Buckinghamshire Geology Group

Newsletter No 34 March 2020

Chalk and flint at West Wycombe

Puddingstones at Bradenham

Ice Age deposits at Buckingham

Chalk fossils and high vis at Kensworth

From the Editor

Missing Newsletter
In a repeat of last year, early spring edition is a bumper issue. This is due to the non-appearance of the Autumn 2019 newsletter, the content of which I have simply added to this edition. The general aim remains to produce three newsletters per year, early spring, early summer and autumn. In order to achieve this, I would welcome any input from members, whether of local fossils finds, enquiries about geological issues you would like to know more about, or interesting places you have been.

Updated Events Programme
We recently circulated the 2020 Group events programme via email. At that point, there were still a few dates not nailed down. These have now been confirmed in the updated programme at the end of this newsletter. We have also included Tom Argles annual GeoWeek event in Buckingham. This is not a Bucks Geology Group event but it is free and open to all and so we have included it, especially because our own Jill Eyers is assisting with the walk.

We plan to start working on the 2021 programme and already have a number of ideas. As members, if there are any events that you would like to see included, whether specific locations or more general ideas then just send me an email.

Membership
Just a reminder to say that our annual membership runs from April 1st to March 31st. If any potential new members or lapsed members want to take advantage of not having to pay a fee for attending our events then, anyone joining between now and April will receive membership benefits right through to the end of March 2021. Please see details at the end of this newsletter or visit the website (see 'Contact Us' tab) for more information.

Mike Palmer

From the County Museum

Mysterious scratch marks on flint
In August last year the County Museum's Keeper of Archaeology was sent a photograph (below) of a piece of flint with scratch marks on. The finder came across the flint in woods below Coomb Hill. The enquirer initially thought that the markings were made by badgers, however, closer inspection of an enlarged photograph seemed to show a more deliberate pattern suggesting the possibility of prehistoric rock art.

My first thought on seeing the photograph of the scratch marks was that they could be striations – scratch marks caused by a moving ice sheet during the Ice Age. In the rock collection at the County Museum Resource Centre we have a piece of flint collected by Dr Jon Radley at Stone Lane Pit in Bedfordshire, SP927289, labelled as *'ice scratched flint (striations) from boulder clay'*. During the Ice Age, most ice sheets didn't come as far south as Bucks with the exception of the Anglian Ice Advance 450,000 years ago which reached as far south as the Chilterns. Could this be the cause of the scratch marks?

Bucks County Museum collection (AYBCM 1988.153.129) 'Ice-scratched (striated) flint in Boulder Clay, Stone Lane Pit, Beds, 7th Nov 1988, Coll. J. Radley

Mick Oates thought not, commenting '*In the January 2013* (see Newsletter No. 21, January 2013) *I wrote a piece about the rate of Chiltern scarp regression and with an assumed rate of*

5mm per year, which would push back the complete chalk cover to the Irish Sea at the end of the Cretaceous, reckoned that at the end of the Anglian glaciation, some 425,000 years ago, the scarp would have been 2km further north-west than its present position. This erosion rate is averaged over 65 million years. It is quite likely that erosion rates in the stressful times of the Ice Age could have been higher (look at how meltwater has created huge now-dry valleys) so the scarp may have been even further back at this time. So, I doubt that any flint found around Coombe Hill has been touched by moving ice'.

The whiteness of the scratch marks compared to the discoloured patina of the flint suggest that the marks are of more recent origin and so, point back to badgers as the most likely explanation. If the flint was 'excavated' by a badger digging, then it is likely that the flint will become scratched. Also, badgers are known to scratch trees and rocks to stretch their tendons in the evening.

Mike Palmer

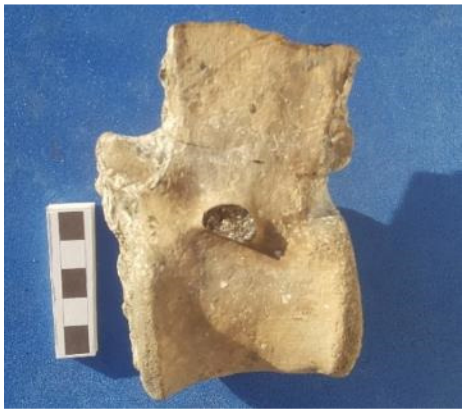
A Stewkley Crocodile

I was walking through the museum gallery last year when a member of the public showed me a fossil vertebra he found in a dry stream bed near Stewkley. The geology of this area is Kimmeridge Clay overlain with glacial till and glacial sand and, here and there, gravel deposits.

The Stewkley Crocodile vertebra

Initially I assumed that it was a plesiosaur vertebra and took him over to the Jurassic Sea display case to show him an example. However, once in front of the case it was the crocodile vertebra on that provided a better match. The distinctive feature to me was the narrowing waist of the vertebra on two sides which seemed to distinguish it from the Plesiosaur vertebra.

Seeking confirmation of my identification, I emailed the BGG committee and received a simple '*Yes, crocodile'* from Mick Oates. An accompanying photo showed another marine crocodile vertebra found by Mick at Watermead, (Kimmeridge Clay) in the 1980s.



Mick Oates' Watermead Crocodile vertebra

From the fossil record, two genera of marine crocodile are known to have lived in Jurassic Bucks, *Metriorhynchus* and *Stenosaurus*. Unfortunately, from vertebral material alone it is impossible to say from which either of these bones came from.

The crocodile vertebra on display in Bucks County Museum is from the Z.D Hunt collection and so would have been collected in the 19th Century. It is listed as coming from the Kimmeridge Clay but unfortunately, no precise location is recorded. The only other crocodile material we have in the collection are three plaster cast bone fragments, again collected by Mick Oates, this time from the Oxford Clay at Flettons Pit, Loughton, Milton Keynes. These are labelled as *Stenosaurus* sp. Another local crocodile find was reported in Newsletter No 27 (July 2016), the fragmentary skull of a *Metryorhynchus* sp crocodile found by Simon Penn in the Oxford Clay of North Bucks.

To stumble across a prehistoric crocodile vertebra while out for a walk is an amazing stroke of luck. Unfortunately, but probably also understandably, the finder didn't appear to want to donate his find to the museum.

Mike Palmer

'Exotic' Mineral find at Hartwell Park

In January, a local metal detector and regular visitor to the Museum Resource Centre came in with a mineral he had found in the 1970s from an area he described at Hartwell Park. Looking at a recent map the location equated with an area to the west of Coldharbour Way, Aylesbury, currently occupied by Aylesbury Park Golf Club and Fairford Leys football pitches.

Cassiterite sample found on the edge of Aylesbury in the 1970s

Jill Eyers and Linda Holmes identified the mineral as Cassiterite, the principle ore of tin. This is certainly not a natural occurrence in Buckinghamshire, the nearest sources being the former tin mines of Cornwall. So how did it get to Bucks. Generally, when faced with this sort of question there are two possible answers. It has either been collected by a person from one place and then discarded (or lost) at another or it has come in as part of a larger load for some purpose or other. There are no obvious purposes for cassiterite to be brought to Bucks and so, we must assume that it was brought in and later discarded or lost by an individual.

One enticing scenario comes to mind when looking at the find site. Less than half a mile to the south west stands Hartwell House. Today, it is a luxury hotel and spa owned by the National Trust, however, in the mid-19th Century it was the home and private museum of Dr John Lee, a collector of all things including Egyptian, Roman and Greek artefacts, medals and coins, ancient manuscripts, old mathematical instruments, portraits and busts of remarkable men and *'many miscellaneous specimens in the fields of geology, fossils, botany, zoology and ethnography'.* The County Museum still houses many the geological specimens collected by Dr John Lee, both locally and from further afield.

Some of the mineral samples collected by Dr John Lee for his private museum at Hartwell House in the mid-19th Century

Could it be that this mineral sample, found in the 1970s, is actually the lost property of the late Dr John Lee. The response from committee member Mick Oates captures the likelihood of this idea well – *'Whether or not it was once part of the esteemed Dr Lee's collection is a fanciful notion that would be a shame to dispel'*

Mike Palmer

Enquiries from Members

Buckingham Marble

The 2019 winter issue of *Buckingham Town Matters* ran a short piece on Buckingham's 'Malted' Milk Factory, a site now the University of Buckingham Chandos Road Buildings. However, this isn't the bit of the story our enquirer picked up on. Rather it is the briefest mention at the beginning of the article of how, when the factory opened in 1892, it occupied the former 'Buckingham Marble' quarry. J. Clarke's *The Book of Buckingham* (1984) records that the Marble quarry, off Chandos Road, had ceased production by 1885, adding that the marble was brown or grey and polished well. Clarke also notes that some of the tombs in the old churchyard are made from it. On the downside, it was described as difficult to work and became replaced by cheap marble from Italy after import duties were abolished.

Does anyone have any more information about Buckinghamshire Marble and is it possible to identify the tombs mentioned in the old churchyard?

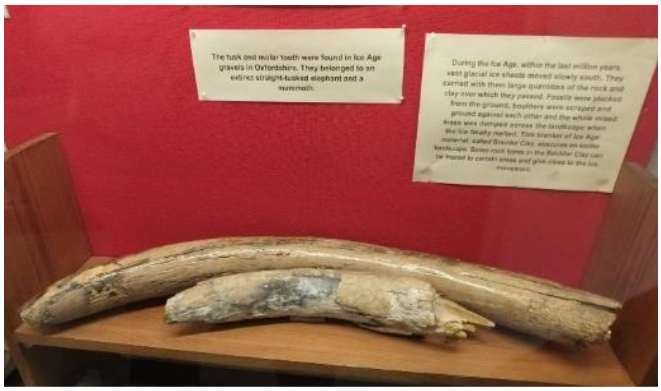
Val Atkins

Pre-AGM wander around Buckingham Old Gaol Museum, Saturday 27th July

Having purposely arrived early at the Old Gaol Museum for the AGM I had time to wander around the displays. With the Museum kindly agreeing to wave the entrance fee for people attending the AGM it seemed that several other BGG members had the same idea. Informative displays focused on archaeology, local history, prison life and Flora Thompson (author of *Lark Rise to Candleford*). It was, however, the geology display I had come to see.

A single but sizeable case, under the banner of *BUCKINGHAM - From the Tropics to the Arctic* featured local (and some slightly less local) fossils and rocks from 160 million years ago during the Jurassic and 200,000 years ago during Ice Age with the greater number of specimens from the former.

A smaller sign told us that *This display was made possible by British Gas, the Friends of the Old Gaol and with the advice and assistance of Michael Oates*. Most of the specimens on display are also loaned to the Museum by Michael (Mick) Oates. Of the many items on display, two objects particularly caught my attention.



Straight-tusked Elephant tusk

Firstly, two large tusk fragments from a Straight-tusked Elephant. This was partly because we don't have any examples in the County Museum collections in Aylesbury / Halton and partly because this is an often overlooked Ice Age mammal overshadowed by its more hairy but smaller cousin, the Woolly Mammoth. While the latter measures in at 3.4m at the shoulder (equivalent to a large modern-day African Elephant) the Straight-tusked Elephant was a real giant, measuring 4.3m at the shoulder. I remember Mick bringing a tusk to one of our early Rock & Fossil Days at Bucks County Museum, largely because it repeatedly prompted the question from visitors, *"Why is it called a Straight-tusked Elephant when it is clearly curved?"* The explanation given was that, although it does curve within one plane it doesn't spiral like the tusks of a mammoth. This was demonstrated by showing how a mammoth tusk would rock to and fro on a flat surface while the Straight-tusked Elephant tusk laid perfectly flat on the table. The tusk on display at Buckingham was found in Ice Age gravel deposits in Oxfordshire.

Another item that caught my attention is a cast of a two-legged dinosaur footprint found at Thornborough Mill in 1979 (see next page). The original piece was taken to the Oxford University Museum of Natural History (OUMNH) for the, then, Curator of Geology, Phillip Powell to examine. His letter of reply read as follows

"This slab of yours is a most wonderful specimen and I am very glad that you took the trouble to bring it here for us to see. It is difficult to decide how many footprints there are apart from this one clear example in the middle of the slab.


Thornborough Mill dinosaur footprint cast

The other impressions may represent the prints of animals which walked over the mud some days or even weeks before.

A walking, three-toed animal of that size at that period must be a dinosaur. The slender bird-like toes and the sharp claws suggest the hind foot of a carnivorous type such as a megalosaur. It is very difficult to be more precise because bones and tracks are such rare fossils. There are remains of megalosaurs from Stonesfield (William Buckland?) and a complete skeleton from the Oxford Clay north of Oxford."

The original is now on display at the OUMNH who kindly produced two casts, one currently here at the Old Gaol and another at the Buckinghamshire County Museum Resource Centre at Halton.

There are clearly more items on display here than we have space in this edition for and so, we may well return to this case in future newsletter

Mike Palmer

Post AGM visit to Buckingham Sand Pit, Saturday 27th July

High winds and the potential threat of falling branches at Buckingham Sand Pit put pay to our original AGM date of 27th April. Three months later we were able to eventually meet up at Buckingham Old Gaol Museum for our yearly chat (AGM minutes included with this newsletter). Post AGM, nine members and guests walked the quarter of a mile around to Buckingham Sand Pit, which is situated in a nearby residential area. As the pit is fenced off for safety, the first hurdle was to locate the entrance. Luckily some of the committee members had a rough idea that it was on the western side of the site and the party was soon inside. The Sand Pit contains some rare Ice Age geology, the clays, sands and pebble layers within the pit are direct evidence that some 450,000 years ago the area was in the grip of a moving ice sheet approximately 2 kilometres thick.


Western walkway viewing platform

The first stop was at the western walkway viewing platform to have a close look at the glacial till. The sediment here is poorly sorted with pebbles, of many sizes, and sand floating within a silty clay. The pebbles had been broken, ground down and plucked up by the ice to be transported from other parts of the United Kingdom and Scandinavia. Time was spent in identifying the types of rock contained within the till and guessing at the origins.


Looking at the varied content of the glacial till


Fossil Gryphaea oyster found loose in glacial till

As an ice age diminishes, the climate warms, the ice melts and retreats leaving behind many torrential river systems. The group now moved to the eastern side of the site to look at evidence of this water flow. At one end of the eastern viewing platform, the group was able to see multiple stratified layers of cobbles, pebbles gravel and sand. Each layer being made up of rocks of a similar size but with the sizes in each layer being slightly different from next. This disparity is the result of different flow rates at different times.

The eastern viewing platform

Jill explaining the direction of meltwater flow at the eastern viewing platform

Discussion took place about the direction of the water flow and how to determine it. Larger pebbles are aligned by the water flow so that the long axes point in the direction of flow. Smaller pebbles and sand are built up by the water flow into underwater dunes and ripples with the steep slope pointing upstream. After much talk is was decided that the general direction of water flow was to the north.

There was one more glacial feature evident at the other end of the eastern viewing platform. As water flows under the ice it cuts into the underside of the ice sheet, this inverted gully confines the water flow into a channel. As the suspended sediment and sand falls from decreasing water flow it forms a ridge under the ice, this ridge is known as an esker. An esker could be seen from one end of the platform and although some of the feature had collapsed it was still identifiable.

Buckingham Sandpit Esker

After a game of "hunt Mike's glasses", found under the walkway, the visit wound up and members made their home.

Ian Hudson

North Lincolnshire Quarry Visits, Saturday 3rd & Sunday 4th August

This was an opportunity for Bucks Geology Group members to join the Geologists' Association's North Lincolnshire Weekend Field Excursion lead by Mick Oates and Paul Hildreth.

The excursion extended over the entire weekend of August 3rd and 4th 2019, with many travelling up to Humberside the night before as we were expected at South Ferriby, the first locality for an early start by 8.30am. This Cemex-operated cement factory uses Cenomanian and Turonian chalk of the Ferriby and Welton Formations, augmented by Kimmeridge and Ampthill Clay, which are separated from the Chalk by a thin Albian Carstone and Red Chalk. It is a striking locality, exposing the only English example of a continuous transition between the Oxfordian and Kimmeridgian, with abundant ammonites indicating the Pseudocordata, through Baylei and Cymodoce Zones. The effect of the contemporaneous Market Weighton High to the north is evident in the pre-Albian erosion of the uppermost Jurassic and absence of most of the Lower Cretaceous. The base Cretaceous unconformity was well exposed with its overlying

metre or so of pebbly Carstone, with occasional reworked Jurassic reptile bones.

Overview of South Ferriby Quarry showing the grey-black Kimmeridgian, red-brown Carstone-Red Chalk and overlying Chalk.

The Jurassic clay formations yielded specimens of *Ringsteadia*, *Pictonia* and *Rasenia* ammonites, along with their microconchs, and a diverse bivalve and gastropod fauna. A few crushed specimens of the rhynchonellid brachiopod *Torquirhynchia inconstans* were found, marking the base of the Kimmeridgian Stage. The Red Chalk yielded, as always, the abundant small belemnite *Neohibolites minimus*.

Ammonite from the Ampthill Clay

Fossils in the Chalk are rarer, as this locality exposes Northern Province Chalk, although some inoceramid bivalves were seen.

The Black Band Bed.

The distinctive Black Band Bed (Fig 3.), has been correlated to the so-called ''Oceanic Anoxic Event'' approximately 93-94Ma. The Black Band is a thin (30cm), but prominent bed, marking the boundary between the Cenomanian and Turonian stages (and between the Ferriby and Welton Chalk Formations). Fossils are rare apart from some fish debris. It coincided with probably the highest Cretaceous global sea levels and a significant extinction phase believed to be associated with depleted oxygen levels. The extinction event saw the last Ichthyosaurs and almost the end of Rudist bivalves elsewhere.

In the afternoon, the group moved west, to Conesby Mine, a huge, disused opencast ironstone pit north of Scunthorpe. Here, the Lower Jurassic Frodingham Ironstone Member of the Scunthorpe Mudstone Formation is still exposed, after extraction ceased over 30 years ago. We were able to examine the upwards-increasing iron content in this shelly rock, between Semicostatum and Obtusum Zones of the Sinemurian Stage.

Ammonites found in the Frodingham Ironstone Member

Most of the commoner fossils typical of the ironstone were discovered, notably *Gryphaea, Cardinia, Camptonectes*, and the ammonites, *Asteroceras* and *Eparietites*. Some of the Charmouth Mudstone Formation overburden is

still accessible here, and produced many belemnites (*Nanobelus*) as well as the later, Raricostatum Zone ammonites *Leptechioceras* and *Eoderoceras*.

Most of the participants took advantage of the opportunity in the evening to enjoy a garden tea-party and viewing of the private Barrow upon Humber Geology Museum at Mick's house.

Enjoying the tea party at Mick's house.

On Sunday, we all convened at Ulceby Vale Chalk Pit, a large abandoned exposure which spans the upper Turonian and lower Coniacian Stage boundary. The chalk and its laterally extensive bands of tabular and nodular flints are still beautifully exposed and Paul was able to demonstrate how these correlate with the much condensed Chalk Rock hardground sequence in the Southern Province. A huge Paramoudra flint was detected in the face and much discussion ensued around the origin of these phenomena. Fossils were confined to a few echinoids, although the Ulceby Oyster Bed, near the top of the face, did produce many examples of *Pycnodonte vesicularis*.

Searching for the Ulceby Oyster bed

After a picnic lunch at Ulceby Vale, the party moved a few miles to the village of Elsham, where a much overgrown excavation in the Elsham Sandstone Member was visited. Although originally mapped as a small patch of Lower Cretaceous Spilsby Sandstone, the few metres of sand in this limited outcrop was explained as a local development within the Mutabilis Zone of the Kimmeridge Clay, immediately below the Cretaceous unconformity. It was reported that on a previous trip, the zonal index ammonite had been found in one of the concretionary blocks that still lie about the uneven ground. We were able to demonstrate for ourselves the proximity to the basal Cretaceous by finding Red Chalk fragments in the overlying field soil.

The party dispersed from Elsham after thanking the leaders for an exceptional field trip. We were very grateful to Alf Kitching Ltd. for access to South Ferriby; North Lincs Council for allowing access to Conesby Quarry; and to Adair Pickering and Brocklesby Estates (Ulceby Vale Quarry) and Mr. and Mrs. Dobbs (Elsham).

Graham Hickman

Some fossils collected at South Ferriby Quarry, North Lincolnshire

Bivalve, Thracia depressa, from the Amptihill / Kimmeridge Clay

Bivalves, Oxytoma inaequivalvis, from the Amptihill / Kimmeridge Clay

Some fossils collected at Conesby Quarry, North Lincolnshire

Ammonites, Prorasenia sp (microconchs of Ringsteadia or Pictonia sp) from the Amptihill / Kimmeridge Clay (Microconchs are the male form of an ammonite and are, as the name suggests, smaller than the female

Echinoid spine, Cideris sp, from the Red Chalk (with scale for size above and close-up below)

Belemnites, Neohibolites minimus, from the Red Chalk

Devil's Toenails, Gryphaea arcuata, from the Frodingham Ironstone Member. The larger valves (above the scale bar) look like a gnarled old toenail, hence the fossils' common name. The smaller valves (below the scale bar) look like a lid

Bivalves, Chlamys / Pseudopecten, from the Frodingham Ironstone Member

Belemnites, Nannobelus brevis from the Charmouth Mudstone Member

Identifications – Mick Oates

Some fossils collected by Mick Oates from previous visits to Conesby Quarry, North Lincolnshire

Nektonic Crinoid

'Conesby' Starfish

Asteroceras sp, from the Frodingham Ironstone Member

Leptochioceras sp

A Visit to Barrow House Museum, Saturday 4th August

As a special event associated with last year's North Lincolnshire field trip Dr Michael Oates offered the attendees a private viewing of the Barrow House Museum. The group enjoyed a fascinating tour of Mick's collection followed by afternoon tea and cakes on his lawn. To get some background on the Barrow House Museum and Mick's extensive collection we were able to ask him a number of questions.

Q1. How long have you been collecting fossils and what first sparked your interest?

I've been collecting fossils since the age of 10 (nearly 60 years) after a primary school teacher in Wendover stimulated a palaeontological interest in several of her class by playing a BBC Schools series broadcast on a Friday morning. I can't remember its title, but I do recall the 'BBC Reporter from the Past' describing the scene from some vantage point as each week concentrated upon life in successive geological epochs. At least two of that class went on to follow geology as a career.

Q2. What made you decide to build your own museum in Barrow-Upon-Humber?

After working as an expatriate for the last 13 years of my career as a geologist, my wife and I chanced upon a house for sale in North Lincolnshire which included a massive two-storey garage. The imagination ran riot. Our offer for the property was accepted and the upper floor was duly converted to a geological display facility, which was created on a small scale almost as soon as we had moved in by late 2015.

Q3. The display cabinets look very professional; can you tell us something about how you acquired them?

Having settled into village life in the UK, I offered to volunteer my geological expertise to North Lincolnshire Museum, in Scunthorpe, where there was no longer a dedicated geology curator. The offer was embraced and quite soon after, the museum advised that the geology collections were due to be re-housed in newly constructed cabinets. It seemed that the old ones, only 30 years old, were to be discarded, so I offered to give them a good home. When the crew arrived to dismantle the old display cabinets, I asked them nicely to keep as much intact as possible, which they did. Since then they have been reconstructed in my own space, although it has meant that the lower storey had to be converted into useful display space as well. Second-hand drawers below the glass displays allows more material to be readily accessible as well. Goodbye garage!

Q4. Can you give us an estimate as to how many Specimens you have in your collection?

That's a difficult question, but it must be in tens of thousands…. and still increasing.

Q5. What do you consider to be your most unusual fossil?

I have several unusual personal finds. The tiny frog skeleton from a 60 million year old lake deposit between two lava flows in the Deccan volcanics of Mumbai ranks alongside a superb tri-dactyl footprint cast from the Cretaceous of Morocco, which may have been created by a huge Pterosaur. Fossil rain pits from a nearly dried-out Devonian lake bed in the Orkneys is remarkable in recording events over a few seconds of time, 370 million years ago.

Q6. Finding fossils is exciting. What has been your most exciting find?

Again, no single specimen can be given this accolade, but I remember well the excitement of excavating the Watermead Pliosaur, particularly the possibility of uncovering a 2m long skull (which sadly never materialised) as we dug out a succession of neck vertebrae. Otherwise, the thrill of discovering a fossil which tells or changes an accepted geological story is up there with the rest — for example, during my post-graduate field work, a couple of ammonites from the Hebrides informed me that the previous interpretation of the Lower Jurassic stratigraphical sequence was completely wrong. Another which springs to mind was the discovery of a single microfossil which resulted in the discovery of a significant extension to a North Sea oil field.

Q7. How many visitors have been to view your museum since you opened the doors?

The visitors' book has one hundred entries, but the total must exceed that.

Q8. I notice your collection is well labelled, can you say anything about how your collection has/is used for scientific research?

Without information about a fossil's locality and stratigraphical horizon, there is little value in it beyond being a rockery or mantlepiece ornament. I have tried to give each specimen its proper provenance, and have benefited from the records written in old field notebooks going back to 1970 to achieve this. Material which has been figured in scientific papers has already been donated to appropriate formal museum collections and a representative selection from North Bucks has created a display in the Old Gaol, Buckingham. The most extensive research was by a PhD student from Leeds, who spent two days meticulously measuring hundreds of Lower Jurassic bivalves collected in the 1970s in Scotland for his own thesis. It is now traditional to loan material annually for the Yorkshire Geology week and the Lincolnshire Show, at which a friend likes to illustrate a geological theme with real specimens. On top of this, I continue to work on some of the material myself but have also left instructions as to which institution it should go when my days are up.

Q9. If members of the public would wish to visit (having read this article) what arrangement should they make? Do you have open days or special occasion when people could arrange to visit?

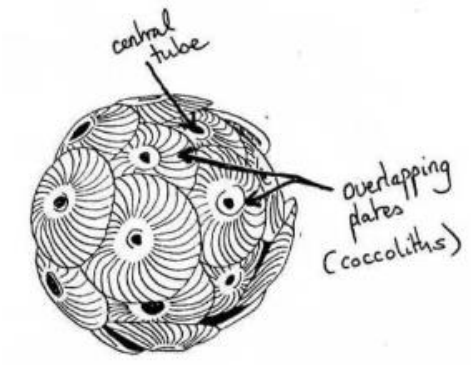
Very occasionally, if there is a village event, I invite people to visit, or if I am involved in a geology field trip in the area we might end up here. But most visitors express an interest after hearing by word of mouth and all are welcome. Just contact me at michael.oates@mail.ru me beforehand for directions and to make sure I am in.

Graham Hickman

Geological Walk around West Wycombe and Bradenham, Saturday 10th August

On a very windy summer morning 14 members and guests met inside the gate of the hill-top church of St Lawrence, West Wycombe. Walking around to the front of the Dashwood Mausoleum, Jill pointed out the banks and ditches that showed we were standing on an Iron Age hillfort. The hill, however, is much older – dating back to the Cretaceous period (in composition at least). The chalk beneath our feet (New Pit Chalk topped with Lewes Nodular Chalk) was laid down between 92 and 88 million years ago at time of major global warming. As sea-levels rose, land, along with land-washed sediments, disappeared.

In these warm and expansive seas single-celled algae, known as coccolithophores, thrived. These organisms are notable for their protective microscopic, calcareous plates (coccoliths) and it is these plates that provide the sediment from which the chalk is largely formed from. Jill pointed out that coccolithophores were a major food source for marine animals such as shrimp which would then excrete the shells to fall to the seabed. And so, we find ourselves unknowingly standing on a mound of shrimp poo!



The chalk was originally laid down in broadly flat layers and so, where did the hill come from? Jill explained that plate tectonics and uplift in the Earth's crust led to the flat chalk strata in our area becoming tilted upwards towards the north-west. Subsequent weathering led to the formation of the Chiltern escarpment which, over tens of millions of years, has slowly been eroded back to its present position. The final part of the formation of West Wycombe Hill takes place part way through the Ice Age around 450,000 years ago when a massive ice sheet (the Anglian Ice Advance) reached down to, but not over the Chilterns. Seasonal melting of this ice sheet sent torrents of water across the frozen Chilterns carving the, now, dry valleys as exemplified by the one below us in which the A40 could be seen running into the distance towards High Wycombe.

Looking east from West Wycombe Hill along the A40

Turning our attention to the Dashwood Mausoleum, Jill provided a potted history – built in 1763-4, principally for Sir Francis Dashwood's wife, Lady le Dispenser. Our focus, however, was on what it was made from. The enormous number of flints, both knapped and undressed, that cover much of the structure would have come from the earlier excavation of Hellfire Caves within the hill. The chalk from the excavations was used in the construction of a new road (on the present line of today's A40) to High Wycombe to replace the older, rutted track in the valley.

The Dashwood Mausoleum, West Wycombe

Other parts of the structure were made from Portland limestone and, later, concrete! The presence of fossil seashells provided one way of distinguishing the two. Although Portland Stone occurs naturally in the Aylesbury Vale hills, this was higher quality stone brought up from Dorset. Predating the railways, the journey by horse and cart would have made this an expensive endeavour.

Exploring the churchyard, Jill noted that the oldest headstones were made from Middle Lias sandstones, probably from quarries in Northamptonshire. These could be seen to have weathered quite a lot. Headstones made from more durable rocks dated from a time after the arrival of the railways and included red granites from Scotland and gabbro, also from Scotland as well as northern England and as far away as Italy.

Looking at the walls of the church tower a mix of stone could be seen. Amongst the flints we could see large blocks of Denner Hill Stone, a local form of sarsen. Shaped stones on the corner of the tower were not Portland Limestone but rather, a limestone from Lincolnshire.

St Lawrence's church tower wall, West Wycombe

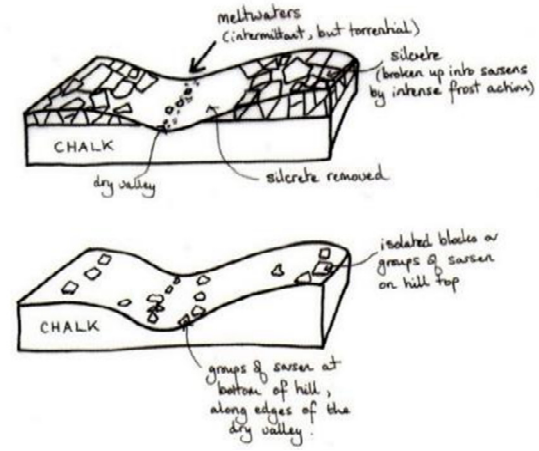
As the group left the churchyard, we paused by a sizeable puddingstone boulder. This example comprised an upper part of hard sandstone (sarsen) with flint pebbles included in the rock further down (puddingstone). Puddingstones, along with sarsens, are known as silcretes – sedimentary rocks where the sand grains and / or pebbles are held together by a very strong silica cement – like concrete but with silica instead – hence the term, silcrete. And our second location of the day certainly had many examples of these.

Driving up the dry valley now occupied by the A4010 and turning right to Bradenham village we arrived at a large expanse of closely mown grass near St Botolph's church. Jill explained that in the past this area would have been strewn with puddingstones of varying size but that these had been moved to the roadside in order to create the village green and cricket pitch. Further up the road was a field still containing a natural strew of puddingstones but unfortunately the vegetation was currently too long to see them today. Jill noted that other nearby locations for puddingstones included Naphill and Downly Commons.

Bradenham Puddingstone with St Botolph's church in the background

Closer inspection of the village green stones revealed a combination both puddingstones containing flint pebbles and sarsens containing sand only along with other rocks that seemed to be half and half.

Puddingstones would have originally formed as large crusts or rafts from gravel deposits before later being broken up into smaller blocks by the freeze-thaw action during the Ice Age. These smaller blocks, exposed on the Chiltern hillsides, would have then moved steadily down slope into the valleys by solifluction (downward movement over time on waterlogged soils) into their present-day location. While this latter stage is fairly clear, the 'when' and 'how' of the formation of the sand and gravel deposits into puddingstones and sarsens is less straightforward.



Dating has historically been difficult as puddingstones and sarsens have all moved from their original locations (as described above) and so, are stratigraphically out of context. Current thinking puts their formation at around 50 million years ago during the deposition of the Reading Beds in the Palaeocene.

At this time, rivers crossing the pre-uplifted Chiltern area would have carried and deposited sands and gravels. The gravels would have predominantly been formed from flints eroded from the earlier chalk. Over time, these deposits became buried and then cemented together by the initial dissolution and later precipitation of silica, firmly binding the sand and pebbles together into silcretes. Exactly how this happened, however, is still a matter for debate and it seems as though every account I read suggests a different process to lesser or greater degrees.

Jill described an arid environment, 50 million years ago, with hot winds blowing sand and fine sand (silica) dust across a landscape of dry riverbeds. Over time the fine silica dust works its way into the spaces between the sand and gravel

deposits while the repeated formation of dew during cold nights would moisten the dust, promoting crystal growth, thus slowly binding the deposits together.

Looking at the rocks, Jill noted that the different-sized flint pebbles were all jumbled up suggesting that they had been deposited during a fairly turbulent river environment prior to their cementation. However, other examples nearby showed different compositions which simply reflected the fact that the deposition environment can vary over an area due to varying flows within different parts of the former river.

Bradenham Puddingstone

When people talk about puddingstones, they are normally talking about Hertfordshire Puddingstones. Jill, however, described the examples at hand as Bradenham Puddingstones. Arthur Morley-Davies and Arnold H.J. Baines in their *Preliminary Survey of the Sarsens and Puddingstone Blocks of the Chilterns*, 1952, described two types in addition to the sarsens, namely, the more widespread Hertfordshire Puddingstones and the less abundant Bradenham Puddingstones. The primary difference seems to be in the size and shape of the flints contained within. The Hertfordshire variety tends to have smaller, more rounded pebbles while the Bradenham form has larger, more irregular and less rounded flints. Jill also noted a difference in colour with the Hertfordshire puddingstones having a darker cement and browner pebbles while the Bradenham puddingstone had a beige cement with lighter pink, red and yellow pebbles. There is far more to puddingstone than first meets the eye and we shall certainly be looking at them again in future newsletters.

Finally, we visited St Botolph's Church. Looking at the worked-stone edges at the front of the church it was interesting to see that the Portland Limestone had weathered to different colours presumably reflecting different sources. On an extension around the back of the church, Totternhoe Stone, one of the harder strata found within the chalk sequence, had been used and was seen to be weathering badly.

Chalk Rock on corner of St Botolph's church

As with St Lawrence's Church at West Wycombe, blocks of Denner Hill Stone, could be seen here and there in the church wall. Jill described, how this very hard stone was, when first extracted from the ground, still soft enough to cut. An explanation for this remarkable fact seems likely to be an article for a future newsletter.

Denner Hill Stone setts, Bradenham village green

Just when we thought we had talked enough about silcretes, on returning to our cars we found that we had parked just off a driveway across the village green formed from setts made from local Denner Hill Stone. Silcretes in all their puddingstone and sarsen forms truly abound at Bradenham

For further information on West Wycombe and Bradenham see our website page
http://www.bucksgeology.org.uk/books_and_leaflets.html

Please note that leaflet gives an age of 20 million years for the formation of puddingstones. This figure has since been revised to 50 million years as noted in this newsletter

Mike Palmer

Visit to Kensworth Quarry, Bedfordshire, Friday 30th August (from 4th June)

The original date for this trip, Friday 14th June, had to be cancelled due to a prolonged period of British summer rain leading to the chalk in the quarry '*slurrifying to indescribable proportions'* making it unmanageable for quarry vehicles let alone humble pedestrian geologists. Not surprising for a hole in the ground 40m deep. By late August, however, all the necessary variables had aligned and the trip was back on.

Rob Farrow, Kensworth Chalk Quarry, Creative Commons

We were met in the car park by leader Mick Oates, who had generously driven down from North Lincolnshire to lead the trip. Mick explained the chalk from the quarry was transported north to the Cemex cement works in Rugby in Warwickshire. However, rather than taking it by lorry or rail, the chalk is mixed with water to form a slurry to be pumped an unprecedented 55 mile distance via an underground pipeline.

On entry, we were met by the hospitable Cemex quarry manager who, after the required health & safety induction, gave us a lift to the far side of the quarry. As Kensworth is the largest active chalk quarry in Europe this mile-long car journey was much welcomed. Once assembled at the eastern end of the quarry, six highly visible members and guests started examining the exposed chalk faces.

Mick provided an overview of chalk stratigraphy outlining the broad groupings.

Age (million yrs)	**Sub-Group**	**Formation**
83	**White Chalk**	*Newhaven Chalk*
84		
85		
86		*Seaford Chalk*
87		
88		
89		*Lewes Nodular Chalk*
90		
91		*New Pit Chalk*
92		
93		*Holywell Nodular Chalk*
94		
95	**Grey Chalk**	*Zig Zag Chalk*
96		*West Melbury Marly Chalk*
97		
98		
99		

Simplified diagram showing the stratigraphical sequences of the Chalk Formations found in the Chilterns

Traditionally the chalk was divided into the Lower, Middle and Upper Chalk, however, these have now been redefined into the Grey Chalk Sub-Group (equating to the former Lower Chalk) and the White Chalk Sub-Group (incorporating the previous Middle and Upper Chalk). The chalk, as we have already seen for the West Wycombe Hill trip was largely formed from the microscopic shells – Coccoliths – of single-celled algae at a time of major global warming and sea-level rises. The Grey Chalk was laid down when land was still near enough to provide clay particles as weathered runoff mixing with the white coccoliths in the chalk-forming seas. However, as time passed and sea levels rose, landmasses largely disappeared leaving only the coccoliths as the main sediment leading to the formation of white chalk.

Within the Chilterns seven stratigraphical chalk formations are recognised dating from 99 to 83 million years in age. The chalk in front of us at Kensworth was part of the Lewes Nodular Chalk Formation dating back around 90 – 89 million years old.

Digging in the Chalk Rock

The green, glauconite-stained upper boundary of the Chalk Rock member is illustrated below.

The chalk was relatively hard and appeared blocky and fractured. Black speckling on the surface of some parts was due to manganese oxide, a more recent deposit, not contemporary with the formation of the chalk. Mick pointed out a particularly hard seam, with a green and brown-stained upper surface with many reworked chalk intraclasts as the Chalk Rock “hardground”, which, as the name suggests, was harder than the Kensworth Nodular Chalk Member above it. At the top was the appropriately named Top Rock, a similar but less-well developed hardground. These hardgrounds formed during periods of low or zero sedimentation. This allowed greater cementation of the Cretaceous seabed to occur, strengthening the chalk. Marine creatures such as certain types of shrimp were able to tunnel into the seabed creating galleries of hollow burrows preserved to this day. The hardground also provided an ideal environment for encrusting, boring and browsing fauna to thrive, such as sponges, brachiopods, gastropods, corals, and these are consequently quite common fossils along with the ubiquitous ammonites and sea urchins.

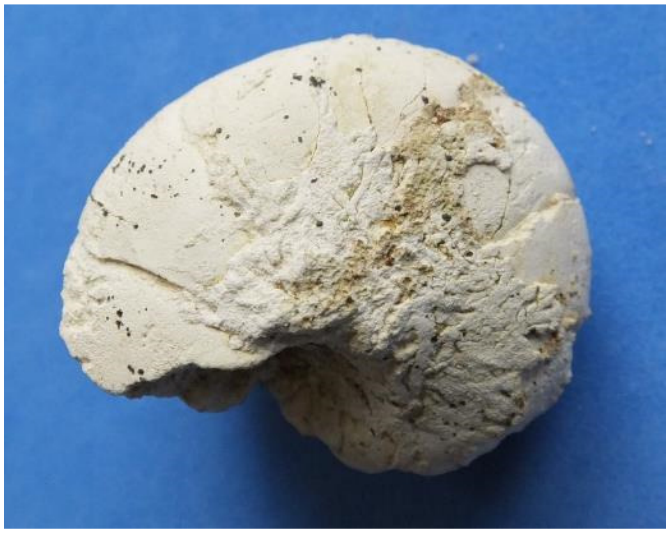
Large sample of Chalk Rock collected from the quarry

Moving further along the track we were able to see below the Chalk Rock and make out the greenish-grey Caburn Marl seam, around 5cm in thickness. (Some marls like this are associated with volcanic ash falls). These can be used both to correlate and date chalk exposures over large distances. Above the Top Rock, flint-rich Tertiary/Quaternary clays/soils could be seen and, in places, filling former sinkholes cutting deep down into the chalk strata.

Former sinkholes reaching down into the chalk strata

A range of fossils were found including

Bivalve, *Spondylus spinosa*. in situ (upper) and cleaned. (lower)



Nautiloid, Eutrophoceras sublaevigatum. Note the straighter suture lines on the upper image that help identify this fossil as a nautiloid rather than an ammonite

Brachiopod, Gibbithyris sp

Echinoid, Echinocorys scutata,

The radiating form of a Ventriculites sp sponge

Fragments of a large Inoceramid bivalve

Borings of a sponge (Cliona ichno sp) in Inoceramid shell

Photos / Fossils collected by Kelvin Allanson, Leah Macgillivray, Mick Oates, Mike Palmer and Ross Williams

Mike Palmer

Later 2019 events

Visit to Stowe Quarry, *21st September*
This meeting had to be postponed due to difficulties in gaining access. It has now been rescheduled for Saturday 4th October 2020 (see programme at end of newsletter)

What's in Store? *Saturday 19th October*
Write up to appear in the next newsletter

Stories in Stone – a Hands-on Rocks Workshop, *Saturday 16th November*
Write up to appear in the next newsletter

Minutes of the 2019 Buckinghamshire Geology Group AGM

Buckingham Old Gaol, Market Hill, Buckingham MK18 1JX

1.00 – 1.30pm Saturday 27th July (rescheduled from 27th April)

1. **Apologies:** None

2 **Present:** Judith Barber, Phil Clapham, Jill Eyers, Mike Howgate, Ian Hudson, Bronwen Lee, Mike Palmer, Sue Winter.

3. **Minutes of previous AGM:** Saturday 12th May 2018, MK Arts Centre, Great Linford (published in BEHG Newsletter No 32, February 2019, available at http://www.bucksgeology.org.uk/pdf_files/BGG_Newsletter_Feb_2019.pdf)

4. **Membership report:** In the absence of the membership secretary no membership was available. However, Julia did provide the following report after the meeting.

Current membership figures are unclear at the moment due to the change in renewal dates from 1st January to 1st April. It is thought that the situation will become clearer over the year. Current membership is thought to stand at 29 people of which

- *14 have been members for over nine years*
- *2 members for over 6 years*
- *1 member for four years*
- *2 members for three years and*
- *7 members for one year*

This represents a small increase on last year's figures

5. **Review of the last 12 months** (May 2018 – April 2019)

5.1. Events & Field Meetings (Mike Palmer)

This review usually covers the period from the previous year's AGM to the current year's AGM. This year's AGM had to be cancelled due to the high winds forecast causing concern for the health and safety of the follow-on trip to Buckingham Sandpit. This trip, as all present know, has been rescheduled to today but for consistency I will stick with the originally planned date for review purposes

Saturday 12th May 2018: After the AGM ten members and guests embarked on a **Geological Walk around Great Linford** led by Jill Eyers, examining local building stones followed by a visit to the Old Quarry and neighbouring modern stone circle. Unfortunately, the heavy rain that set in halfway through the walk meant that the fossil search in the nearby Stonepit Field scrape was somewhat less enjoyable and productive as it might have been.

Saturday 9th June 2018: Eight members and guests attended the **Exploring the Geology of Bath** field meeting, led by Graham Hickman. A range of locations were visited by car and on foot combining both countryside and town centre walks, all enjoyed in glorious sunshine

Sunday 29th July 2018: Seven members and guests travelled to Oxfordshire to explore **Duns Tew Quarry** with Jill Eyers. The day included identifying the key strata, preparing a sedimentary log and fossil collecting. After the event, some members went in search of local standing stones.

Saturday 11th August 2018: Twenty-nine people followed leader Phil Clapham on a **Pitstone Hill Circular Walk** with the aim of understanding the rocks and processes that have shaped the Chilterns. This was a joint BGG / Bucks Archaeological Society with the majority of participants coming from the latter organisation.

Saturday 8th September 2018: Eleven members and guests travelled to Bedfordshire for the **Munday's Hill Quarry Visit**. In addition to studying the beautifully coloured sandy strata a number of fossils were collected from the Gault overburden.

Sunday 21st October 2018: Four Bucks Geology Group members joined the Reading Geological Society on a **Dorset Coast Geology Trip** lead by former Bucks resident and now Jurassic Coast expert, Simon Penn. Highlights included over 100 sauropod footprints

Saturday 10th November 2018: Unfortunately, the **Discovering Minerals Hands-on Workshop** with Jill Eyers at Bucks County Museum Resource Centre had to be cancelled due to a lack of people signing up for the event. This was probably due to an oversight in publicity for the event. This event was rescheduled for January 2019 (see below)

Saturday 26th January 2019: With greater publicity and a revamped title, the rescheduled **Wonderful World of Minerals Workshop** with Jill proved to be a great success. With an event capacity for up to twelve participants all places were taken up by members and guests. This event follows on from the successful 2017 Hands-on Fossils workshop. More workshops are planned

Saturday 16th March 2019: The **Coombs Quarry Clean-up and Tour** unfortunately had to be cancelled due to a forecast for high winds raising health & safety concerns for an organised trip.

Saturday 13th April: The annual Rock & Fossil Day event at Bucks County Museum was another success with an estimated 750 people visiting

Cancelled and rescheduled events
Nine events were planned of which one, November's *Minerals Workshop*, was cancelled but successfully rescheduled two months later while another, the Coombs Quarry event was simply cancelled on the basis that this location features regularly in our events programmes anyway. The issues concerning the Minerals Workshop cancellation seemed to be due to poor publicity. Greater use of Facebook and the circulation of individual event flyers in addition to usual website listing seems to be working. The Coombs Quarry cancellation was due to high winds. As an organised Group and registered charity, we have to undertake risk assessments for all meetings and so, it was felt that under the prevailing weather conditions we couldn't run the event. This is just a fact of life for groups running outdoor meetings.

Event locations
Of the eight events that went ahead four were held within Bucks, two within neighbouring counties and two more further afield. The Committee are deliberately aiming to provide a variety of locations rather than confine group solely to Buckinghamshire sites. While attendance provides some indication of what people think about this approach the committee would be delighted to hear from individual members as to what they think.

Joint working
Of the eight events that went ahead two were run jointly with other groups, namely the Bucks Archaeological Society and the Reading Geological Society. Again, the committee feel that this approach allows the group to run a wider range of events that would be possible on our own and we will look to develop links with groups both within Bucks and from neighbouring counties.

5.2. Conservation (Jill Eyers)
The conservation work that used to be carried out by Bucks Geology Group is now carried out by several management teams who have taken responsibility for sites such as Coombs Quarry, Whiteleaf Quarry and Buckingham Sandpit. They have their own teams of volunteers and simply get on with it. We help if they struggle at any time. Home Farm Pit at Stowe is a, or was a, working pit. A reccie visit is being arranged to see the state of play here prior to a future visit.

The one conservation event organised this financial year was:

Coombs Quarry, near Buckingham June 24th.
There were no takers for this event. It unfortunately coincided with England's match in the world cup and a major tennis tournament. Jill Eyers (leader of event) went in during the week (a preferred day for her) and cleared the faces. Herbicide was carefully applied to brambles and hawthorn in order to prevent their rapid return. This move has seen the faces not grown back as quickly with these invasive plants, and so was a good move.

6.3. Newsletter (Mike Palmer)
Two newsletters were produced since the last AGM, May 2018 and February 2019. The aim is to produce three issues a year but unfortunately work pressures made the production of an autumn 2018 edition difficult. This was hopefully partially rectified by producing a bumper edition over twice the size on the average newsletters of the recent past. The committee, however, appreciate the importance of maintaining a regular newsletter. Mike is currently working with other committee members to build-up a number of possible articles ahead of the ongoing event reports and news items with the aim of making publication a less onerous task.

All members are encouraged to contribute articles and geological queries to the newsletter

Website (Mike Palmer)
Mike reported that Graham is continuing to manage the Group's website which has been running well since the problems encountered in 2017. Please report any errors or faults to Mike who will discuss issues with Graham and the committee.

Facebook (Jill Eyers)
This account is currently maintained by Jill, although anybody can upload any images they wish from events. It would be nice to have a wider input from members showing some of the sites or people enjoying the trips and workshops. Or simply make some comment on the event in the chat box.

Jill has found it difficult to keep up the diary with listed events and if anyone would like to add events from the calendar (found on the website) then this help would be gratefully accepted.

Jill reported the following statistics:

- 95 people have **liked** Bucks Geology Group.
- We **reach** between 24 and 243 people on a posting for an event. The average is 50 to 70 people reading an event post.
- Between 1 and 9 **actions** result from reading a post.
- Page likes have gone down significantly to just a couple a month as Jill has not had time to post any of the events and no information or photos have been added for months.

Conclusions:

- We are under-utilising this resource
- Events should be listed here as well as on the website
- More references need to be made on FB to the info in the website & events there
- Our FB page should also put a link to the newsletters on offer on the web for interesting info
- More photos of events need to be posted
- We need to check the FB more often to avoid unwanted comments (just deleted 27.07.19)

6. Treasurers Report (Jill Eyers)
The Income and Expenditure Account for year ending 25th April 2019 was circulated to all present (and to all committee members prior to the meeting) – see below. Jill noted that web domain and hosting payment had not been included in the accounts. Instead, this would be carried into next year's accounts

7. Election of Officers and Committee Members
The following officers were re-elected *en bloc*

- Chairman: *Mike Palmer*
- Secretary: *Position vacant*
- Vice Chair/ Membership Secretary: *Julia Carey*
- Treasurer: - *Jill Eyers*

Judith Stanton has stood down from the committee. Members for 2019-20 are Phil Clapham, Graham Hickman, Ian Hudson, Michael Oates

Mike Palmer to continue to edit the newsletter
Jill Eyers to continue to manage the Facebook page
Graham Hickman to continue to manage the website

8. Any Other Business
None

9. Date of Next Meeting

A date in April or May 2020 to be announced in the first newsletter of 2020

Buckinghamshire Geology Group

Income and Expenditure Accounts for year ending 25th April 2019

Income:	**£**	**£**
Book Sales	0	
Membership	137.50	
Donations	0	
Site monitoring UKRIGS	675.00	
		812.50
Expenditure:		
UK RIGS subscription	10.00	
Geol Assoc Membership	40.00	
AGM room hire 2018	50.00	
Insurance	110.56	
Materials & equipment	116.97	
Field fee (Dorset)	60.00	
Web Domain and Hosting	0	
Site travel	142.80	
Fees/consult	675.00	
Print, materials, conservation	52.98	
		1258.31
Excess of Expenditure over Income		- 455.81
Opening Bank Balance (31st March 2018)		5207.29
Less Excess of Expenditure over Income		- 455.81
Balance accounted for:		4761.48
Balance as per Bank Statement (25th April 2018)		**4696.98**
Balance for petty cash		**64.50**
Total balance		**£4761.48**

Prepared by J. Eyers 25.04.2019

Buckinghamshire Geology Group – *2020 Programme*

Cost: *Unless otherwise stated, all events are FREE to members and £3 for non-members*

Booking: *Where stated booking is essential to ensure that events are not over-booked and to allow leaders to contact would-be attendees with any last-minute changes*

Clothing: *Some trips, especially quarry visits, may require protective clothing such as helmet and high-vis jackets. Please enquire with the event leader or see event flier nearer the time for details.*

Saturday 15th February, 10am-12 noon **Ammonites: Evolution, Diversity and Identification** - a hands-on workshop with Jill Eyers at Bucks County Museum Resource Centre, Halton. Places limited - BOOKING ESSENTIAL. Contact Mike Palmer on 01296 325223 or mpalmer@buckscountymuseum.org for further information and to book your place.

Saturday 14th March, 1 – 3pm **Visit to Northmoor Hill,** near Gerrards Cross with Jill Eyers. Discover clues to the underlying Cretaceous, Tertiary and Ice Age geology at this Bucks Local Geology Site. BOOKING ESSENTIAL. Contact Jill Eyers at j.eyers@btopenworld.com for further information and to book your place.

Saturday 4th April, 11am – 4pm **Rock & Fossil Day at Bucks County Museum**, Church Street, Aylesbury, HP20 2QP. Explore hands-on geology displays, discover fossils from the Museum's behind-the-scenes collections and bring your own mystery objects in for identification. No need to book – just turn up. Entry to the County Museum by donation to help support the Bucks County Museum Trust, registered charity 1153345. Contact Mike Palmer on 01296 325223 or mpalmer@buckscountymuseum.org for further information.

Saturday 9th May **Bucks Geology Group AGM**, 1.00 – 1.30pm, Studley Green Community Centre followed by a **Geology and Landscape Walk around Aston Rowant Nature Reserve** (nr Stokenchurch), 2 – 4pm, with Jill Eyers as part of **GeoWeek**. A circular walk of about 2 miles taking in the incredible chalk landscape, walking over chalk grassland, through woods, dry valleys and holloways, past sinkholes and small quarry pits. Human influence on this landscape is evident in numerous ways, yet nature is in its full glory with interesting things to see. There are steps to walk down and a fairly steep hill to climb back up – but we will do this at a slow pace while admiring the view! Free car park. BOOKING ESSENTIAL. Contact Jill Eyers at j.eyers@btopenworld.com for further information and to book your place.

Sunday 17th May, 10am **A GeoWeek Event - Local Stone and Rocks from afar in Buckingham.** Meet both local and far-travelled building stones in this historic town on a free tour, in the company of Dr Tom Argles, Senior Lecturer at the Open University and (moderately) long-time resident of Buckingham and Jill Eyers of the Open University and long-time Bucks Geology Group member. Meeting in the heart of the town by the Old Gaol, Dr Argles will lead you on a gentle stroll of about a mile, past buildings both ancient and modern, looking at a variety of stones and other building materials. You will have time to search for fossils and other features, as well as hearing the ancient histories of the rocks and the stories of how they ended up in Buckingham. A flyer including booking details and further information will be circulated nearer the time. Visit www.bgs.ac.uk/geoweek for more information on GeoWeek.

Saturday 27th June, 10.30am – 2pm **The Geologist of Hartwell House – His Museum and Garden** with Mike Howgate. This is a joint trip with the Amateur Geological Society. Meet 10am for tea, coffee and biscuits (cost £6) in the library of Hartwell House (a requirement for entry to the grounds) before an introduction by Mike to Dr John Lee and his mid-19th Century museum followed by a guided tour of the grounds to discover a range of geological features. Places limited - BOOKING ESSENTIAL. Contact Mike Howgate at mehowgate@hotmail.com for further information and to book your place.

Saturday 4th July, 10.30 start **Out-of-County Trip to Aust Cliff** on the Severn Estuary with Graham Hickman. An opportunity to look for teeth and bones from Triassic fish and reptiles. This is a joint meeting with the Bath Geological Society. Further details nearer the time. Contact Mike Palmer on 01296 325223 or mpalmer@buckscountymuseum.org to express your interest

Saturday 8th August, 10 – 11.30am **What's in Store?** - A look behind-the-scenes at Bucks County Museum's geology collections with Mike Palmer at the Museum Resource Centre, Halton. Members free, Non-members £7.50 (museum charge) Places limited - BOOKING ESSENTIAL. Contact Mike Palmer on 01296 325223 or mpalmer@buckscountymuseum.org for further information and to book your place.
Saturday 12th September, 10.30am to 4.30ish **Out-of-County Trip to the Uffington White Horse,** Oxfordshire with Jill Eyers exploring the geology and landscape of the area including Wayland's Smithy long barrow, Uffington Hill Fort and Dragon Hill. BOOKING ESSENTIAL. Contact Jill Eyers at j.eyers@btopenworld.com for further information and to book your place.
Sunday 4th October, 10.30a- 12.30pm **Visit and Recording Trip to Stowe Quarry** with Jill Eyers with **optional informal building stones walk around Stowe Landscape Gardens** (National Trust charges apply) in the afternoon. BOOKING ESSENTIAL. Contact Jill Eyers at j.eyers@btopenworld.com for further information and to book your place.
Saturday 7th November, 10am – 12 noon **Volcanoes – a Hands-on Workshop** with Jill Eyers. Bucks County Museum Resource Centre, Halton. Places limited - BOOKING ESSENTIAL. Contact Mike Palmer on 01296 325223 or mpalmer@buckscountymuseum.org for further information and to book your place.

Membership Details

Annual membership now runs from 1st April to 31st March the following year.

Individual membership is £7.50 and Family membership is £12 per annum.

Membership is open to beginners and experts alike.

A copy of the membership form is available on our website under the 'Contact Us' tab. Please complete and return payment to

Membership Secretary, Julia Carey, c/o BMERC, Place Service, 6th Floor, County Hall, Aylesbury, Bucks HP20 1UY (Email: jcarey@buckscc.gov.uk)

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

Further Information

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