

North Eastern Geological Society

Newsletter June 2017

UPCOMING EVENTS

Wednesday July 5th 2017 13:00 to 14:00

Durham University: Time Machines:

Talks. IAS Seminar Room, Palace Green

Cherry Lewis - The Dating Game: Arthur Holmes' dream to date the age of the Earth

This talk will be free of charge. Booking is not required for lunch time talks but seating will be allocated on a first come, first served basis. The IAS building is located opposite the entrance to library across Palace Green.

Enquiries regarding talks should be made to Palace Green Library on 0191 334 2976.

Field Trip Saturday July 15th 2017

The Whin Sill on the North-East Coast

Leader: Ian Kille

(<https://www.northumbrianearth.co.uk/dr-ian-kille>)

Meeting at 10.00 a.m. at the War Memorial, beneath Bamburgh Castle on the edge of the cricket green.

Grid Reference: **NU182350**

Duration: 5 hours (finish 3:00)

Clothing: Bring stout footwear as we will be scrambling across rocks on the foreshore which can be slippery when wet. Walking poles are helpful if you are at all uncertain of your footing. Wet weather gear or sun-cream depending on the forecast, the coast is exposed and can be cold in wet and windy weather

Food: Please bring a packed lunch - whilst there are hostelrys and cafes on the island they will be very crowded at this time of year.

Locations: we will start by exploring the foreshore between Bamburgh Castle and Stag Rocks and will then move on to Lindisfarne for lunch, leaving Bamburgh between 12 and 12.30 so that we can be on the Island at the lowest point of the tide

There are toilets on Lindisfarne.

The aim of the trip is to compare and contrast the exposure at these two locations which each give a different insight into the Whin Sill, which is a fascinating and iconic landform. This will help understand some of the intricacies of the form of the Sill, the process of intrusion (how long it flowed for and whether in a single or multiple pulses) and the relationship of the sill to the Carboniferous sedimentary basin into which it is intruded. This in turn (with a bit of geo-chemical background) will help tease out what the Whin Sill can tell us about the tectonic setting at the time of its intrusion. The trip also gives an opportunity to examine the unique "pahoehoe" structures which can be found at Harkess Rocks and on St Cuthbert's Island and to offer interpretation of them.

FIELD TRIP REPORTS

Sunday May 7th 2017

Mega-Scale Glacial Lineations in Mid-Northumberland

A joint field meeting with NHSN led by Derek Teasdale

A group of eight members met Derek Teasdale

Mid-Northumberland was recently (approx. 26-16 K years BP) over-ridden by ice flowing away from

accumulation zones in the Lake District, Southern Uplands and Scottish Highlands. Local ice caps also existed in the Northern Pennines and the Cheviot Hills. The moving ice masses eroded bedrock in some locations, especially on higher ground and where the rocks were hard and resistant. On lower ground and in valleys the ice deposited sands, gravels or diamicton (also known as boulder clay, lodgement till or ground moraine). When it wasn't eroding and/or depositing the ice might have been actively moulding and re-shaping previous deposits. The resulting suite of landforms are still visible in the landscape of Northumberland. After all, 16 thousand years, is a blink of the eye in geological terms. This trip explored one characteristic that unifies all of these features - they are elongated along the direction of ice movement.

The day started at Kirkley Hall where the group of eight members enjoyed a morning stroll by along the River Blyth, at its junction with the Cadgers Burn. The Hall was built on top of a glacial end moraine, that runs in an almost straight line, NNE to SSW for 10 km, and dictates the course of rivers. The stop was remarkable for a member of the party being head-butted by a lamb, as they both tried to pass through a gate. Luckily no one was injured. A quick stop to examine a glacial meltwater channel at Shilvington was followed by lunch on the higher ground at Bolam Church, with views of streamlined drumlins to the north. Whilst the bedrock for the entire day was of Upper Carboniferous (Namurian) age and belonged to the Stainmore Group, at Bolam and the later sites we had moved on to higher ground underlain by coarse sandstones of the Shaftoe Grits. Passing ice had preferentially eroded along faults in the grits, to form crag and tail features (e.g. at Harham) and thin meltwater channels (at Shaftoe Crag). The day ended at the top of Shaftoe Crag with a fine view to the south of elongated drumlins.

The day showed us that glacial lineations can allow us to tease out the movements of ice

across Northumberland during the last Devensian glaciation, and that cross-cutting relationships can help elucidate the waxing and waning of particular ice streams, and by implication the growth and decay of ice accumulation zones.

Derek Teasdale

A day in which I heard several people say that they had learned to open their eyes and look more deeply at the landscape. (Editor)

Saturday MAY 20th 2017

Jurassic ironstone and jet plus a Palaeogene dyke, Roseberry Topping and Cliff Rigg Quarry.

Karl Egeland-Erikson was joined by a group of ten NEGS and NOUGS members for this walk through several locations and a varied geological and human history. The field trip was supported by a six page, illustrated handout and the enthusiasm of Karl throughout.

Saturday June 17th 2017

Whiteadder Water, Lower Carboniferous sediments, Berwickshire, Scottish Borders.

Louis Golightley met a keen group of eight on a glorious day in June, on the anniversary of Quatre Bras and the day before the 202nd anniversary of Waterloo, in the Whiteadder valley in Berwickshire. Louis provided a comprehensive set of materials to support his introduction and the journey through three locations.

The rocks examined were of Tournaisian age, at the beginning of the Carboniferous

[approximately 359 Ma – 347 Ma]. BGS now defines these as the **BALLAGAN FORMATION**. Formerly, the rocks in this locality were known as the *Cementstone Facies* and it is commonplace to still refer to the ***Cementstone group***. It is estimated that the entire Tournaisian sequence is represented at Burnmouth on the Berwickshire coast; in the Whiteadder valley we have a large part of that sequence, but the sections exposed have been affected by folding and, probably, by faulting and no definitive stratigraphy has yet been established. There are approximately 490 metres of strata in the Cementstone group, comprising:

- Red sandstone and conglomerates
- Sandy cementstones and cementstones
- Mudstones
- Siltstones
- Sandstones ranging from quite narrow bands to thick channel, crevasse and splay sand sheets

The palaeo-environment is believed to have been a coastal plain draining to the East and South East, crossed by rivers subject to flooding, depositing sediment, most apparent in channel and crevasse sandstones. Lagoons, flood-plain lakes and periodic coastal inundation contributed mudstone, siltstone and cementstone [Calcilutite], in thin bands, and Gypsum. Plant and animal biota were well represented.



Cementstone group at Edington Mill

The West-East flowing Whiteadder, a tributary of the Tweed, has incised deeply into the quite soft rocks of the Cementstone group and meandered, giving a topography of vertical cliffs, with exposure to one side of the river and broad floodplains on the other, alternating North and South.

D C Greig – a painstaking surveyor – in *'The Geology of the Eyemouth District'* provides eight graphic logs of Whiteadder valley exposures which, he suggests, cover the Cementstone group sequence. Greig suggests there are probably five anticline/syncline pairs and some of the outcrops examined showed evidence of this folding. The rocks were affected by the late Carboniferous/early Permian sub-Variscan front pressure which threw up the Berwick Monocline and there is a general dip to the South/South-west of approximately 12° – 15°.

A borehole, sunk for water supply purposes, in the 1920s, at Hutton Castle Barns, penetrated 142m of the lowest cementstone group and 41m into the Upper Devonian below. As a generalisation, the cores from this bore suggest the bulk of its sandstones – fluvial, sub-aerial - lie in the basal layers and cementstones – lagoonal, lacustrine - occur more frequently in sections higher in the sequence.

Sections examined at Edington Mill, Bluestone Ford, Patie's Cove and Hutton Mill illustrated the repetitive sequences of sandstones, siltstones, shales, mudstones and cementstones and, at Patie's Cove, the red sandstones suggestive of sub-aerial seasonal fluvial flood deposition, similar perhaps to wadi deposition in desert environments.



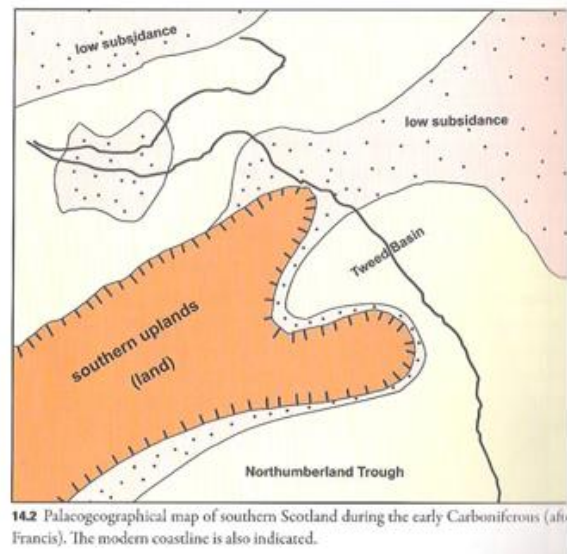
Red sandstones, Patie's Cove

A disappointment was that 'Willie's Hole' a pool in the river below a small natural weir and with low sandstone and shale cliffs, supposedly fossil rich, yielded no fossil finds. Specimens may have been removed by the TW:eed project which had located tetrapod fossils there. However, ace fossil finder Christine Burrige, found a fine specimen of *Lepidodendron* at Patie's Cove and the red sandstones there also revealed specimens of plant fragments and worm bores.



Patie's Cove: *Lepidodendron*

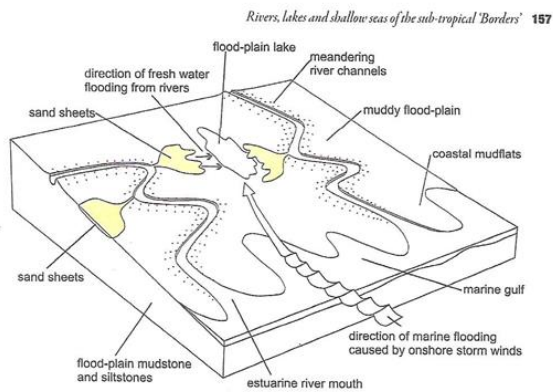
It is speculated that the flood plain was richly vegetated; the lakes and lagoons richly populated with fish, arthropods and worm and their surroundings home to tetrapods, which have been the subject of important palaeontological work in recent years in the TW:eed Project [*Tetrapod World: early evolution and diversity*].



The palaeogeography of Berwickshire.

The river features at the sites were exceptional with clean bed rock floors, some point bar features and alignment suggesting strike control and a fault.

At Foulden Newton there is a designated SSSI for the 'Foulden Fish Beds', where Thomas Ovens collected 150 specimens in about 1910-12, from a former lake environment. Ovens died, aged 19, in 1912 and his parents sent the collection to the Natural History Museum, where there appears to have been no systematic attempt to describe and categorise the material, which included hitherto unknown species, until the late 1920s. A further co-ordinated study of the biota, the palaeo-environment and palaeo-ecology took place in the 1980s and is detailed in a thematic volume [Vol 76] of the Transactions of the Royal Society of Edinburgh, in 1985. Sadly, the SSSI site is overgrown and inaccessible.



14.6 Palaeoenvironmental reconstruction of the Lower Carboniferous Cementstone environment (after R. Anderson).

Images from Clarkson, ENK and BJ Upton: Death of an Ocean: A Geological Borders Ballad; 2010. Dunedin Academic Press. Ch 14; Rivers, lakes and shallow seas of the sub-tropical 'Borders'.

The party were delighted with the day and thanked Louis for his leadership and excellent supporting handout.

Main report: Louis Golightley

FIELD TRIP PROGRAMME

Not NEGS but OU
Saturday July 22nd. 2017

NWOUGS (OU- North West Branch)
The Pennine Escarpment and High Cup Nick

Contact Maggie Deytrich at
mdeytrikh@gmail.com

Sunday July 23rd. 2017

The Cross Fell Inlier, Dufton

A joint field meeting with NOUGS

Led by Karl Egeland-Erikson, OUGS

Meet: 10.00 am at the public car park,

Dufton village [NY 689 250]

Details at negs.org.uk

NEWS AND LOCAL EVENTS

Saturday and Sunday July 29th / 30th
The first North Pennines Mineral Expo

ADMINISTRATION

The 2017 winner of the **NEGS** student prize has been announced as Edward. A. Ffrench,

more later

Winter season Lecture Series

Professor Gillian Foulger works hard at providing members with a varied and interesting lecture programme every year. If anyone has any suggestions for speakers, please do let Professor Foulger know.

Also

The December meeting is Members Evening where YOU the member can give a 20 to 30 minutes presentation on your chosen geological topic.

Do give it some consideration and let Professor Foulger know at: -
<http://community.dur.ac.uk/g.r.foulger/>

Two Heritage Open Day events have been planned for 7th and 8th September 2017 in the evenings at Newcastle and Sunderland.

Please contact negsec@gmail.com to volunteer to help run, support, act as back-marker etc. on these events.

NEGS requires a representative to the **GEOLOGISTS ASSOCIATION**, this person needs to be a member of the Geologists Association who will report back from meetings. GA pays some expenses.
