

Bedfordshire Geology Group

New mapping techniques enhance understanding of the lie of the land

By Henrietta Flynn

Don't miss in this newsletter:

GCLP Update page 3

Latest news on the progress of this important project. News on site improvements, installations, the 3 geotrails, brochures, the Wall of Geology and the GCLP Festival on May 4th

Membership Renewal page 8

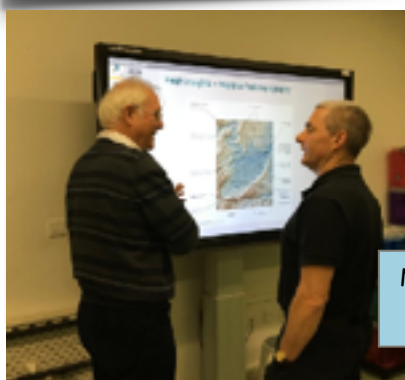
Don't forget to renew your membership. Renewal date April 1st.

Opening of the disability access facilities at Potton page 8

Come to Potton Scout Hut Quarry on March 23rd for this opening ceremony.

2019 Events page 11

Dates to put in your diary on BGG walks, talks, visits, site clearances and conference.



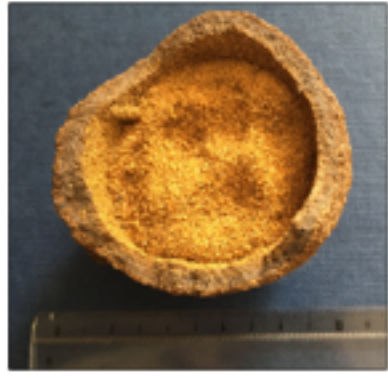
*A talk by Dr Martin Whiteley
(formerly of Bedford Geology
Group and University of
Derby) at The Higgins on
Sunday March 10th*

Martin in discussion with
Peter Sheldon

After coming to terms with the challenging flat screen at The Higgins, Martin found his magic finger on the touchy feely screen to flick through his excellent presentation with his usual energy and flair.

In collaboration with colleagues Tim Farewell (University of Cranfield) and Peter Friend (University of Cambridge), he explained how new mapping techniques have been explored to better understand the landscape of Eastern England. Starting with a basic BGS geological map, various digital datasets of topography, bedrock, superficial deposits and soil were integrated in layers and manipulated using a GIS (Geographical Information System).

By adding these elements together in 3D a digital terrain model was created where information could be added or removed and visualised from different angles. For example, it is possible to change the angle of the sun creating different shadow effects which can enhance structures and by tweaking the vertical exaggeration, new structures become visible. By then adding colours the maps show distinctive



Remember this?

In the last newsletter we had an enquiry from Richard Carter about an unusual sandstone nodule.....*'the image I've attached shows a 'sphere' of indurated Woburn Sands, which I've split in half and found filled with loose dry sand. This is not the first of such spheres which I have found in this interesting local formation. I'd love to know how they form like this*

So we asked geologist Glynda Easterbrook for her interpretation.....

" This looks like an ironstone concretion formed by the remobilisation of soluble iron in sandstone. Such nodules are quite common in the Lower Greensand.

The outer solid part is well mineralised by the iron oxide hematite. This has not penetrated into the centre of the nodule, in which are trapped loose grains of sand which may be iron-stained but not cemented. The exact mechanism of this process is uncertain.

features not obvious from traditional geological maps.

Of particular interest on Martin's maps was Marston Vale which appeared as a prominent lens shape, bounded by the Greensand Ridge to the south-east and limestones to the north. The detail in his maps picked up depressions from the old clay pits and the fluted edges of the Greensand but in places the topography didn't relate to the geology.

It appeared that the superficial deposits reflected the topography better than the solid geology and explained why the Greensand ridge appears to continue further northwards than it actually does. This high relief is actually Quaternary superficial deposits.

Martin explained the importance of understanding drift and the weathering process as well as soil formation. By adding a soil dataset to the digital map an even better understanding of the landscape is achieved and vital for planners, engineers and developers. There's no better place to obtain this information than the University of Cranfield where over 700 soil types have been recognised!

Martin talked further about the rate of the weathering process explaining that weathering during the Cenozoic was far slower than in periglacial times of the Pleistocene where the landscape denuded very quickly. This all contributed to the final landscape of Bedfordshire we see today. Martin showed us how the combination of various datasets and their relationships breathes new life into landscape visualisation in this part of the country.

Many thanks Martin for an excellent talk. We look forward to your next one!

We would also like to thank our hosts The Higgins for preparing the Barbican room for us, laying out the chairs and sorting the technology.

When found in situ, such nodules are often broken open, causing the loose sand to fall out, leaving the outer part as a solid spherical or cup-like feature."

Thank you Glynda.....it will still be the scotch egg of the Greensand to many!

Update on the Greensand Country Landscape Partnership Project

By Bev Fowlston

We're halfway through the Delivery Phase of this four-year project funded by the Heritage Lottery Fund and we have done so much work over the past two years:

- **Developed a new Eastern Geotrail** – highlighting the Woburn Sands Formation (formerly Lower Greensand) and its importance in underlying Greensand Country.
- **Installed a viewing area and steps at the LGS Sandy Warren Lodge Quarry** on the RSPB reserve in Sandy – allowing visitors a clear and safe view of the spectacular exposure of Woburn Sands.
- **Produced a 24-page booklet on the Earth Heritage of Greensand Country** – giving everyone in and around Greensand Country more detailed information on the rocks beneath their feet and the natural resources that Greensand Country have, and still, provide globally. Along with examples of how the Woburn Sands Formation affects habitats and land use across the area.
- **Created an accessible ramp to our premier educational site at LGS Scout Hut Quarry** in Potton – delivering a unique visitors' experience in Bedfordshire to this wonderful exposure of Woburn Sands.
- **Delivered several workshops** for the public including geoconservation, stone preparation and graphic logging – all aimed at teaching people how to look after the rare exposures of Woburn Sands in Greensand Country.
- **Produced an updated information board at LGS Scout Hut Quarry** in Potton – highlighting the scientific importance of the site and including all the wonderful match funding bodies who have helped us at this specific site.
- **Constructed a Wall of Geology** from local rocks to represent the geology of Bedfordshire as it crosses the centre of Greensand Country at Clophill. Based at the Eco Lodges site at St Mary's Old Church the wall is a focal point for everyone who traverses the Greensand Ridge Walk at this central point.



The Wall of Geology



Bev with Potton Scout Hut Quarry board



GCLP working team

With just over two years left on the project we still have a few things left to complete.....

- Interpretation for the visually impaired at LGS Scout Hut Quarry in Pottton (scheduled for completion at Grand Opening on Sat 23rd March).
- Interpretation for Wall of Geology (to be completed for Opening on Sat 4th May).
- Paint 'sky' area on Wall of Geology (scheduled for completion Sat 4th May).
- Central Geotrail leaflet (scheduled for launch at Festival event on Weds 29th May).
- Western Geotrail leaflet (scheduled for completion Dec).
- Site clearance of Dick Turpin's hideaway at Rushmere Country Park (scheduled for completion end of Summer 2019).
- Waymarking of all geotrails (scheduled for completion Dec 2020).

Greensand Country Festival 2019

It's coming up to that time of year when we showcase what we have done and invite the public to get involved. We are hosting two events and are involved in another during this year's festival. Following on from last year's feedback Greensand Country Landscape Partnership are running a month-long festival during May.

The events we are hosting are:

• Grand Opening of the Wall of Geology:

- Saturday 4th May, 11am -3pm
- Eco Lodges at Clophill
- Stands
- Activities
- Ribbon cutting
- Refreshments

○ Central Geotrail launch:

- Wednesday 29th May, 11am -4pm
- The George Inn at Maulden
- Promotional stand
- Activities

○ Eastern Geotrail guided walk:

- Wednesday 8th May from 10am

If you can help at any of these events – then please let one of the committee members know as soon as you can. Help as always, very much appreciated.

Shortly, we will have brochures to give out with all the events detailed, if you know where they can be distributed, please let Bev know.

We have been working with some great match funding bodies, without whom none of our projects would be possible:

Tesco Bags for Help, Postcode Local Trust,
The Geologists' Association's Curry Fund,
Pottton Town Council, Sandy Town Council,
Bedfordshire Local Community Fund with London
Luton Airport Operations Community Fund,
Tarmac, Plus numerous small donators

We thank them for their support so far and into the future.

Thanks Bev for a great report and thanks for all your hard work as Project Manager



Want a geological holiday with a difference? - try South Africa

by Henrietta Flynn

Having just returned from South Africa I thought I'd share some of the geological highlights I encountered.

Starting our holiday in Cape Town obviously included visiting Table Mountain which looms over this city. This famous mountain forms part of the Cape Fold Belt, being made up of strata of the Cape Supergroup, composed predominantly of quartzitic sandstone with the Malmesbury slates beneath. The third rock in Table Mountain is the Cape Granite which was intruded into the Malmesbury group beneath. The Table is estimated to be 520 million years old, making it at least 6 times older than the Himalayas and one of the oldest mountains in the world!



From Cape Town we travelled the 'Garden route' taking in (of course) the vineyards of Stellenbosch and Franschhoek then headed north-east into the Cape Fold mountain range, returning to the coast around Wilderness and Plettenburg Bay and completed the holiday with a safari in the Addo Elephant Reserve. Fabulous! The Cape Fold Belt is a magnificent mountain range comprised of a fold and thrust belt of rift valley sandstones and shales of Cambrian-Ordovician age 510-330mya. It was originally continuous with mountains in Argentina, Antarctica and in Australia forming part of the super continent Gondwanaland. Extension of the Falklands Plateau from Africa around 500mya followed by compression around 330mya resulted in the Cape Fold Mountains. It was very strange referring to rocks in the Southern hemisphere that had a totally different tectonic orientation from familiar British geology.



After closure of the rift valley and rucking of the Cape Supergroup into a series of parallel folds, running mainly east-west towards Port Elizabeth the continued subduction of the paleo-Pacific Plate caused a mountain range of immense proportions to rise.

The roads cutting through the Outeniqua and Swartberg mountains of the Cape Fold Belt revealed amazing exposures of contorted and near vertical sediments, anticlinal thrusts and spectacular peaks and views. We also visited the Cango Caves near Oudtshoorn, where the limestone is Pre-cambrian in age, utterly different from the Carboniferous caves of Derbyshire!

South Africa is a fascinating country to explore where the mountains and beaches go on for miles and miles. The food and drink is first class and the intriguing mix of friendly peoples and cultures is very

welcoming.and I didn't mention the exciting wildlife and Safari - I can't wait to go back!

Members try out proposed GCLP Western Geotrail

Sunday February 24th

The warmest day of the Spring so far brought out a good number of members to explore the GCLP Western geotrail. The carpark at Rushmere Park's Visitor centre was almost full as the combination of fabulous weather and half-term attracted walkers and families alike.

We walked a circular route of around 5 miles starting at Rushmere, following part of the Greensand Ridge Walk through Oak Wood where cycle tracks have exposed old quarry workings. We then took a diversion over fields to Great Brickhill. From the garden of the Red Lion pub (it was the morning so unfortunately not open!) located on the western edge of the Greensand Ridge we had an excellent view across the Jurassic clays of Aylesbury Vale towards Milton Keynes.

Our proposed walk then took us over fields towards Rammamere Farm where we returned to Rushmere Park via a rather muddy stile. Here we encountered the best greensand exposure of this walk at 'Dick Turpin's Cave' – an old quarry location with some spurious history (yet to be investigated). This could provide an excellent greensand site after significant clearance. A project for the summer perhaps.



Dick Turpin's cave



The group examine the Great Brickhill Greensand boulder

We continued south towards Stockgrove Park visitor's centre walking across a shallow valley of glacial origin. Continuing the walk through the woods and over glacial capping deposits we returned to Rushmere's carpark.

Feedback from some of the walkers was that the walk was too long. However, greensand exposures and geomorphological features are few and far between. There are 3 refreshment break-outs on the walk so it could be done at a more leisurely pace.

Many thanks to all the walkers for their suggestions and in particular to Malcolm Oliver (BGG founding Chairman) for his geomorphological input.

There is now a £3 parking charge at Rushmere, which was covered for members by BGG funds. Exiting Rushmere proved to be a challenge on the day due to the volume of cars. So maybe best to visit on a quieter day when we revise the route!

Cruise Corner: *Visit to Petra*

by Glynda Easterbrook

My latest cruise trip took me to the Middle East and the Suez Canal. From Aqaba, in Jordan, I was able to visit the ancient city of Petra, lost to all except the Bedouin until discovered in 1812 by Swiss traveller Johann Ludwig Burckhardt. The whole city was carved into the rocks of a hidden valley in ancient mountains which rise high out of the surrounding desert. Thought to have been settled as early as 9000 BC, it was finally established in the 4th century BC by the Nabataeans, nomadic Arabs who promoted it as an important regional trading hub.

The rocks of Petra are late-Precambrian in age, fluvial, cross-bedded sandstones deposited by braided river systems in an arid, desert-like environment. Petra is often described as the 'Rose Red City', due to the astounding colours of purple, pink and orange caused by the remobilisation and precipitation of various oxides of iron, highlighting some equally amazing sedimentary structures.

Petra itself is accessed through a very narrow gorge known as Al Siq which, unlike the lost city, has been formed by entirely natural processes, as a result of flash floods flowing directly into nearby Wadi Musa.

The floods have preferentially exploited fault and joint systems in the ancient sandstones. Al Siq is 1.2 kms long but only 3-4 metres wide, and is surrounded by extremely high cliffs. This formed a natural defensive system for the Nabataeans who lived in Petra, and ensured that it remained hidden for centuries after its eventual decline as alternative sea trade routes were established and a series of earthquakes destroyed the city in the 4th century AD.

Sounds like a brilliant place to visit.



Visit to Bow Brickhill C of E Primary School

On 7th February, Bev popped along to Bow Brickhill school to talk to the children in Years 3 and 4 about volcanoes and earthquakes. The children were brilliant, very intelligent and asking lots of wonderful questions. Miss Rust, their teacher, had a very well behaved and engaged group of young people. Bev received copies of some amazing thank you letters from all the children. Here are some of the facts they learnt (not sure they have remembered them all correctly!):

"Granite comes from a volcano that hasn't emptied in a while."

"Pumice is very light because it is made of bubbles."

"The oldest rocks in the world come from Highland Scotland."

"Fools gold is a rock that people thought was gold."

"Slate is a flat rock that is made from mud and crystals."

Membership Renewal

That time of year again..... yes, your membership is due for renewal on April 1st for 2019/2020. It remains at **£10 per person per annum** or £25 for group membership (organisations with 4 or more employees). Please send payment to Tony Baker at:

Mr Tony Baker, BGG Membership Secretary

36 Chapel Close, Toddington, Beds, LU5 6AZ (Cheques payable to BGG)

Alternatively, you can pay online directly to the BGG account.

Account name: Bedfordshire Geology Group, no **21507427**

HSBC, Leighton Buzzard Branch, no **40.28.12**

Please email Tony after payment at tonybaker36.bggmembership@yahoo.co.uk to let him know you have paid.

Please also let him know of any changes in address, telephone no, email etc

Your membership entitles you to 4 newsletters a year, free entry to all BGG events, walks & talks and frequent communications.

Join the BGG for the opening of the disability access facilities at Potton Scout Hut Quarry

We are holding the official opening of the disability access facilities at Potton Scout Hut Quarry on **Saturday March 23rd at 11am**. This educationally important geological site is part of an array of geoconservation projects undertaken for the GCLP.

An important aspect of this project has been to facilitate greater and easier access to geological sites. To deliver this, BGG has cleared this Potton exposure, improved its pathways and constructed new stairways and railings. A new interpretation board has also been designed.

A wheelchair access ramp has been installed so the disabled can get hands-on access to the exposure. The interpretation board has also been designed for those with impaired eyesight.

10 – 11am	Set up for exhibitors
11am	Gates open for public access
12 – 12.30	Introduction & presentation on the Greensand Country
12.30pm	Ribbon cutting ceremony
1pm	Refreshments, activities & promotions
3 -3.30pm	Dismantle & finish

Please let Bev Fowlston know if you plan to attend.
bev.fowlston@gmail.com or text 07919158622



Visit to Sedgwick Museum of Earth Sciences

Wednesday January 16th

On a rather dull January morning ten BGG members gathered outside this impressive museum in the University of Cambridge. Once inside, under a huge replica of a skeleton Iguanodon an alarm went off. Had someone tried to open one of the display cabinets? Staff member Rob Theodore quickly took control of security before giving us an introductory talk on the museum, its history and its founding members – Dr John Woodward and Rev Adam Sedgwick.

The museum's estimated 2.5 million objects are founded on the world's oldest intact collection of rocks, minerals and fossils. Assembled & bequeathed to the University of Cambridge in the late 17th century by Dr John Woodward, the collection expanded during the 18th and 19th centuries with additions from eminent geologist Rev Adam Sedgwick.

The current building was built in 1904 as collections grew and became known as The Sedgwick Museum after the Reverend. Today the museum houses mostly palaeontological specimens with much in storage. The bulk of minerals and rocks have now been moved to new premises west of the city and visited by appointment only, awaiting new premises.



The group not looking too happy! – well it was cold & wet

We wandered through the galleries which were arranged by geological age. Fabulous fossil specimens greeted us from all the original Victorian cabinets, ranging from the Cambrian Burgess Shale fossils to bones of only a few thousand years old collected locally in the Fens. A Darwin collection included his field notebooks and one of William Smith's original geological maps drew our attention.

Rob then took us downstairs to view the Watson Building Stone collection which showed a comprehensive collection of slates, granites, marbles and sandstones from quarries all over the world.

After lunch in John Lewis, avoiding the January bargains, (our intended café at the Museum of Zoology was closed!) we walked over to the newly opened Museum of Zoology. This university museum showcases an amazing diversity of animal life, explores extinction, survival and conservation.

A thoroughly interesting day in Cambridge. If you couldn't make this trip why not visit at your convenience. Both museums are open throughout the year and are free!

Hopefully BGG can organise a future visit to include the mineral and rock storage collection too.



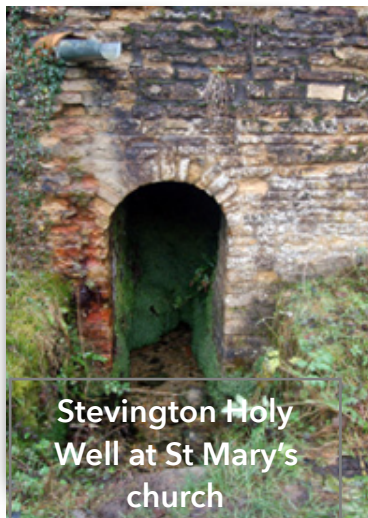
The group admiring the impressive iguanodon

Still in search of 'Holy Wells' by Derek Turner

The quest to locate the site of the holy well in Linslade that Bernard Jones described in the last edition of the BGG newsletter begs the question, "Were there other holy wells in this area?"

Long ago, visiting holy wells appears to have been a common pursuit, particularly during ancient festivals such as Imbolc (later 'Christianised' as Candlemas), Beltane (Mayday), Lunnasa (Lammas Day) and Samhain (All Saints Day). Depositing coins or other precious objects was one of the associated rituals and archaeologists have uncovered these subsequently during excavations on long-forgotten holy sites. We shouldn't be surprised that springs were venerated and I suppose that the well-dressing ceremonies that continue in the Peak District are modern equivalents.

Some place names show where springs achieved a "holy" title. The town of Holywell in Clwyd, is home to St Winifrid's Well and a chapel close by that still attract frequent visits. Other Holywell place names exist in Cornwall, Dorset, Northumberland, Gloucestershire and Herefordshire. Just across the Hertfordshire boundary, the little village of Holwell is probably another one and I know a pond there that is usually dry nowadays and looks a likely candidate for its location.



Stevington Holy Well at St Mary's church

Back in Bedfordshire, we know that there's one at Stevington where a steady but unspectacular flow of water emanates from beneath the outcrop of limestone where the church stands. One was recorded about 300m NE of the church in Cranfield in the 13th century and in the early 1800s, the water from it was used to treat sore eyes.

Some holy wells had other names. St Faith's Well at Hexton, Herts, (the site of which we'll go past on the Ravensburgh Castle walk on 7 April) was "holy" but appears to have dried up at some point and was filled in, presumably when the water table fell. Other settlements along the foot of the Chilterns scarp have churches located close to springs that were perhaps considered holy at one time and I suspect that the same applies in other villages along the Ouse valley as well as Stevington. If you are aware of others in Bedfordshire please let me know.

Thanks Derek.

.....News from the Old Linslade Holy Well archaeological dig from Bernard Jones.

Many objects were recovered from the summer dig, some dating from the 1600s and included clay tiles, bricks, pottery, pipes, a spur, horse bones and a knife. These have all been washed, measured and catalogued. Of particular interest is what is thought to be a Medieval curse or healing charm which requires some specialist research and conservation. The charm shaped like a small envelope is made of iron with delicate perforations or decorations. Bernard will be taking it to the Ashmolean Museum in Oxford shortly for some professional identification and dating.



BGG 2019 EVENTS

Date	Event	Description	Time	Venue
Saturday 23 rd March	GCLP Event	The opening of the new access ramp and information board , to allow people with disabilities to appreciate Greensand geology	10am	Potton Scout Hut, Sutton Road, Potton SG19 2DS
Sunday 7 th April	Visit	Visit to Ravensburgh Castle , near Hexton, an Iron Age hill fort on a spur of Pegsdon Hills	9.45 for 10am	Meet carpark nr Hexton School SG5 3JL
Saturday 4 th May	GCLP Festival Event	Opening of the Wall of Geology. Come along to see this unique feature in Bedfordshire celebrating the Earth Heritage of Greensand Country. Enjoy activities throughout the day	11am to 3pm	Clophill Eco lodges, Old Church Path, Clophill MK45 4BP
Wednesday 8 th May	GCLP Festival Walk	GeoWalk at the RSPB Lodge. A walk to discover geology and ancient environments. There are some steep sections on this trail	10am or 12 noon	RSPB Lodge Potton Rd, Sandy SG19 2DL
Wednesday 29 th May	GCLP Festival Walk	Walk the new Central Geotrail. A guided walk on the Greensand Ridge in the heart of Greensand Country's fascinating landscape and geology	11am or 2pm	Meet at The George Inn Maulden MK45 2DF
Saturday 15 th June	Site clearance	Kensworth Quarry Nature Reserve site clearance. This annual clearance will restore this Chalk exposure to its former glory. Bring along spades, trowels and hand brushes	10.30 to 12.30	Kensworth Quarry, Dunstable Downs LU6 2PR
Saturday 13 th July	Conference & field studies	John Catt Symposium. In association with Herts Geol Soc & Herts Nat Hist Soc.	Whole Day	University of Hertfordshire Bayfordbury Field station



BGG Committee:

Acting Chairperson	Anne Williams	annew36@hotmail.com
Group Secretary	Derek Turner	derek.turner@phonecoop.coop
Treasurer	Bev Fowlston	bev.fowlston@gmail.com
Meetings Secretary	Glynda Easterbrook	glyndaeasterbrook@gmail.com
LGS Manager/Information	Anne Williams	annew36@hotmail.com
Projects/Greensand Rep	Bev Fowlston	bev.fowlston@gmail.com
GA/Geo-East rep	Henrietta Flynn	henriettaflynn@btinternet.com
Chalk rep/BNHS rep	Janet Munro	janet.munro@bedford.gov.uk
Events Coordinator	VACANT	Could this be you?
Membership Secretary	Tony Baker	tonybaker36.bggmembership@yahoo.co.uk
Newsletter Editor	Henrietta Flynn	henriettaflynn@btinternet.com
Publicity	VACANT	Could this be you?

Website Revision

The committee are looking at revising the BGG website as it's beginning to look a little dated and needs new navigation tools, new images and links.

Could you spare a little time to review some of the pages?.....we're not looking for a tech wizard as we will use a professional to restructure it. But someone to edit the content and improve imagery. Please contact Anne or Derek if you'd like to help.

Newsletter compiled and edited by Henrietta Flynn.
If you wish to include an article, photo or share your geological interest in the next issue, please contact me by email at henriettaflynn@btinternet.com

Hope you enjoy the read!

Please look at our website for news of walks, talks and events. It's easy to download flyers & geotrails.

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