
Prof Robert Ward, British Geological Survey

Wednesday 6 February 2019 7.00pm: Annual General Meeting:
Presidential Lecture by Cathy Hollis

Who's Who in the MGA
Officers

President: Dr Cathy Hollis

Vice-President: Niall Clarke MSc

General Secretary: Sue Plumb BSc

Membership: Jennifer Rhodes

Treasurer: Jennifer Rhodes

Indoor Meetings Secretary: Jane Michael BSc (Hons)

Field Excursions Secretary: Vacant

Newsletter Editor: Lyn Relph BSc (Hons)

Webmaster: Peter Giles MSc

Other elected members of Council

Nicola Fowler BSc (Hons)

Peter Gavagan

Penny Heyworth MPhil

Ex officio members of Council

The Immediate Past President, Manchester Geological Association: Prof. Ray Burgess PhD

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

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To contact our Vice-President: vicepresident@mangeolassoc.org.uk

To contact our General Secretary: secretary@mangeolassoc.org.uk

For membership enquiries: membership@mangeolassoc.org.uk

For field visit enquiries: outdoors@mangeolassoc.org.uk

For indoor meeting enquiries: lectures@mangeolassoc.org.uk

For newsletter correspondence: newsletter@mangeolassoc.org.uk

For other enquiries: info@mangeolassoc.org.uk

MGA and GeoLancashire field excursion to Crummack Dale 24 July 2018

led by Peter del Strother

In order to maximise the geological interest and minimise walking, the party of eleven left one car at Austwick before meeting at Horton-in-Ribblesdale near the railway station.
On the walk up to the head of Crummack Dale the path follows Silurian strata until, passing over an unseen unconformity, it tops out on Carboniferous limestone. The karstic upper surface of the limestone is characterised by occasional sink holes and a limestone pavement with long linear grykes aligned parallel to each other. Balanced on one of these is a 0.7m diameter erratic, which on inspection with a hand lens proved to be sandstone, composed of 'crystal clear' grains of quartz.

Sandstone erratic perched on limestone pavement

Limestone pavement at the head of Crummack Dale; note the long linear parallel grykes

The party progressed down Crummack Dale to the Moughton Whetstone locality. The whetstone exhibits Liesegang rings, here banded red and grey; they appeared to be arranged in shells around unseen initiation points. No rings were seen to interfere with each other. Although bedding is not readily distinguished from cleavage in this locality, the rings crossed the layering in the rock with little deviation. One example was seen in situ in the stream bed. An example collected by me on a previous occasion suggests that the layering in the rock is cleavage.

Moughton Whetstone outcrop in stream bed

Moughton whetstone showing probably cleavage (horizontal plane) and bedding (vertical plane in the location where the Liesegang rings are disrupted)

The use of this whetstone has a long history. It was once quarried and sent to Sheffield for the razor industry. I tried using it (at home) to sharpen an old sheath knife, with some success. The rock is soft and easily grooved. It worked quite well with oil but not at all with water.

Efforts over a century or more to explain the formation of Liesegang rings have been only partially successful. If, like me, your knowledge of chemistry is at best at undergraduate level then the published explanations are largely incomprehensible.

The upper part of the main limestone face to the north was extensively jointed. The joints probably explain the long parallel grykes in the karst. The jointing stopped at a grassy ledge, beneath which bedding dominated. I suggested that the jointing stopped at the ledge because of a mudstone parting which had prevented the joints propagating downwards by plastic deformation of the mudstone. I do not know the cause of the jointing. One possibility is that it is a consequence of isostatic rebound after melting of the last major ice sheet circa 18ka ago.

View looking north from a couple of hundred metres south of whetstone locality cliff

We followed the main track between two dry stone walls. At one locality a good number of the walling stones were of different lithology to what we had seen before. The matrix fizzed with HCl. The rocks are conglomerates with limestone matrix and weathered-proud siliciclastic pebbles 10-20mm in size. I asked the group to remember these as they would see similar rocks in situ further down the valley at Nappa Scar, where they form the basal Carboniferous conglomerate above Ordovician strata. In the current location the rocks underfoot could be either Ordovician or Silurian. Where did these conglomeratic cobbles come from? It must be from the basal Carboniferous but in the valley side, see second photograph below, the unconformity was at least 20m above the path.

One of several loose cobbles in dry stone wall, a couple of hundred metres south of whetstone locality

Basal Carboniferous unconformity on east side of valley

The dipping underlying strata underneath the unconformity is probably the Austwick Formation, which is of Wenlock age (Silurian) and was previously known as the Moughton Whetstone or the Austwick Flags and Grits.

The rocks outcropping along the full length of the path alternated between layered (most likely cleaved) mudstones and massive sandstones. Contacts were not clear, but on the basis of what is seen further down the valley they are part of a succession of turbidites.

Lunch was taken by the bridges over Austwick Beck at NGR SD777705. Over the more southerly bridge an area of bedding plane was exposed on the opposite bank and a larger example about 200m away in the field to the south west. The second outcrop was a single bedding plane in the form of a small syncline about 25m wide and 50m along strike. Here, as in all the previous exposures down the track, the strike was approximately NW-SE.

Well exposed syncline (Photo taken by PdS on a previous excursion. The difference in strike of the two flanks is distortion in the photographic panorama. The strikes of both flanks were not far off horizontal)

Syncline seen on the west side of the valley (white arrows indicate the dip)

On the southwestern side of the small syncline, sandstone and mudstone beds crop out in a number of low faces perpendicular to bedding planes. The sandstone beds fined upwards and terminate in fine grained mudstones. The transition from mudstone to the underside of the overlying sandstone was everywhere sharp, with rare flute casts. Several beds contained subspherical mudstone clasts, mostly weathered out. This (Silurian) succession was interpreted as a series of turbidites. The mudstone clasts are rip-up clasts, very similar in form to those exposed in the (Carboniferous, Namurian) Pendle Grit on Nick-of-Pendle near Clitheroe.

Bedding parallel hollows arising from weathered out mudstone rip-up clasts.

I told the story of the Grand Banks earthquake. The following summary is from "The Newfoundland Tsunami of November 18, 1929:

An Examination of the Twenty-eight Deaths of the "South Coast Disaster" by Alan Ruffman; Newfoundland and Labrador Studies 2006.

THE "GRAND BANKS" EARTHQUAKE occurred at 17.02 (Newfoundland Standard Time) on Monday, November 18, 1929. It was centred eighteen kilometres beneath the Laurentian Continental Slope, 265 kilometres south of Newfoundland's Burin Peninsula, in 2,000 metres of water. The event had a surface wave magnitude of Ms = 7.2 and it was felt as far afield as New York City and Montreal. Onshore the damage from the earthquake's shaking was restricted to some slumping and minor building damage.

On the ocean floor offshore, part of the Laurentian Slope was shaken loose and began an underwater landslide that went on for hours and flowed at least 1,100 kilometres out onto the floor of the 5,000-metre-deep Sohm Abyssal Plain. It was 23 years before scientists recognized the landslide and its great importance as a dominant ocean process. The 1929 "turbidity currents" moved at speeds of 50 to 70 knots (93-130 km/s) and cut twelve trans-Atlantic telegraph cables in about 28 places. Repairs involved every available cable ship in the Atlantic and continued until August 1930. About 200 cubic kilometres of material was removed over an area of 20,000 square kilometres of the continental slope and rise. This material was redistributed over an area of 150,000 square kilometres out on the abyssal plain; this is an area one-and-one-half times the size of the island of Newfoundland.

The muddy horizons were cleaved. The relationship between cleavage and bedding and what could be inferred about adjacent anticlines and synclines was discussed. One exposure displayed a good example of cleavage refraction.

Cleavage refraction in turbidite, looking west. The white arrow is parallel to the plane of cleavage in the fine-grained mudstone at the top of the turbidite unit. The relationship between cleavage and bedding indicates the presence of a syncline to the right and an anticline to the left. The syncline is the one in the panorama photograph previously illustrated.

The highlight of the excursion was the Ordovician/Carboniferous unconformity at Nappa Scar, at SD770697. The lower of the two exposures is difficult to access and it is would be safer not to attempt it in wet weather. You need to see both exposures to interpret the depositional environment. The lower exposure reveals the unconformity. The basal conglomerate contains abundant 5-20mm siliciclastic clasts in a lime mud matrix. Also seen in the conglomerate were several solitary corals, of Dibunophyllum morphology, and tabular limestone clasts up to 300mm long by 75mm across. For those who chose not to scramble down to the unconformity I showed an A4 print of a photograph, the one illustrated below.

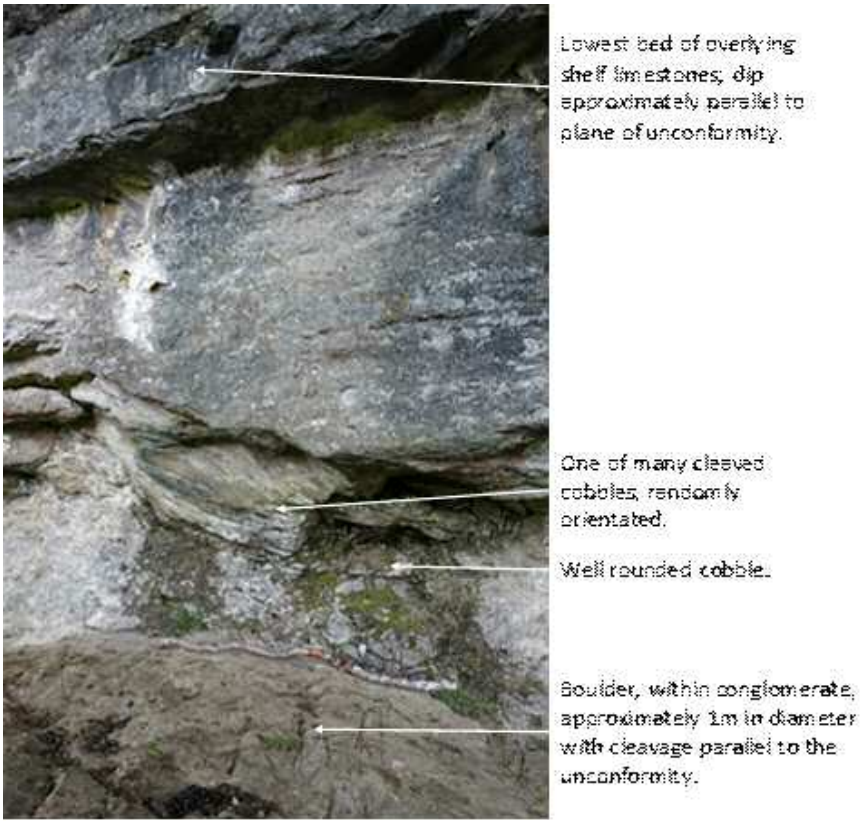
On a metre scale the eroded Ordovician surface was undulating as shown below. The strata are reported to be calcareous but in this location there was no reaction with HCl.

No evidence of grading in the basal conglomerate was observed but one example of cross bedding was seen. The directions of bedding and cleavage in the Ordovician strata were noted. The cleavage was approximately perpendicular to the plane of the unconformity.

Ordovician Carboniferous unconformity; below - bedded Ordovician with cleavage parallel to the plane of the picture; above - Carboniferous basal conglomerate

The upper exposure, which is beside the path, might at first sight appear to be the unconformity. It isn't. The typical horizontally bedded Carboniferous strata above give way to a chaotic arrangement of cobbles and boulders below. One boulder in the base of the exposure is almost a metre across, contains quartz veins and is cleaved parallel to the unconformity. The strike of cleavage planes in other boulders varies widely.

The outcrop is interpreted as a cliff and beach deposit, where the larger boulders have fallen from the cliff above. The top of the Ordovician strata is in the form of hills and valleys with relative heights of 200m, the whole landscape being buried by on-lapping calcareous Carboniferous sediments as relative sea level rose (mostly by subsidence of the land). The story is a little more complicated than this, as indicated by the presence of solitary corals and limestone clasts in the conglomerate. I leave you to think about why that might be.



Boulder bed about 3m above unconformity

Most of the group finished the excursion by taking a short walk to see the Norber erratics. They stand rather splendidly on plinths of limestone on a vegetated karst surface. It is said that the height of the plinths indicates the amount of limestone dissolution that has taken place since the end of the last glaciation. While this must in principle be true I do not think that the rate of dissolution should be applied unquestioningly to other localities. The limestone surface is vegetated and

dissolution rates below this plant cover will be different from that of exposed limestone because of the lower pH of water percolating through the vegetation.

We failed to see the *rôche moutonnée*, below, which I had seen on my recce.

Rôche moutonnée?

The group sat outside the Game Cock in Austwick enjoying cups of coffee and other beverages in the sunshine. The excursion had lasted from 10.30am to 4.15pm and I was relieved to finish without a mutiny! That said, everyone was very cheerful so I think the excursion can be considered a success!

Free Download

The NAMHO The Archaeology of Mining and Quarrying in England - A Research Framework will be of interest if you've not already come across it. It covers English mining from prehistory onwards. It includes many areas and industries which will be familiar to MGA members. Some of the authors are likely to be familiar as well.

At about 10 Mbytes for the two volumes the file size is reasonable - especially given that it has 360 pages with many colour plates.

The links are...

https://www.namho.org/documents/MINING_FRAMEWORK_Pt_one.pdf and
https://www.namho.org/documents/MINING_FRAMEWORK_Pt_two_v2.pdf

[I downloaded the files without any problems. The content is interesting and contains a lot of local material. Ed]

OTHER SOCIETY EVENTS

BCGS http://bcgs.info/pub/

1 September 10.00 – 5.00, – Field Meeting, Visit to Titterstone Clee Hill
17 September 7.30, – Indoor Meeting, 'Geological Highlights of South Devon'. Speaker: Alan Clewlow.
6 October 10.30 – 2.30, – Geoconservation Day, Portway Hill, Blue Rock Quarries
15 October 7.30, – Indoor Meeting, 'Catastrophic Volcanoes'. Speaker: Sebastian Watt.
3 November 10.30 – 2.30, – Geoconservation Day, Wren's Nest
19 November 7.30, – Indoor Meeting, 'Abberley & Malvern Hills Geopark'. Speaker: Georgia Jacobs.

Leeds Geological Society http://www.leedsga.org.uk/

11 OCT 18 Waking the Giant: How a Changing Climate Triggers Earthquakes, Tsunamis and Volcanoes
Prof Bill McGuire. Univ College London

08 NOV 18 The Early Toarcian (Jurassic) Oceanic Anoxic Event: Untangling Global and Regional Signals
Dr Rob Newton. Earth and Environment. Leeds University

06 DEC 18 AGM and Conversazione – Short Talks and Displays by Members

OUGS http://ougs.org/northwest/

22nd September 2018 Butterfly Conservation Event. Myers Allotment, Silverdale, Lancs
14th October 2018 Goyt Valley and Marple. Leader: Jane Michael

NWGA http://www.ampyx.org.uk/cdgc/rhaglen.html

Geolancashire http://geolancashire.org.uk/lectures-and-excursions/

North Staffordshire Group

15 September EMGS Field Trip: Churnet Valley led by Dr Ian Stimpson
10 November Park Hall Site Clearance with GCStaffs

Manchester Geological Association
Outdoor Meetings 2018/19

Saturday 29 September 2018 Fred Broadhurst Memorial Field Trip: Deep Dale and Magpie Mine

Leader: Jane Michael
Contact: Field Excursions Secretary

Notes: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.

Manchester Geological Association
2018/19 Indoor Meetings calendar

Wednesday 17 October 2018 7.00pm: Holiday Geology: members talks
Mary Howie, Peter del Strother and Ken Jacobs

Saturday 10 November 2018 Broadhurst Memorial Lectures 1.30pm:
Earth's Distant Past:
Dr Stefan Schroeder, University of Manchester
Prof Richard White, University of St Andrews
Dr Matthew Warke, University of St Andrews

Thursday 22 November 2018 6.30pm: Joint Lecture with Manchester Geographical Association:
Dr. Colin Summerhayes, Scott Polar Research Institute, Cambridge.
“Melting Ice - Rising Seas: Antarctic Climate Change and the Environment”

Saturday 8 December 2018 1.30pm:
Some Aspects of the Quaternary:
Prof Jamie Woodward, University of Manchester
Prof Jeff Peakall, University of Leeds
Prof David Bridgland, University of Durham

Thursday 17 January 2019 6.30pm: Joint Meeting with Geological Scoiety NorthWest Region
Prof Robert Ward, British Geological Survey

Wednesday 6 February 2019 7.00pm: Annual General Meeting:
Presidential Lecture by Cathy Hollis

All lectures with the exception of the Joint Meeting with the Manchester Geographical Association will take place in the Lecture Theatre in the Williamson Building, Manchester University, Oxford Road, Manchester. The venue of the Joint Meeting with the Manchester Geographical Association will be the same as last year; ie Manchester
Fref