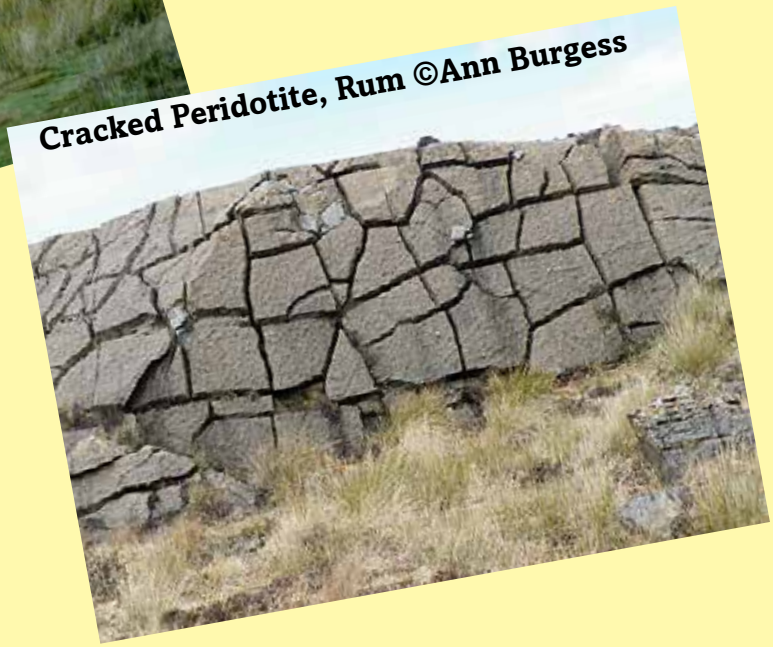
Conserving Warwickshire's Geological Heritage

WGCG
Hidden wonders in the landscape of Warwickshire

In this issue:


Limestone pavement, Whitbarrow © Karl & Ali


Cheesewring Stones, St Cleer ©Len Williams


Cracked Peridotite, Rum ©Ann Burgess

Images from

geograph
photograph every grid square!

Newsletter

Spring 2014 Issue Number 27

WGCG
Hidden wonders in the landscape of Warwickshire

WGCG
c/o Warwickshire Museum
Market Place
Warwick
CV34 4SA

On the web: http://www.wgcg.co.uk

On facebook:
http://www.facebook.com/WarwickshireGeologicalConservationGroup

On twitter: https://twitter.com/#!/wgcg_uk

Front cover photos

geograph
photograph every grid square!

These photos are taken from the Geograph site. For a review of this site read the article by Robin Sott on page 4.

Limestone pavement
Whitbarrow near Howe, Cumbria

Photographers: Karl & Ali
Photograph number: 2636110
OS Grid square: SD 4486

Cheesewring Stones
To the north of St Clear

Photographer: Len Williams
Photograph number: 2819313
OS Grid square: SX 2572

Cracked Peridotite
Near Long Loch, Rum

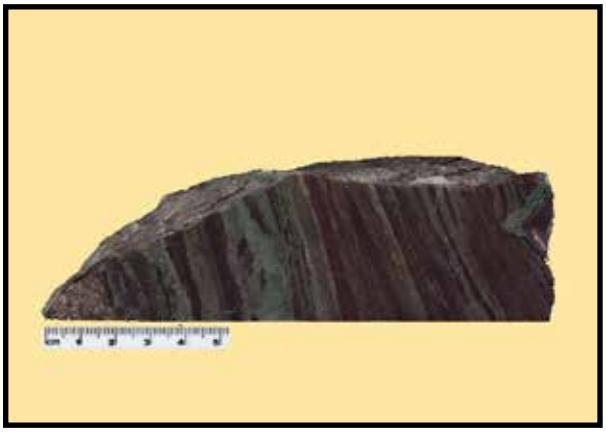
Photographer: Ann Burgess
Photograph number: 2918135
OS Grid square: NM 3698

Contents

From the Rockbox

From time to time we hope to spotlight some of the fine specimens in the Group's collection of rocks, fossils and minerals.

Photos by David Emsley.



Bardon Tuff

This was cut and polished by Frank Wells to great effect. Generally the coarser particles are paler in appearance and the finer ones darker; they are graded. This pyroclastic rock is 'lithic' i.e. the particles are < 4mm and graded as a result of ash sedimentation in a submarine environment. So we have graded lithic tuff from, it is believed, the Blackbrook Reservoir Formation of the Precambrian Blackbrook Group which outcrops in Charnwood Forest, Leicestershire.

Gneiss

This gneiss is from southern Norway where the metamorphism has progressed to the stage where the black minerals (mainly biotite mica) and the white minerals (principally plagioclase feldspar) have become strongly segregated.

From the Chair - Storms and Floods

Brian Ellis

We must all have been following the dramatic changes to the landscape during December, January and February. Most of the media coverage and the responses by politicians have largely ignored looking at the problems in terms of the environmental system working in a linked and integrated way. So much of the 'explanation' has emphasised an isolated single cause (e.g. rivers "breaking" their banks) and proposed a single (and "simple") solution (e.g. dredging). Only if you recognise the complex linkages in the environmental system is it possible to make decisions about policies for managing landscape changes and these have implication for conservation in its broadest sense.

The winter rainfall has been exceptional - greater than any since the long-term data back to 1760 has recorded. And it has been accompanied by exceptionally and prolonged high wind speeds. Both can be linked backwards to a high frequency of deep depressions, in turn generated and driven eastwards by an usually strong jet stream (up 250 mph) following a more southerly path than usual, which in turn is caused by very cold conditions in the USA spreading further south than is normal. I will ignore further backward linkages beyond that!

It was only quite late in the day that the issue of how the landscape deals with the excess rainfall (i.e. the forward links) came into the media and political discussion. Eventually the concept of the water table was recognised as was the notion of ground water reaching and exceeding saturation levels causing flooding irrespective of the state of the rivers. Regrettably the relevance of the local geology and river catchment area topography have played little or no part in the discussion, so the missing links between falling rain and rising water levels have been omitted. And, of course, those are the parts of the environmental system which are least amenable to change.

The Somerset Levels are a revealing case in point. Those affected have been both vocal and influential in raising the issue of the absence of dredging in the rivers; enough to engage the Prime Minister and for a Secretary of State to challenge the authority and judgement of the Environment Agency.

There seemed to be a misconception that the Somerset Levels are a natural flood plain and that dredging rivers is the key to solving the problem in future. But the Levels are a reclaimed embayment of the Bristol Channel, floored by marine clays and much of it is at or below high tide level. The rivers are really drains and above the level of much of the surrounding area, which relies on pumping to drain the land. Even more significantly the Somerset Levels are a basin with the Mendips (Carboniferous Limestone) to the north, the Quantocks (Devonian Sandstone) to the south and the Polden Hills (Blue Lias) within the Levels all capable of shedding large quantities of water into the Levels as the water table within them rose, contributing to flooding by ground water over the low and flat land. A key issue for constraining flooding is the relative size of the elements of the environmental system which can be managed as opposed to those which can't. The latter have been missing from the public discourse.

The consequences of human changes to the environmental system became very apparent in the damage done to the sea front at Aberystwyth. It suffered from a 'Perfect Storm' - a formidable unchangeable part of the environmental system. A string of depressions had piled up the Atlantic eastwards against our south and west coasts, strong winds generated large waves, low atmospheric pressure coinciding with lunar high tides raised water levels which together led to the spectacular assault on the sea front. But Victorian building has reduced the coasts ability to cope with storm conditions. The construction of the breakwater associated with the small port at the mouth of the river Rheidol had restricted the supply of sediment to the beach thus reducing the width of beach over which storm waves could lose energy. Along Marine Terrace and especially along Victoria Terrace, at the northern end of the promenade, the hotels and university buildings were erected in front of the natural cliff line, compounding the problem. However, at Borth (north of Aberystwyth) those on last year's field trip saw that there is now an artificial island of very large boulders about 400m off shore. This is built to reduce the effects of storms (which regularly used to throw waves over the shoreline buildings) and allow a sand beach to extend seawards giving a wider area over which wave energy can be dissipated. But even that attempt at mitigation could not prevent the winter storms scouring sand from the beach exposing a huge tract of the submerged forest.

Borth submerged forest

Enough of the fossilised trees are exposed after the storms to be able to get some idea of what the forest looked like

Marine Parade, Aberystwyth

Much sand & gravel was thrown onto the Parade and most of the buildings near the sea were demolished

Geology and Geograph

Robin Stott

The Geograph website ***www.geograph.org.uk*** is a rich resource for anyone interested in geology. These notes show you different ways of finding images that illustrate rocks, geological features, associated landforms and more. Geolocated images let you explore landscapes and geological sites across the British Isles. The photographers are all volunteers. After moderation their photos are published on the website under a Creative Commons licence that allows their use, free, for any purpose as long as the photographer is credited.

Home page search. The search box at top right on the Home page is simple and effective. Enter a placename, any text, grid reference or postcode to find almost anything.

Search Results. This can be viewed on a range of maps, and as thumbnails, and as a slideshow. Individual photo pages have links to nearby images in the same grid square, to images by the same contributor, and to images using the same tags.

The photo below is one of four found in a Home page search for **Edge Hill**, then, in the **Place search** list, choosing grid square **SP3747** then entering **scarp slope** in the Keywords box on the Grid square page that appears, and clicking **Search**. Links on the Grid square page can take you in many directions. Explore!

Edge Hill and The Tower
Photo 3651500 by John Sutton

Tags. Since early 2011 all images have been assigned at least one tag. To browse all tagged geological content follow these links:

- Home
- Explore
- Geographical Context
- Geological interest
- View [c.11,000] images.

Enter a term into the Search box to find subjects or places.

Similarly, tags can be searched:

- Home
- Explore
- Tagged Images
- click and start typing in the Tag Search box
- a dynamic dropdown list appears
- select a tag

If you don't see the dropdown, click View instead.

Older images used a single category as a descriptor. Follow these links to explore them:

- Home
- Search
- Advanced search
- Category (dropdown)
- scroll and select from 10,000 categories
- Find

Categories are part-way to being converted to tags so that the entire Geograph collection – nearly 4,000,000 images to date – can be searched by tag. Otherwise older photos will become less easy to find.

The Browser finds sets of images, to which successive filters can be applied to refine a search.

Here's an example:

The Wren's Nest, Dudley
Silurian limestone ripple beds
Photo 637380, one of a series of studies by Roger Kidd.

Aberystwyth Grits
One of ten images in a collection formed automatically by the use of a common or Shared Description

Photo 3122487 by Rudi Winter

- **Home**
- **Browser**

In the sidebar of attributes, under **Countries**, click on

- **Scotland**

Scroll down to Geographical Context then click on

- **more**

Scroll down and click on **Geological interest**

Scroll down to **Contributors**, then click on

- **more**

Select

- **Jonathan Wilkins**

to see his photos from Scotland. From the **Mode** dropdown, top right, select **Map** – **Thumbnails** to see clickable thumbnails on a map.

Always give the Browser time to

refresh. Hit X to exclude attributes or turn off filters. It's OK to get sidetracked!

You may follow Jonathan and other contributors who are strong on geology; they include Anne Burgess, Ashley Dace, Lairich Rig, and Rudi Winter. Follow this path:

- Home
- Search
- more (in tabs)
- Contributors (in tabs)
- Keywords
- Search
- Name:
  Enter a name or part name
- Search

Many Geograph members share an interest with geologists in mines, quarries, extractive industry, building stones and industrial archaeology. They make some knowledgeable contributions, for example in Articles, Blogs, Shared Descriptions, Geo-trips and more.

They can be found at:

Sheared mudstones, Mull of Galloway Photo 3096303 by Jonathan Wilkins

Thumbnails displayed on a map Jonathan's photos from the Mull of Galloway

- Home
- Collections
- tick or untick formats
- enter text into Keyword Search
- Find

Example: a search on 'metamorphic' found two shared descriptions on Cheviot geology and scenery. Members are uploading their photographs from past decades, increasing the historical depth of the collection. Aerial photos show landscape context.

Places reflect the environmental, social, and economic conditions of past and present times. The Geograph Project has been documenting places throughout the British Isles since 2005. To add your own photos and knowledge and to join the helpful, entertaining forums, **register** with the website. You will be welcomed by the Geograph community.

SiluAn oil-shale bing – the Five Sisters, West Lothian
Photo 3479981 by Thomas Nugent

The **Geograph® Britain and Ireland** project aims to collect geographically representative photographs and information for every square kilometre of Great Britain and Ireland, and you can be part of it.

12,030 contributors have submitted 3,889,353 images covering 271,112 grid squares, or 81.7% of the total

What is Geographing?

It's a game - how many grid squares will you contribute?
It's a geography project for the people
It's a national photography project
It's a good excuse to get out more!
It's a free and open online community project for all

www.geograph.org.uk

Serendipitous Sandstone

David Coates

Our walking group was just approaching Knowle village centre at the end of a morning excursion when one of the party came up alongside me and said "You do a bit of a geology, don't you? You should have a look in this garden along here." We continued along Kenilworth road, just past the canal bridge, and came to a front garden which was fronted by a high steel builders' fence. My colleague said "If you can get a look at it, there's a huge hole in their front garden". I squeezed round the end of the fence onto the property's driveway and snatched the photo below Just as my fellow walker had said, there was indeed a huge hole in the front garden – in fact, there was no longer a garden at all, since the rectangular hole stretched almost from the property line right up to the front wall of the old timber-framed house. The sides were shored up with steel piles and railway sleepers, and the bottom was already covered by a concrete slab. I wasn't able to investigate further as the site was clearly private property and I was short of time, so I have had to interpret the geology from the photograph.

The interesting feature, of course was the exposure of green/grey Arden Sandstone in the side of the hole. Using the railway sleepers as a guide, I estimated that the hole itself was some 3.5 – 3.75 m deep and the top of the Arden sandstone exposure was some 2.5 m below the present land surface. So far as I could make out, the overlying material looked like Mercia Mudstone, extending up to the base of the soil layer. From the map I estimated the grid reference of the site to be SP 186 766. The BGS map shows Arden Sandstone underlying this area. The sandstone is probably best known from the canal cutting at Shrewley, but exposures in the Knowle area are few and far between – it is very occasionally exposed by road works on the low escarpment formed by the sandstone to the south east of Knowle – so the opportunity to see a fresh exposure at this building site was appreciated.

Arden sandstone

Further along the road towards Knowle I was able to speak to one of the hole's neighbours, who was working in her garden. She told me that the property owners were having the front garden excavated in order to build an underground gymnasium! Building work has advanced, of course, and the hole was soon lined with concrete.

Of course, snatched glimpses and photos like this can never substitute for proper fieldwork – but nevertheless, in an area where clean exposures are scarce, no amateur geologist should ever pass a hole without peering into it.

Two Close Encounters in the Jurassic Park

Mike Allen &Ian Fenwick

Over the past few years both Mike Allen and Ian and Ann Fenwick have found themselves travelling through the Jura mountains to the north and west of Geneva, much of which is designated as the Parc Naturel Régional du Haut Jura.

Ann & Ian were staying just north of the mountains when they were offered some 'local intelligence' that a vast exposure of dinosaur footprints had been found recently near the village of Loulle, some 60km to the south. So … off we set!

The village of Loulle (Jura département) lies c.70km due north of Geneva and just south of the small town of Champagnole. The area is dominated by Late Jurassic Oxfordian (c.160Ma) carbonate rocks formed on the SE margin of the French Jura platform (Cariou et al, 2014) which lay between the Paris and Delphino-Helvetic Basins (to the NW & SE), the Rhenish Massif (to the NE) and the 'Central Land'(to the SW) (see figure 1).

Fig. 1 a Geographical location of the Loulle section. b Paleogeographical context at the Bimammatum/Planula boundary (Late Oxfordian), compiled after Cecca et al. (2005), Hug (2003), Jank et al. (2006), and this study

In the early years of the last century, limestone was quarried but this ceased c.35 years ago. However, by chance, a whole suite of what are mainly sauropod footprints where spotted in 2006 by a casual jogger. Tracks are now recorded from a horizon just 94cm thick. In all, it is thought that there are some 1500 prints across an area of c. 3km2, ranging in size from 20 to 100cm. In many cases, the print is surrounded by a raised rim where the mud has been expelled under the weight of the animal and then dried.

Although paleaogeographical reconstructions normally show the area as fully submerged during this part of the Jurassic it is now clear that there must have been small emergent islands where these tracks are now to be found. The host sediment is mainly a muddy limestone which shows ample evidence of having cracked following exposure and drying. This, together with widespread ripple formation and stromatolites, suggest an inter-tidal flat environment which allowed the dinosaurs to walk along a narrow WSW-ENE isthmus (Cariou et al, 2014).

Mike's diversion while heading from Provence to southern Germany was totally due to chance! He writes:

My eye was caught by a road sign bearing the unmistakable silhouette of a 'brontosaur' and the word "Dinoplagne". This was too much to ignore, or resist, so I turned off along yet another little winding by-road, the D49, which duly delivered me to a car-park near the village of Plagne (population c.130). Dinoplagne lies some 80km to the SSW of Loulle but is in a very similar sedimentary situation.

Loulle footprints

A track adorned with yet more 'brontosaur' figures on signposts led through woodland to a clearing where what appeared to be an archaeological excavation was in progress.

This proved to be quite an impressive undertaking to expose what has proved to be the world's longest continuous sauropod trackway, 155 metres of it (and counting?), and also boasts the largest single sauropod footprint, at just under 2 metres diameter, amongst the 115 or so separate imprints on the site. According to one website, this apparently betters the previous record holder - two trackways some 142 and 147 metres long at Pedreira da Galinha in Portugal discovered in 1994. Other websites show that Portugal was something of a magnet for dinosaurs leaving their visiting card of one kind or another!

Meanwhile, back in Plagne, site panels give all the usual kind of information one might expect.....what a herd of sauropods might have looked like etc.....but also some idea of how palaeontologists extract information from such a trail. This site was first discovered as recently as April 2009 along a logging road by two members of a local natural history society, which gives hope to us all! As far as I can ascertain, this location lay in a deltaic area, also on the flanks of the Jura Platform.

The trackway is preserved in thinly bedded and flaggy limestones of Tithonian age (the uppermost Jurassic c.150 Ma) which is roughly the same as "our" famous Portland Stone and likewise the equally reknowned Solenhofen Limestone in Bavaria (which yielded the Archaeopteryx fossils, and much else besides). By then the Jurassic sea level had fallen somewhat and probably left Loulle as dry land. The beds at Plagne are gently tilted to the east and betray their shallow-water origin in the form of lunate and interference ripples, suncracks and, of course the footprints. In addition to sauropods there are apparently the tracks of crustaceans and tortoises (?) on the site, though I have to say these were not spotted by this correspondent!

I am also left wondering how they determine the exact size of a single footprint: those I measured on site seemed to average around 70-80cm in diameter, well short of the 2 metre mark mentioned above. Perhaps they had hidden the best examples; some areas were under cover at the time of my visit, presumably to protect against damage / weathering. From the official website I gather that the site is now kept entirely covered during November to May, so it might be worth bearing this in mind before rushing to examine matters for yourself!

A size comparison

Reference:

Cariou, E. et al (2014) Dinosaur track record on a shallow carbonate-dominated ramp (Loulle section, Late Jurassic, French Jura), Facies (on-line), 4 April 2013

Visit the website for the local area (Click on the UK flag for the English version)

Lemptégy - Once hidden depths of a volcano

Doug and Jill Aspell

On the road to Clermont Ferrand, in the heart of the Massif Central in France, a range of mountains appears on the horizon and with each passing mile grows ever larger to proclaim itself as the Chaîne de Puys, one of seventeen volcanic Chaînes in the Massif Central, four of which lie within the Volcano Regional Park.

Jill's first sighting of the Chaîne de Puys

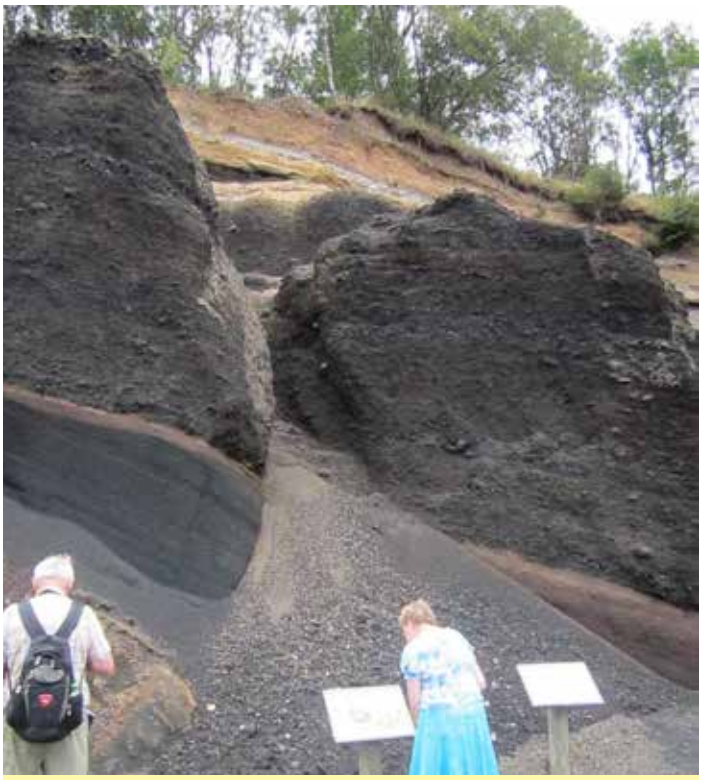
Arriving at the city you will almost certainly want to view the surrounding countryside from the heights of the Puy de Dôme, an extinct volcano. This lava dome is the highest volcano in the area at 4,803 ft and overlooks a whole series of cinder cones, lava domes and maars (a crater usually occupied by a lake) which form the Chaîne. The summit is easily reached by a rack railway and affords an unparalled overview of Clermont Ferrand and the volcanic chain as it stretches some 32km across the countryside.

Whilst the Puy de Dôme is the most visited volcano in the area, it is not necessarily the most interesting, for within striking distance is another less well known but far more impressive site for those with an interest in geology. This is the Puy de Lemptégy which my wife Jill and I found, quite by chance, after losing our way to a better publicised, but for us, less interesting attraction.

The two Lemptégy chimneys

The Puy de Lemptégy is a strombolian double scoria cone volcano. The first of these two cones (Lemptégy 1) was formed some 30,000 years ago as a vent to the Puy de Gouttes, a somewhat larger scoria cone nearby which went on to cover Lemptégy with ashes from its own eruptions. Several centuries later Lemptégy 2 formed, from a completely separate eruption but very close to the first - such that the two Lemptégy chimneys, now visible, are within yards of each other. Again, some 14,000 years later the Puy de Côme was formed, its volcanic debris further cloaking the growing mass that was Lemptégy. Then, finally, just 9,500 years ago, nuée ardente from the Puy Chopine laid the topmost layers of ash on the volcano's surface, all plain to see in the 'Volcan a Ciel Ouvert'.

This volcano might have remained comparatively obscure had it not been for the devastation of World War II when the reconstruction of Normandy's cities created a pressing demand for scoria, known commercially as pouzzolane. Lemptégy was found to be a rich source of this material and extensive quarrying took place to a depth of 110 metres exposing, as in a cut-away section, the inner 'plumbing' of the volcano showing faults, dikes, sills, lava flows and the various, quite distinctive, deposits from each of the five cones which one after the other added to Lemptégy's final height. So to look at the exposed walls of Lemptégy is to look at its formation step by step over the whole 30,000 years of its history.



Inside the Lemptégy volcano

Doug holding samples of red and black scoria, the redness of the former showing that this had cooled slowly allowing the iron content to oxidise

Today there is a growing appreciation of this unique site and a thriving visitor centre offers guided tours by foot or by a motorised trailer. There seems to be no restriction on gathering samples from various parts of the quarry and there is a superb display illustrating several types of volcanic bombs – not that you would want to carry one of those home with you – they are huge!

Displays include the spindle bomb illustrated here. Shaped something like a rugger ball it spins and stretches as it hurtles through space and cools sufficiently to maintain its shape when it strikes the ground. The cow pat bomb on the other hand forms because its short path gives it no time to solidify so that it spreads and flattens on impact. The ball bomb is propelled a few times round the inside of the crater gathering rock fragments and layers of lava before it is finally ejected. This latter bomb is round, compact and very heavy, the biggest being estimated at 60 tons in weight! Yes there is all this and much more to see and marvel at in Lemptégy.

A Lemptégy spindle bomb

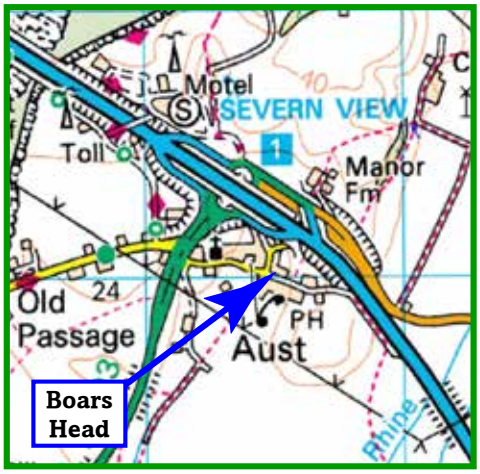
Summer field trip programme 2014

Wednesday 7 May
Saxon Mill to Rock Mill traverse
Leaders: Ian Fenwick & Jon Radley
Meet for a prompt start at 6.30 pm
Saxon Mill CV34 5YN SP 2906 6707

From Saxon Mill across the Avon terrace sequence. Observe Bromsgrove Sandstone SSSI of Guy's Cliffe. Then to another Bromsgrove site at Rock Mill.

Saturday 14 June
Aust Cliff and Portishead
Leader: Jon Radley
Travel by coach to rendezvous point:
11am at Boars Head, Aust BS35 4AX
ST 5748 8900

Pick-up details to be emailed separately.

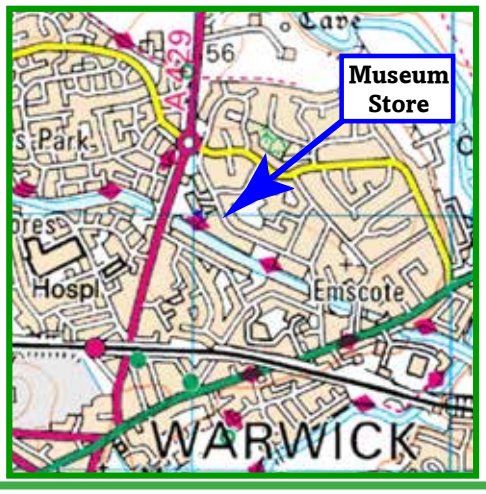


Wednesday 16 July
Stoney Cove & Sapcote Church
Leaders: Brian Ellis and John Crossling
Meet for a prompt start at 7pm
Stoney Cove Diving Centre LE9 4DW
SP 4928 9422

South Leicestershire diorites, Triassic Sediments & paleo-features plus varied building stones in Sapcote churches.

Wednesday 24 September
Warwickshire Museum Store CV34 5LT
Leader: Jon Radley
Meet 11am WCC site, Montague Rd, Warwick
SP 2910 6602

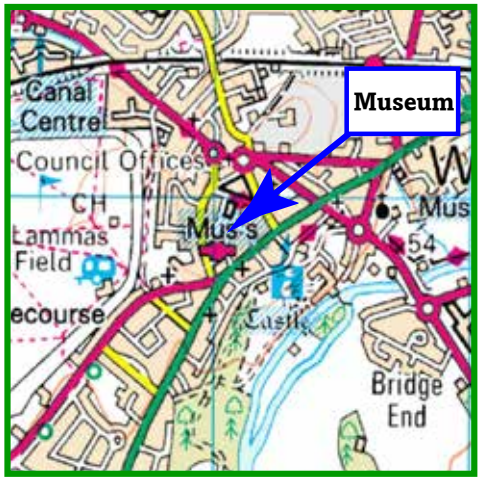
Recently, the Warwick Museum store has been transferred to new accommodation. This will be an opportunity to see their extensive reserve collections..



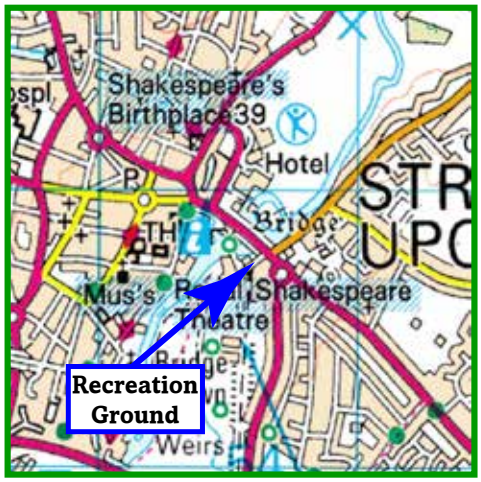
Outreach events 2014

Wednesday 14th - Saturday 17th May
Museums at Night, Warwick
Warwick Museum, Market Place CV34 4SA
SP 28023 64927

This event in the Market Place is to showcase Warwickshire's cultural heritage, with a large number of participant groups. It will be open from 2.00 -10 pm and WGCG is having a 'Market stall'

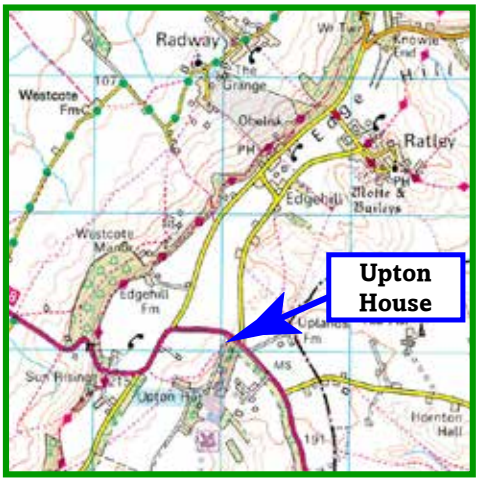


Saturday 5th & Sunday 6th July
Stratford River Festival
Stratford Recreation Ground CV37 7LS
SP 20551 54713
www.stratfordriverfestival.co.uk



Saturday 16th & Sunday 17th August
Upton House OX15 6HT
SP 37034 46123
www.nationaltrust.org.uk/upton-house

A WGCG event in partnership with the NT, from 11.00 am to 3.30pm. There will be a WGCG display with children's activities as well as guided walks to explore the geology of the site and the house.



Friday 12th September
Astley Castle Open Day
Nuneaton, Warwickshire CV10 7QS
SP 3117 8947
www.landmarktrust.org.uk/news-and-events/upcoming-events/astley-castle-open-day1