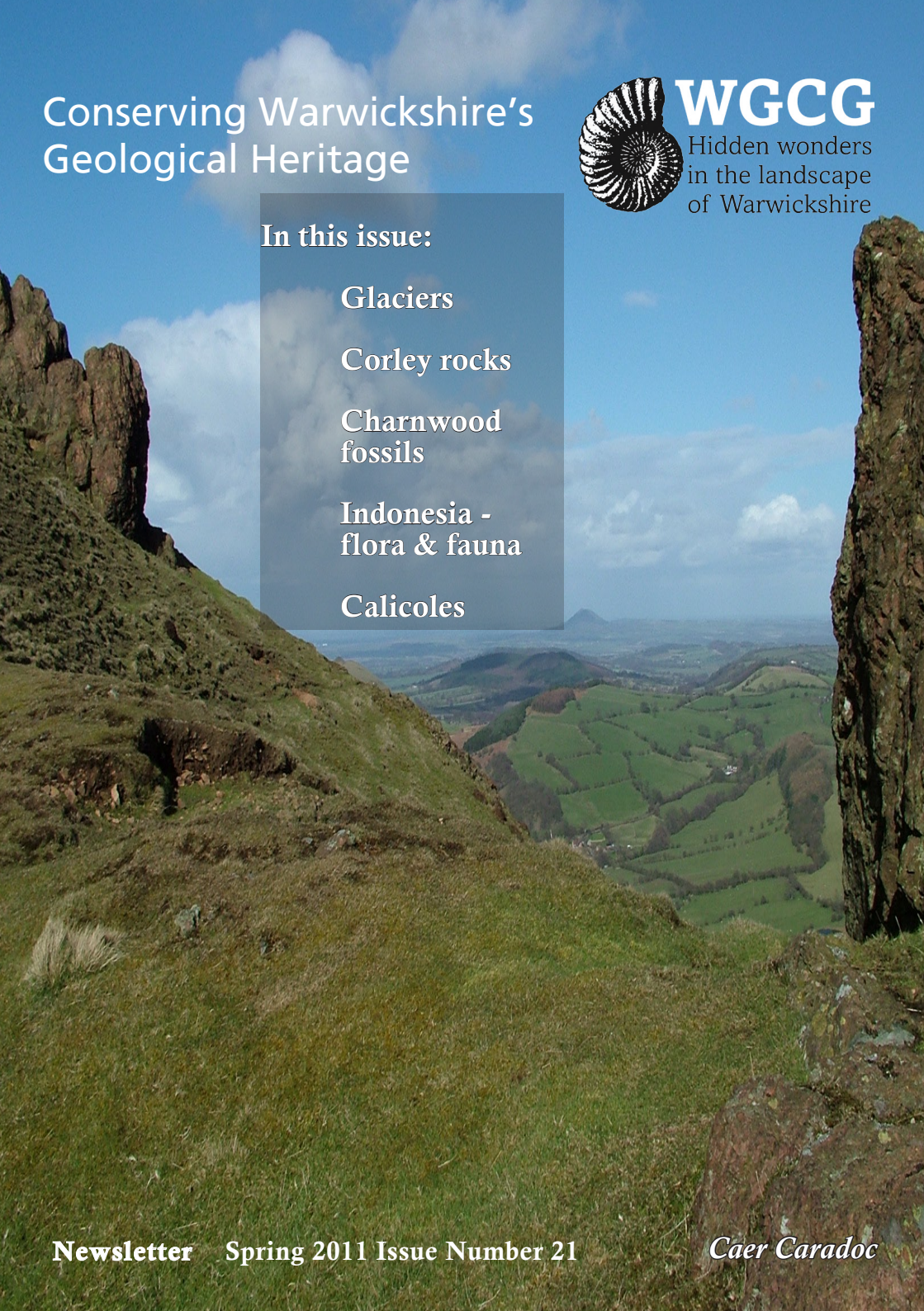
Conserving Warwickshire's Geological Heritage

WGCG
Hidden wonders in the landscape of Warwickshire

In this issue:

- Glaciers
- Corley rocks
- Charnwood fossils
- Indonesia - flora & fauna
- Calicoles



Newsletter Spring 2011 Issue Number 21 *Caer Caradoc*

Chair's Report March 2011

As I write, the work has begun at last in completing our submission to the Charity Commission for charity status for the Group. As you will know, big changes have had to be made in our governing documents, largely to accommodate the legacy left to the Group by Rob Holloway. One other aspect of Rob's generosity was his massive collection of rocks. Jon Radley and I have been working our way through this to produce a manageable collection for the Group, but also to offer to schools and colleges to assist with their teaching. Should you be aware of any teaching institutions at whatever level that might benefit from such a rock collection, please let me know.

I remarked in the last Newsletter that the conservation work on the Kenilworth cutting exposure had made good progress during the early part of last summer. However, this is a project where we can't work at our own pace. It forms part of a much larger Sustrans cycle route scheme where many partners are involved – the County Council, ecology groups, community groups as well as Sustrans. Each have their priorities, not least financial, and so, inevitably, progress can be slow. Nevertheless, the County have recently cut down some of the small trees which obscured the geology and this should allow us to move back on to the site once the various protected animals are 'on the move'.

Also, on the Conservation front, there are the first concrete signs of the Warwickshire Geological Action Plan as the first of the clutch of documents has now emerged from the Group's new design team, the Drawing Room in Leamington. The principal partners in this have always been seen to be the County Museum and ourselves. However, the economies having to be made in Museum expenditure will almost certainly mean that we have to shoulder a much greater share of the responsibility for the GAP and, indeed, for geoconservation in general.

The Drawing Room will soon be undertaking the revision of the Warwick Trail, originally created by Jim Passmore and Nigel Harris for Martyn Bradley's course. This should be the first of several re-publications to appear in a new Group house style.

Over the summer, we hope to be flying the flag for geology & geoconservation at various events - usually outdoor - around the county. We are anxious for as many members as possible to be involved. All that is needed is enthusiasm and a little time! Please get in touch (swift@ianfenwick.f2s.com or 01926-512531). Enjoy the summer – and do visit some of the wonderful sites – another one is featured in this issue - we have in this corner of England!

Ian Fenwick

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Glaciers and the Pembrokeshire Field Trip

Brian Ellis

While we were discussing the effects of glaciation in Pembrokeshire the question of how fast glaciers might advance came up and I said I knew of good documentary evidence from Norway. I think this may be of interest to members even if they didn't come on the trip. During what is known as the 'Little Ice Age' glaciers advanced in most of Europe and there are detailed first-hand accounts of this from many places. The area I know well is in Norway and particularly the Nigard valley where the glacier is one of the outflows from the eastern side of the Jostedal ice cap, north of the Sogn fiord.

Nigardsbreen

The evidence comes from land owners' complaints and from farmers and local priest's descriptions as well as from court records of appeals for the reduction of taxes and rents. The first record is from 1684 when a landlady called Brigitte Munth took two farmers to court who pleaded that they could not pay rent because their high pastures had been covered by ice. But later evidence clearly shows that ice was intruding into the valley bottom land. Mjolver farm lies at the end of the Nigard valley (i.e. furthest from the present glacier snout) and was founded in 1585. But in 1735 Guttorn Johanssen Mielvar, the farmer, was asking his neighbours to testify to the court that *"the glacier has grown so much, year after year, that it has carried away not only the greater part of the farmed meadowland but also the cold given off by the glacier prevents any corn growing or ripening so that the poor man who lives there, and his predecessors have each year to beg for fodder and seedcorn. …… They also explained that providing the above mentioned glacier continued to grow as it had been doing for some years and was now within a stone's throw of the house, the farm would be carried away within a few years".* In fact between 1710 and 1735 the front of the glacier moved forward some 2800 m (i.e. just over 100 m per year)

Nigardsbreen

By 1742 officials found that *"the glacier has advanced to within 12 m of the cabins or derelict farm buildings ….. abandoned by their people four years ago. The glacier covers the whole valley from one mountain side to the other and is some 630 m wide at its margin, where immediately in front of the farm, it is over 88 m high".* A year later it was noted that *"the glacier had carried away the buildings; pushing them over and tumbling them in front of it with a great mass of soil, grit and great rocks from the bed and had crushed the buildings to very small pieces which are still to be seen".*

To add to the farmer's woes other accounts record that farmland was badly affected by rock falls, landslides, avalanches and floods. But the ice advance was soon to end and the "mass of soil, grit and great rocks" described above can still be seen as the terminal moraine at Mjolver which is dated at 1750. The Nigard valley remains uninhabited to this day. Although we don't know the exact location of the ice front in 1684 we can estimate the rate of the ice front advance by 1750. The

Nigard valley bottom is about 3500m long and the ice advanced that distance in about 70 years – an average of about 50 m a year. The evidence is that the rate of advance was variable but there is no doubt that an observer would have been very aware of it.

Evidence of the subsequent retreat of the glacier front abounds in a series of 'recessional' or 'stadial' moraines, which have been well studied and dated. The 'retreat' of a glacier, perhaps better thought of as 'wasting', reflects its loss of volume when the input of new ice from accumulated snow is less than the loss of ice through melting. This is reflected in the thinning of the glacier and in the shortening of its length (the 'retreat'). For the Nigard glacier there is evidence for three phases of wasting. Between 1750 and the late 1930s the front of the glacier moved up valley (retreated) about 2000 m giving an average of 11 m per year. Between 1938 and 1964 the retreat was about 1800 m giving an average of about 70 m year and exposed a basin which is now occupied by a lake. The photograph (1) was taken standing on the 1938 moraine and the 1964 ice front was more or less at the far end of the lake. The photograph, taken in the 1990s, also shows that there has been further retreat since 1964. Melting is now taking place on the steep rock bed of the icefall (Photograph 2). The Norwegian monitoring and my personal observations during the 1980s and 90s show that the ice front is advancing in some years and retreating in others, suggesting that, at the present time, there is a fine balance between accumulation and melting of ice on the Jostedal ice cap which feeds the Nigard glacier. In Krundalen, the next valley south of Nigard, the glacier has already melted from its former icefall location and can now only be reached by a steep climb up the old ice fall rock bed. All this suggests that the wasting (retreat) process is just as variable as the advance but no less readily observable.

The quotations used are from Jean. M. Grove The Little Ice Age (Pub. Routledge)

WGCG at Warwick Museum

Jim Watts

On Saturday 12th March Warwick Museum hosted an activity day related to the television series presented by Neil Oliver on 'Early Man in Britain'. The programme covered the arrival of hunter gatherers at the end of the last ice age 14,000 years ago. It then showed how the early Britons used stone tools to clear forested areas to take up farming, domestication of animals and a settled way of life. The flint knapper seen in the programme was present at the museum demonstrating the making of hand axes, knives and arrow heads. Our stand had examples of flint and a copy of a hand axe, found locally, made by Heidelberg man about 500,000 years ago when Britain was inhabited during a previous warm period.

Early Britons dressed in sack cloth wandered in and out of the museum during the day and spent time in their cave built on the museum's first floor. Young children were able to have their faces painted in woad and there was a quiz for them to complete as they went round.

The museum had 500 visitors during the day and quite a few visited our stand. They showed considerable interest in our exhibits. Some of them were locals, so we were able to hand out many leaflets on our local geology.

Out and About on our Local Sites

No. 4: Corley Rocks (LGS 18)

Ian Fenwick

There are just two Warwickshire local sites where we (and even the local parish council) don't know who the owners are! One of those is Corley Rocks to the north-west of Coventry (GR: SP 302 852), one of the most accessible of all our 90 or so sites. Indeed, some might say that it is too accessible since it attracts what may be regarded as undesirable attention.

I'm not well versed in the origin of these sandstone bluffs but it would be no surprise to learn that the area was quarried for building stone in the historical period. But that was long ago.

The exposures in the cliff faces are in the Upper Carboniferous Salop Formation, what used to be known as the Barren Measures, above the productive Coal Measures. The Corley Sandstone, part of the Keresley Member, accounts for the bulk of the section but the real interest is in the Corley Conglomerate which forms lenticular units and 'stringers' within the sandstones. Marked cross-bedding is apparent which, taken with the presence of the conglomerates, is a sure indication of deposition by a large river.

The conglomerate is one of a handful in the Salop Formation, but is unique in that it is the only one derived from the east. When taken in conjunction with the Coventry Ring Road site at Wickes store (LGS 20), it allows us to infer the palaeogeography of the area during the late Carboniferous. It seems that during Upper Carboniferous times there must have been an upland area to the east of Coventry of which there is no longer any trace.

New Local Geological Sites (LGS)

Since the publication of the RIGS sites list in the Spring 2009 newsletter the name of the sites has changed to Local Geological Site (LGS) and three new sites have recently been added:

LGS 96 - Staircase Lane, Allesley - SP 3019 8118
Allesley Member rocks are exposed on both sides of a 'cutting' in the sunken "Staircase Lane" on the northern slope of the valley of the River Sherbourne.
LGS 97 - Kenilworth Cutting, Kenilworth - SP 2986 7326
Exposure of the Permian Kenilworth Sandstone Formation (Warwickshire Group) on the east side of disused railway cutting.
LGS 98 - The Dumble Tufa Springs, Kingsbury - SP 2375 9743
The Dumble contains well developed tufa features in locations, including four springs and tufa covered rocks at the confluence of a tufa spring tributary with the main Dumble Brook.
Details of all Warwickshire LGS sites can be found at: www.wgcg.co.uk

Charnwood Fossils

A talk byPhil Wilby of the BGS

David Coates

The subject of February's WGCG meeting was a talk by Phil Wilby of the BGS on recent research on the Ediacara fossils of Charnwood Forest.

Many – or most – of us recall being told about the discovery of Charnia masoni in 1957 by the schoolboy Roger Mason: the first fossil of a complex life-form to be confirmed within rocks of known Precambrian age. Most of us also recall being told that it may have been a precursor of modern sea pens, that Charniodiscus also existed in Charnwood and other Precambrian fossils had been found throughout the world, notably in the Ediacaran Hills of Australia, and sites in Newfoundland and Russia.

Many – or most – of us present at the February meeting thus found Phil's talk to be a revelation. Phil described the original Charnwood finds, and showed the classic site at Mistaken Point in Newfoundland where many fossils have been found by making silicone rubber "peels" of bedding planes exposed in sea cliffs. He then showed us pictures of recent work being undertaken in England. Bedding planes at a Charnwood quarry have been cleaned with high pressure water jets to remove soil and lichen, before silicone rubber peels were taken. The silicone rubber moulds were then used to make plaster casts replicating the original surface. Fossil impressions can be revealed in great detail by photographing the casts with varying angles of illumination. Phil and his colleagues have thus been able to reconstruct a complete Ediacaran biota, with several different species of these strange life-forms, several of them new to science and presumably occupying different ecological niches. A common feature of many species was a holdfast attaching them to the seabed, but they displayed a range of different forms for the "superstructure" sticking up into the water column. Some had a low, branching form, and others consisted of a long leaf-like frond of up to a metre or more. There is possible evidence that some of these may have been supported by gas-bladders, in the manner of modern seaweeds. Phil told us that the Ediacaran period covered a long time range from approximately 635 to 540 million years ago. The fossils from the Ediacara Hills are fairly late in the period, and those from Newfoundland and Charnwood are somewhat earlier. In fact, the lowest horizon at Charnwood may include the earliest Ediacaran fossils yet found.

Phil was at pains to point out that it was difficult to interpret these fossils in terms of modern classes of organisms – for example, Charnia masoni has a superficial resemblance to a modern sea pen but the growth mechanism appears to have been completely different. The organisms lived on the seabed, and appear to have filtered nutrients directly from the water. Phil emphasised that the water chemistry and dissolved oxygen levels at the time were completely different from those of modern sea water, so it isn't possible to interpret these fossils in terms of modern environments.

The talk inspired an enthusiastic discussion and question and answer session, to the extent that the chairman had to terminate the meeting with several members' questions still outstanding. A well deserved vote of thanks rounded off a meeting that was a highlight of the season.

The Indonesian Archipelago

Distribution of flora and fauna

Jim Passmore

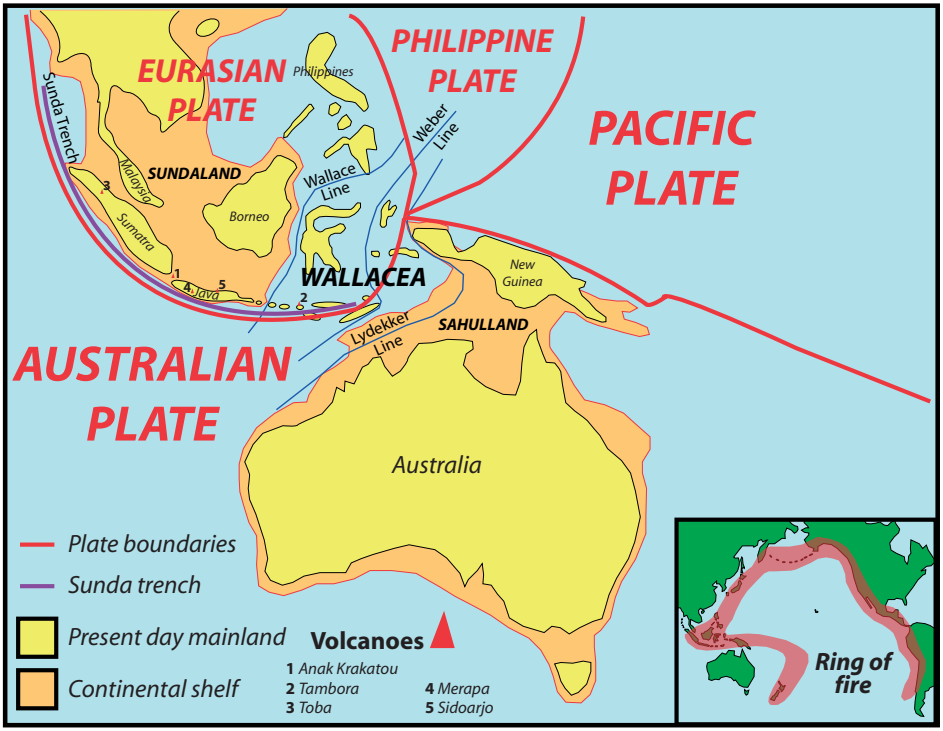
The Last Ice Age

The last ice sheet reached its maximum extent around 18,000 years ago. In 1742 the extent of the ice sheet was commented on by geographer Pierre Martel when, on a visit to Chamonix in France, he noted the occurrence of erratic boulders. Similar observations were made by James Hutton in 1795 when exploring the Alps.

At the time of this ice age a vast amount of water was locked within the ice sheets causing the sea level to be around 120m lower than it is today. In consequence the land area of continents was greater since continental shelves were exposed.

Continental shelves

In Europe the UK was joined to thecontinent by a low lying area in the southern North Sea known as Doggerland. It connected the current island of Britain to mainland Europe during and after the last Ice Age. Geological surveys have suggested that it stretched from Britain's East coast across to the present coast of the Netherlands and to the Western coasts of Germany and Denmark.



In the North of Doggerland (named in the 1990s by Prof. Bryony Coles when she was studying the area) were the Dogger Hills. Around 8000 years ago the ice sheets were melting and the sea level rise cut off Great Britain from the rest of Europe. The Dogger Hills became an island before finally becoming submerged and are now known as the Dogger Bank, being only 15m below sea level. (On 7th June 1931 the Dogger Bank was the epicentre of the largest recorded earthquake in Britain measuring 6.1 on the Richter scale. Luckily damage on the mainland was slight).

Sundaland and Sahulland

Half way around the globe are two more continental shelves which were above sea level at the time of the last glacial maximum. Sundaland, part of the Eurasian plate with Sumatra, Java and Borneo and Sahulland, part of the Australian plate with New Guinea and Tasmania. Between the two is a deep oceanic trench. It was in 1919 that Max Carl Weber (see below), in conjunction with Gustaaf Adolf Molengraaff (1860-1942), an authority on the geology of South Africa and the Dutch East Indies, named the Sunda and Sahul continental shelves.

Wallacea

This is a group of Indonesian islands, the largest being Sulawesi to the East of Borneo, which are separated by this deep oceanic trench from the Asian and Australian continental shelves, Sundaland and Sahulland. The boundaries are the Wallace Line to the North-west and the Lydekker line to the South-east.

The Wallace line

Alfred Russel Wallace (1823-1913) , born in Wales but of Scottish ancestry, was a naturalist who carried out extensive fieldwork, first in the Amazon and then in the Malay Archipelago. From 1854 until 1862 he explored the islands and noted that there was a dividing line where animals to the north-east were predominantly of Asian origin. This line has be named the Wallace Line.

In August 1858, Darwin and Wallace jointly advanced the theory of evolution in a paper, which, although lauded by fellow scientists, did not have the impact of Darwin's Origin of Species which was published a year later.

The Lydekker Line

Richard Lydekker (1849-1915), an English naturalist who in 1895 delineated the biogeographical boundary which separates Wallacea from the islands of Australia and New Guinea. The Lydekker line encloses the region to the south-east in which the fauna is exclusively Australasian.

The Weber Line

The Weber Line was so named by Paul Pelseneer in 1904 after Max Carl Weber (1852-1937) a German-Dutch zoologist. It is the midpoint where Asian and Australian fauna and flora are approximately equally represented, and follows the deepest straits of Wallacea traversing the Indonesian Archipelago.

Geology Museum - Bandung, Java

Jim Passmore

The Indonesian Archipelago, a vast area of 17,508 islands, was colonised by the Dutch and in 1800 named the Dutch East Indies After a short occupation by the Japanese during the second world war it finally became indepenent in 1949.

After the industrial revolution in Europe occurred in the mid-18th century, the Dutch realized the importance of the minerals in the archipelago. In 1850, a Dutch mining official living in Bogor - Dienst van het Mijnwezen - began collecting and researching and minerals found in Indonesia.
By the early 20th Century this collection had grown to such an extent that a new building was needed to house the collection. This new building was opened in Bandung in 1929, later being opened to the public as a Geology Museum.

As one might expect a large proportion of the museum is dedicated to the tectonics and explanations of the volcanic activity in the region. To the right is an example, this showing plate tectonics and subduction zones active in the Neogene period (23 - 2.6 million years ago).

In the Autumn 2010 newsletter Mount Merapi was mentioned as being the most active volcano in the region. Only a week after the issue was published it errupted once more on 26th October 2010.

To the left is a diagram showing the lava flows from the volcano since 1911 up to the 2006 eruption.

In addition to the West wing containing the geology exhibition the museum also houses two other sections, History of life in the East wing and Geology for Human Life on the top floor.

This museum is extremely well laid out and well worth a visit. There is also an auditorium showing films. When there my wife Tiur and I joined several parties of schoolchildren to view a film about the geology around Bandung. However this was in Indonesian so I was not able to fully appreciate the story of the five volcanoes (now extinct) surrounding the city

Calcicoles

Plants and animals that love limestone

Steven Falk

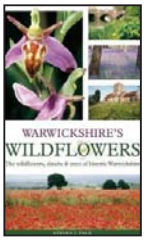
This is the first of a series of articles I hope to produce that make a connection between geology and biodiversity from a natural historian's perspective. Geology, both underlying and superficial (including the soils these give rise to) have the most profound impact on the pattern of wildlife in Warwickshire. The county has an almost fifty-fifty split of calcareous versus non-calcareous geology with the Arden of the north and west largely representing the latter. Look at the distributions of local plants and insects, and you will soon see that many are strongly correlated with geology.

Bishops Bowl

One of the most distinctive of these assemblages is that of calcicoles (literally calcium colonisers). These are the various plants and animals that prefer to grow where the ground contains relatively high levels of calcium carbonate. Such alkaline soils are generally termed calcareous or base-rich (pH above 7). At least 100 local plants could be described as reasonably calcicolous. Most of these can be found growing in locations like old limestone quarries or cuttings where limestone is exposed and any overlying soils are thin. But some calcicoles also inhabit the older limestone grassland of some old meadows and road verges. Such grassland is now incredibly rare. Some arable weeds are also calcicolous, growing alongside crops in limestone districts like Ilmington, Combrook and Long Compton.

The more obvious calcicolous plants to look out for in quarries, cuttings, meadows and verges include Woolly Thistle, Dwarf Thistle, Carline Thistle, Greater Knapweed, Rough Hawkbit, Wild Basil, Marjoram, Wild Parsnip, Traveller's-joy, Field Scabious, Yellow-wort, Pyramidal Orchid and Hairy Violet. Sometimes these plants reveal calcareous geology where you least expect it e.g. the narrow bands of Spirorbis limestone in the Hartshill area, or local calcareous anomalies in the Arden (Traveller's-joy in hedges is especially useful for this). Calcicolous plants have also been introduced into non-calcareous areas through the movement of spoil, e.g. Pyramidal Orchid at places like Ryton Pools. A further suite of calcicoles is present in calcareous woods and includes Spurge-laurel, Early-purple Orchid, Wild Privet and Herb-Paris. Snitterfield Bushes and parts of Oversley Wood are good places to see these.

There are also at least 200 sorts of strongly calcicolous insects in the county. In many instances these are associated with calcicolous plants. Thus the Small Blue butterfly has caterpillars that feed on Kidney Vetch. Snails can provide the link between these insects and the calcicolous plants. They can be super-abundant in calcareous habitats and offer attractions to flies, beetle and bees. In the case of the bees like *Osmia bicolor* it is the abundance of empty snail shells in sites like old cement quarries that attract them. They use the shells as nesting sites, but also forage heavily on plants like violets and bird's-foot-trefoils that can abound at calcareous sites.



Steven Falk is Keeper of Natural History, Warwickshire Museum

To find out more about calcicolous plants in the county, Steven has published *Warwickshire's Wildflowers* (Brewin Books, 2009) available at the Warwickshire Museum and some local bookshops, £15.95

Summer evening field trips

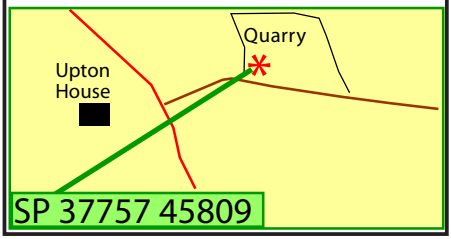
Wednesday 18th May

Edgehill

Meet at 7 p.m. A422 quarry.

Leaders: Jon Radley, Ian Fenwick

A joint visit with Wellesbourne U3A. We hope to explore the highly fossiliferous ironstone of the Marlstone Formation and to see rocks rich in the mineral berthereine (formerly chamosite). This quarry also displays some of the finest examples of Brown Calacareous Soil development in the Midlands.



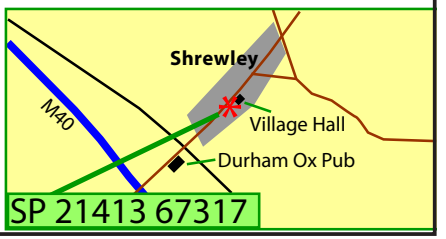
Wednesday 22nd June

Shrewley Cutting and Rowington Church.

Meet at 7 p.m. Village Hall car park.

Leaders: Martyn Bradley, John Crossling

A visit to see the exposures of Arden Sandstone revealed in the canal cutting at Shrewley. This SSSI has recently been cleared and the sections should be well exposed. John Crossling will then lead us to Rowington Church, once the parish of Revd. Peter Brodie, the father of Warwickshire geology.



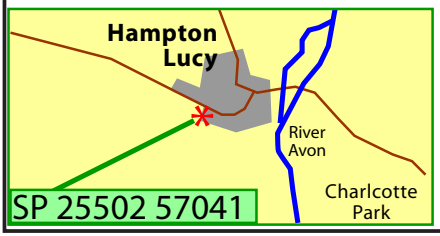
Wednesday 20th July

Avon Terrace Walk - Hampton Lucy.

Meet at 7 p.m. Boar's Head

Leader: Brian Ellis

A walk to explore the flight of four river terraces above the village of Hampton Lucy, near Stratford. We hope to be able to examine the materials laid down by the river in its early history, as well as for evidence of glacial deposits'



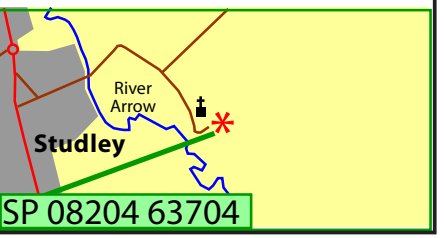
Wednesday 17th August

Studley/Henley.

Meet at 6.30 p.m. End of Castle Road.

Leaders: Ian Fenwick, John Crossling

A walk along the banks of the Arrow to examine a very active, migrating meandering stream, complete with pools, riffles, and active bank erosion, with palaeo-channels on the floodplain. Concluding with a walk down the High St. of Henley to look at some of the local building stones.

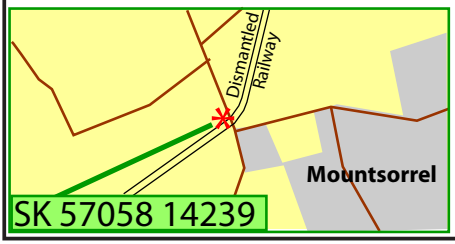


Saturday field trips

Saturday April 9th
Mountsorrel Railway Cutting
Meet at 10.30 a.m. Wood Lane Railway Bridge.

Leader: Ian Fenwick

We shall be visiting a former quarry in the Mountsorrel granodiorite intrusion which is of Ordovician age. Also, we hope to visit another former quarry where later intrusions, probably Carboniferous, into the granodiorite can be seen. Of much later date, Pleistocene, are the sections in till exposed by recent work on the railway cutting. Both the tills we find in N. and Central Warwickshire - derived from Triassic and from Cretaceous source areas - appear in this cutting, one of the few places where their relationship can be demonstrated.

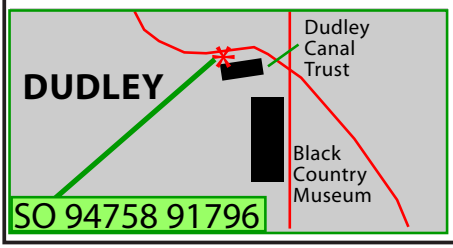


Footwear advice is different for this trip! Because the access to the cutting will be flooded, wellies (as long and strong as you can find) are essential. The ground under-water is quite tricky to walk on so would not be advised if you experience any problems with balance.

Saturday May 14th
Dudley Wrens Nest and canal trip.
Meet at 10.30 a.m. Car park of Dudley Canal Trust.

Leader: Graham Worton *(Dudley Museum)*

Wren's Nest is the most exceptional site for studying the fossils of the Wenlock Limestone. We shall have the good fortune to be led by Graham Worton who is Keeper of Geology at Dudley Museum - and is a real enthusiast for the geology of the Black Country. The visit will be followed by a fascinating canal trip through the limestone caverns, another product of the intensive industrial activity in this area in the 19th century.



Leaflets describing these areas can be downloaded from the following websites:

www.dudley.gov.uk/leisure-and-culture/tourism-travel/leaflets

www.dudleycanaltrust.org.uk

Arrangements for the unexpected cancellation of meetings:
An email will be sent to all members, and phone calls to those not on line.

The WGCG mobile phone will be answered on the day.
For Wednesday evening field trips from 11am.
For Saturday day field trips from 8.30am.

The number to ring is 0752 7204184

Make-a-Map from BGS

Jim Passmore

This is an interactive geological map of the British Isles intended for amateur geologists, students and teachers. It provides an overview of the geology of the British Isles with the various coloured layers, representing the different rock types, able to be turned on and off.

Placing the mouse over an information button ⓘ will bring up the BGS Timechart. One can then print the map/data containing just the geological data that you need.

When using the internet one can use the online version provided, but BGS also provide a download of the software for use on your computer when offline.

For further information go to:
http://www.bgs.ac.uk/education/makeamap/

iPhones and geology

Brian Ellis

If you own an iPhone there are a number of Apps that may be useful. Here are a few:

iGeology: a free app from the British Geological Survey, which shows you the geology beneath you feet and provides detailed information on local features and other details - a great free resource. See: *http://www.bgs.ac.uk/iGeology/*

Disaster Alert: keep informed on a range of geo-hazards including earthquakes and volcanic activity. See: *http://itunes.apple.com/us/app/disaster-alert-pacific-disaster/id381289235?mt=8*

Peak.ar: look around you in a hilly area and this app will tell you what you are looking at and how high it is. See: *http://peakar.salzburgresearch.at/*

Iapetus: move forward through millions of years of geological time, and watch the continents drift. See: *http://www.appstorehq.com/iapetus-iphone-80320/app*

Leicester Literary and Philosophical Society

Section 'C' - Geology (CHARNIA)

Programme - Summer 2011
(As per www.charnia.org.uk on 27th February)

Saturday 9th April Leader - Alan Hart
Natural History Museum, London.
We will visit the mineralogical collections at the Natural History Museum, London.

Saturday May 14th Leader - TBC
Pode Hole, Spalding

Friday 3rd- Sunday 5th June Leader Professor Mike Petterson
Holmrook, Lake District Weekend field excursion.

June, Date TBC Leader - TBC
6.30pm Evening visit

Saturday 9th July Leader - Dr John Aram
Welton le Wold

Saturday August 13th Leader - TBC
Cleeve Hill

Saturday September 10th Leader - TBC
Edge Hill

Saturday October 8th Leader - TBC
A local museum

For further details contact the Field Secretary, Helen Jones, for further details and to register your participation. ***helenjonesx@hotmail.com***

Black Country Geological Society

Programme - Summer 2011

Sunday 3rd April 2011: (Field meeting) Visit to the Saltwells Nature Reserve, led by Graham Worton and Julia Morris. Meet at the car park off Coppice Lane, SO 933 868, 10:00am. (Adjacent to Saltwells Inn, DY5 1AX.) Bring a packed lunch.

Monday 11th April 2011: (Indoor meeting) 'The Geology of Lundy'. Speaker: Dr. Clive Roberts, University of Wolverhampton.
This talk will outline the geology and examine new radiometric dating suggesting

THE UNIVERSITY OF WARWICK

LIFELONG LEARNING

Courses being led by Martyn Bradley

Geology and scenery in South Shropshire

Sunday 8th May

A Day Field School using the University minibus. Participants will explore Clee Hill, Nordybank, Corvedale, Wenlock Edge and Caer Caradoc.

Cost : £70

Landscapes in Warwickshire

Monday 1st - Friday 5th August

A Field Week visiting various areas of the county. Departures each day will be from Coventry House, University of Warwick.

Cost : £320

If you are interested in joining either of these field trips please contact Martyn Bradley using the telephone or email contact details shown below.

024 7652 3533

email: martyn.bradley@warwick.ac.