WGCG

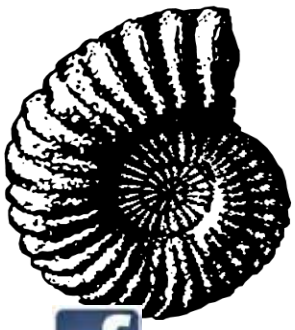
Conserving Warwickshire's Geological Heritage

Lapworth Church is built of Arden Sandstone. When weathered in a building it often appears pale grey and also often hosts a superficial red algal growth.

Photo credit: Stuart Burley

Newsletter

Autumn 2021 Issue Number 42



Warwickshire Geological Conservation Group

Hidden wonders in the landscape of Warwickshire

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Contents

Editor: Brian Ellis Designer: Norman Dutton

Meanwhile…..

…..two small groups of members – the Conservation Committee (CC) and the Education Committee (EC) – have been leading the way in maintaining the activities of the Group during the lean times of the Covid-19 pandemic. Much of this newsletter is devoted to bringing you up to date with the outcomes.

In the Spring 2021 Newsletter, we reported that WGCG was **monitoring five Warwickshire geology SSSIs** under a contract for Natural England (NE). Max Down, chair of the Conservation Committee, had the tricky task of coping with the NE requirements which constrained the completion of the monitoring, in winter and at short notice, by a small party of members. Formal reports were submitted, on time and on budget, to NE and the piece in this newsletter summarises the condition of the sites. The findings raise the question of the role of local groups in helping maintain SSSIs. The piece by Stuart Burley on the **Shrewley cutting** describes how WGCG is planning to conserve and interpret this SSSI. Stuart also led a small group to **Kingsbury Quarry** to examine changes to the SSSI resulting from an extension of the quarry. This too is reported in the newsletter. Stuart, a new member of the Conservation Committee, is a welcome addition to the small number of professional geologists in WGCG. Alongside these initiatives, Phil Henser has invited members to take part in the **routine monitoring** over the summer and autumn of 24 LGS. Phil still needs surveyors for 12 of these sites – contact ***philiphenser@gmail.com***

The Education Committee (Chair Mike Allen) had the daunting task of **maintaining a talks programme**, via Zoom, through the winter and spring. This did bring speakers from far and wide, and on a range of topics, but the evidence is that it attracted more 'visitors/friends' than members. The committee has revived fieldwork with a planned visit to **Blockley Quarry** (cancelled because of the weather) and a residential trip to **North Lincolnshire** (which did take place). Members were invited to join a visit to the **Lickey Hills**, led by Ray Pratt and there is an account of that in the newsletter. The newsletter also has the **provisional plans for the programme until December**. It raises issues on the nature of future meetings and now is an opportunity for you say what your preferences are. If you have any thoughts about this, please send them to Mike Allen by email – ***marocks@btinternet.com*** **.**

This year saw a WGCG initiative – the production of a **geological video** based on the Burton Dassett Hills. Ray Pratt and Norman Dutton have written an account of this. It draws attention to the value of working with individuals and organisations outside WGCG. This is also a welcome feature of all the activities reported in this newsletter.

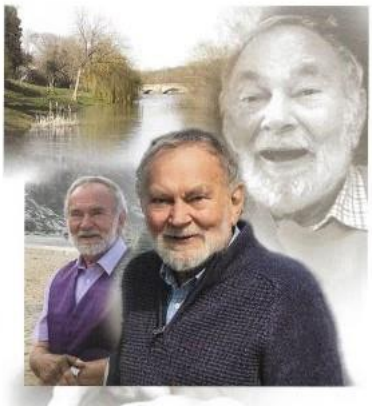
The importance of these external links lies at the heart of WGCG principal charitable activity – the **Holloway Bursaries and Awards**. This year is their tenth anniversary. Brian Ellis, who has co-ordinated this activity, has written account of the range of Awards and Bursaries given over those ten years and of the variety of individuals and bodies involved, meeting Rob's wishes in many different ways.

Three stalwart members of WGCG have died in recent months:

Fred Turner was a regular at meetings until health problems prevented him coming. He missed our activities, particularly field work. He got involved in helping organise residential trips, and some of you will remember the splendid accommodation he found for us in Malham: comfortable rooms, excellent food and young welcoming hosts - all in an atmospheric building reached by a York Stone bridge over the infant River Aire, running through the garden. Fred hailed from Norfolk, then had early career as a policeman in London and after retirement retrained as a solicitor, practising in Kent and then Norfolk, retiring again to live in Warwickshire.

Bill Shakespeare was a long-standing member and, until 2016, was the Membership Secretary. In that role he was a member of the Management Committee. He was a keen photographer and made some artistic records of field trips. Bill was also a great jazz enthusiast. He recently achieved fame as the first male (and second person) in England to receive the Covid-19 vaccine at University Hospital, Coventry. That led to him having a mention in *Have I Got News For You* which would have appealed to his sense of the absurd.

Mike Heath died in Myton Hospice on 26th August 2021 after the recurrence of an aggressive cancer. He was another true WGCG stalwart. We have lost a valuable member who generously brought his experience and skills to our activities. Most recently he had devoted a lot of time and thought to his work on developing the new-look website. We valued his IT and promotional skills. Even though he was becoming increasingly ill, he made positive and supportive contributions during the summer to the production of the first WGCG video. Mike regularly took part in fieldwork and was a great walking companion. There was always a tale or two to tell, usually with his dry sense of humour, and there would be a twist in the tail Mike was a true friend, always ready to listen and provide suggested solutions to problems. He was delighted a few weeks ago to receive an Honorary Membership of WGCG.



Fred

Bill

and Mike

WGCG Winter Lecture Programme: 2021
Mike Allen

In the period of recovery from Covid-19 restrictions, unfortunately, arrangements have to be provisional. The situation as of the end of August is as follows:

The **September meeting** will almost certainly have to be on the *ZOOM* platform.

September 15th *Jonathan Paul* *Subsurface Engineering & Water Resources of Greater London*

Then we hope meetings will resume as face to face in Kenilworth.

All meetings are on Wednesdays at 7.00pm for coffee before a 7.30 pm start. Venue: St Francis Church Hall, Warwick Road (Kenilworth main street), Kenilworth CV8 1HL (map page 38).

October 20th AGM *followed by a short talk on ten years of the Holloway Bequest*

Ian Fenwick and Brian Ellis

November 17th *Stuart Burley* *The Arden Sandstone*

December 8th ? Social Event……hopefully in person; possibly to include another quiz

Members might like to know and contribute to an ongoing debate about

- *having only face to face meetings as has been the norm*
- *continuing as a matter of principle with a mix of face to face and Zoom events, or,*
- *holding events in both formats if technological issue can be solved.*

*If you have any thoughts about this, please send them to Mike Allen by email - **marocks@btinternet.com***

When this is resolved the Spring programme will be circulated

The basic message is "watch out for future information"!

Ten years of Holloway Awards/Bursaries

Brian Ellis and Anne Morton

Just over ten years ago, WGCG member Rob Holloway died and left the group a substantial and generous bequest in his will. During his illness he discussed how he would like some of the money to be used, including fostering geological education and supporting young geologists early in their careers. (He also made clear that he did not want us to spend money on buying land – specifically quarries!) The Management Committee recognised that we had to develop some ways of meeting Rob's two specific wishes and thus the idea of the Holloway Awards and Bursaries was born. We also recognised that this was a charitable activity and that it was desirable to be formally set up as a Charity and made a successful application to the Charity Commission. This gave a formal legal framework for managing these activities which were new to the Group.

All that was time consuming and tedious, but necessary. Much more interesting and challenging was finding recipients for our charity. We were surprised that it turned out to be quite difficult to "give money away" in an organised and systematic way. It was clear we needed some partners. Our first ports of call were the geology departments at Birmingham and Leicester Universities.

After looking at several possibilities at Birmingham we settled on supporting undergraduate students doing mapping projects during summer vacations. This was competitive and awards are made to the 4 – 6 students who perform best in the preparatory course. The number varies according to size of that year group. The money is most often used for travel, accommodation or basics like boots/waterproofs or on one occasion snake serum. The success of this approach led to similar schemes with Camborne School of Mines [CSM](Exeter University) and Derby University.

Presentation to Tom Barrett, the first recipient of a Holloway Award. Tom is now Dr Tom Barrett and Visiting Fellow at the Open University

Leicester University followed a different path. They offer both undergraduate and post-graduate students the opportunity to take part in outreach activities, which are not part of their course. The students submit ideas for activities to the department and we agree with the department how the budget of £3000 is shared amongst the viable projects, which normally involve a group of students. These have included work in schools and a touring exhibition.

Leicester University students with their display at Scarborough Museum

Photo credit: Leicester students)

Students from all universities have written accounts of their activities in WGCG Newsletters, come and given talks or put on displays at AGMs and in some case have gone on to have academic careers in universities.

At the same time Barry Dale was exploring the possibility of supporting students gaining practical experience on work placements. He used his contacts (his 'mates' he called them) within the 'geology industry'. This was a promising development during 2014 and 2015 when we had six students placed with British Gypsum, Sibelco and BGS, in the latter case as parts of Masters degrees. Unfortunately changes in staff (the 'mates' moved on) and financial constraints led to these opportunities ending. An attempt to set up links through members of EIG – the Extractive Industries Conference Ltd – ran into the ground. Four other organisations Barry contacted did not reply. Not all our attempts to find partners paid off. Barry's prolonged illness and then death has robbed us of a good friend and an experienced and committed member.

We have made several attempts to offer support to the few Warwickshire/West Midlands secondary schools who teach geology but with no success (or even response). The exception has been the donation of teaching kits of rocks, fossils and minerals to secondary schools in Warwickshire and further afield, sourced from Rob Holloway's collections. However, we have been able to support Professional Development (INSET) work for teachers in two ways:

Funding bursaries for science and geography teachers attending a residential Summer School on teaching geology hosted at Keele University; and day schools run by the Earth Science Teachers Association (ESTA) for trainee teachers, usually at their training institutions.

Summer School teachers on fieldwork

Photo credit: Professor Chris King)

However there has been more success with local Primary schools. We have subsidised transport costs for the Primary School fieldwork at Burton Dassett Country Park organised by the Outreach group for 5 years. We also subsidised transport for a visit for one school to Lapworth Museum, but further visits have fallen foul of Covid-19.

The children are measuring the dimensions of the old quarry. They then use these measurements to calculate how much rock was removed.

Photo credit: Frances Morley

All of the above involve medium-term commitments, mostly resulting from initiatives by WGCG seeking out partners. They provide continuity of support to the recipients usually for 3 years, subject to renewal. A more varied type of bursary are 'one-offs. These are normally single awards for a specific purpose, usually to individuals but sometimes made to institutions. Most of these are either unsolicited applications or result from suggestions from WGCG members reacting to 'good causes' they have come across.

Examples of such awards include:

- bursaries to students taking post-graduate degrees
- bursaries to postgraduate students at BGS and CSM for attending conferences or specialist laboratories
- contribution to Warwickshire Wildlife Trust's budget for building the geology wall at Brandon Marsh

The geology wall at Warwickshire Wildlife Trust's reserve at Brandon Marsh

- contribution to CSM hosting the Cornwall Schools Mining Games

Serious work at the Cornwall Schools Mining Games

Photo credit: Max Willcock

- contribution to the costs of renovating Lapworth Museum
- purchase of artwork for the new geology displays at Warwickshire Museum

Part of the geology display at Warwickshire Museum

- contribution to the purchase of equipment by two independent researchers (see Newsletter Autumn 2020)
- contributions to appeals for the Etches Collection (Newsletter Autumn 2020) and the purchase of the Lyell notebooks by Edinburgh University (see Newsletter Autumn 2020).

Two students who received bursaries to support them during their Masters degrees were young WGCG members:

- **Jenny Clayton (now Taylor)** took a Masters degree in micro-palaeontology at Birmingham University and gave us a talk about it. She went on to take a job with a geology consultancy in Wales. When the bottom dropped out of geological exploration in which micro-palaeontology is vital, Jenny retrained as a teacher and was last known to be working in a Primary School. Jenny was an enthusiastic member of the Outreach Group and was particularly involved in developing children's' activities.

Jenny overseeing the excavation at an Outreach event at Combe Abbey Country Park

- **George Guice,** who lived in Wellesbourne, was a member while still at Kineton High School.

George Guice

Photo credit: Smithsonian Museum website

He got his BSc at Keele (2014), his MSc at Camborne School of Mines (Exeter University) (2015) and a PhD at Cardiff (2019). He visited us to give an enthusiastic talk on his travels in the search of geology. He is now a Post-Doctoral Scholar at the Smithsonian Museum of Natural History in Washington, USA.

George examining an outcrop of mantle rocks at Baltimore USA, a discovery which made the front page of the Baltimore Sun

Photo credit: George Guice collection

Rob Holloway would have been particularly pleased with these two awards.

Ten years on is a good time to review how well we have lived up to Rob Holloway's wishes. The above account records the range of activities we have supported. We have not tried to count the number of individuals who have benefited. It is remarkable how many different ways WGCG has been able to support geological education and young geologists. Virtually all requests for Awards/Bursaries are less that £2000 (and many much less). The largest individual award was £10,000 towards the renovation of the Lapworth Museum. In the period 2011 -2020 the total expenditure on Awards/Bursaries has been in the order of £65,000. One element of the Holloway Bursaries success has been its ability to respond *flexibly and quickly* to charitable opportunities as they arise. At the AGMs of 2014 and 2015, members raised the question of whether WGCG was spending enough on Awards. One response to these questions was to increase the scope of and expenditure on the Bursaries and Awards.

It would be good to hear members' views on how WGCG should proceed in the next ten years.

Postscript – Who was Rob Holloway?

It is a pity we only have photos of Rob dating from the 1970s. We would be please if anyone could let us have a later photo, perhaps from the Watchet field trip.

Rob spent most of his career teaching at Court Farm Primary School in Erdington, north Birmingham. He was committed to coaching the junior football team which led to him being much loved and appreciated by many of the youngsters. After he retired, Rob dived headlong into his great interest – geology. This had been spawned when he carried out fieldwork for an undergraduate dissertation on the Shepton Mallett area of Somerset. Much of this focussed on the local geomorphology and it was via this route that he developed an interest in the solid rocks. His many trips led to him accumulating a very large, good quality geological collection which WGCG inherited.

In 2008 Rob 'found' WGCG and threw himself into events and activities. Rob was a very quiet, unassuming man but one who was always willing to pitch in when help was called for. Most notably, during our first monitoring project of our Local Geological Sites (RIGS), Rob visited several of the very important exposures in the far north of the county (he lived in Tamworth, Staffs). That was in February of 2009 and in the May of that year he joined the weekend trip to Watchet, Somerset – memorably turning up in his camper van. In both of these activities he was able to bring together his interest in geology and his passion for photography, most notably in black and white. Too soon illness curtailed Rob's active participation and he died in June 2010.

Rob's commitment to education and his enthusiasm for geology are both reflected in his wishes for the use of the generous bequest he made to WGCG.

Warwickshire Geological Sites of Special Scientific Interest (SSSIs): the 2021 Survey

During the early part of 2021 some members of WGCG monitored five geology SSSIs with a contract from Natural England (NE). The geology of these sites, which led to their designation, is described in the Spring 2021 Newsletter (pp 18 - 21). This article summarises our findings about the current condition of those sites selected by NE.

Griff Hill Quarry (SP 361881) **Surveyed by Mike Allen and Ray Pratt**

The quarry is no longer operating but is used for landfill, especially beyond the SSSI limits. This has led to the unfortunate loss of several exposures that previously informed the Lower Palaeozoic geology across the wider site in more detail.

Within the SSSI itself there had also been a build-up of slumped sediment and water which has left the main quarry face in the Caledonian diorite sill unapproachable.

The main sill

Photo credit: Mile Allen

The worst of the flooding is being controlled by pumping. Even so, it is likely that the basal contact of the sill is not presently exposed. The upper contact and unconformable Coal Measure cover are visible at the top of the quarry face but can only be seen at close hand by looking obliquely along the top of the main face.

The trace of a coal horizon is approachable on the graded slope above the quarry face close to the south-western limit of the SSSI.

The unconformity with the Coal Measures on the far face

Photo credit: Mike Allen

Vegetation cover isn't a serious obstruction to general visibility, but growth, particularly where the quarry faces have begun to collapse, can only get worse if left unchecked. It will be desirable to revisit the site under drier conditions to better assess what detail can still be seen of the sill itself, and whether the lower contact can feasibly be revealed without too much excavation. The current leaseholders were most cooperative and may be willing to assist with such remedial work.

Napton Hill Quarry (SP 457661) **Surveyed by Ian Fenwick, Deborah Parke and Paul Abernethy**

Napton Hill Quarry, to the east of Southam, is cut into the face of the Napton outlier, a small hill of mudstones capped by our old friend, the Marlstone Rock Formation. The mudstones of the Dyrham Formation were quarried during the 19th and early 20th centuries by the Napton Brick and Tile Company and their distinctive tiles with the windmill motif can still be encountered in the quarries.

A Napton Tile

Photo credit: Ian Fenwick

When the quarry was closed, an L-shaped face, some c.200 x 100m long, remained. The geological interest of the quarry lies in a rich ammonite assemblage which enables the Lower Jurassic sequence to be stratigraphically fixed with great precision. A bed of large sandstone boulders or doggers, occurs in the Dyrham Formation, some of which have been moved to an area below the quarry where they form an accessible Local Geological Site.

Unfortunately, the mudstones are inherently unstable so that, over the past 30 years, the quarry faces have degenerated through slippage. Colonisation by grasses and then by shrubs and now trees has also taken its toll. Sadly, little of the geology can now be seen although it would be quite possible to hand-clear small sections should that be desired.

Talus and scrub concealing the SSSI feature of interest

Photo credit: Deborah Parke

Napton would be a prime candidate for a WGCG work party as the continued growth of shrubs threatens the viability of this important site.

Cross Hands Quarry (SP 268290) **Surveyed by John Crossling and Peter Hawksworth**

The quarry had originally been used as a source of aggregate and roofing slate for the local Cotswold buildings. Extraction has long since ceased. Over the last 30 years much of the centre of the quarry has been infilled with inert waste and grassed over. A track, which is rather steep and becomes rather overgrown in summer, has been kept down to the exposed and preserved face.

The exposure reveals the contact of the Clypeus Grit and the Hook Norton Limestone. The conserved face is a SSSI and has been designated as such since the early 1980s as the most northerly exposure of these strata. The face has been fenced off with a metal gate providing access, but a key is required.

The Clypeus Grit and Hook Norton Limestone exposure

Photo credit: Brian Ellis

There is another exposure close to the preserved face which is just as good and is not fenced off. The SSSI face shows signs of some degradation due to deep jointing, allowing water and frost penetration. Some parts of the face look somewhat unstable and extreme caution should be taken if approaching closely.

Spoil heaps, associated with a short-lived industry of using crushed limestone to make cement blocks, have been regularly turned over to provide a ready supply of small fossils, catering for the regular school visits and trips organised by the museum.

Just inside the site, near the main road, there is an interpretation panel which is in good condition. It is attached to the wall of a small building.

Photo credit: Peter Hawksworth

The site is owned by the Newman family who have been strong supporters of the conservation requirements of the site.

Wolston Gravel Pit (SP 411746)) **Surveyed by Max Down, Brian Ellis and Ian Fenwick**

The pit was exploited for Wolstonian sands and gravels. It has been landfilled with domestic waste except for a conserved face of Baginton Sands. Post reclamation the site has reverted to farmland and is now pasture which is grazed . This inhibits the growth of scrub.

The conserved face within the reclaimed farmland

Photo credit: Larry Wooding

The site is fenced and is accessible by a public footpath. The state of the site owes much to the co-operation of the farmer. Larry Wooding gave valuable help with his long-term, local knowledge and photographic archive.

The site is in good condition based on the implementation of the recommendations of the survey of 1991. All the scrub has been cleared and the unstable face of Baginton Sands has been conserved by a ramp of clay which is showing evidence of slumping but not sufficient to expose the Wolstonian sediments. The protective cover limits the long-term usefulness of the site for observing these deposits in situ.

The only risks to the conserved face are: (i) penetration by roots from the trees growing on the bench at the top of the outcrop and (ii) flooding in the lowest part of the site. Observation over a long period of time shows the depth of water is very variable. At higher water levels, the base of the protective fill will be saturated, probably affecting the slumping noted.

Threats from slumping and flooding

Photo credit: Larry Wooding

Ryton and Brandon Gravel Pits **Surveyed by Brian Ellis and Ian Fenwick**

This SSSI consists of three units (parcels):

(i) Brandon Reach (SP384762)

This is an 'excavation reserve' of Baginton Sands conserved as an unexposed example of those sands. Most of the SSSI is on land leased by the Warwickshire Wildlife Trust (WWT) as part of their Brandon Reach reserve. It is within a fenced parcel of pasture, which is maintained by grazing.

The slope to the right of the fence is the excavation reserve

Photo credit: Brian Ellis

Under the care of the WWT, the SSSI should remain undisturbed as currently there is no public access to this part of the reserve.

(ii) Ryton (SP 377749)

This is a disused Baginton Sands quarry. This is part of land leased from Tarmac for farming and rifle shooting. The quarry is currently unused.

(iii) Brandon (SP 386761)

This is a disused Baginton Sands quarry, adjacent to the entrance to WWT headquarters at Brandon Marsh. It is owned by Tarmac and is unused.

The approach to both Ryton and Brandon quarries is heavily overgrown by trees and scrub making them difficult to access. The Ryton quarry face can only be seen from a distance and part of the quarry immediately below the face is flooded.

The grass covered old quarry face is just visible in the distance and the algae-covered pond is in the middle distance.

Photo credit: Brian Ellis

Access to the quarry floor at Brandon can only be achieved by climbing (sliding) down the outcrop face (not attempted!). Both quarry faces are subject to slumping and, as far as could be seen, none of the underlying geology is exposed. There is evidence at Brandon that the sands are being disturbed by animals. At neither of these sites can the features for which they are designated SSSIs be seen. When members of WGCG visited both these sites in 2007, it was possible to access both quarry faces and expose the geological features.

Some afterthoughts:

- Only at Cross Hands quarry are the geological features which justify the designation as SSSIs readily exposed and visible. At others they are concealed for conservation purposes (Brandon Reach and Wolston) or by slumping and/or talus development (Napton, Brandon and Ryton). Exposure and accessibility at Griff varies, dependent on the current state of reclamation activities.
- Only Wolston is easily accessible with a public footpath running through it. All other sites require permissions to enter. There are particular safety risks at Griff because of active reclamation works.
- The abandoned sand quarries at Brandon and Ryton are physically difficult to access because of dense tree and scrub growth. There are additional safety issues due to the instability of the quarry faces.
- Only one example of fly tipping was observed probably due to these access problems
- Once identified, all the owners or lessees have been cooperative and interested in the significance of the sites and in any future developments
- The issues related to limited exposure of the geological features on the one hand and problems of access on the other may have positive broader conservation gains:
    - the geological features are being safeguarded and protected
    - the sites have considerable wildlife value
    - but these gains are at the expense of the potential educational value of the sites
- The surveys were undertaken after 30 years or so of little or no attention being paid to the sites. This may reflect both budget and staff cuts made to Natural England and the decline in the significance given by DEFRA and national policy to geodiversity and geoconservation in contrast to that given to biodiversity
- This raises the issue of the appropriate role for local groups, like WGCG, in the maintenance of geology SSSIs in their locality.

The Shrewley Cutting SSSI and the Arden Sandstone

Stuart Burley

The Arden Sandstone Formation gets its name from the Forest of Arden in Warwickshire, so it's a truly local geological deposit, and the type locality for the formation is the cutting on the Grand Union canal immediately west of the Shrewley tunnel. It is a beautiful setting on the canal (as you can see from Figure 1) but is somewhat in an overgrown condition. It is thus very timely and appropriate that WGCG has started planning to clear a section of the SSSI to expose a representative section of the Arden Sandstone Formation.

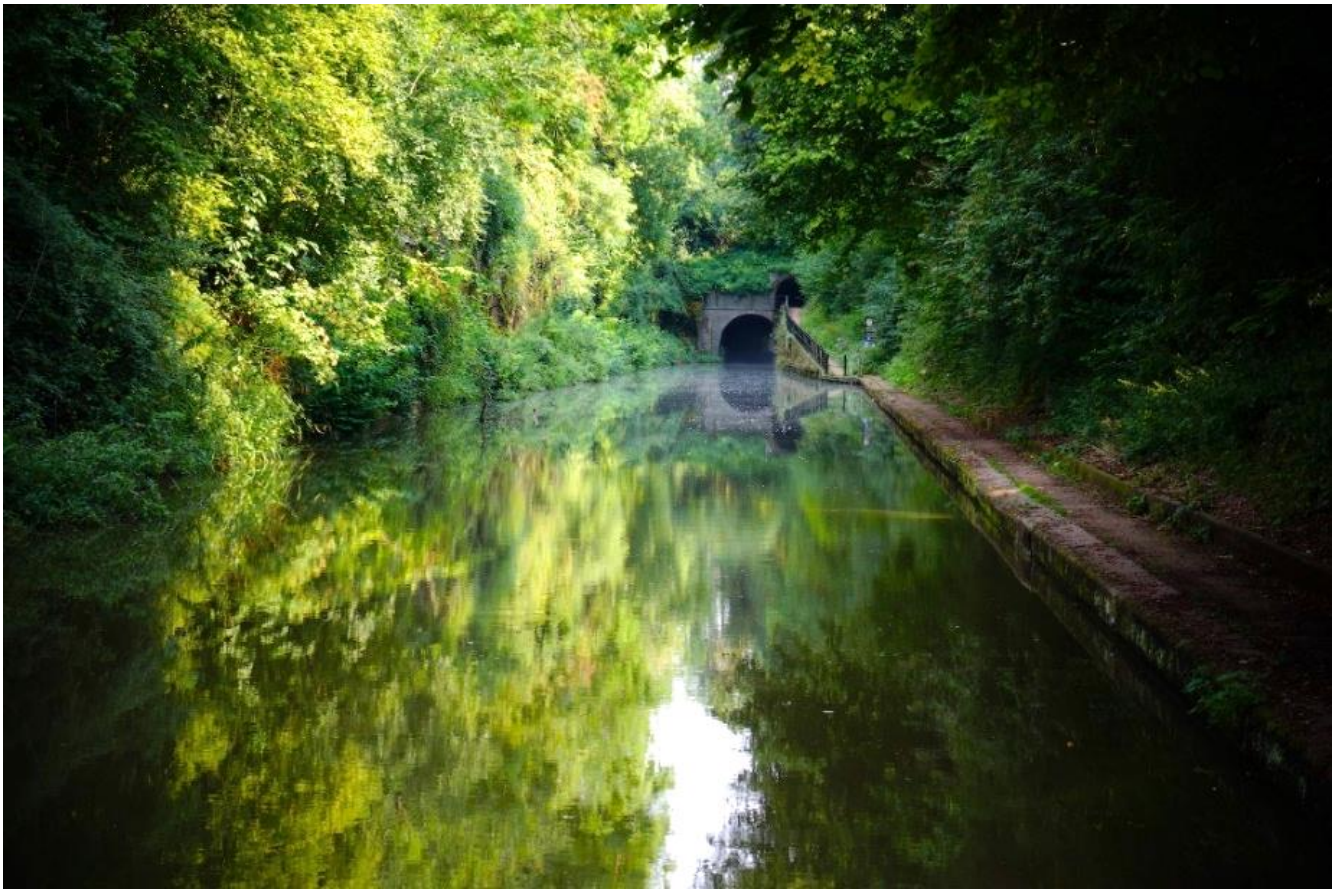


Figure 1. The Grand Union Canal looking towards the Shrewley tunnel entrance from the west. The SSSI includes both banks of the canal over an area of 1 hectare. Map grid reference of the entrance to the tow path tunnel SP 21413 67317.

The site is owned and managed by the Canal and River Trust with the canal cuttings either side of the canal from the tunnel portal to the Tythe barn bridge being designated as a Site of Special Scientific Interest (SSSI). With SSSI status, the trust requires assent from Natural England to carry out any activities within this section. This is to ensure that the site's special features are both protected from damage and receive positive management. Any clearance work has to be undertaken outside of the bird nesting season, and any special aspects of the habitat must remain undisturbed.

We are required to follow a process which first involves preparing a proposed work plan with the Trust and Natural England, which will be signed-off following assent for all activities included within the plan. WGCG always prefers to work in partnership with all parties that have a vested interest, and Max Down as Chairman of the Conservation Committee has already contacted Shrewley Parish Council for their guidance and assistance in addition to our joint work with NE and the Trust. Jon Radley is co-ordinating our efforts with Warwickshire Council.

The current status of our preparations is that WGCG is in discussion with both NE and with Paul Wilkinson, a senior ecologist of the Trust, to define the section of the SSSI which it is safe and practical to renovate, and we have had one site visit with their ecologist, Shaun Pope, to identify aspects of the fauna and flora which will require careful conservation. We are now working with the Trust and Natural England to write the conservation plan. We hope to be able to undertake the clearance work this coming autumn or winter, utilising the Trust's Green Recovery Fund, which will see the site bought back into favourable condition on both sides of the cutting. WGCG volunteers will be needed to help undertake with the clearance work!

The Shrewley Grand Union canal cutting SSSI is not only the national type locality for the Arden Sandstone, but this has taken on new geological significance nationally and internationally as it is now recognised as the level in the Triassic which records an important inflection point in reptile evolution, and potentially the evolution of other fossil groups. This change was instigated by a sudden increase in rain and riverine deposition during the latest Triassic deserts. The same event has been recorded from many places around the world, but the type locality has not been fully documented let alone described. The Reverend Peter Brodie (Figure 2) discovered fossil fish and reptile remains from the Shrewley Grand Union canal cutting in the 1850's (which are on display in Warwick Museum: see figures 3-4) at the stratigraphic horizon in which the evolutionary changes began. Preserving the Shrewley Grand Union canal section is thus important for further research and teaching, as well as bringing this locality to wider public awareness.

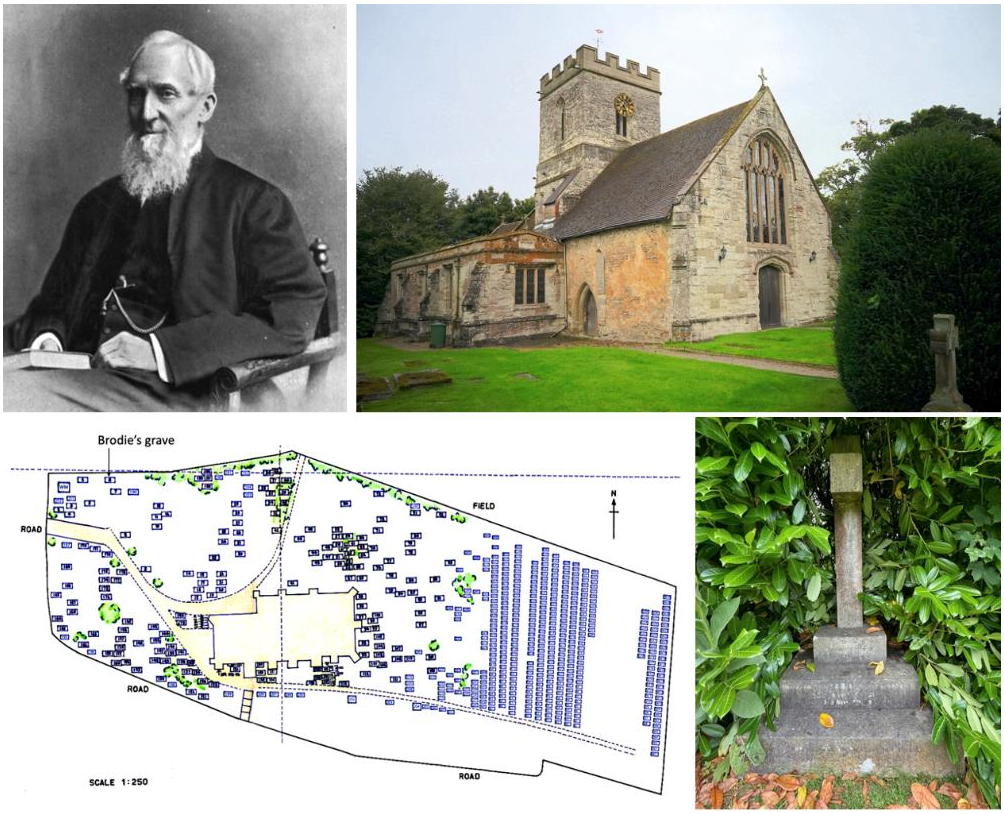


Figure 2. *Top left: The Rev. Peter Brodie, MA, FGS, 1815-1897. Top right: St Laurence church, Rowington, picture taken from where Brodie is buried. The church is a fine example of early 12th Century architecture and is constructed mostly of Arden Sandstone. The first written record of the church is contained in a deed of 1157 whilst the nave north wall is Norman. In the 1280s a new west wall was constructed and the building widened southwards. The red sandstone on the top course of the chancel stonework came from Kenilworth Priory. Brodie is buried at the front of the church. Bottom left: St Laurence graveyard map. The resting place of Brodie appropriately stands on the crest of the Arden Sandstone outcrop, on the boundary with his vicarage. Bottom right: The gravestone of Brodie, now partially obscured by the Laurel hedge.*

The Arden Sandstone Formation is typically 5 to 7m in thickness. It is mostly fine grained, cross-bedded and contains a fauna which includes clam shrimps, crustaceans and bivalves, in addition to the fish and reptile remains recorded by Brodie. The base of the sequence overlies red mudstones of the Sidmouth Formation (Lower Mercia Mudstone Group) and begins with thinly bedded, rippled, highly dolomitic siltstone and very fine-grained sandstones interbedded with green mudstones full of worm burrows. This is overlain by 2-3m of fine to medium grained sandstone which is prized for its building stone qualities. Many of the churches in the Forest of Arden (Lapworth, Rowington, Wootton Wawen, and others) and old stately homes (such as Baddesley Clinton) are built of Arden Sandstone. The quarries for the building stone were always located in the upper part of the Arden Sandstone Formation. The lower thin-bedded section of the Arden Sandstone Formation records a saline lake margin – these lakes were widely developed in the Mercia Mudstone Group as indicated by the gypsum and halite deposits in the section. The upper sandy part of the Arden Sandstone Formation records the influx of fresh river waters into the lake, probably as flash floods which carried the sandy detritus and enabled the fauna to temporarily thrive.

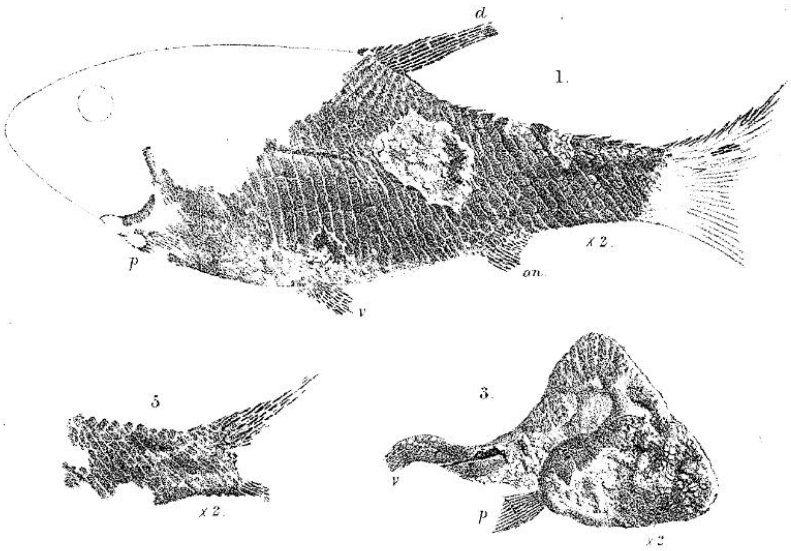


Figure 3. *Line drawings of Triassic fossil fishes collected by the Reverend Peter Brodie from the Grand Union canal cutting in Shrewley.*

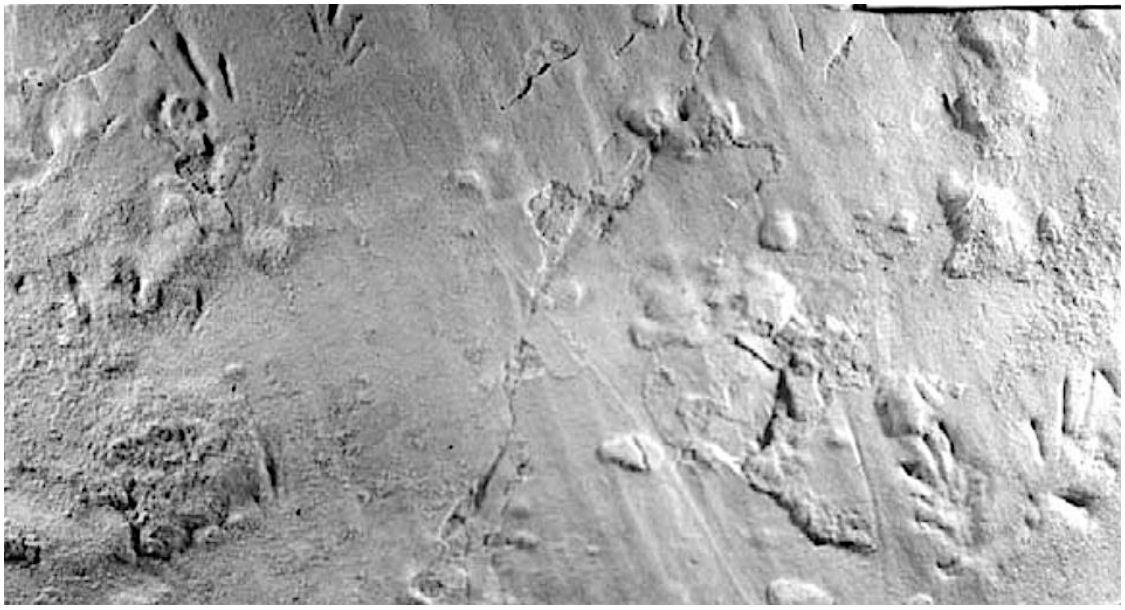


Figure 4. *Footprint tracks of a reptile preserved on a bedding plane of the Arden Sandstone from Shrewley*

The exact provenance of the fossils collected by Brodie is not known, but detailed description of the Shrewley exposure may help better define which part of the Arden Sandstone the specimens most probably came from. This in turn will help reconstruct the environment of deposition of the Arden Sandstone and further our understanding of late Triassic palaeogeography and evolution.

Figure 5. *The current condition of the Arden Sandstone Formation exposed on the south face of the Grand Union canal cutting. This is the upper part of the sandstone, which is sought as a building stone. Note the top of the thinly bedded sandstones in the bottom part of the cliff section.*

Although we do not have a detailed conservation work plan agreed yet, the intent will be to clear a short length of either the north or south bank to reveal as much of the vertical rock succession as is possible and is safe. This is likely to be a few tens of metres in length. There are clearly some safety aspects to be addressed as the section faces are steep (Figure 5) and directly adjacent to the canal, and NE will have to approve. We intend to supplement the conserved site with an information panel, that will present information on the story of the canal cutting as well as aspects of the important geological features of the Arden Sandstone.

Saving the Geological SSSI at Kingsbury Brickworks, Whately

Stuart Burley

The SSSI at Kingsbury brickworks quarry exposes the Upper Carboniferous (Westphalian D) Etruria and Halesowen formations. It was originally notified in March 1996 as a Regionally Important Geological Site (RIGS) and is also WGCG LGS 5 (Grid reference: SP 22047 98893). The quarry is reached via an access road leading from Rush Lane which goes east from the A51 towards the village of Whateley. Kingsbury brickworks quarry is now operated by Wienerberger and actively used in the making of a specialist, high quality 'blue brick' renowned for its refractory properties. Wienerberger have planning permission from Warwickshire Council to extend the current quarrying activities further east, which will result in the existing SSSI being excavated. They have proactively and generously provided a replacement SSSI to be located at the northern boundary of the new quarry site (Figure 1) and kindly recently facilitated a visit to the quarry to examine the current deep workings, existing SSSI site and proposed new SSSI site.

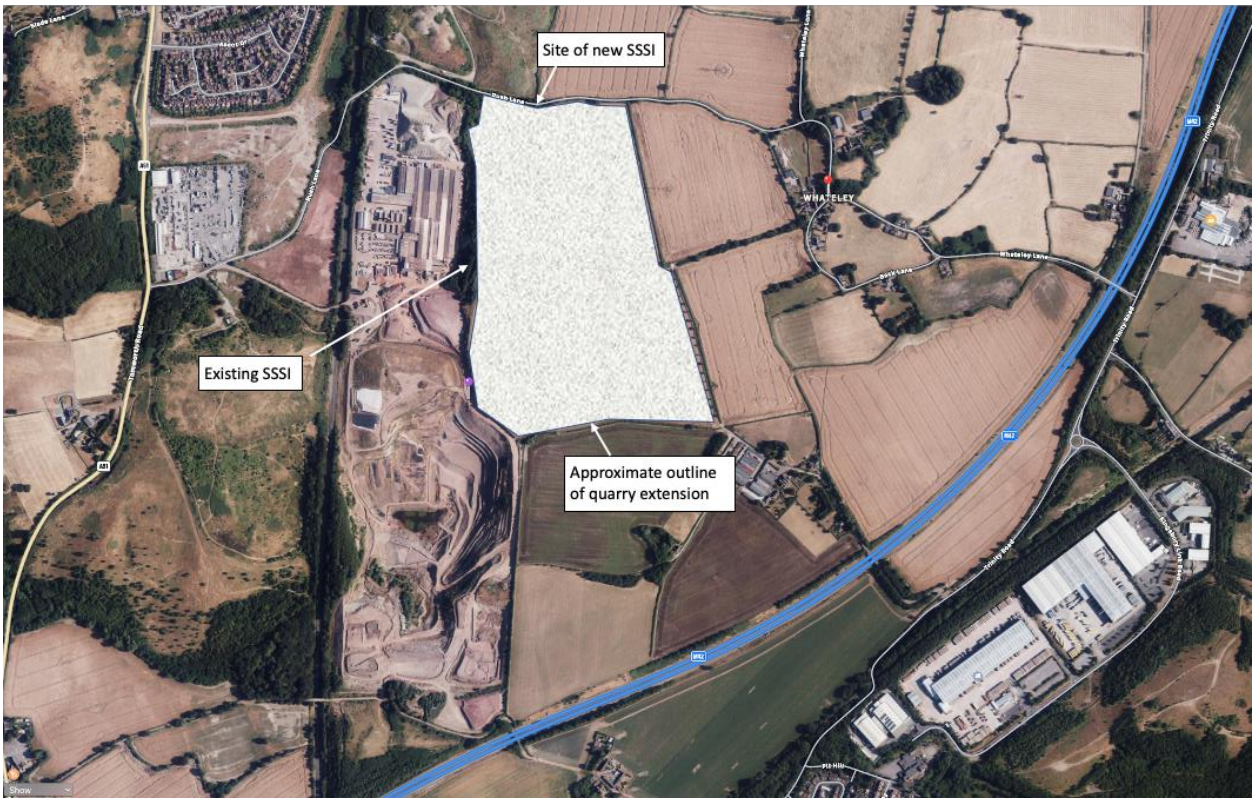


Figure 1. *Google Earth view is the Kingsbury Brickworks and quarry immediately north of the M42, west of Whateley. The approximate area of the new quarry is shown in stippled white and the location of the existing SSSI and new SSSI are indicated.*

The SSSI is important because it is one of the few exposures of this late Carboniferous sequence in Warwickshire, revealing the sedimentology of the upper part of the Warwickshire Coalfield and the stratigraphy of the Warwickshire Group (see Figure 2). The Etruria and Halesowen formations were deposited between 316 to 306 million years ago and lie above the productive 'Pennine Coal Measures'. They are sometimes referred to as the 'Barren Red Measures', because of the characteristic colour of the rocks and the general lack of coal within them. They record the deposits of very poorly drained, swampy mud plain soils and river channels derived from the London-Brabant upland area to the south.

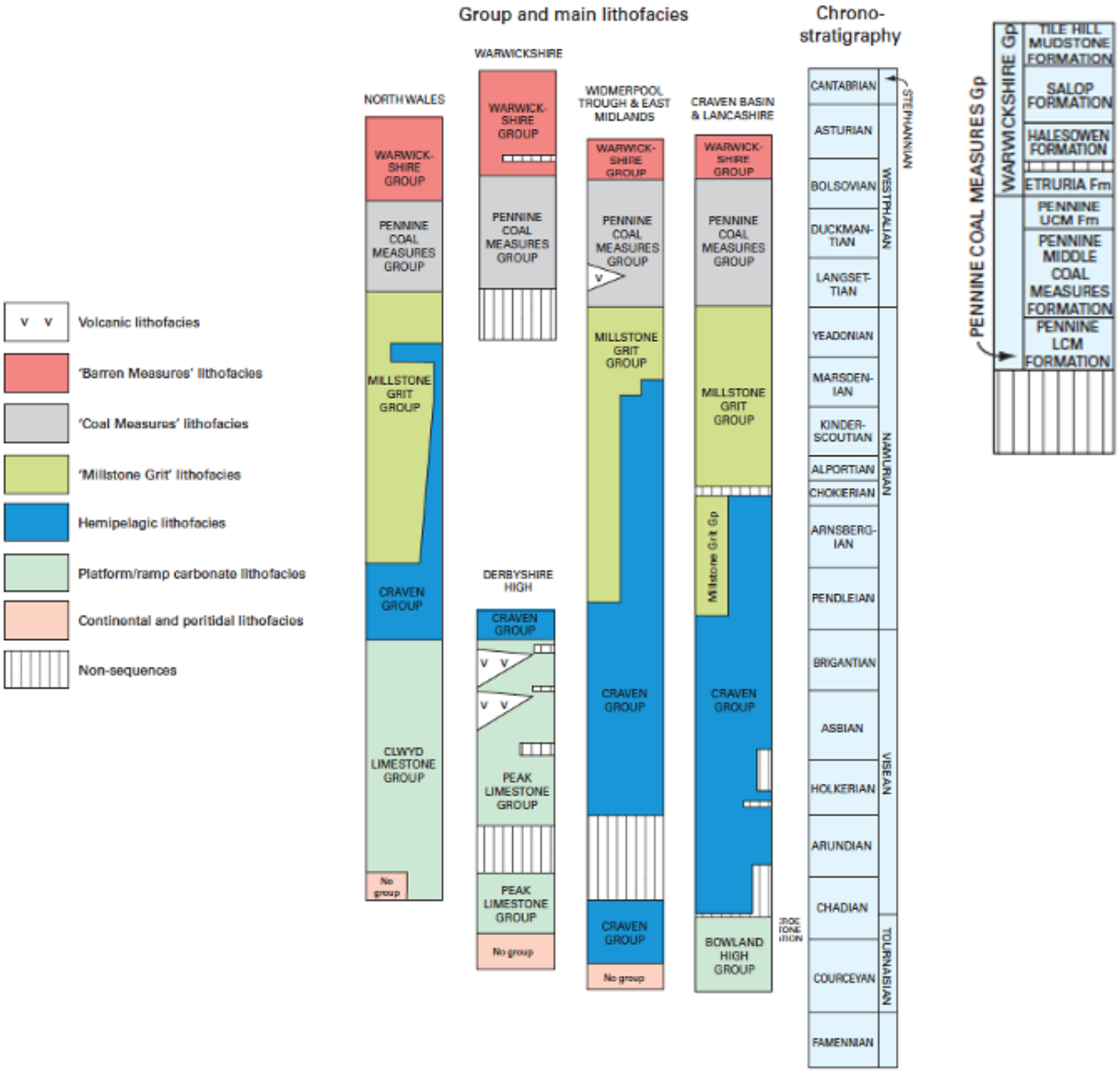


Figure 2. *Stratigraphical context of the Etruria and Halesowen formations and their relationship to UK Carboniferous stratigraphy.*

The Halesowen Formation is dominated by the presence of a coarse-grained, cross-bedded fluvial channel sandstone which represents sediment transport in multi-story, low sinuosity rivers channels to form river terrace deposits, with fine silt and clay from overbank floods forming floodplain alluvium. The sandstone also contains abundant coal fragments as rip-up clasts and lag deposits. This contrasts with the coeval Newcastle Formation found further north in Staffordshire which records higher sinuosity fluvial deposition and contains a much greater proportion of mudstone in the sequence. The strata at Kingsbury therefore provide a valuable insight into the paleogeography of Britain during late Westphalian times.

The most important part of the SSSI is the unconformity at the base of the Halesowen Sandstone where it lies on the Etruria Formation. This unconformity marks a significant tectonic event associated with Variscan (end Carboniferous) movements which remain poorly understood and are the subject of continued research in the British Geological Survey and several Midlands universities. The Etruria Formation comprises highly variegated red through purple to brown and greenish-grey mudstones (Figure 3).

Figure 3. *Left: Variegated soils of the Etruria Formation. Right: Angular to sub-rounded green coloured Merevale clasts in the debris flow deposits of the upper Etruria Formation.*

These are Westphalian subaerial soil deposits containing siderite nodules and the variegated colours form around fossil root structures resulting from chemical reduction around the organic matter that was present in the roots. The upper part of the Etruria Formation in the working quarry includes a coarse-grained, debris-flow deposit consisting of angular to sub-rounded clasts of the Cambrian-Ordovician Merevale Shale Formation and igneous lamprophyre from the Midlands Minor Intrusive Suite (Figure 3). This formation is exposed today immediately west of Kingsbury Quarry suggesting that the source of the debris flow in the Carboniferous was very local (see also Figure 4).

Kingsbury Quarry is also remarkable as it exposes one of the major east-west oriented strike-slip faults which crosscut the Warwickshire Coalfield horst (Figure 4), known locally as the Whateley Fault. This fault is oblique to the Western Boundary Fault of the Warwickshire Coalfield horst, and older than the Western Boundary Fault. The steep dips visible in the quarry result from the bend in the fault trace which causes what structural geologists term a 'flower structure' of steep faults in the compressional area immediately adjacent to the fault.

Figure 4. *Left: Geological map of the western edge of the Warwickshire Coalfield horst showing Carboniferous sediments resting on the Palaeozoic Merevale Formation, and the Whateley Fault crossing the southern part of Kingsbury Quarry. Right: Dr Bernard Besly and the Wienerberger geologist, Andrew Norton, viewing the Whateley Fault in the quarry. Note the steeply dipping beds of the Etruria Formation (top right of the photograph) and sandstones of the Halesowen Formation on the far (southern) side of the fault.*

Max Down and Stuart Burley of WGCG visited Kingsbury Quarry this summer, accompanied by Dr Bernard Besly (Keele University, Carboniferous expert) and the Wienerberger geologist, Andrew Norton, being guided by the quarry manager, Jason Bailey, to view the current workings and the existing SSSI (Figure 5).

Figure 5. *View of the current SSSI east of the Kingsbury Quarry brickworks (see Figure 1 for location) showing the Halesowen Formation at the top of the section and talus of Etruria Formation in the foreground, as being explained by Jason Bailey (Kingsbury Quarry Manager).*

Wienerberger kindly maintain the SSSI which exposes the upper part of the Etruria Formation and the Halesowen Formation. This was last cleared by Wienerberger in October 2020 but is already in need of further attention.

WGCG will continue to work with Wienerberger and Dr Besly from Keele University to document the geology of the quarry and have plans in place to examine core taken by Wienerberger across the quarry site.

A WGCG Initiative: The Burton Dassett Video

Ray Pratt and Norman Dutton

The video can be viewed on YouTube at *https://youtu.be/p6oUfmzB3yQ* or enter 'Burton Dassett V4' into the search box and look for the ammonite.

Planning

In a conversation at a Conservation Committee meeting about monitoring Local Geological Sites, two speculations were raised: using video and using drones. As so often happens, the conversation moved sideways and the idea of making a geological video as part of WGCG's education/publications remit was sown. The snag was that we were starting from a base of little or no experience of either of these. Using his initiative, the late Mike Heath, our only member with real experience with video, contacted Warwickshire College to explore the possibility of engaging a film student to create a geological video for us. The College suggested Kane Wilson who was both able and willing. We were impressed by Kane's videos on YouTube (enter 'Kane Wilson Film' in the YouTube search box to find some of them). Ray entered into an agreement with the College on behalf of WGCG and it was agreed to undertake the project over the Easter break in order not to affect Kane's academic coursework.

Ray set up a small project team who drew up a plan based on the Burton Dassett Hills. This location was an obvious choice as, over the years, there have been numerous field trips there for varied clientele with four different leaders from WGCG. There is also documentation for the non-geologist, written for our trips with Warwickshire junior schools, plus many other images available to use in a video. The team agreed that the video should have an appeal to the general public and not be too long or too technical. Several themes were put forward and discussed.

The problem with the geology of Burton Dassett is what to leave out. In the end, Norman Dutton's script managed to squeeze in rock types, industrial history, landscape, building stone, ice ages, fossils, Jurassic, plate tectonics and geological principles into 6½ minutes. At this stage, opportunities to deal with Kane's inexperience of geology and our inexperience of film making were restricted by the lack of opportunity for everyone to meet up except on *Zoom*.

Filming

On a preliminary socially distanced reconnaissance visit to Burton Dassett on Friday 19/3/21, we ran through the script altogether, enabling Kane to familiarise himself with our ideas and for us to draw on his knowledge and expertise. From the outset the vision had been to use drone footage alongside regular filming. Other than Kane, none of us had any experience of using drones and we were fortunate that Kane had his own drone, enabling us to capture the aerial images that we wanted. We needed to get permission from Warwickshire County Council in order to fly the drone there. The council were very supportive of this project and requested a copy of the drone footage for their own promotional activities for the Burton Dassett Hills Country Park. We decided to acquire drone footage on this reconnaissance visit even with the very dull and often drizzly conditions, in case the weather was worse on the second filming day.

On Wednesday 14/4/21, the rest of filming took place on a warmer and sunnier day, but still under Covid-19 restrictions. Kane used his own equipment to take photographs and make short movie sequences, resulting in plenty of material for him to select from. There was still a steep learning curve for all concerned. Kane was more used to making his own films than working for a client. The script had gone through several rewrites, and it was always difficult to gauge how much detail and prescription was needed. Then there was the necessity to use memory rather than visit the locations during script writing. The big unknown was the best format to show Kane what we wanted while not stunting his creativity. However, when all filming had been completed on the day, there was a high degree of satisfaction with what had been achieved.

Editing

The majority of the work in making a video is undertaken in the editing process. To create a 7-minute video can take up to 70 hours in total. We knew by now that it was best for Kane to deliver a voiceover to the visuals, but using a film student, not a geologist, was a challenge. Covid restrictions meant that getting the script writer and film student to sit together during the editing process was not a possibility. Consequently, several stages of editing were required. The final video is therefore not perfect. There are a few occasions where the images and voiceover do not match exactly, and the pace of speaking is perhaps in parts too fast for the viewer to take in more complex geological ideas. However, in contrast to so many videos on YouTube, we feel that it has a relaxed and engaging format, appropriate to a short documentary on the English countryside. It fulfils the requirements requested by WGCG as an educational resource. The clear diction and timbre of the voiceover adds to the experience for a wide range of viewers, whatever their age or knowledge of the location. There are clever selection of shots, including drone footage. The calm music and lack of immediate commentary at the start sets the scene wonderfully. The timing of the shots allows viewers to pause and rewind to use the video as a learning resource in an individual way. We hope this 'taster' video encourages viewers to explore the geology of the location further. Given that the film was produced by an 18-year-old student, not a professional film maker, the result has been well worth the effort.

The future

Overall, the project team were very satisfied with the outcome, especially during a pandemic lockdown and with the inexperience of all concerned. The phrase "*We will know next time*" comes to mind. The College were also pleased with the way the project had worked out. This project fulfilled several criteria in line with the objectives of WGCG:

- Collaboration with a local college.
- To provide a short general interest narrative in a popular format and medium
- To promote WGCG
- To promote the Burton Dassett Hills as a geological wonder.

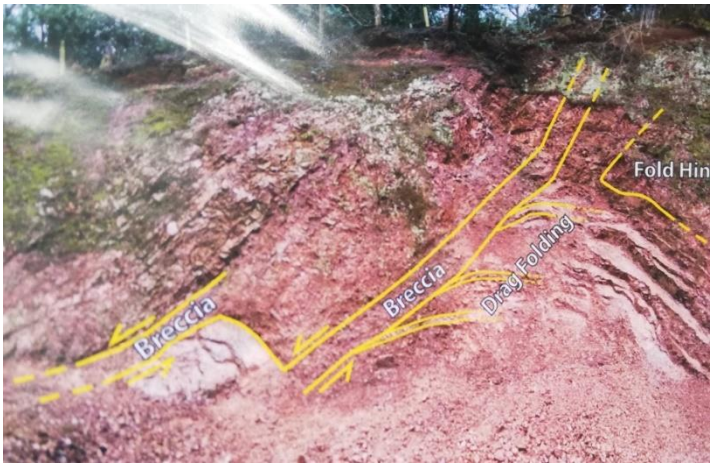
The project also benefited the student, enhancing his range of experiences, that can be added to his portfolio. Positive feedback to the College from both the student and WGCG has resulted in a desire by the College to use WGCG again for another placement during the upcoming academic year.

The film and lessons learned from the process, will provide a template for such future collaborations with the Warwickshire College Group.

Field Trip to the Lickey Hills Ray Pratt

Seven members of WGCG joined six other participants who were guided and entertained around this wonderful area, south-west of Birmingham, by Ray Pratt and Julie Schroder. The Lickey Hills is an inlier of older rocks forming an upstanding horst, analogous to, but more complex than, the Nuneaton Ridge in northeast Warwickshire. Its geology has been studied since the 1800's by the likes of Murchison, Lapworth and Boulton. Little recent research work can be found, and many questions remain unanswered. The Lickey Hills Geo-Champions, of the Earth Heritage Trust, have been maintaining these sites. Through their conservation work and investigative studies, many new facts have emerged, some supporting and others challenging earlier ideas.

The walk took in 3 quarries where the complex folding and faulting were observed. Sedimentary features gave indications as to the depositional environments that prevailed at the time. Viewpoints from elevated vantage points gave an appreciation of the Lickey Ridge structure and its bounding faults. Changes in geology along the walk, though masked by vegetation cover, were identified by such things as, changes in slope, soil colouration and pathway composition. The final exposure was the unconformity seen at Rubery Road Cutting. Here the Ordovician Lickey Quartzite is overlain by the Silurian Rubery sandstone – a gap of 30 million years between them.



Fault in quarry diagram on Information board

The stiff scramble up a steep muddy path

Ray viewing the Neptunian Dyke

Pointing to a clay layer in quartzite quarry

The editor was pleased to receive the following comments from WGCG participants:

"We really enjoyed the visit on Monday, excellently led by Ray and Julie. For the first geology field outing in a while, the trip to the Lickey Hills took some beating. From interesting quarries, to discussions of what constitutes quartzite; fantastic worm burrows, well worth the stiff scramble up a steep muddy path; faults aplenty; breccia boulders at the top of the ridge; stunning views of Birmingham and beyond; crossing a golf course and looking out for the sandstone ridges; a vast, dark grey limestone monument mysteriously hidden away behind trees and hedges; a spectacular overfold; and, saving the best until last, the Rubery cutting seeing the Ordovician Silurian unconformity so clearly. Also impressive were the features displayed at the Barnt Green Road Quarry, where the Lickey Hills Geo-Champions have erected a number of display boards to explain the geology. On its western wall, beds of Lickey Quartzite, interspersed with layers of dark mudstone, illustrate a most impressive overfold. At the south end of the quarry, we were able to examine samples of rock containing mica, feldspars and other minerals that probably suggest volcanic deposits of unknown source. We had an interesting discussion about the possible formation of the Neptunian dyke and a particularly odd-looking rugby ball-shaped inclusion. Both Ray and Julie provided plenty of information, including a 23-page booklet of field notes; and answered the many questions.

Lots of laughs too. It was great to be out again looking at rocks with good company and reasonable weather. All in all, a grand day out."

Our Traditional Winter Lecture Venue:

St Francis Church Hall, Warwick Road (Kenilworth main street), Kenilworth CV8 1HL