Buckinghamshire Earth Heritage Group

Newsletter No. 21 January 2013

Geology in Bucks 2013 and beyond...

Over the last two years the BEHG has achieved a huge amount of conservation work (both geological and biological) through the hard work of volunteers and support from the lottery funding. The conservation work investigated several aspects of Buckinghamshire geology from a 'pure' professional and research basis through to education of locals and schools, including aspects of geology linked to our historical and archaeological past.

Plans are in place to get further and more regular assistance from government conservation bodies such as Natural England. Membership fees support the ongoing expenses incurred by the BEHG in providing insurance for site work, displays, and educational outreach and also to maintain the website. A few more members would therefore be very handy! The activities planned for 2013 should appeal to people with geological and wider interests such as nature, archaeology, history and architecture, as well as walkers and many others. If you haven't joined yet, please do and if you know of others who might like to please ask for some pre-printed information which we can give you at any of our events

Jill Eyers

Photo above: A group descending the steps into the Buckingham Sand Pit, a Local Nature Reserve full of geological interest.

Building Stones Survey - volunteers needed!

The BEHG is about to start a Building Stones Survey to document the geology in our building heritage.

This project will highlight where some of our poorly exposed rocks may be seen at the surface, albeit not in natural position, but incorporated as buildings. Impressive geological stories can be gained from here. For example the ammonites in the Bugle Horn pub wall can be used to demonstrate the fight for living space in the Jurassic seas which covered the area 150 million years ago.

Historical information will also be revealed as we conduct this survey which will add to our understanding and appreciation of Buckinghamshire's rich cultural heritage. The survey should also provide a catalogue to assist archaeologists in the identification of building stones; this is a study in its own right.

1.

2.

Some questions we might answer.

1) A carved architectural fragment (ashlar) – but what is the stone and where did it come from?

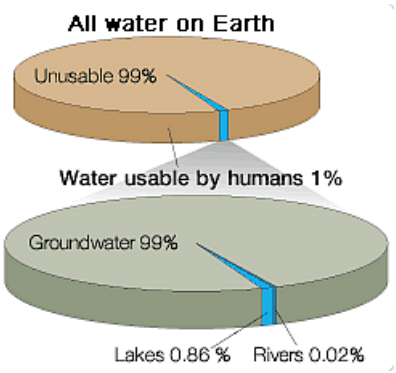
2) A Roman rotary quern found in a field – what is this rock type?

If you are interesting in being part of a small team of volunteers involved in this survey please contact **Jill Eyers**.

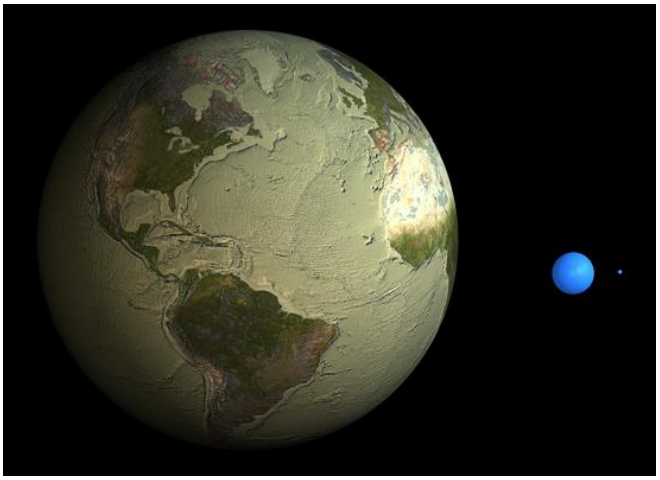
Hydrology - Water is a valuable resource!

Hydrology is the study of water movement, distribution and quality. It has close ties to the study of geology and the study of these overlapping subjects occurs under the banners of hydrogeology or geo-hydrology. It is a subject which we should all be interested in as water supplies sustain life on earth.

As part of the Burnham Beeches Streams, Springs and Sink holes walk, we pause at the Middle Pond to consider the availability of fresh water. Graphics similar to the one below are shown to describe the percentages of fresh and saline water at a global level. Trying to make the point that 99% of the Earth's water is saline and that, of the 1% of fresh water, most of it is invisible to us as ground water.



Recently however I came across a much better graphic that really brings the numbers to life.



The illustration above tries to visualise the data as a sphere of water next to a dried out Earth. The larger blue sphere includes all the water in the oceans, ice caps, lakes, and rivers, as well as groundwater, atmospheric water, and biosphere. It would be 860miles in diameter. The smaller blue sphere to the right represents fresh water in all the surface-water sources such as lakes and rivers on the planet; it is only 35miles in diameter. When visualised like this water must be seen as a valuable resource.

Graham Hickman

Source: The USGS Water Science School. http://ga.water.usgs.gov/edu/2010/gallery/global-water-volume.html

Recipe for the Chiltern Hills - the 'Chalk cake'

Allow millions and millions of microscopic algae to flourish in a warm, tropical sea for about 30 million years. Let settle into very thin layers 100s of metres thick, occasionally interrupted by a lack of oxygen which will kill off other life on the seafloor. Allow the resulting dead bodies to be engulfed in silica ooze which will harden into flint. Keep for 63 million years to harden into Chalk rock cake, flat as a pancake, but hundreds of metres thick.

The icing:

Allow some of the Chalk to be dissolved away leaving a gooey cap of Clay-with-flints. For variety, cap other areas with river sands and pebbles from around 40 million years ago.

Cutting and shaping:

Entomb the hills under tundra during several glacial advances. Allow freezing and thawing to break up rock, and allow melt waters to cut down into the flat Chalk, shaping beautiful rounded hills and carving out coombs.

Ingredients

- 100s of metres of Chalk
- A good sprinkling of flints
- A generous quantity of fossils
- clays and sands for icing
- one Ice Age
- oodles of time

Keeping the cake:

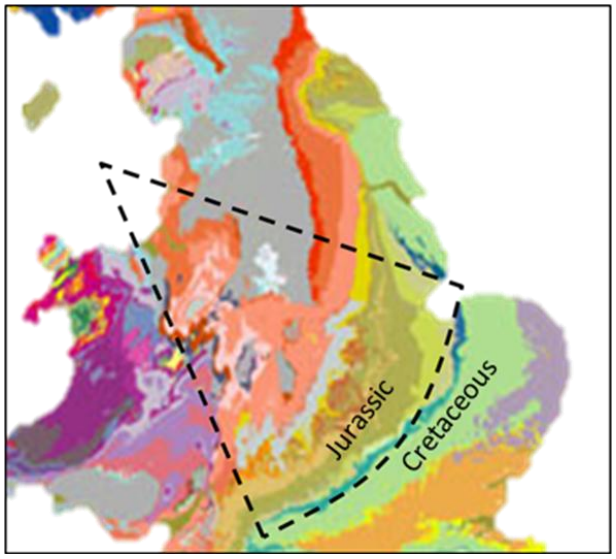
Keep in a safe place away from some humans who may want to eat it all! Allow nature to take its course, continuing to wear and weather the beautiful Chiltern hills. If stored well it will last for millions more years.

Jill Eyers

The pattern and rate of change in Bucks Geology

Travellers from NW Wales to London may notice that the rocks they cross get progressively younger the farther southeast they go. This is due to the regional dip of the geology and because the younger strata in the NW have been long since been eroded away, leaving the older rocks now at the surface. Not only that; the **geological map (right)** shows that the outcrop of these layers, particularly the Jurassic and Cretaceous ones, follows a generally actuate pattern, with a radius originating in the Irish Sea. Researchers have recently attributed this to a crustal scale 'upwarping' caused by a mantle hotspot at the end of the Cretaceous period (~65ma) which formed beneath what is now the Irish Sea. At least 2km of sediment has been stripped off. The uplifted Chalk would have started eroding at that time, forming a series of scarp and dip slopes which retreated towards the southeast through time. Evidence for these past escarpments can be deduced from the current drainage patterns which appear unrelated to the present underlying geology; this is because they were established by a pre-exisiting surface and now form "Superimposed Drainage". For example in Bucks the majority of the streams flow parallel to the geological outcrop in a NE-SW orientation. It is natural for watercourses to originate in clay vales at the foot of a scarp slope. But many of these streams flow along the same direction out in the clay vales, well away from the present day scarps. **The diagram** below shows how the drainage pattern was formed on an earlier pattern of scarps and vales and as erosion progressed (as per the dotted lines) it eroded vertically down, through the Portland Limestone, leaving the streams 'trapped' between isolated limestone capped ridges in the Vale, which otherwise might have been a continuous dip-slope.

So, what is the rate of this scarp face recession? To us the Chiltern scarp seems un-

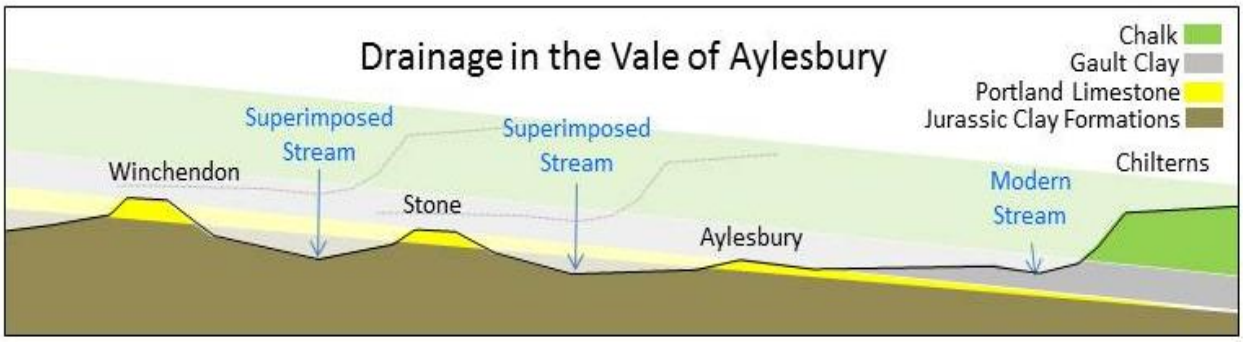


changed for millennia. But, if we consider the period since the end Cretaceous uplift (~65ma) and the distance from the hot-spot as 320 km, a simple calculation suggests an average annual Chalk scarp retreat of about 5mm per year. That is 5cm each decade and 35cm in an average lifetime. Rates do not perhaps seem that rapid to us, but is this necessarily the case?

It has been suggested that patches of gravel (opposite the Wendover and Risborough Gaps) that are at least 3km out into the vale, represent part of an original gravelly infill to these valleys, when they extended out to the NW along with the scarp.

As these gravels are dated to the Ice Age, we can use this average rate of 5mm/year to back-calculate a possible scarp position at the time of the last ice-melt 10,000 years ago (50m), the end of the Anglian Glaciation 425,000years ago, which practically reached the Chilterns (2km); or even the beginning of the first cold period at the onset of Pleistocene glaciations at 2.6 million years (over 12 km). Doesn't seem such an unreasonable rate after all!

Dr Michael Oates



2013 Future Programme –

Further trips and talks will be scheduled as the year progresses. Please check the BEHG website or email the organisers before any event, for the latest update.

Thursday January 3rd 2013. Talk on Northamptonshire Geology and Archaeology by Dr Clive Rodgers. Yardley Gobion Local History Group.

Tuesday February 19th 2013 10am-12noon. Geological Detective, Wendover Library. Drop-in session for children lots to handle and discover about fossils and make your own ammonite art to take home. For details contact Jill Eyers: at (j.eyers@btopenworld.com) or call 01494 881325.

Saturday February 23rd 2013, 10am-12noon. Geological Detective, Wendover Library. Discover your local rocks and fossils and ask a geologist about local sites to visit. Bring in any rock or fossil you want identifying, drop in from 10am. For details contact Jill Eyers: at (j.eyers@btopenworld.com) or call 01494 881325.

Saturday 2nd March 2013, 10am-2:30pm. Geological Detective, Lane End. Hands-on talk. For details and to reserve a place contact Jill Eyers: at (j.eyers@btopenworld.com) or call 01494 881325

Saturday March 9th 2013, 10am – 3:30pm. Fossil Workshop Coombs depot then quarry walk. Walk led by Jill Eyers. For details and to reserve a place contact Jill Eyers: at (j.eyers@btopenworld.com) or call 01494 881325

Saturday March 23rd 2013, 10:30am-2:30pm Geological Walk - Great Brickhill's Geological landscape and Greensand Hills Ramble. Leader Dr. Clive Rodgers. To include optional pub lunch at the Old Red Lion, Great Brickhill. For details and to reserve a place contact Clive Rodgers clmrodgers@btinternet.com or tel. 01296720062

Thursday April 25th 2013, 11am-12noon Bugle Pit Grand Opening and social gathering with lunch at the Bugle Horn Pub opposite at 12noon. For details and to reserve a place contact Jill Eyers: at (j.eyers@btopenworld.com) or call 01494 881325 Let Jill know you if you are coming by 1st April to book table for lunch.

Saturday April 27th 2013, 10am. AGM at the Tea Rooms, Claydon House. This will be followed by a landscape and geological/archaeological walk led by Dr. Clive Rodgers. The walk will be suitable for members with older children. Contact Clive Rodgers at: clmrodgers@btinternet.com or tel. 01296720062

Saturday May 4th 2013 10am-3pm, Buckingham Sand Pit site work and nature survey using simple ID guides. Survey and Clean-up teams needed - everyone can help no previous experience needed. For details and to reserve a place contact Jill Eyers: at (j.eyers@btopenworld.com) or call 01494 881325

Sunday May 12th 2013, 10am-3pm, Linford Quarry for logging the small sequence, and then building stones with the stone circle, church and other buildings. 10 am to 3'ish. For details and to reserve a place contact Jill Eyers: at (j.eyers@btopenworld.com) or call 01494 881325

Sunday October 13th 2013, 10am, Geological Excursion: New Bradwell, Milton Keynes. Leader Dr Tom Hose. The walk (and cyclists are welcome) entitled "Nobby and the Cut" will be following the new Geotrail along the Bradwell to Newport Pagnell railway walk/cycle route. For details and to reserve places contact Tom Hose: at (t.hose123@btinternet.com)

Saturday 26th October: Geological "fly-drive" based upon an old Geologists' Association Centennial Guide route. Leader Tom Hose. More details to follow.

Autumn - **joint BEHG/BAS event**, probably at Aylesbury Museum. Leader Mike Palmer

Membership

A thank you to those that have already renewed their subscriptions for this year, 2013 and a reminder to those that have yet to renew to forward on their membership fee as soon as possible please to Lindsay.

Annual membership runs from 1st January. Individual membership for the 2013 calendar year is **£7.50** and family membership is **£12**.

A copy of the membership form is available on our website: www.bucksgeology.org.uk

If you would like to join please complete and send the application form together with payment to:

Membership Secretary, Lindsay Hiles 4 Phoenix Close, Leighton Buzzard Beds LU7 3YW email: behg.membership@btinternet.com

Alternatively, you can pay your subscription direct to the ***BEHG*** account at :
Lloyds TSB (White Hart Street, High Wycombe)
Sort code: 30-94-28 Account no. 00744003

Confirmation of receipt will either be by email or by post. The BEHG welcomes all new members.

The Buckinghamshire Earth Heritage Group aims to record, conserve and promote the geology of Buckinghamshire and Milton Keynes.

Website: *www.bucksgeology.org.uk*

For general enquiries please contact:

Mike Palmer, Tel: 01296 624519
email: mpalmer@buckscc.gov.uk
Bucks County Museum Resource Centre,
Tring Road, Halton,
Aylesbury, Bucks HP22 5PN

Affiliated to the Geologists' Association

Bucks Earth Heritage Group

Membership Subscription due 1st January 2013

Individual membership £7.50

INDIVIDUAL/PRINCIPAL MEMBER (Please use BLOCK CAPITALS):
In order to keep costs to a minimum, correspondence will be forwarded via email wherever possible.

TITLE: …… NAME: ……

ADDRESS: ……..……..

…… POSTCODE : ……

TELEPHONE: …… MOBILE: ……..……..…

EMAIL: ……

Family membership £12.00

2nd MEMBER – NAME:……

3rd MEMBER - NAME:……

4th MEMBER - NAME:……

I/We hereby apply for membership of the Bucks Earth Heritage Group

A cheque/PO for £…….. is enclosed (cheques payable to BEHG)

Signature : …… Date : ……..

How did you hear about the BEHG?.....

Please send this completed form together with payment to:

BEHG Membership Secretary,
Lindsay Hiles,
4 Phoenix Close,
Leighton Buzzard
Beds. LU7 3YW
behg.membership@btinternet.com

For general information about the Bucks Earth Heritage Group and for an up to date programme of events please visit:

www.bucksgeology.org.uk