CHARNIA

Newsletter of the

Geology Section

Of the Leicester Literary and Philosophical Society

September 2020

Contents

Cover picture: Tidying my desk drawers I came across the leaflet that I picked up at a lecture by Dr Mike Howe in November 2013 on laser scanning and 3D printing of fossils which prompted a revisit to the web site to explore again.

The specimen illustrated is *Coroniceras hyatti.*

From http://www.3d-fossils.ac.uk/fossilType.cfm?typSampleId=25000573. British Geological Survey © NERC.

Editor's Notes

A few more months have passed since the June edition of Charnia and not much has changed. At the time of writing we seem on the verge of tightening COVID restrictions again and many of us are now experts on the use of Zoom. Formal education is struggling to come to terms with social distancing whilst providing a good educational experience as well as the social elements of attending school, college or university. The less formal sector of clubs that entail delivering lectures is struggling to find venues that will accommodate them and so, although some have given up – at least for now, others are looking for imaginative ways to continue to serve and retain their memberships.

The Geological Section has teamed up with the Warwickshire Geological Conservation Group to share on-line lectures which will continue on Zoom for the foreseeable future. The current programme is included on page 18. You should have received e-mails from Gavin about offerings from the Yorkshire Geological Society and from the Geologists' Association both of which offer online lectures and in the GA's case other online experiences (see https://geologistsassociation.org.uk/festival/ for example).

This edition of Charnia has no reports of recent lectures or site visits for obvious reasons but there are three articles contributed by members. Two continue a thread from June with local walks which we are still able to do. I am experimenting adding maps where appropriate. I have not used Ordnance Survey 1:25000 or 1:50000 maps as they require a licence and the minimum fee per issue is about £50. So for this edition I have used OS open source maps which are free to use. These can be edited to add additional information as you can see in the examples used. However they do not include a lot of the familiar information of the standard maps. If you use these maps alongside a 1:25000 in your hand or on your phone I hope that all will be clear and that you don't get lost. It's a long time since I used GIS in anger but I have downloaded QGIS to have a play with and see where that leads. Any comments or suggestions for improvement are welcome to bdh2o@hotmail.co.uk. In the meantime, if you are moved to contribute an article and would like to include maps, don't be shy and we can work something out.

Thank you to Roger, Roy and Geoff for their contributions for this issue. The next edition of Charnia will be put together in early January 2021 so there are three months available for your reports, thoughts or ideas.

Don't forget that subscriptions are due on 1st October and you should have received the paperwork by e-mail or post from Gavin. It is now possible to pay by on-line banking as well as cheque and standing order.

GEOLOGICAL WALKS AROUND LEICESTERSHIRE

Charnwood volcanics – Warren Hills and the Bomb Rocks. (About 2 to 3 miles)

This walk starts off at the layby on Abbey Road which is just outside Whitwick on the Warren Hills Road between Whitwick and Copt Oak. The layby is quite narrow and is more like a scrape the side of the road when you can park your car. Enter by the stile at the end of the layby.

In front of you you'll see 3 knolls of rock (see 1).

Ignoring the North Knoll for the time being walk towards the middle and south knolls. These rocks represent the sedimentary ash layers laid down under water from the erupting volcanics of the Charnwood Forest in Precambrian times. They consist of volcaniclastic sandstones, sedimentary breccias (created as the layers slumped down the side of volcano carrying with them fragments of erupted material) and laminated siltstones. (See 2, 3, and 4).

These constitute sedimentary rocks overlying the Bradgate formation and were created when the volcanic activity calmed down from its earlier violent phase into a much less active phase. The rocks of the South Knoll are younger still than those of the Middle Knoll as the rocks dipped sharply to the west. There is some white volcaniclastic sandstones (see 5).

Away from the knoll along the wide cart road you reach the far end of the Warren Hills and looping back on yourself you can follow the path nearer the road which passes between ridges of slumped breccias of the Bradgate Formation. (See 6)

The path loops around and by keeping to the right at the low stone wall you make your way back to the broad pathway which leads down the slope towards the car park. There, on the right-hand side is the North Knoll. This is

the outlier of a much more violent phase of volcanic activity of the Charnwood Lodge Formation. These rocks are pyroclastic in origin and have a coarse-grained tuff (see 7). From this point it should be possible to cut across country using the footpaths towards the Bomb Rocks in the middle distance. In practice the access to the Bomb Rocks from this part of Warren Hills – the lane that leads up the side the farm – is blocked, and the footpath across the fields lead to stone walls that must be scrambled over with some difficulty.

So it's probably easier to return to the car and drive along Abbey Road in the direction of St Bernard Abbey and Shepshed until you reach the crossroads, when you turn left towards the Abbey and when you can immediately park in another informal layby by the stone wall on the left hand side. Leaving your car here you can return along Abbey Road (carefully, the traffic comes along the road very quickly) until you are just short of the crown of the ridge. On the left-hand side there is a gap in the stone wall and a kissing gate. Going through this immediately take the footpath uphill on the right to get to the outcrop of pyroclastic rock at the top. (See 8).

Walking along the tarmac path (originally an access to Charnwood Lodge ahead, but now blocked off from the main road) you reach a gravel track the right-hand side. You can walk down this track to the Bomb Rocks, but if you fancy a slightly longer walk with softer material underfoot you can carry on past Charnwood Lodge on your left hand side up towards the top of the hill. Just before you reach the gate, turn right and follow the footpath along the wall on your left-hand side. This meets with a wall ahead of you and passing through a gap in that wall take the right-hand path that runs alongside the wall. Ahead you will see the Bomb Rocks.

Strictly speaking these rocks do not contain volcanic bombs of either piecrust or cowpat variety. What they do have is large inclusions of rock blasted out of

the volcano into hot ash layers. (See 9 and 10 and 11).

The blocks are composed of andesite that may have come from a single source blown out of the volcanic and eruptive phase in the Whitwick area. The two areas of bomb rocks are separated by the gravel track. In the second area is worth a look (see 12).

Proceed down the gravel track to the bottom of the hill and take one of the numerous tracks across the rough land to the corner of the stone walls. Once at that corner proceed straight ahead across the tarmac path and the rock

strewn coarse grazing until you reach the diagonal path running back down the hill past the pyroclastic rocks on your left to reach the kissing gate and Abbey Road. Walk down the road back to where you parked the car.

Roger Latham

Approximate location of walk

“….. Time to Stand and Stare” (Davies) at Ketton Gorse

On reflection, for those of us of a certain age, memories of geological fieldwork are tinged with the rosy glow of how easy it was to do. Prior to any concept of ‘safety-at-work’, young legs, a hammer, a hand-lens, and a packed lunch were all that was required; no forms, no hard-hats, no high-viz (a comic?!). Covid-19 has made it even worse – fieldwork is essentially impossible.

I have recently been introduced to a point on the map where one can at least stand and stare – there is still no physical contact with ROCK – stand and stare at one of the wonders of East Midlands geology.

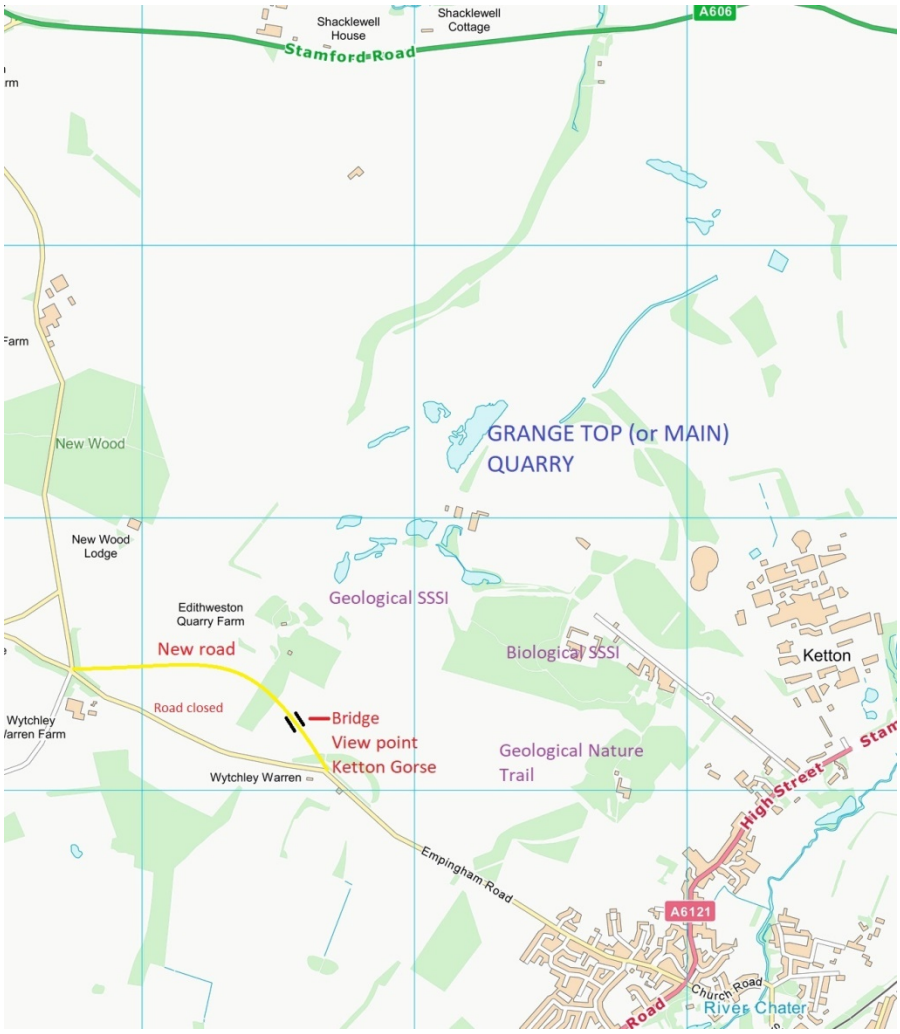

Figure 1 Locality map for Ketton Gorse, showing the new course of the Empingham Road (sketched), and the ‘viewing’ bridge.

This point is the parapet of a bridge on the recently constructed diversion of the Empingham Road at Ketton Gorse, out of the village of Ketton (Rutland; Grid Ref.: c.SK9655 0525 – see fig.1). Here we have views over new extensions to Hanson Cement's Ketton quarries (figs. 2 and 3), showing the two main components they use to make cement – limestone below (the marine Lincolnshire Limestone Formation) and silty mudstone above (the non-marine Rutland Formation (formerly the 'Upper Estuarine Series')). [Older and younger strata of the mid-Jurassic sequence can/could be seen elsewhere in the quarry complex – but not here (see fig. 4).] Viewing is good at the moment, but the upper, softer formation will rapidly deteriorate with weathering and the growth of vegetation.

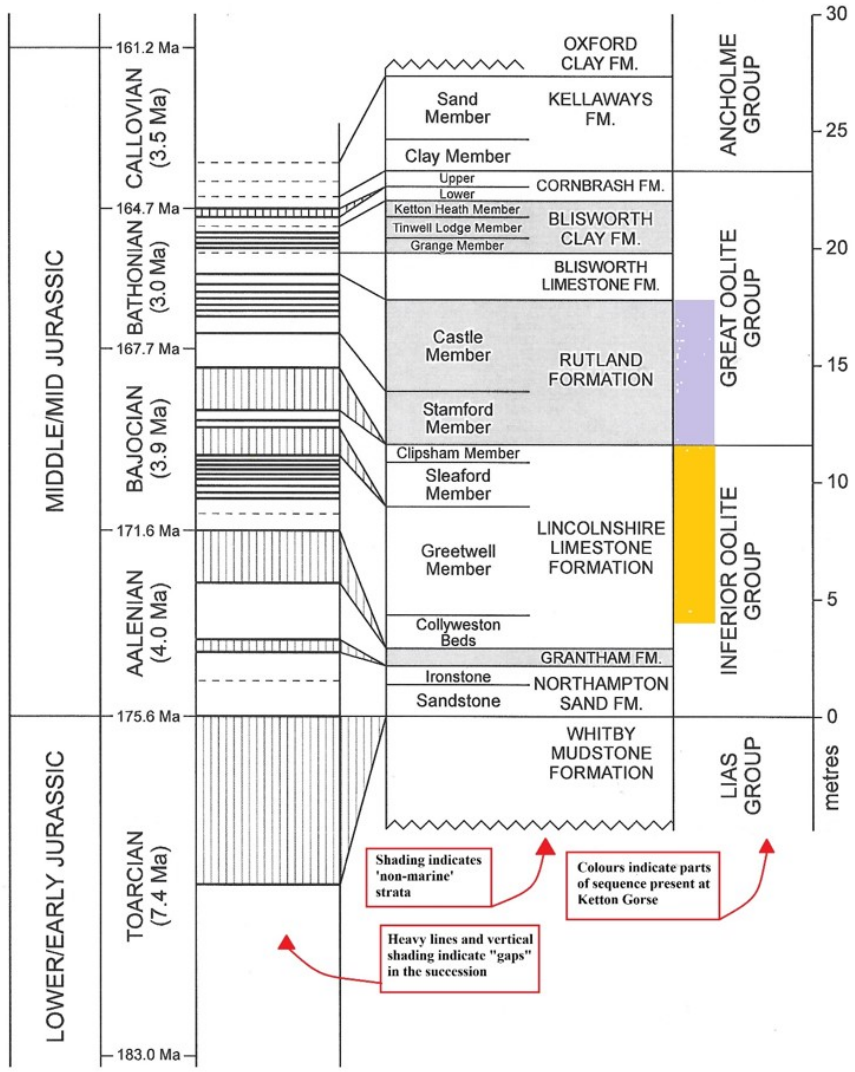

Figure 2 The sequence of mid Jurassic rocks seen in Ketton Quarries, and those at Ketton Gorse (colours) in particular.

Figure 3 Panorama from the new bridge at Ketton Gorse, showing the new workings; looking north-eastwards and towards the former workings.

Figure 4 Panorama from the new bridge at Ketton Gorse, showing the new workings; looking south-westwards – with rain-drops!

Fig. 5 shows a rough interpretation of the succession seen from the viewing point in terms of a simplified version of the section based on Hudson and Clements 2007 (which see for a more comprehensive/detailed account of the rock sequence at Ketton). The topmost metre or so of the Lincolnshire Limestone Formation is the characteristically brown-stained cross-bedded limestone of the Clipsham Member. Beneath this, some rather massive paler beds are the Sleaford Member, which yield the often pinkish, beautifully pure oolite used widely as a building stone – the Ketton Stone. The lower beds are the more variable beds of the Greetwell Member of the Lower Lincolnshire Limestone.

The Rutland Formation, on the upper level, is much more obviously varied (see fig, 5). The bottom four metres or so consists of cream-coloured, to pale mauve, to blue-grey silts and mudstones of the Stamford Member (previously known as the 'Lower Freshwater Sequence). Above this, the Castle Member (the 'Rhythmic Sequence' *auctt.*) consists of a more varied succession of six, named cyclic sequences (or "Rhythms") of fossiliferous, rootlet-bearing mudstones and silts, with minor limestones and coals. The top of the Clipsham Rhythm ("Rhythm two" *auctt.*) is a particularly prominent coal ('Black Bed'). In the lower third of the Wellingborough Rhythm ("Rhythm Four" *auctt,*) is a prominent oyster lumachelle (the 'Main Oyste Bed') which can be just made out.

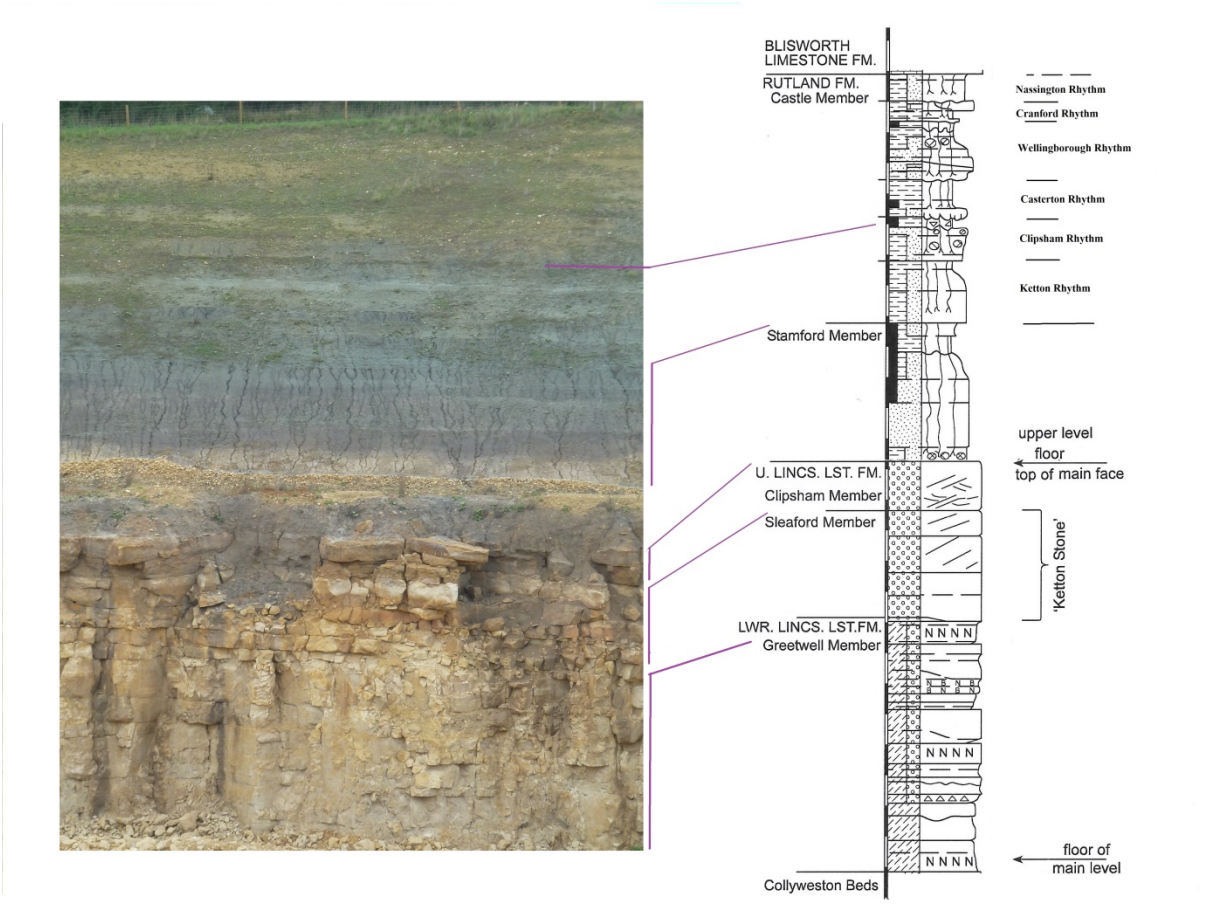

Figure 5 : Rough correlation of the standard Ketton sequence (modified from Hudson and Clements 2007 fig.4) with the newly exposed sequence at Ketton Gorse (NB scales do not match; photograph taken from bridge, looking north-eastwards

Del Strother (2014) has provided a useful, well-illustrated, and accessible account of the original Grange Top Quarry, of which these new cuts are an extension. His account is readily available on-line.

References:

Davies, W.H., 1911: *Leisure*. A.C. Fifield.

del Strother, Peter, 2014 (revised): *The geology of Hanson Cement's Grange Top Quarry at Ketton*. #geologistsassociation.org.uk#, 32pp.

Hudson, J.D., and Clements, R.G., 2007: The Middle Jurassic succession at Ketton, Rutland. *Proceedings of the Geologists' Association*, **118,** 239-264.

Roy G. Clements

6th September 2020

LIST OF FIGURES:

Three in One

The West Mine is the most extensive of the mines at Alderley Edge, Cheshire, that were worked primarily for ores of copper and lead, but also produced cobalt minerals and concentrates of other elements including vanadium (Warrington 2010, 2016).

At the far western end of one of three levels worked in that part of the West Mine is a small alcove, the purpose of which is open to conjecture. However, features representing three episodes in the history of this area, and the different processes that occurred at separate times during a period of 245 million years, are visible in this minor excavation (Fig. 1).

Fig. 1. West Mine Sandstone, West Mine, Alderley Edge. Early Mid-Triassic aeolian dune-bedding overprinted successively by liesegange and recent pick marks. Scale (matchbox) – 5 cms.

The host rock of the mineralization in this mine is the largely aeolian West Mine Sandstone Member of the Helsby Sandstone, the lowest formation in the Sherwood Sandstone Group (Warrington 2010; Thompson *et al*. 2016), The oldest feature seen in the alcove is fine dune-bedding, dipping steeply from right to left (Fig. 1). This is early Mid-Triassic (Anisian) in age and formed around 245 million years ago.

The traces of dune bedding are overprinted and partially obscured by irregular colour banding (*liesegange*) caused by precipitation of minerals during successive phases of fluid migration through the host rock during mineralization and diagenesis (Milodowski *et al*. 1999); this activity commenced in the later Triassic or early Jurassic.

The most recent phase of activity is represented by numerous clean pick marks on the walls of the alcove. The last significant period of mining at Alderley ended following a boiler explosion at the works near the entrance to the West Mine in 1877. The pick marks may date from just prior to that event or from when mining resumed briefly in 1914–1915, and again in 1918; activity was finally suspended in 1919 (Warrington 2016).

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References:

Milodowski, A.E., Strong, G.E. and 10 others. 1999. Diagenesis of the Permo-Triassic rocks. *In*: Plant, J.A. *et al*. (eds) *The Cheshire Basin: basin evolution, fluid movement and mineral resources in a Permo-Triassic rift setting*. Keyworth, Nottingham: British Geological Survey, 125-175.

Prag, A.J.N.W. (ed.). 2016. *The Story of Alderley – Living with The Edge*. Manchester: Manchester University Press, xxxii+984 pp.

Thompson, D.B., Warrington, G., Pollard, J.E. & Nudds, J.R. 2016. The solid geology of Alderley Edge. *In*: Prag, A.J.N.W. (ed.), *q.v*., 75-97.

Warrington, G. 2010. Alderley Edge district, Cheshire. *In*: Bevins, R.E. *et al. Mineralization of England and Wales*. Geological Conservation Review Series, **36**. Peterborough: Joint Nature Conservation Committee, 182-190.

Warrington, G. 2016. Mining in the Alderley district: the documented period. *In*: Prag, A.J.N.W. (ed.), *q.v*., 368-413.

Leicester Literary and Philosophical Society, Section C (Geology)
Winter Programme, 2020-2021

For the foreseeable future, all meetings will be held at 7.30 pm **online via Zoom**. Instructions for joining the online meetings will be circulated by email shortly before each event.

In green are meetings hosted by the Warwickshire Geological Conservation Group (WGCG) which we have been invited to attend.

2020

Wednesday September 30th
Dr Tom Wong Hearing (University of Gent, Belgium). **Understanding Earth's climate during the Cambrian radiation of animals.**

Wednesday October 14th WGCG
Marco Mafioni. **Plate tectonics** (title TBC)

Wednesday October 21st WGCG
HOGG speaker on **Buckland and 'geologists responding in times of crisis'**

Wednesday October 28th
Dr Jamie Farquharson (University of Miami, USA). ***Volcanica*.**

Wednesday November 18th WGCG
Richard Edmunds. **Geological history of the Jurassic Coast.**

Wednesday December 2nd
Dr Mark Ireland (Newcastle University). **GeoEnergy 2030 - Why characterising and reducing subsurface uncertainty is vital to future subsurface energy projects: a UK perspective**

Wednesday December 9th WGCG
Aerona Moore (Lapworth Museum, Birmingham) on the museum development and some of the gems of their collection.

Wednesday December 16th
Christmas Meeting social – online quiz

2021

(WGCG talks to be confirmed)

Wednesday January 13th
Dr Kirsty Wright (Heriot-Watt University). **Tsunamis! Past, present and future.**

Wednesday February 10th
Dr Zoe Mildon (University of Plymouth/University of Cambridge). **Chasing recent and historical earthquakes around the world.**

Wednesday March 10th.
TBC

Wednesday March 24th
Annual General Meeting and Chairman's Address

Monday April 12th
Joint meeting with the Parent Body (speaker TBC)

SECTION C COMMITTEE 2020 – 2021

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