



Buckinghamshire Earth Heritage Group Newsletter No. 10 July 2010

Walk from West Wycombe to Bradenham. May Bank Holiday 3rd May 2010

The Bank Holiday walk was well attended despite the cold winds. Jill Eyers lead the walk from West Wycombe to Bradenham, stopping at a number of geological features along the way. Jill explained how the West Wycombe site was originally an Iron Age fort. Parts of the ditch and bank can be clearly seen next to the path on the north side of St Lawrence's church.

The Mausoleum, which was built by Sir Francis Dashwood in 1765, has a stunning display of flints set into the walls and large facing blocks of dressed Portland Stone. Much discussion was had on the formation of flint within the Chalk (see members questions) and how the builders had transported the Portland Stone before canals and railways had reached High Wycombe.



Photo above: Jill describes the flints

From the vantage point of the Mausoleum we were able to see the broad dry valleys cut into the frozen chalk during the Ice Age. Next a walk through the church grave yard provided an opportunity to see a wide range of non-local rock types from granites, marbles and sandstones. As the path continued along the ridge, muddy patches provided evidence for the 'clay with flints' which overlay the chalk. These deposits are the results of the dissolution of the chalk with the addition of remnants of Palaeogene sediments.

The deposits comprise reddish brown silty and sandy clays with flint pebbles and flint nodules.



At Bradenham the group was able to examine the sarsen stones dotted around the green **(Photo above)**. Sarsens are very hard silica-cemented sandstones and conglomerates which are found across the Chilterns above the chalk. Like the 'clay with flints' they are believed to be a remnant deposit of early Tertiary age. The modern equivalents form when wet tropical conditions alternate with hot dry conditions; warm acidic rainwater dissolves minerals as it penetrates the ground, then evaporates leaving a hard pan of cemented grains. At the end of the walk, the group examined the walls of St. Botolph's church, recognising the different stones used in its construction.



Photo above: Bradenham Puddingstone

Further details at: www.bucksgeology.org.uk/pdf_files/Walk4_Wycombe_Bradenham.pdf

Burnham Beeches walk - Springs, Streams and Sinkholes.

Saturday 19th June 2010

Around 20 people attended this event which was a joint BEHG and Corporation of London event led by Graham Hickman. Helen Read the ecologist at Burnham Beeches added to the groups understanding with explanations of the special habitats which the surface water sustains.

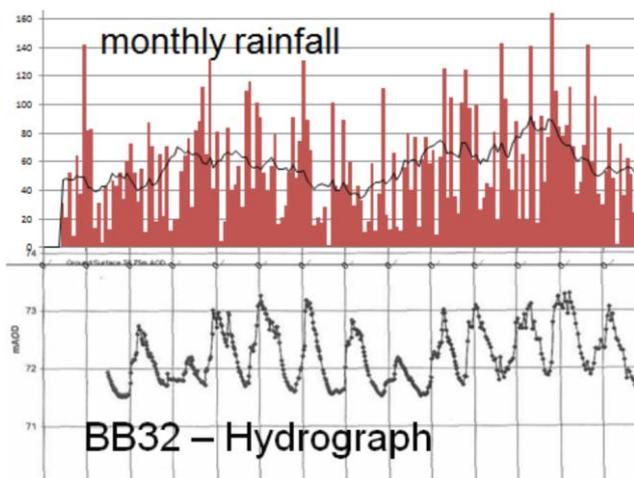


The geology of Burnham Beeches is dominated by the Quaternary sands and gravels of the Winter Hill river terrace. The gravels are up to 6m thick and form the flat topography of the common. The gravels are highly permeable and water tables within the gravels fluctuate seasonally with rainfall. Below the gravels are less permeable clays of the Lambeth Group, these can be found in the stream banks and valley sides. Springs and seeps occur at the outcrop boundary between the gravels and clays and these are often perennial in nature giving rise to rich areas of sphagnum mosses.

The hydrology was explained by tracing the streams from their sources as springs and mires, via the man-made ponds to sinkholes where they lose their flow and become the source to the underlying chalk aquifer. An insight into the hidden ground water within the gravels was also gained by opening up a couple of the water observation boreholes and using the Corporation’s well-dipper to measure the water level.



(Photo above – measuring the water table).



(Above: Monthly rainfall (red bars). Graph below: Hydrograph water table fluctuations)

After the walk one of the walk participants, Pauline Bunday, emailed in the following: “The walk was fascinating, extremely informative. I learnt so much I didn’t know and it has given me much more respect for the provision of water and a greater understanding of the work going on in Burnham Beeches (an area I really love walking in). The beginning was essential to gain an understanding of the whole process, the illustration cards were excellent to understand what was happening below ground at each area, the route through the Beeches was direct from one place to the next... I thoroughly enjoyed it.”

Finally the group enjoyed tea and cakes in the café after visiting the old quarry.

Talk: Bucks Ice Age Mammals. - May 19th 2010.

19 people attended Mike Palmer's talk on the Ice Age Mammals of Bucks. From hippos and spotted hyenas to woolly rhinos and cave lions, Mike used the Museum's collections to paint a picture of the changing fauna Buckinghamshire during the climatic ups and downs of the Ice Age. Of particular interest was the evidence amongst the 11,700 mammalian bones excavated from the former Pitstone cement works in the 1980s that the Steppe Mammoth was being replaced by the incoming Woolly Mammoth 200,000 years ago at the end of the Aveley Interglacial. This talk was part of a programme of events linked to the Museum's Human: half a million years of living in Bucks which ends shortly on Sunday 11th July.

Members Questions: How did flint form?

Anyone living in Buckinghamshire will be familiar with "flint", the ubiquitous stone present in all gardens and fields. It is found fresh in often irregular shaped nodules in the higher parts of the Chalk, from which it was mined by our stone-age ancestors for flint tool manufacture. But answering the question "How did it form" is not so simple. **(Photo below: irregular flint nodules)**



The Chalk is a pure limestone, made up from Calcium Carbonate (Calcite - CaCO_3) fragments of microscopic marine algae and animal remains. In contrast, flint is more or less pure quartz (Silica - SiO_2), albeit in a poorly crystalline form. So, from whence did this silica originate, and how did it accumulate as a distinct rock?

The Chalk sea, during the latter part of the Cretaceous Period, around 65-93 million years ago, was teeming with life, remains of which form the body of the chalk itself. Among these life forms were sponges, different from many other creatures in that they were supported by a skeleton of silica spicules, not calcite. On death, the sponges broke up and their disaggregated spicules were eventually incorporated into the chalky ooze forming the sea floor. In the top metre or two of the sea floor, these tiny skeletal fragments of sponges tended to dissolve more readily than in normal fresh water, particularly given the high relative surface area of the tiny sponge spicules and the fact that in certain salt solutions, silica becomes much more soluble. The silica in solution, as a gel, moved within the chalk ooze until it nucleated on something; maybe a piece of organic material, or a burrow system in the sea floor. Bacterial activity within

the seafloor sediment will have been creating hydrogen sulphide (incidentally the starting point for Iron Pyrite formation) and at some point, this will meet the oxygen-bearing seawater percolating downwards. At this level, acidic conditions are generated, which promote the dissolution of chalk and its replacement through precipitation of the dissolved silica. So any silica-gel concentrations coincident with this sub sea-floor chemical boundary will solidify into the microcrystalline form we know as "Flint".

For further proof that many flint nodules formed in burrows, look carefully at their shape. You may recognise the original characteristic branching form, albeit enlarged by subsequent flint growth. These invariably come from beds of flint, which have vast areal extent. Maybe this reflects periods of lower sedimentation, when burrowing organisms were able to create extensive galleries below the sediment-water interface. When the acidic conditions reached the depth of these burrow systems, solidification was able to take place. Occasionally, flint can be found in a tabulate form, infilling faults or joints and obviously forming much later than the time of deposition. These are less well understood, but the same dissolution and precipitation principles, under differing chemical conditions must also have been responsible.

(Photo right : Chalk cliffs showing cyclic dark flint beds. Some of these flint horizons can be traced from England across into Northern Europe.)



Michael Oates

2010 BEHG Programme

Saturday 10th July 2010: 10am. Burnham Beeches – Streams, Springs and Sinkholes. Another chance to participate on this geological walk led by Graham Hickman for Hertfordshire Geological Society. Contact Graham Hickman at (hickmang@bp.com) or call 07763363266 for more information.

Sunday 11th July 2010: Visit to Munday's Hill Quarry – Unfortunately this trip has been cancelled due to unforeseen circumstances.

Saturday 7th August 2010: 9:00am. Kenworth Quarry- Nature Reserve clean-up. A joint BEHG and Bedford & Luton Geology Group clean-up. Please bring your own equipment & refreshments. Parking arrangements still to be finalised. Contact Anne Williams at annew36@hotmail.com or call Lesley Hiles on 01525 371101 for further information &/or to register your assistance.

Tuesday 24th August 2010: 7:00pm Coombs Quarry & Thornborough Community Woodland. A joint meeting with NHSMK (Natural History Society Milton Keynes). Lead by Dr Jill Evers and Julia Carey. Blisworth bivalves, Cornbrash curios, community woodland, orchard, pond and, with luck, Barn Owls at dusk. Meet in the car park at Coombs on the small road between Adstock and the (burnt out) Lone Tree Pub on the A421. **Grid Ref: SP734320.** Contact Jill Evers at (i.evers@btopenworld.com) or call 01494-881325 (mornings only) to confirm your booking.

September 2010: Visit to Tottenhoe Stone Quarry. more details to follow

Saturday October 9th 2010: Four Decades Of Earth And Planetary Sciences At The OU. The Open University celebrated its 40th anniversary last year and to celebrate past achievements they are organising two days of scientific meeting and an Open Day on the 9 October 2010. BEHG members have been invited to participate. **More details to follow.**

October 2010: Conservation work at Froghall SSSI. more details to follow

Saturday November 6th 2010: 10:30am - 4:30pm. Festival of Geology at University College London, Gower Street, London WC1E 6BT. This free event organised by the Geologist's Association is open to the public. There will be speakers, exhibitors and activities suitable for children. The BEHG are planning to have a stand contact Graham Hickman (hickmang@bp.com).

Saturday 20th November 2010: 2.30pm - 4.00pm. Messages in Stone - Buckinghamshire's geological Past. A talk by Graham Hickman. Meet at Buckinghamshire County Museum, Church Street, Aylesbury. A joint meeting of the BEHG and the BAS Natural History Section.

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Membership

Membership is open to beginners and experts alike. Annual membership runs from 1st January. Individual membership is £5 and Family membership is £8 per annum. 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 email: behg.membership@btinternet.com

4 Phoenix Close, Leighton Buzzard Beds LU7 3YW

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

For general enquiries please contact:

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