NORTH EASTERN GEOLOGICAL SOCIETY
Newsletter September 2014
http://www.northeast-geolsoc.50megs.com

1. NEGS SPRING/SUMMER FIELD MEETING PROGRAMME

~~Saturday~~ 12th October 2014 GEOLOGY OF THE NENTHEAD AREA

Leaders: Brian Young & Peter Jackson

Objectives:
The day will be spent exploring the geology of the upper part of the Nent valley in and around the former lead mining village of Nenthead. We will examine the nature of the local Carboniferous rocks in their regional setting and discuss the varied ways in which they, and the overlying mantle of Quaternary deposits, have influenced the distinctive landscapes of the high Northern Pennines. Particular attention will, however, be directed towards the very numerous vein and related mineral deposits hosted within the Carboniferous rocks. We will examine fine *in situ* exposures of primary lead and zinc deposits, as well as visiting sites where the effects of supergene alteration may be clearly appreciated. Particular attention will be paid to the conspicuous effects centuries of metal mining have had on the local landscape, both physical and human. Protected remains of the lead mining and smelting industry will be visited.The continually evolving ideas on the genesis of these deposits will be outlined and the potential for future commercial mining will also be discussed. There will also be ample opportunities to see typical examples of many of the local minerals.

It is likely that a short underground visit to one of Nenthead's many abandoned lead and zinc mines can be arranged as part of the day's activities. The underground visit is not arduous. For members wishing to do so, lamps and hard hats can be provided. An alternative programme will be available for members not wishing to go underground.

Meeting point:
Meet at 10.30am at the car park in the centre of Nenthead village [NY781 436].

Food & drink:
Please bring a packed lunch and drinks.

Health & saftety;
The route will follow moorland tracks and open fellside, as well as rather uneven spoil heaps and river banks. Stout walking boots, warm and waterproof clothing are recommended. We will examine several rock faces for which hard hats are advised. A personal first aid kit should be carried.

The maximum walking distance is expected to be around 4 kilometres.

Toilets:
There are public toilets adjacent to the car park at the starting and finishing point. Toilets may also be available at the Nenthead Mines Heritage Centre.

Maps & literature references:
Topographical maps:
Ordnance survey 1:50 000 scale Sheet 86 Haltwhistle and Alston
Ordnance Survey 1:25 000 scale Sheet OL31 North Pennines

Geological map:
British Geological Survey 1:50 000 scale Sheet 25 Alston

Geological literature refrences:
BEVINS, R.E., YOUNG, B., MASON, J.S., MANNING, D.A.C. and SYMES, R.F. 2010. *Mineralization of England and Wales.* Geological Conservation Review Series, No 36. : The Mineralogy of Great Britain. Joint Nature Conservation Committee, Peterborough, 598 pp.
DUNHAM, K. C. 1990. Geology of the Northern Pennine Orefield (2nd edition); Volume 1 Tyne to Stainmore. *Economic Memoir of the British Geological Survey, England and Wales.*

STONE, P., MILLWARD, D., YOUNG, B., MERRITT, J.W., CLARKE, S.M., McCORMAC, M. and LAWRENCE, D.J.D. 2010. *British Regional Geology: Northern England* (Fifth edition). (Keyworth, Nottingham: British Geological Survey).
SYMES, R.F. and YOUNG, B. 2008. *Minerals of Northern England*. NMS Enterprises, National Museums of Scotland. 208 pp.

Saturday 25th October 2014 GEOLOGY OF DURHAM CATHEDRAL

Leader: Brian Young

Although members may be familiar with this magnificent cathedral, our visit today will focus on the geology in and around the building by looking at some of the features that are often overlooked by many of its visitors. Beginning with a review of the local geology, we will discover some of the ways in which the geotechnical properties of the site created opportunities and imposed constraints on the Norman architects and masons, dictating the layout and appearance of the cathedral we see today. We will explore detailed characteristics of some of the stones used and discuss their sources, as well as looking at the various ways in which their properties have been employed in shaping the spectacular engineering and architecture of what has been dubbed "the best cathedral on planet Earth".

Meet outside north door of the Cathedral, Palace Green, Durham at 2pm. Our visit will last for about 2 – 2½ hours. The normal Cathedral charge of £5 per person (£4-50 for concessions) for guided tours will be collected at the start of the tour.

Meals and light refreshments are available in the Cathedral's Undercroft Restaurant, adjacent to which are toilets.

Please note that photography is not permitted inside the Cathedral.

There is no parking at the Cathedral. To avoid parking charges and worries over car park

times, members are advised to use one of Durham's excellent free Park & Ride car parks at Belmont [NZ303 446], Sniperley [NZ258 442] or Howlands [NZ271 407] and to take the Park & Ride bus, alight at the Market Place and walk up to the Cathedral.

Field Trip Report: Austwick and Crummackdale. Sunday 20th July 2014

Enthusiastic NEGS members travelled to the Settle area to examine the Silurian – Carboniferous unconformity. The leader was Eric Johnson, instrumental in producing the BGS geology sheet of the area.

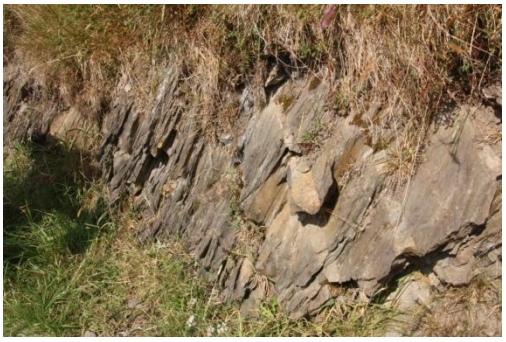
Eric started with a brief palaeogeographical sketch of the area. The Lower Palaeozoic Windermere Supergroup rocks accumulated on the continental margin of Eastern Avalonia in the remnants of the Iapetus Ocean in the Late Ordovician – Silurian interval. In the Early Devonian when Eastern Avalonia collided with Baltica, the orogenic forces deformed the Windermere Supergroup in large regional scale folding, accompanying uplift created a Himalayan-scale mountain chain. This phase of deformation is termed the Acadian Orogeny, The continental collision also resulted in granite plutons being intruded into the Windermere Supergroup. One of these intrusions, the Wensleydale Granite underpins the area that is now referred to as the Askrigg Block.

A sustained period of erosion through the remainder of the Devonian and Early Carboniferous removed more than five kms of strata during an interval of about 50Ma. The erosion generated a low relief land surface with local deposits of conglomerates preserved in hollows. The Carboniferous seas gradually flooded the area and deposited calcareous sediments that now form the Carboniferous Limestone on the former land surface. This event produced spectacular angular unconformity at the base of the Carboniferous succession.

Younger rock successions (Permian to Cretaceous) were probably deposited across the area but were subsequently removed following the Early Caenozoic uplift of the British Isles ~65Ma ago. Gradually the landscape was shaped into that which we recognise today. Intense erosion accompanied the Quaternary glaciations that affected the area in the area in the last 2.5Ma

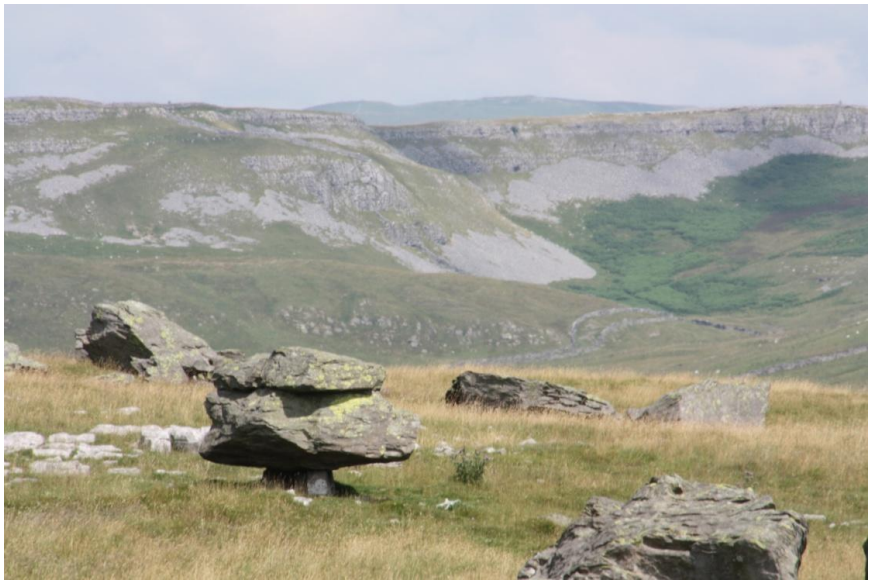
The excursion began along a minor road a little east of Austwick on the Late Ordovician Dent Group (formerly known as the Coniston Limestone Group). The group was deposited in a shallow marine environment associated with gradual subsidence and a rise in sea level. The view to the east showed an ENE trending Acadian anticline in the Lower Palaeozoic rocks, immediately north of the North Craven fault. Present day river erosion exposing the oldest rocks in the core of the anticline.

A careful study of the Dent Group Norber formation in the north bank of the minor road demonstrated the dip of 40 degrees to the North with bedding recognised by slight colour changes in the fine sediment. The exposure was dominated by a strong SSE (110 degrees).



We followed a footpath north onto a scarp slope and walked along the outcrop of the Norber Formation. This section was spectacular but care was needed when descending the scarp (photo above left). The Ordovician material was strongly deformed; the unconformity is estimated to represent a time interval of about 100Ma. Pebbles of the Ordovician rocks were enclosed in a limestone matrix. In places the conglomerate was seen to be preserved in shallow channels (photo above right). The sub-Carboniferous unconformity is also well exposed at Thornton Force near Ingleton.

The group climbed onto Norber Brow onto the Carboniferous limestone. Here the land surface is littered with hundreds of Silurian Austwick Formation sandstone boulders, the famous Norber erratics (photo below). The Late Devensian ice sheet plucked the sandstone boulders from outcrops a mile or so to the north in Crummackdale and deposited them on the Carboniferous Limestone at Norber Brow. The group worked its way NE before moving SW to regain the road we had left at the scarp.

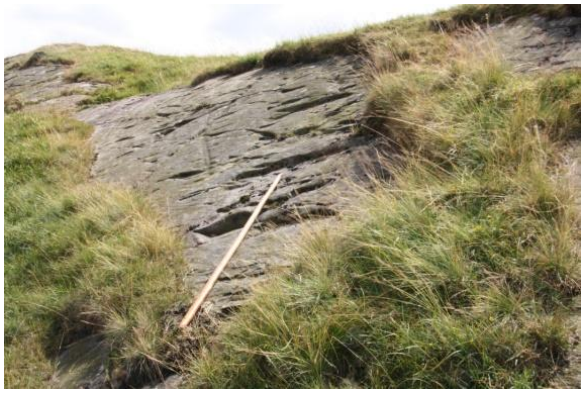


We left the road to turn into the farm track trending SW. Eric pointed out the location of the Wharfe Conglomerate in a small stream. We did not have access to the location, the significance being its age of late Ordovician that reflected a fall in sea level associated with a Late Ordovician glaciation. It correlates with conglomerates in the Howgill Fells.

We left the track and headed north to a series of turbidite sandstone exposures, part of the Austwick Formation. The sandstones formed the southern limb of a broad syncline that was clearly visible in the landscape. The turbidites dip north at 65 degrees, careful study revealed

some excellent cleavage refraction. A dense group of flute casts was noted on one surface. These turbid flows are interpreted as forming on the northern margin of the Eastern Avalonian microcontinent. Flute casts on the beds indicate that they were derived from the southeast.

The group studied the landscape to the Northwest. The Carboniferous limestones could be seen overlying an irregular erosion surface of Lower Palaeozoic rocks. The erosion resistant Austwick formation turbidite sandstones forming a high point above small crags where the Norber erractics had been plucked off by the Late Devensian ice-sheet. Moving over the turbidite sanstone outcrop a variety of features associated with the Late Devensian ice sheet were observed (photo below left). These included erosional grooves, chatter marks and striae.

. 

The group used a green lane to head NE onto the Brathay Flags. Limestone scars were abundant on the west facing slope. A gentle climb along the popular footpath that crosses this area brought us into areas of gentle meandering streams. Eric highlighted the Moughton whetstone deposits. The rocks have an attractive red and green colour banding (photo above right) and the past were worked as ‘whetstones’ for sharpening metal bladed tools. The colour banding is known as Lieisgang rings and originated by pre-Carboniferous weathering of the Lower Palaeozoic rocks.

The group worked its way onto the limestone pavements of Moughton before descending into Horton, crossing the famous Settle to Carlisle rail track.

The group agreed that the leadership of Eric had been an exceptional experience, his knowledge and insight allowing us to recognise and understand the vast processes that had shaped the area.

Gordon Liddle

.

2. NEGS AUTUMN/WINTER LECTURE PROGRAMME.

17th October, 2014 A New Dawn for Shale: Oil, Gas and CO_2 Storage
Prof. Andy Aplin, Durham University

21st November, 2014 Brief History of Stable Isotopes: from Kangaroos to Forensics to Botany and the Mesozoic
Dr. Darren Grocke' Durham University

12th December, 2014 **1.** Uluru and Kata Tjuta – the geology of a unique area.
Gordon Wilkinson
2. People I've met on the Road from Stanley to Pangea.
Gordon Hull
3. A Particular Quarry in Gloucestershire
Christine Taylor

16th January, 2015 Chinese Dinosaur Embryos.
Dr John Nudds, Univ. Manchester

20th February, 2015 Chromite, tungsten and iron: Mineral deposits and mines in Portugal
Lesley Dunlop, Northumbria University

20th March 2015 Poles Apart? Glaciers and Climate Change in the Arctic and Antarctic**.**
Prof. Chris R. Stokes Durham University

Suggestions (with names, contact if possible) for speakers would be appreciated by Prof. G. Foulger. : email: g.r.foulger@durham.ac.uk

3. NEWS

3.1 "Explore" lifelong learning

has just published its programme for autumn 2014, running from 6 Oct to 12 Dec, and is keen to recruit new members. There are classes in aspects of geology / cosmology /archaeology /history / philosophy and other topics

See www.weareexplore.org.uk for all the details."

Some Upcoming Geological Events

FESTIVAL OF GEOLOGY

SATURDAY 1st NOVEMBER 2014

ENTRANCE FREE !

10.30 am — 4.30 pm

University College London, Gower Street, London WC1E 6BT

Exhibitors from the World of Geology

Fossil and mineral displays, stonecraft, books, maps and geological equipment, jewellery, beads, Geology Poetry Readings, Art and Geology on Flamborough Head, Yorkshire and much more...

Discovery Room

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

Geological Talks

Laurance Donnelly
Forensic Geology: The Applications of Geology to Policing Enforcement

Richard Edmonds
Fossils and fossil collecting along the Jurassic Coast

Iain Stewart
Planet Oil

Peter Styles
Shale Gas: What the frack is that all about!?

Walks and Field Trips

Diana Smith - Building Stone Walk in the City

Diana Clements - The lost waters of Islington

Rod Legear - Chislehurst Caves

Ruth Siddall - Geological walk around UCL campus

ROCKWATCH

UCL

Amateur Photographic Competition

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

Further Festival details: www.geologistsassociation.org.uk | www.rockwatch.org.uk
Tel: 020 7434 9298
Email: festival@geologistsassociation.org.uk

Geology and History in Southeast England

The West Sussex Geological Society plays host to a
Southeast Regional Conference
supported by the Geologists' Association, the Brighton and Hove Geological Society, the Horsham Geological Field Club and the History of Geology Group
Saturday 29 November 2014 in the Exhibition Hall of **Worthing College**
at their new college campus, on the northern outskirts of the town

Rory Mortimore on Flint

David Bridgland on Gravel

Roger Cordiner on Building Stones

Seven Sisters to Seaford Head Panorama, CC BY-SA 3.0

Matt Pope on Prehistoric Peoples

David Martill on Conan Doyle, Pterosaurs and Piltdown

and other interesting presentations

Ouse Valley viaduct CC BY-SA 3.0

Conference Fee is £25 for the day, including coffee/tea, buffet lunch and Conference publication. Conference Fee for Full-time Students is only £20
For a Programme / Registration Form, please email the Conference Organiser:
anthony.brook27@btinternet.com

4. INFORMATION

a. A report from the Geologists Association Conference

Palaeo' to the People! Fossils in the service of Man

Geologists' Association Annual Conference. Leicester University

A day of lectures at Leicester University covering a range of topics including: Applied Stratigraphy, Archaeology, Civil Engineering Projects, Forensic Geology, Micropalaeontology, Future of museums and their collections.
The main theme was fossils and their use in modern studies of geophysical and geographical problems in bio-stratigraphical, climatological and ecological interpretations.
The opening of the conference was the controversial new epoch of the Anthropocene which now is proposed to sit on top of the Holocene. This new epoch in the geological time scale is pinned on the evidence of human driven large scale changes to the Earth System.
There were a lot of examples of computer and digital imaging for future predictions of increases in ocean and land surface temperatures. These were based on previous Pliocene environments. (discussion evolved on the role of field geology and desk based software modelling).

I was astounded at tomographic techniques to produce high fidelity three dimensional virtual fossils, the images were easier to follow than the technology.
The use of microfossils in the sourcing of materials for artefacts in archaeology has allowed the origin of a great many sources for Roman chalk tesserae and also Iron Age clays for pottery.

Palynology (study of organic walled microfossils) is used to determine marker indices in the petroleum industry and vegetation studies for the Quaternary. This micropalaeontology is now also used in forensics and a series of high profile criminal cases have been solved through their interpretation.

The museums lecture provided an insight into the role of collections for education and general interest in the modern digital age. Computer games analysts are being used to develop geology as an educational tool, hopefully to attract more young people into science. Key personnel trained in biostratigraphic and palaeoenvironmental studies are still needed by the hydrocarbon industry to analyse the pre-drilling and sub-surface uncertainties, and apparently a great deal of investment is provided to ensure this.

The last round of presentations featured the role of fossils in determining the deposition of the chalk. A recalibration of drill cores has allowed the production of a three dimensional digital model which has helped in the planning and construction of tunnels, roads, railways and flood prevention schemes.
In large tunnelling and wind farm structures, marker beds containing specific fossil horizons are used to mark specific strata showing lithological variations in mechanical and hydrological properties. With this knowledge the design of the construction can be assessed more accurately.

There were field trips on the Sunday but my broken foot prevented me from visiting the Precambrian geology of the Charnwood area of Leicestershire

Gordon Hull. September 2014.

4.2 MEMBER PROFILE

Our second member profile. This new item for the Newsletter does require the input of members and contributory profiles will be welcomed. A little bit of getting to know everybody a little bit better. This month it is **Gordon Hull.**

72years young and ticking off Fairfield, another Wainwright
Leaving a Secondary Modern Boys School with attitude and an ambition to win the Tour de France seems a long way from a love of geology. However a trainee draughtsman, drawing layouts for irrigation schemes for tobacco and coffee barons in East Africa then surveying and cartography. This led to industrial reclamation of major metaliferous sites and finally landscape analysis and the restoration of historic landscapes. This then led to Industrial Archaeology at first through the Northern Mines Research Society and the North of England Institute of Mining and Mechanical Engineering (now a Council Member). Running through all of this was an interest in geology as what I described myself as an 'enthusiastic amateur' until I retired and deciding to move the goalposts a little further by signing up for a OU degree in Geology. I have since jumped ship and am attempting a distance learning degree in Earth Sciences with Birkbeck, University of London. I am also a member of The Geologists Association and The Yorkshire Geology Society as well as completing 140 Munros.
My two favourite geological outcrops are High Cup Nick, and for an experience, sitting on an outcrop of Lewisian Gneiss looking at the Torridonian Sandstones of Suilvan in NW Scotland.

ADMINISTRATION

Many thanks to Gordon Liddle and Gordon Hull for their reports of meetings.

If you receive this newsletter by post and have an email address, then please let me have it.

Best Wishes,
Chris Burridge
(Secretary) email: negsec@gmail.com