



2021 was the second year affected by the COVID-19 pandemic. The Society was unable to meet physically indoors until September 2021. This document records the Newsletters which we produced to engage with members throughout 2021.

January 2021

- The new Barnhill Geotrail in Chipping Sodbury – by Charles Hiscock.
- BGS Zoom Social – 007 Quiz highlights by David Hall
- More of Mell's Rocks – Phyllite with Crenulation Cleavage

February 2021

- WW2 Bomb Damage on Buildings in Bath: by Maurice Tucker.
- Rock fall at Browne's Folly – Graham Hickman
- More of Mell's Rocks

March 2021

- Lt. Cmdr. A.T.F Comer remembered – Graham Hickman
- The Pacific Plate – Allan Comer (article reprinted from 1996)
- WW2 Bomb Damage on Buildings in Bath - Part2: by Maurice Tucker.
- Burlington House – Campaign to keep learned societies there.
- Clypeus ploti- A Middle Jurassic sea urchin (echinoid)

May 2021

- Upcoming Lecture May 6th 2021 and field Trip May 22nd 2021
- From our Archivist – Charles Hiscock
- Out of this World – GSL lectures on the geology of the planets in the Solar System
- WW2 Bomb Damage on Buildings in Bath – Part 3: by Maurice Tucker.
- Neolithic Scraper found on BGS field trip – Dr Sam Medworth

June 2021

- Upcoming Lecture June 3rd 2021 and field Trip June 9th 2021
- The Silurian/Upper Old Red Sandstone Unconformity at Buckover, near Thornbury Re-exposed. by Charles Hiscock
- Moving to net zero 'inevitably means more mining' BBC article

July 2021

- Upcoming Lectures & field trips 1st July, 7th July and 5th August 2021
- More Dinosaur Snippets by Phil Burge
- Jurassic Ark exhibition at BRLSI
- Mell's Rocks

August 2021

- Jurassic Ark exhibition and Lecture at BRLSI - Wednesday 8th September 2021
- Vale of Wardour field trip – Thursday 23rd September 2021
- Thornbury field trip – Saturday 25th September 2021

October 2021

- Lecture – Extreme Wave Events – Dr Chris Spencer - Thursday 7th October 2021
- Clevedon field trip – Maurice Tucker – Saturday 16th October 2021
- Lothar Respondek remembered – long-time member and former secretary of BGS

November 2021

- Lecture – Geotechnical Engineering - Thursday 4th November 2021
- GA Festival of Geology – Free online event – Saturday 6th November 2021
- The Bath Geological Society Journal ...an update – by James McVeigh
- GA Joe Collins conference – Saturday 25th November 2021
- Tom Ralph remembered

December 2021

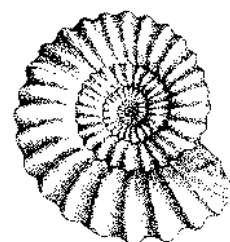
- Lecture live at BRLSI – Devonian-Carboniferous extinction - Thursday 2nd December 2021
- Xmas Zoom Social – Thursday 16th December 2021
- The Burial History of Bath Oolite – by Maurice Tucker

<http://www.bathgeolsoc.org.uk>

Bath Geological Society

Newsletter

January 2021



The New Year has heralded the good news that the Covid-19 vaccine was approved for use in the UK and we have seen the start of the vaccination campaign. Indeed some of our own members have already received vaccinations. However, we have also heard about the spread of a new mutation of the virus, the introduction of Tier 4 lockdown measures and the international reaction to close borders. The Committee continues to monitor the situation and we now expect to continue the programme of Zoom lectures in 2021. We have received positive feedback for the Zoom lectures and we are grateful to the speakers who have provided some excellent and interesting presentations.

During December the monthly lecture, using Zoom, was given by Professor Tim Elliott from Bristol University. This was a very interesting talk entitled; Recipes for Making the Earth. Tim explained how isotope analysis of different types of meteorites could be used and compared to the isotope composition of the Earth. In January Professor Maurice Tucker talked about Fossil Viruses and how this is a huge new area of research and one that has only recently considered the role viruses play in seeding the precipitation of carbonate sediments.

Our next virtual lecture will be held on Thursday February 4th 2021. It will be given by Professor Tom Blenkinsop and is titled; Ballistic Impacts in the Cosmos and in Combat. As always the lectures are free to members, they will be automatically registered and sent the meeting ID and password. Non-members are invited to attend but will need to register through Eventbrite to join the lecture, we are asking for £5 donations from non-members.

It is a stressful and uncertain time for many people. I hope our regular newsletters and Zoom lectures can lift your spirits a little. The social chat after our Zoom has been quite uplifting and many members enjoyed the Zoom social in December. If you have some geological news you would like to share we would love to hear from you. We hope you enjoy reading this Newsletter. Stay positive and stay safe.

Graham Hickman

chairman@bathgeolsoc.org.uk

In this issue;

1. The new Barnhill Geotrail in Chipping Sodbury – by Charles Hiscock.
2. BGS Zoom Social – 007 Quiz highlights by David Hall
3. More of Mell's Rocks – Phyllite with Crenulation Cleavage

Upcoming Zoom Lecture: Thursday February 4th 2021 at 7:30pm

Title: BALLISTIC IMPACTS IN THE COSMOS AND IN COMBAT

Bath Geological Society Zoom Lecture
Thursday 4th February 2021 @ 7:30pm
Title: Ballistic Impacts in the Cosmos and in Combat



**The Lawn Hill Impact Crater, QLD, Australia
(Darlington et al. 2015).**

Professor Tom Blenkinsop
School of Earth and Environmental Science, Cardiff University

Some effects of meteorite impacts on Earth's geological history are well documented; others, such as their role in the extinction of the dinosaurs, are more controversial. In our lifetime we have witnessed the dramatic effects of the collision between comet Shoemaker-Levy 9 and Mars. The physics of such collisions are quite well understood through a combination of field evidence and numerical modelling. Paradoxically, some of the clearest evidence in the geological record for past impacts on Earth comes from microstructures of deformed minerals, which may be preserved, despite removal of larger scale evidence such as craters by erosion or tectonics. Similar microstructures can be recognised in ballistic impacts from small arms fire and shrapnel in combat zones. Damage caused by such impacts is important for conservation, especially where it occurs in culturally sensitive sites. This talk will explore the fascinating interplay between knowledge gained from the different scales of ballistic impacts in the cosmos and in combat.

Tom Blenkinsop is Professor of Earth Sciences at the School of Earth and Environmental Sciences, Cardiff University. Tom's research interests include structural geology and tectonics, economic geology and surface process/tectonic interactions. Prior to lecturing at Cardiff Tom has held research and teaching positions in Australia, Zimbabwe and USA.

Lectures are FREE for Bath Geological Society members. We will send you joining instructions. Email: programme@bathgeolsoc.org.uk

[Get Tickets](#)

£5 donation via Eventbrite requested from non-members and visitors.

<https://www.eventbrite.co.uk/e/ballistic-impacts-in-the-cosmos-and-in-combat-the-lawn-hill-impact-crater-tickets-135846876665>

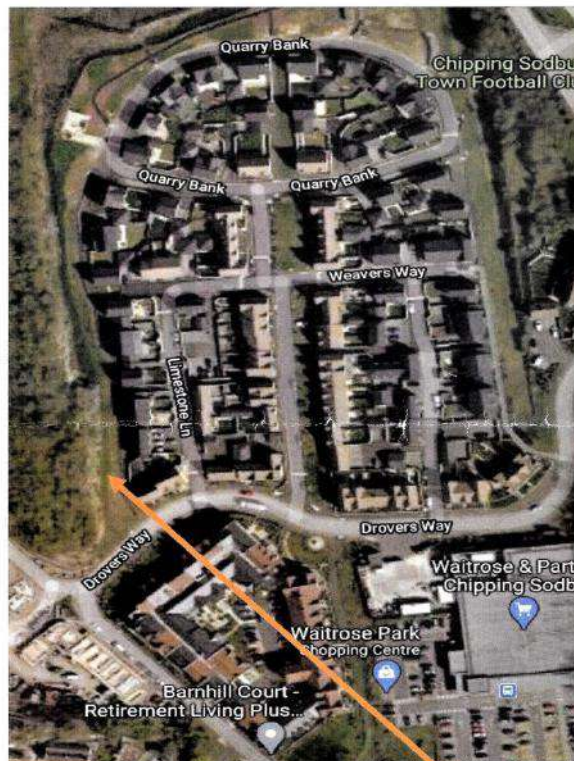
New Geotrail in Chipping Sodbury by Charles Hiscock

The Thornbury U3A Geology Group held its first Zoom talk last week, in which a member gave a presentation on the new Geotrail at the southern end of the old Barnhill Quarry at Chipping Sodbury. The attached information has been produced by the U3A member. I went over a few days later and in glorious sunshine walked the trail.

The Geotrail is about a third of a mile long, on tarmac paths, provided with some excellent and extremely informative interpretation boards. There is easy access and parking in Drovers Way or from Waitrose car park.

The trail follows the edge of the new housing estate which was built on a new stone platform at the southern end of the quarry.

LIMESTONE LANE, BARNHILL COURT AND THE ORIGINS OF LIFE ON EARTH



There are two Limestone Lanes but the path to be taken is across the road, opposite No 10 Apartment, Barnhill Court and provides easy access to Barnhill Quarry – 'A



I did a RIGS survey in the quarry in 2008 as a result of the planning application submitted by the developers to build in the quarry. The RIGS Group objected but, needless to say, the estate was built but the geological features, extensive stromatolite beds, which gave it SSSI and RIGS status, have been largely preserved and are highlighted by the boards.

Photo to Left is of a Stromatolite bed on the east face.



Photo above: The superb view along the quarry (best viewed on a sunny day when the sunlight illuminates the full length of the excavation). There is no access into the quarry from the trail but if we proposed a Society field trip one can gain access by applying to Hansons.

When I was there I made the acquaintance of an elderly gent walking with the aid of a mobility frame. After asking if I was interested in the quarry he proudly told me he was a 96 year old retired miner and that he had recently produced a leaflet on the quarry, aided by his son, a geologist in Australia, for the use of local people. He has sent me a copy. Hopefully, his leaflet will reach a wider audience.

North West Highlands Geo-Park

Elizabeth Devon brings our attention to a free talk on February 25th 2021.

The Talk Title: On the dawn of the Cambrian explosion of life: The Scottish fossil evidence

Dr Frankie Dunn is a palaeontologist and an Early Career Research Fellow at the Oxford University Museum of Natural History and Merton College. Frankie's research focuses on the origin and early evolution of animals and particularly on fossil record of the late Ediacaran Period (approximately 570 – 540 million years ago). The aim of this research is to understand how animal body plans evolved in deep time, before the divergence of the living animal lineages.

If you are interested in attending this free Zoom talk you will need to register at:

<https://www.nwhgeopark.com/events/list/>

BGS Zoom Social – 007 Quiz highlights by David Hall

On 15th December 2020 members took part in a Zoom Social. Among the items offered for entertainment was a film-set geology quiz. The most dramatic example shared being from the James Bond movie **The Spy who Loved me**, which was released in 1977.

As the previous production (The Man with the Golden Gun) had been a near box office flop it was decided that the next in the series, The Spy Who Loved Me, needed a spectacular opening. The result was the best James Bond stunt of all time that set a gold standard for subsequent set pieces.



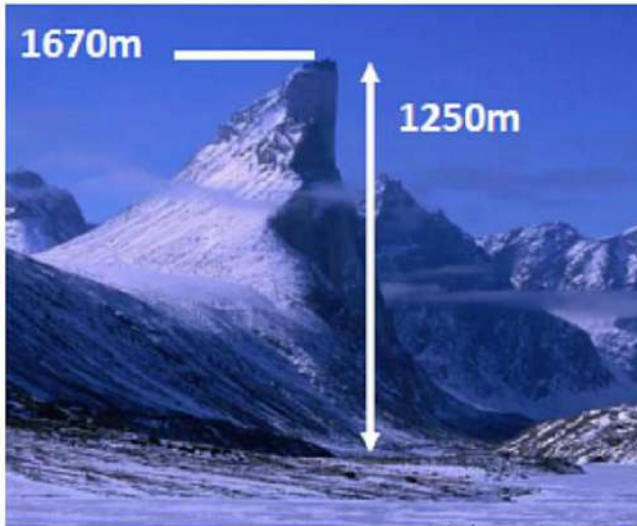
James Bond is being chased on skis by the bad guys down an Alpine slope and then launches off a precipice into a stunning free-fall parachute jump.

The free-fall lasts circa 20 secs which required a total drop elevation of about 1800m based on rule of thumb parameters of 60 m/sec for the free fall (including drag) and 600m after parachute deployment.



The search for suitable topography for the stunt led the production team to the extensively glaciated Precambrian granitoid terrain of Baffin Island in Canada, the 5th largest in the world.

If James Bond Island in Thailand, was karst on steroids, Baffin Island demonstrates the glacial erosion on steroids that occurred beneath the Pleistocene Laurentide ice-sheet. The results are highly impressive for just 2.5 M years of erosion even if some of this was accentuating pre-existing topography.



Mt Thor : The world's tallest cliff

Mount Thor which has the tallest and steepest cliff face in the world (1250m) is a go to location for static jumpers and paragliders looking for an ultimate adrenaline rush (they are welcome to it). The top part of the cliff face leans out slightly, presumably representing the part of the cliff that stayed exposed above the 1 km thick ice sheet. However at an elevation of 1670m above sea level Mount Thor was not suitable for a lengthy free fall and more importantly it slopes steeply in the wrong direction behind the cliff edge.

The nearby Mount Asgard, which has an elevation of 2015m and ticked all of the boxes. It is a massive rock cylinder with a top that slopes towards the cliff edge. Although the shape looks like a volcanic plug it is interpreted as an example of localised confined valley glacial erosion.

This stunt was filmed in one take, with no camera tricks. The stunt man was Rick Sylvester (USA) who had performed a similar ski jump off the El Capitan peak which is a big chunk of granite in Yosemite Valley. Just one reconnaissance trip was made to Mount Asgard to plan the jump, there was no practice run, although smoke bombs were let off to check that he would not be blown back into the cliff.



The day of the jump was a near disaster. Firstly Rick Sylvester came off the cliff so fast that he flew above the master helicopter camera positions - fortunately the third back rescued the shoot. What had been overlooked is what would happen to the skis which detached on take-off. No problem during the free fall as the skis were more aerodynamic than a human body – but as soon as the parachute opened they caught up and nearly got entangled in the parachute cords. This is certainly not compliant with today's HSE standards! It is all there in the film – if you look for it.

So that is nearly everything you did not want to know about the stunt. If you want to read on, the full story plus video can be found at <https://boldentrance.com/the-spy-who-loved-me-ski-jump/>

There are also plenty of cool (pun intended) organised trips on the internet for those who would like to get up close to the scenery, geology and wildlife (except Polar Bears).

David Hall

Mell's Rocks

This month Mellissa Freeman shares another photo from her collection. She writes, "This is my favourite! I found this big lump of rock while on a geology trip to Sikkim, India. It's a phyllite with fantastic crenulations."

A Phyllite is a low-grade metamorphic rock usually made from the alteration of fine grained sedimentary rocks such as shales and mudstones.



Crenulation cleavage is a series of micro-folds at the centimetre scale or less with parallel axial surfaces. The Crenulation cleavage is the result of two phases of stress acting on the rock. Depending on the angle between the existing foliation and the secondary stress field, the crenulation cleavage will be symmetric or asymmetric.

Mary Anning Statue

Lots of people have talked about a permanent monument for Mary in Lyme Regis, but nothing ever seemed to get off the ground. The spark of inspiration finally came in the form of an 11-year old, fossil mad, local girl, Evie Swire when she asked her mother, 'Why isn't there a statue to Mary, mummy?' A few phone calls, emails, and several meetings later, and Mary Anning Rocks was born.

This is a crowd funding appeal and already has the support of the Geologists Association, Sir David Attenborough, Professor Alice Roberts, NHM, and so many more.

They are appealing for help to raise the money needed to complete Mary's statue, along the Jurassic Coast at Lyme Regis, so we need all the people power we can muster.



<https://www.crowdfunder.co.uk/maryanningrocks>

Membership

As we enter a new year please can I thank you for your support, especially over the last few months. The online lectures have been a great success, and there has been continued interest with people joining the society all the way through the year, despite the circumstances.

Like you, we are looking forward to good things in the New Year and our committee has done a marvellous job securing speakers for 2021 and organising some much-missed field trips, in the hope we can get out a bit later in the year and enjoy some of our local geology, albeit in smaller groups than usual.

If you have not yet renewed your membership, please may I encourage you to do so now? You can do this by visiting the Membership area of the website at <https://bathgeolsoc.org.uk/membership.html> and filling in the online form. You can also download the form and return it by email or post. The membership fee can be paid via bank transfer or by sending a cheque. There is also an option to set up a standing order.

The rates remain the same as last year: individual £30, student £15, family £45.

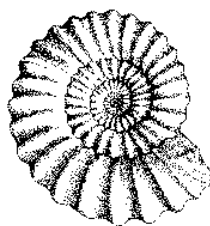
Finally we are pleased to include our 2021 programme; the Society has arranged an exciting series of monthly talks and four field meetings. The lectures will be held virtually using Zoom until such time as it is safe to return to physical meetings. However, we are hopeful that by the spring and into the summer outdoor field meetings can go ahead dependent upon government rules and guidance at the time.

Best wishes

Polly Sternbauer

membership@bathgeolsoc.org.uk

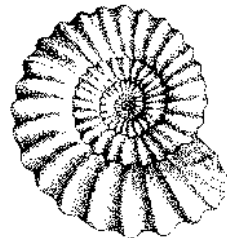
Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

February 2021



The Covid-19 vaccine roll-out continues at pace. The news that many of our members are receiving vaccinations can only be good news both for them and everyone else. The government plans to open-up again after our third lock-down appear cautious. The Committee continues to monitor the situation and we expect to continue the programme of Zoom lectures during 2021. We are grateful to the speakers who have provided some excellent and interesting presentations.

Before the February lecture, we were able to hold the 51st AGM using Zoom. We conducted the business of running the Society and welcomed Katie Munday into the role of Secretary for the Society. Phil Berge, our treasurer, now has all the approvals necessary to apply for online banking for the Society.

The February monthly lecture, again using Zoom, was given by Professor Tom Blenkinsop his title was; Ballistic Impacts in the Cosmos and in Combat. Tom and his students have been studying the impacts of war on ancient monuments and how best to repair. The lecture stimulated Professor Maurice Tucker to visit the Labour Exchange Building here in Bath which bears the scars of WW2 - you can read his account and observations in this newsletter.

Our next virtual lecture will be held on Thursday March 4th 2021. It will be given by Dr Hazel Beaumont. She will be describing her work on the fluvial sediments in Rajasthan, India. As always the lectures are free to members, they will be automatically registered and sent the meeting ID and password. Non-members are invited to attend but will need to register through Eventbrite to join the lecture, we are asking for £5 donations from non-members.

It is a stressful and uncertain time for many people. I hope our regular newsletters and Zoom lectures can lift your spirits a little. The social chat after our Zoom has been quite uplifting. If you have some geological news you would like to share we would love to hear from you. We hope you enjoy reading this Newsletter. Stay positive and stay safe.

Graham Hickman

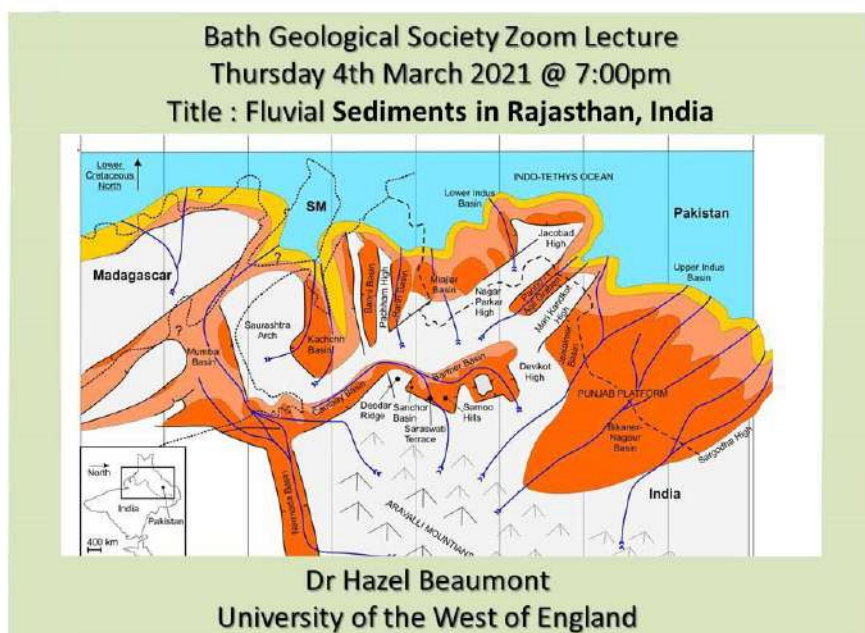
chairman@bathgeolsoc.org.uk

In this issue;

1. WW2 Bomb Damage on Buildings in Bath: by Maurice Tucker.
2. Rock fall at Browne's Folly – Graham Hickman
3. More of Mell's Rocks –

Upcoming Zoom Lecture: Thursday March 4th 2021 at 7:00pm

Title: FLUVIAL SEDIMENTS IN RAJASTHAN, INDIA



Abstract: The preserved deposits of continental sedimentary environments are inherently three-dimensional and highly varied: properties that make subsurface interpretations of such environments difficult to interpret from core alone. To provide an understanding of subsurface continental successions, extensive field studies are required to appreciate the geometry and scale of the system in three-dimensions, and to develop quantified models to use as guides in core interpretation. This work presents the development of quantified sedimentary models from outcrop of the Lower Cretaceous Ghaggar-Hakra Formation, Barmer Basin, India, as an example of the deposits of a spatially and temporally varied fluvial system, as a means to aid interpretation of subsurface core and interpret fault movements.

Dr Hazel Beaumont is a senior lecturer at the University of the West of England

To register please email: programme@bathgeolsoc.org.uk

We will send you joining instructions and the Zoom meeting info.

£5 donation via Eventbrite requested from non-members and visitors.

[Get Tickets](https://www.eventbrite.co.uk/e/fluvial-sediments-in-rajasthan-india-tickets-141115286621)

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WW2 Bomb Damage on Buildings in Bath:

Follow-up to Professor Tom Blenkinsop's Lecture

By Maurice Tucker

maurice.tucker@bristol.ac.uk

The day after Tom Blenkinsop's fascinating talk to the Bath Geological Society on 4th February 2021 on impacts from meteorites and comparisons with damage from bullets and shrapnel in conflict zones, I visited the former Labour Exchange building in Bath (Figures 1, 2). This is a grade-2 listed building preserving the damage from the air-raids during WW2 on 25th and 26th/27th April 1942. You will recall in the discussion that Tom expressed interest in such damage and he will be visiting Bath, with his research students, when permitted. However, I did see some really intriguing features there which may have implications for impacts in the geological record which I would like to share with you in this newsletter. I have also been wandering around Bath looking for more bomb damage and have found some intriguing marks on a couple of buildings.

I would like to ask if anyone knows of any other buildings in Bath where one can still see good examples of shrapnel marks (I know there are some in the Circus and Queen Square).



Figures 1 & 2. The Labour Exchange building, James Street West with WW2 bomb damage.

On 2 fateful nights in 1942, 100s of bombs and incendiaries were dropped on Bath by the Luftwaffe, destroying many buildings, killing 417 people and injuring 1000s. This was one of the Baedeker raids, allegedly inspired by the German tourist guide-book to Britain when targets were chosen for their historical and cultural value rather than any strategic or military value. These raids followed the RAF's bombing and destruction of the German city of Lübeck in March 1942. Over 19,000 buildings in Bath were affected, with 1100 seriously damaged or destroyed, including 218 of architectural or historic interest. There is now little evidence of those air-raids except for the former Labour Exchange, only built in 1938, in James Street West, with its shrapnel damage. See Figure 14 at the end of this article for a map with the bomb-sites of central Bath and the Bath Blitz website for further information.

In the very early morning of 26th April, the Labour Exchange was hit by shrapnel from a 250 kg bomb that landed in James Street West and badly damaged the nearby Holy Trinity Church (later demolished). The next night, another bomb landed across the road, opposite Kingsmead North, and created further blast damage. The building also caught fire destroying the top floor. Repairs were made, a temporary roof erected, and the building continued to serve its purpose. After the war, the building was used for storage and then it was grade 2

listed in 2002. The building was renovated in 2017 with the façade retained and it is now a shop selling kitchen-catering equipment (Nisbets) with student flats above.

The building is constructed of Bath Stone, as to be expected, and it is a well-sorted oolitic grainstone with few bedding or sedimentary features – good freestone in other words, possibly from Box-Corsham. The 100s of impact craters on two sides of the building reach up to 20 cm across and 8 cm deep but there are numerous small ones a few cm across. There appear to be few radiating fractures related to the impacts, but in some places there are hints of concentric fractures. The stone would seem to have broken off in shards and flakes and been comminuted or pulverised. Some craters are quite smooth inside, as if the stone was finely broken up and recemented or recrystallised from the shock (Figures 3, 4).



Figures 3 & 4. Range of sizes of impact marks; many are quite smooth inside. The stone blocks are 20 cm high.

Where an impact struck towards the margin or corner of a stone block, then in some cases the crater stopped at the edge of a block, so that the generally circular shape of the crater did not develop. Rather, then, the crater has one or two straight sides (Figures 5, 6). Clearly the shock was not able to propagate across the ‘thin air’ boundary between blocks.



Figures 5 & 6. Impact craters where their shape has been determined by the position of the impact on the block relative to the block edges.

However, in other cases, the crater has developed across two blocks, but then the join itself between the blocks is now not visible (Figures 7 and 8). Presumably, this is the result of the shock pulverising the rock or causing its recrystallisation so that the boundary disappears.



Figures 7 & 8. Impact craters across areas where 2 or 3 blocks are in contact with loss of the boundaries. Note the granular nature of the weathered surface of the limestone, contrasting with the finer-grained-looking surface of the stone within the crater.

Of further interest is that there is a lead damp-course running across the building's wall at two levels, at 40 cm and 1 m above the ground. Where an impact has struck near a lead sheet, then it has curled up and been deformed (Figures 9, 10). Indeed, it may possibly have even melted since in some places it seems to have thickened up or disappeared. This would indicate significant heat generated by the impact as shock metamorphism, as Tom was explaining in this talk.



Figures 9 & 10. Deformation of the lead damp course where it occurs within an impact crater: lead is folded and contorted. Note finer-grained appearance of limestone inside the crater compared to outside on the weathered stone. The black colouration in Fig. 9 (and 6 and 7) is likely weathering and organic-microbial staining.

Apart from these obvious shrapnel marks, resulting from flying debris from the exploding bomb itself along with chunks of stone and brick generated by the explosion, the German planes also raked the streets with machine-gun fire during and after dropping their bombs. There are vivid accounts of this on the Bath Blitz website, so there could also be bullet holes on buildings. These might be expected in more open areas, where people might have been congregating, putting out fires, rescuing trapped people. German machine-gun bullets were 7.92 mm and 131 mm in diameter and could fire up to 25 per second or 1500 per minute. Bullet-damage on stone might be expected to be directed downwards, with an elongate shape. Most shrapnel damage on the Labour Exchange and that elsewhere is circular / symmetrical, rather than asymmetrical / elongate, presumably since the shrapnel was mostly travelling out horizontally from the bomb-impact sites. In addition, some marks could be caused by shrapnel from Anti-Aircraft fire, in the attempt to shoot down enemy planes. Such

injury from 'friendly-fire' is well documented in WW2. AA-guns were located at Lansdown Park, Claverton Down and South Stoke.

There are clearly many interesting matters of detail in the old Labour Exchange building and on buildings elsewhere in Bath relating to the Blitz which warrant closer inspection (and from more of an expert in matters of shocked rocks than myself) – and these may well give some useful geological information in terms of rock deformation through impacts. Hopefully we will receive more insightful comments from Tom Blenkinsop and his research group from Cardiff University when they visit.

Watch this space!!

Acknowledgements: For comments and suggestions, thanks to Tom Blenkinsop, Ollie Campbell, Oscar Gilbert, Lisa Mol, Mark Lewcun, Jim Warren, Stuart Burroughs, Tim Lunt, Vince Baughan, Graham Hickman, Phil Burge and two stone masons I bumped into at Bath Riverside.

References: Wainwright, M. (1992) The Bath Blitz. DK Printing, Bath; www.BathBlitz.org

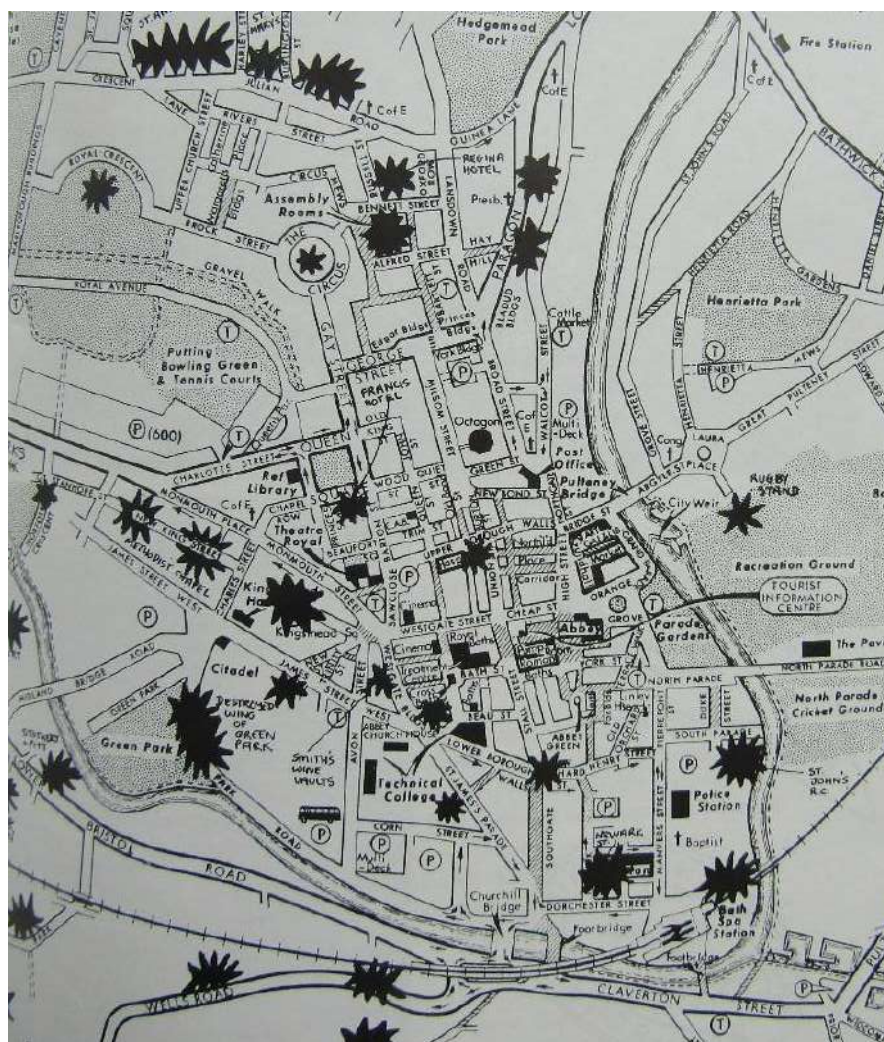


Figure 11. Map of the bomb-sites in central Bath (from Wainwright 1992).

Rock fall at Browne's Folly by Graham Hickman

The Bath Geological Society makes an annual visit to Browne's Folly, our last visit was on February 29th 2020. The trips have a dual purpose; to introduce the geology to newcomers and to remove rubbish and vegetation from the sites. However because of the COVID-19 pandemic and continued government restrictions that limit the number of people meeting, our trip planned for March 2021 will need to be postponed. Members who live nearby are however allowed to visit the site to exercise and I would encourage people to do that.

Glynn Williams and John Hutchinson regularly visit and had informed me about a rock fall that had occurred at site 1. (GPS Location: N 51°23.730' W 002°17.728'). Intrigued I visited the site on 20th February 2021. The block is easy to locate from its fresh buff colour, indicating that it is un-weathered. It will be interesting to observe over the next few years how quickly it discolours.



Site 1.

Photo taken on 17 April 2018

The photo is taken from the mine entrance (on the hillside) looking back along the access route.

The interpretation is that this was originally an adit (horizontal access tunnel) which collapsed and was cleared.



Site 1.

Photo taken on 20 February 2021

Showing a large fallen block of the "Roof Bed" which has come dislodged from the west side of the access route

Mell's Rocks

This month Mellissa Freeman shares another photo from her collection. She writes, 'Another great big lump of rock (schist) I found in Sikkim, India. I had a very heavy bag to get home. You can clearly see the garnets and this piece now enjoys life as an ornament'

Garnet Schist is a medium-grade metamorphic rock usually made from the alteration of fine grained sedimentary rocks such as shales and mudstones.



Although valued as a gem stone, garnet is generally of low monetary value because of its relatively common occurrence. The word 'garnet' comes from the Latin word granatus, which means 'seed-like,' a reference to the common appearance of garnets as discrete small red rounded crystals that look like pomegranate seeds embedded in rock.

Membership

Thank you for your support of the Bath Geological Society. The online lectures have been a great success, and there has been continued interest with people joining the society all the way through the year, despite the circumstances.

If you have not yet renewed your membership, please may I encourage you to do so now? You can do this by visiting the Membership area of the website at <https://bathgeolsoc.org.uk/membership.html> and filling in the online form. You can also download the form and return it by email or post. The membership fee can be paid via bank transfer or by sending a cheque. There is also an option to set up a standing order.

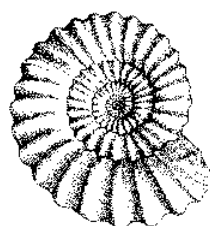
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Best wishes

Polly Sternbauer

membership@bathgeolsoc.org.uk

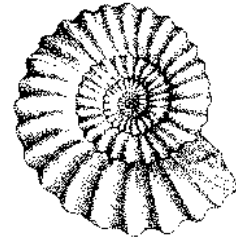
Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

March 2021



As I write the foreword to this newsletter, the UK Covid-19 vaccine roll-out is continuing at pace. In the next few weeks all over-50s in the UK will have been offered the first dose of the vaccine and the government plans are to offer all adults their first dose by the end of July. As spring arrives it brings hope that life may be returning to some form of normality. The Committee continues to monitor the situation as to when we might return to physical lectures and field trips, but in the meantime we will continue the programme of Zoom lectures.

The March monthly lecture, using Zoom, was given by Dr. Hazel Beaumont. Senior lecturer from the University of the West of England, she described how her field work in India developed a framework for understanding the fluvial sediments. She also shared information about the initiative <https://geoscienceforthefuture.com/>. Hazel believes geology underpins all we do and all we need, from drinking water to mobile phones, and wants to encourage others to help develop our sustainable future.

Our next virtual lecture will be held on Thursday April 8th 2021. It will be given by Dr.. Catherine Klein, she will be describing her work on the evolution of snakes and lizards. As always the lectures are free to members, they will be automatically registered and sent the meeting ID and password. Non-members are invited to attend but will need to register through Eventbrite to join the lecture. We are asking for £5 donations from non-members.

This newsletter brings you; a further article on WW2 Bath Stone damage by Maurice Tucker, and an article remembering Allan Comer, who died in February. As Allan was a Founder and Honorary member of the Bath Geological Society it felt appropriate too to reproduce one of Allan's Journal articles from 1996.

Burlington House in Piccadilly has been in the news too as rent increases are likely to force the Geological Society of London to seek cheaper and more sustainable accommodation, a fuller explanation can be found in this newsletter.

We hope you enjoy reading this Newsletter. If you have news or articles to share we would love to hear from you. Stay positive and stay safe.

Graham Hickman

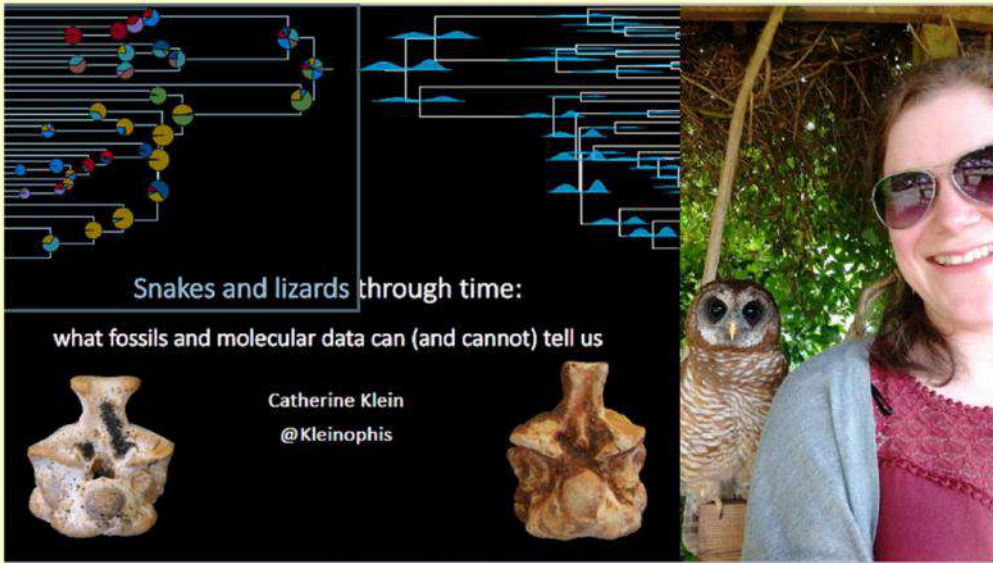
chairman@bathgeolsoc.org.uk

In this issue;

1. Lt. Cmdr. A.T.F Comer remembered – Graham Hickman
2. The Pacific Plate – Allan Comer (article reprinted from 1996)
3. WW2 Bomb Damage on Buildings in Bath - Part2: by Maurice Tucker.
4. Burlington House – Campaign to keep learned societies there.
5. Clypeus ploti- A Middle Jurassic sea urchin (echinoid)

Upcoming Zoom Lecture: SNAKES AND LIZARDS THROUGH TIME: WHAT FOSSILS AND MOLECULAR DATA CAN (AND CANNOT) TELL US.

Bath Geological Society Zoom Lecture
Thursday 8th April 2021 @ 7:00pm



Snakes and lizards through time:
what fossils and molecular data can (and cannot) tell us

Catherine Klein
@Kleinophis

Dr Catherine Klein
Formerly with University of Bath

Abstract: Squamates (snakes, lizards and amphisbaenians) are represented by over 10,000 living species, with a rich diversity of ecologies and life history traits. They split from their closest relatives some 250 million years ago, and as a group have survived several large environmental upheavals, notably the Jurassic-Cretaceous extinction event, the Cretaceous-Palaeogene (K-Pg) mass extinction, and the Eocene-Oligocene (E-O) cooling event.

Dr.. Catherine Klein was recently awarded a PhD from the University of Bath for her work on the Mass Extinction and Adaptive Radiation of Lizards and Snakes. Her work was based on evidence from the fossil record and molecular data. Using molecular clock analyses to show how squamates diversified through time and responded at times when other fauna experienced elevated rates of extinction.

To register please email: programme@bathgeolsoc.org.uk

We will send you joining instructions and the Zoom meeting info.

£5 donation via Eventbrite requested from non-members and visitors.

[Get Tickets](#)

<https://www.eventbrite.com/e/snakes-and-lizards-through-time-tickets-144666510427>

Lt. Cmdr. A.T.F Comer Remembered

We were saddened by the news that Allan Comer had died on 27th February 2021 at the age of 97.

Allan was a Founder and Honorary member of the Bath Geological Society. He served as the Treasurer for six years from 1978-1983. Continuing to serve on the committee from 1984-6 and then took on the role of Deputy Chairman in 1988 and Chairman in 1989.

Allan Theo Frank Comer (A.T.F for short) was born in July 1923 in West Ham.



Allan Comer - photo from 1995

Allan joined the Royal Navy and rose through the ranks initially as a commissioned Electrical Officer but quickly reaching the rank of Engineering Lieutenant Commander. In June 1975 Allan was awarded the MBE.

In 2005 he was granted Honorary Membership in recognition for his long service. His son John Comer writes "Although he wasn't able to participate in the Society affairs during the last few years, he did have a framed certificate hanging in his home acknowledging his Honorary Membership, which the Society granted in April 2005. My father had a deep and abiding interest in geology and his membership of the society meant a lot to him."

His other son Tony Comer writes "While I'm sure he would have liked to have been remembered for his enthusiasm and organisational skills in the world of geology and as a founder member of the Bath Geological Society, perhaps he should also be remembered as a rebel! He derived so much satisfaction lampooning conventional geological axioms and presenting alternative explanations. His chosen victims included ice-age and glaciation modelling, tectonic theory and climate change. He would write at great lengths on these subjects, not because he was qualified to do so, but because he wasn't. His contributions to the science he would say, were not written to gain a certificate but were to present well-conceived alternatives to accepted theory based on sound scientific and engineering principles, and, of course, to get people thinking!"

Allan was a prolific writer for the Bath Geological Society Journal and between 1983 and 2004 he wrote around twenty articles. Some of his longer pieces were on Montserrat and the geology of Crete. Unfortunately these older journals have yet to be scanned and made available on our website. However we have transcribed one of his articles on the Pacific Plate and this appears below.

Allan will be sadly missed, but hopefully his writing will continue to get people thinking. The Bath Geological Society is truly grateful to his commitment and organisational skills in the early years of our Society.

Graham Hickman

THE PACIFIC PLATE - by Allan Comer. [BGS Journal No.15, 1996]

I have often regretted that I knew nothing about Geology in the early years of my Navel career, particularly just after the war ended when the ship I was in, a Battleship called Duke of York, had to remain in the Far East for many months afterwards, carrying out tasks that had been neglected for the previous six years. For example we were sent to look at Krakatoa, between Java and Sumatra to see whether it was causing any navigational problems, and sure enough it had reappeared after its disastrous explosion in 1883, in the form of a fuming cone some 30 metres high on which there was not yet any vegetation. It was my first active volcano and a very evil looking thing it was. Later we were to narrowly escape damage in the eruption of a Japanese volcano, which scared us all, and made a lasting impression on all who saw it.

There were also two other events with geological connotations that are worth describing.

Throughout that time in the Pacific Ocean, the Captain of the ship was ever mindful of the frustrations many of the ship's company felt at being kept away from home for so long after the war was over, most of them after all being conscripts in the Navy for "hostilities only".

One consequence was that many things were done to keep us interested, some simple but others much more serious. We went to both Nagasaki and Hiroshima to see the nuclear bomb damage for ourselves, before we knew anything about the dangers of radiation, and we visited many seaports in Japan and on the Chinese mainland, with two visits to Australia to use docking facilities there, on the first of which the steel plates that had been welded over our scuttles (portholes) for safety during the war were removed, and a pair of large hatches were opened from the fo'c'sle into the sickbay, greatly improving comfort and ventilation throughout the ship.

On our return northwards from Sydney we experienced a period of delightfully calm and pleasant weather as we were passing among the easternmost islands of the East Indies archipelago, so quiet indeed that it was considered quite safe to leave all our scuttles and hatches open, with windscoops out, even overnight. However, towards the end of the middle watch that night, the bridge lookouts became alarmed by a thick black line that suddenly arose in the moonlight across the horizon just off the bow, quickly diagnosed as a huge wave that was advancing towards us. The First Lieutenant who was on watch, known as Jimmy- the-One as all first lieutenants in the Navy are, took immediate action. He passed orders to close all scuttles, and personally took a party of seamen and a Chief Petty Officer from the duty watch on to the fo'c'sle to close the sickbay hatches, which they accomplished just in time, getting all the seamen under cover just before the ship struck the wave. Unfortunately, however, the Officer and Chief Petty Officer did not themselves quite make it. Both were swept overboard, the Chief to be swept back on to the quarterdeck with a broken limb, but the other fine officer was never seen again despite many hours of searching, first by searchlight and then into daylight. Men who saw it told us that the wave crest was a long way above the upper deck as the ship crashed through it, but astonishingly once it had passed conditions quickly returned to peaceful calm. Down below where scuttles were not successfully closed there was absolute chaos for the few moments when they were several feet below the surface, mainly in mess-decks and living quarters, but there really was no great danger to the ship or even much damage once the mess was cleared away, though everyone on board was greatly saddened by our casualty.

It was a long time before I learned what had caused the wave that struck us but it finally transpired that there had been a very serious earthquake in Chile the day before, which had initiated a pressure wave that had crossed the ocean to cause immensely destructive "tidal

waves" amongst the islands of the north Pacific. It would have been imperceptible in the open ocean, but Duke of York was in fairly shallow water which caused the wave to rear up so suddenly, to our great cost. Such waves, more properly known as tsunamis, are not uncommon in the Pacific Ocean because of the tectonic activity that surrounds it. However, events such as the one we experienced have resulted in an active organisation being set up throughout the area to watch and give warning when tsunamis might arise, so that Islanders and ships are given the best chance of escaping the destruction they can cause.

On a lighter note, another incident with a geological content arose not long afterwards. One of the Captain's innovations was to stop the ship for half an hour in the first dog watch whenever the weather was suitable, so that we could enjoy a swim over the side, needing only a safety boat, scrambling nets, and a couple of armed sentries in case any sharks were seen. We looked forward to it, and I went in as often as possible with a like-minded messmate who was the "Gyro EA" that is the artificer responsible for the gyro-compasses, who had access to all the charts in use in the navigator's office. One evening he casually commented that the water was over two miles deep, but the following evening he refused to swim at all - nothing would persuade him. Later that night he confessed that he had looked at the charts that afternoon and had noticed that we were over the Marianas Trench where the water is nearly seven miles deep, the deepest in the world, and that it was too much. It made him ill to think of it, and that was the reason for his refusal.

It should not be forgotten that at that time, even if I had known anything about Geology, the principles of Plate Tectonics had not been worked out, and the significance of the few deep trenches that were known had not been realized, nor had the Pacific Ring of Fire been recognised. There were a few wild ideas about Continental Drift being pedalled in the newspapers following Alfred Wegener's papers on the subject a few decades earlier, but these were not generally supported by scientists in northern universities until they were developed in the 1960s. How much more interesting that voyage would have been had I been aware of the information available today.



Third Fleet and the British Pacific Fleet in Tokyo Bay, 28 August 1945, preparing for formal Japanese surrender. The Duke of York lies just beyond USS Missouri in the fore. Mount Fuji is in the background. Reference: [Official U.S. Navy photo 80-G-339360U.S.]

Bomb Damage on Buildings in Bath: Part 2 - Impact Marks and Other Features on Bath Stone.

By Maurice Tucker

maurice.tucker@bristol.ac.uk

Since my article in last month's Newsletter on bomb damage to heritage buildings in Bath, following the lecture of Prof Tom Blenkinsop (Cardiff University) on impact damage and meteorite craters to the Bath Geological Society in February, I have continued to wander purposefully the streets of Bath in pursuit of bomb damage from those German air-raids in April 1942, looking for further interesting features.

Shrapnel marks are now not that common around Bath, but they are there, once you get your eyes focused. The best place to look is higher up on buildings in a location where bombs are recorded to have landed nearby, for example, around Queen Square. There are maps on the Bath Blitz website which show the locations of the bomb sites (about 240 bombs were dropped) across the whole of the City, as well as where some incendiaries hit, and these mostly resulted in fire damage. Two houses in the Royal Crescent were hit by incendiaries, numbers 2 and 17 (Isaac Pitman's house) and they were burnt out. A bomb landing on the grass in front of no. 21 created a large hole but seems to have only caused minor shrapnel damage to a few houses. Most bombs intended for the Royal Crescent landed behind in the Julian Road area.

The effect of fire on Bath Stone is to turn it a pinkish-red colour. This will be the heat causing oxidation of iron minerals like pyrite (a ferrous iron, Fe^{2+}), turning it into a ferric oxide (Fe^{3+} , like hematite). After the war, historic buildings were repaired where possible, but stone that had been involved in a fire was not re-used, except locally in the construction of walls. Such pink-red stones can be seen in walls along the north side of Julian Road (Figure 1), near the site of St Andrew's Church, which was completely destroyed.



Figure 1. Pink-red Bath Stone blocks, likely resulting from fire damage, in a wall by Julian Road.

In some places around the City, shrapnel craters on buildings have been filled with a cement to hide them, but this has met with varying degrees of success, depending on how much effort was put into matching the colour and grain-size of the cement to the stone itself. Infilled impact marks can be seen in the curved wall outside the main entrance to Bath Spa railway station (4 bombs landed very close by) and also on the north side of Queen Square (Figures 2A, B), where a 500 kg bomb landed in the SE corner, badly destroying 4 houses that were part of the Francis Hotel. Another example can be seen in Third Avenue, Oldfield Park, with an unfilled crater higher up there (Figure 2C).

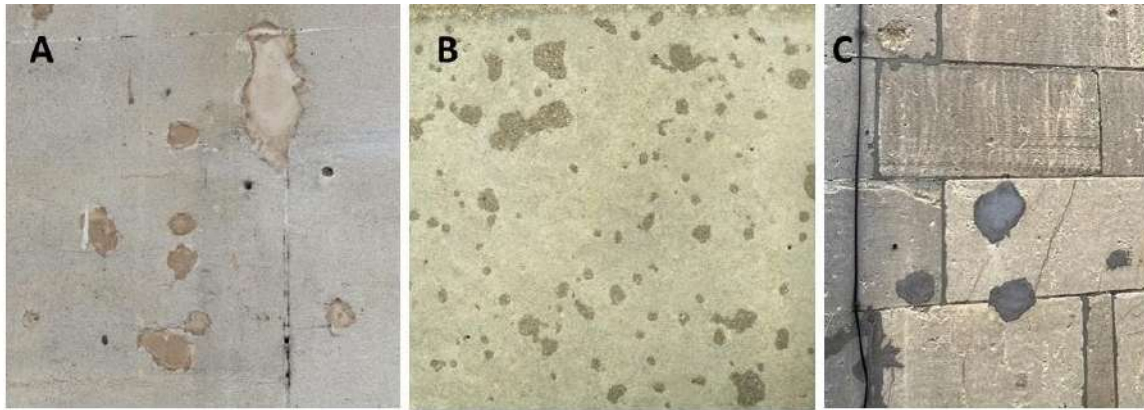


Figure 2. Infilled shrapnel craters: A - the wall in front of Bath Spa Station; B - an office in Queen Square; C - a house in Third Avenue, Oldfield Park, all in the close vicinity of bomb sites.

On the walls of some buildings there are 'gouge' marks that are somewhat elongate, quite different from the more circular impact marks that are well displayed on the Labour Exchange building in James Street West for example. In some places, several occur close together and they can have a similar orientation, commonly directed downwards or at an angle (see Figure 3).

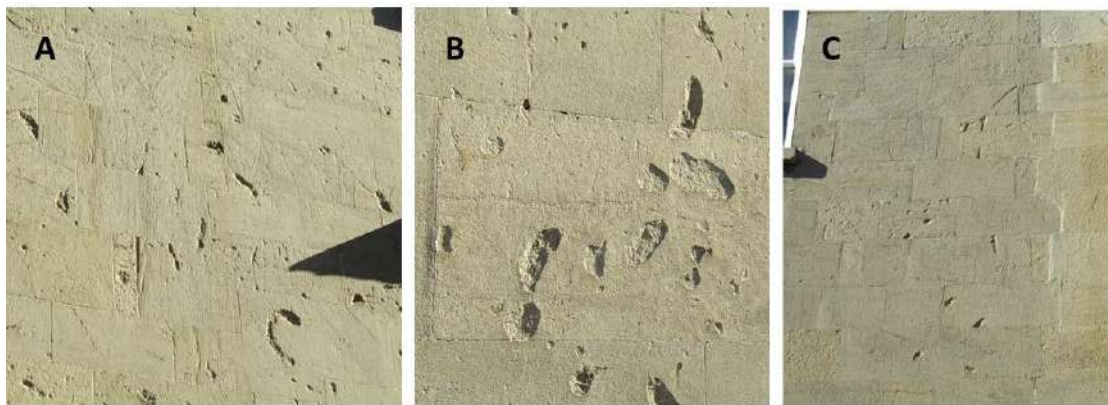


Figure 3. Could these marks be from machine-gun bullets? A: elongate, downward-directed marks on a wall of Miles's Buildings, B: on Jane Austen's house in Gay Street, and C: a wall in Gloucester Road Lansdown, where an adjacent house on right has clearly been restored.

They tend to be 10-20 cm in length and 2-5 cm across, 1-2 cm deep. These would appear not to be formed in the same way as the more circular, deeper shrapnel impact marks, formed by exploding bomb fragments and debris flying out from the impact site, bits of building, road, pavement etc. These latter impact marks tend to occur in the lower parts of building walls and they get smaller higher up the wall as at the Labour Exchange. Perhaps these elongate features were produced by machine-gun bullets being fired from the German planes. There are many accounts from local people of planes flying low on those 2 nights in April 1942, after having dropped their bombs, raking the streets with their machine guns, hoping to catch people putting out the fires, rescuing others or just running for cover.

On quite a few buildings around Bath, easily seen in the Paragon on two houses (not far from where a 250 kg bomb landed and destroyed house numbers 28, 29 and 30), I have noticed some intriguing structures that look very much like small impact holes (Figures 4, 5).



Figure 4. Small impact holes on a house in the Paragon; Bath Stone blocks 30 cm high.



Figure 5. Details of small impact craters from the front walls of several houses in the Paragon.

They are mostly in the range of 10-20 mm in diameter. Some are clearly impact marks, like miniature shrapnel marks, where stone has flaked off to create a small crater. Some appear to be asymmetric, as if they formed from an object coming at an angle. But other mini-crater-like structures have a central hole of ~5 mm in diameter. In some cases, there is a fragment of metal within the hole. The other notable feature is that these holes occur in clusters, several or many 100s in the same area, covering a square metre or several m². They mostly seem to occur on walls up to 1-3 metres above pavement level and between ground-floor windows, but they also occur higher up, on first-second floor walls.

These small impact marks are also clearly visible on two houses in Walcot Parade (Figure 6), and a few buildings in Queen Square (notably in the SE corner, now the offices of Crisp Cowley, and also on the north side). They can also be seen on some houses in the Royal Crescent. Those present at first-floor level on the front wall of Magdalen Hospital (rebuilt 1761), in Holloway, near Beechen Cliff, where 7 bombs landed and caused much damage, are shown in Figures 7A, B.



Figure 6. Small impact craters on front wall of a house at Walcot Parade.



Figures 7A, 7B. Small impact craters on the front wall of Magdalen Hospital at first-floor level. 7C: Flechettes – aerial darts dropped by planes, are the right size for the small impact marks.

These mini-crater structures certainly look like small impact marks – like someone has been firing a gun with bird-shot at the wall. I would imagine these holes are too small to be from German machine-gun bullets, which were 7 or 13 mm in diameter but they could account for the structures in Figure 3. One type of missile which would have made small holes like these is a flechette or aerial dart, several cm (1 inch) to 10 cm (4") long (Figure 7C). They were used by the Germans in WW1, dropped in their 1000s from planes on soldiers below, and by the US Air Force in the Vietnam war ('beehive bombs'); however, I cannot find any reference to their use by the Luftwaffe in WW2.

One further possibility (Ollie & Oscar, email comms.) is that these small impact marks relate to anti-aircraft gun-fire. AA guns fired a range of shells in an attempt to bring enemy planes down, but one particularly interesting type was a shrapnel shell, full of 1000s of ball-bearings. AA gun emplacements were located at Lansdown Park, Southstoke and Claverton Down. These clusters of small impact marks are not that common and do seem to occur in particular areas (although I do see an increasing number as I walk around the city!). As an experiment, and thanks to Graham Hickman's son's air-rifle, we fired a few rounds of VMX pellets at some slabs of Bath Stone (Figure 8). The impact marks produced are not very different from those on the buildings in Bath. Since the gun was firing aero-dome head pellets rather than pointed pellets/bullets, there is no central indentation there.



Figure 8. Impact marks from an air-rifle using Webley VMX Pellets .177 calibre from a distance of 2 metres into Bath Stone. The mini-craters are similar to some of those on buildings in Bath.

However, could it be that these small holes have nothing to do with WW2 at all and are something completely different? Part 3 explores these other options in the next issue...

Maurice Tucker

Acknowledgements: For comments and suggestions, thanks to Tom Blenkinsop, Ollie Campbell, Oscar Gilbert, Lisa Mol, Mark Lewcun, Jim Warren, Stuart Burroughs, Tim Lunt, Vince Baughan, Graham Hickman (and for use of air-rifle), Phil Burge and two stone masons I bumped into at Bath Riverside.

Burlington House, Piccadilly. London

Since 1854 the Geological Society has been based in Burlington House, Piccadilly London.

Fellows of the London Geological Society will be aware of the recent campaign to try to stop the government pricing them out of their premises at Burlington House.



Burlington House courtyard is home to the

- The Geological Society,
- Linnean Society
- Royal Astronomical Society
- Royal Society of Chemistry
- Society of Antiquaries
- Royal Academy of Arts

These buildings were built specifically for the use of the learned societies by Queen Victoria's government to create a cultural hub in central London.



Statue of William Smith in the entrance to Burlington House.

However in a move to increase the rents to bring them in-line with central London properties. Many of these Societies are finding it increasingly difficult to balance their books and will be forced to relocate.

The case for these learned societies to be co-located and their ongoing contribution to science and the UK economy is being used as the argument to reach an agreement for future rents to be affordable and sustainable.

The geological Society is encouraging people to join their campaign and write to their MP. Details can be found here.

<https://www.geolsoc.org.uk/burlingtonhouse>

As the Bath Geological Society we should be supportive of the Geological Society of London's desire to maintain its heritage home in the face of commercial pressures. Indeed we are affiliated members of the Geologists' Association which also shares office space in Burlington House and will no doubt have to relocate if a compromise agreement cannot be reached.

Article in the Guardian Newspaper:

<https://www.theguardian.com/science/2021/feb/28/under-threat-the-birthplace-of-darwins-historic-theory>

Clypeus ploti

This month we feature a rather nice fossil sea urchin (echinoid) called *Clypeus ploti*. It is of Bajocian, Middle Jurassic age.

These are more commonly known as **Chedworth Buns**, after the nearby village where they were often found or **Pound Stones**, because their weight was usually a good approximation to 1lb.

Clypeus lived in burrows on the seafloor, and burrowed their way through the sediment to get nutrients.

This specimen came from a quarry in Gloucestershire and was from a layer of strata called the *Clypeus Grits*. They had fine hair-like spines and are an

example of what is known as an “irregular” echinoid because they are more heart shaped than circular. The species ‘ploti’ is named after Robert Plott who first published an illustrated them in his book called the *Natural History of Oxfordshire*, first published in 1677.



Membership

Thank you for your support of the Bath Geological Society. The online lectures have been a great success and there has been continued interest with people joining the society all the way through the year despite the circumstances.

If you have not yet renewed your membership please may I encourage you to do so now? You can do this by visiting the Membership area of the website at <https://bathgeolsoc.org.uk/membership.html> and filling in the online form. You can also download the form and return it by email or post. The membership fee can be paid via bank transfer or by sending a cheque. There is also an option to set up a standing order.

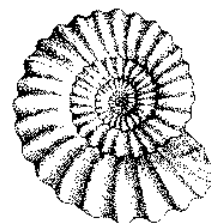
The rates remain the same as last year: individual £30, student £15, family £45.

Best wishes

Polly Sternbauer

membership@bathgeolsoc.org.uk

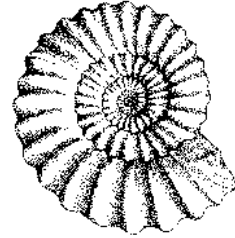
Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

May 2021



April has seen the gradual lifting of COVID-19 restrictions as non-essential shops are opened. We are glad to see rates of new infection and hospital admissions are all coming down. The efficient rollout of the vaccination program appears to be helping and now many young people are being invited for their first jabs. We should remain cautious however as the pandemic is still gripping many other parts of the world and the threat of new variants is unknown.

However, we have decided to go ahead and plan a field trip for 22nd May 2021 in the event that the easing of restrictions will allow for up to 30 people to meet outdoors. We are asking members to register if they wish to attend.

As we look forward to restart physical lecture meetings at BRLSI there are a number of issues the committee will be investigating; the possibility of live streaming a physical lecture via Zoom, the social distancing measures and room capacity restrictions on BRLSI meeting rooms. As always we will keep you informed.

The April monthly lecture, using Zoom, was given by Dr Catherine Klein. She spoke about the evolution of snakes and lizards and how they radiated and recovered from extinction events.

Our next virtual lecture will be held on Thursday May 6th 2021. It will be given by Professor Malcom Hart and will be on the subject of micropalaeontology. As always the lectures are free to members, they will be automatically registered and sent the meeting ID and password. Non-members are invited to attend but will need to register through Eventbrite to join the lecture. We are asking for £5 donations from non-members.

This newsletter brings you; a further article on WW2 Bath Stone damage by Maurice Tucker, and several short articles/photos from Charles Hiscock and Sam Medworth

We hope you enjoy reading this Newsletter. If you have news or articles to share we would love to hear from you. Stay positive and stay safe.

Graham Hickman

chairman@bathgeolsoc.org.uk

In this issue;

1. Upcoming Lecture May 6th 2021 and field Trip May 22nd 2021
2. From our Archivist
3. Out of this World – GSL lectures on the geology of the planets in the Solar System
4. WW2 Bomb Damage on Buildings in Bath – Part 3: by Maurice Tucker.
5. Neolithic Scraper found on BGS field trip – Dr Sam Medworth

Bath Geological Society
Zoom Lecture:

May 6th 2021 @ 7pm

Title: A Bug's LIFE

by Professor Malcolm
Hart, Plymouth University



Abstract: Despite entering university with an interest in volcanic activity (following an expedition to Iceland), the undergraduate training at Imperial College provided an opportunity to develop an abiding interest in microfossils. Since that change in the 1960s, the following 50+ years has developed this interest in the role of 'problem solving' using microfossils. While some of these 'problems' have been the usual biostratigraphical work, some of them have involved multi-million pound projects trying to build structures like the Channel Tunnel, the Thames Barrier, some motorways and other engineering challenges. Oilfield work, including directional drilling in chalk-based fields in the North Sea Basin and giant fields in the Middle East, have also proved challenging. In recent times, microfossils have been used to determine the volcanic history of Montserrat, as well as changes in ocean acidification.

To register please email: programme@bathgeolsoc.org.uk

We will send you joining instructions and the Zoom meeting info.

£5 donation via Eventbrite requested from non-members and visitors.

[Get Tickets](#)

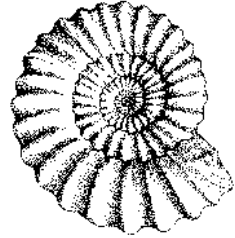
<https://www.eventbrite.co.uk/e/a-bugs-life-tickets-150783556677>

Bath Geological Society

Fieldtrip to the Isle of Portland

Saturday May 22nd 2021, 11am-4:30pm

Leader: Professor Maurice Tucker



NOTE: We are planning this field trip on the basis that COVID-19 Restrictions from May 17th will allow for a group of up to 30 people to meet up outside. If the restrictions are not lifted the trip will be postponed.



To register please email Bob Mustow at field@bathgeolsoc.org.uk
Joining instructions and meet up location will be given on Registration

The plan is to visit the outcrops around Pulpit Rock and then walk up the spectacular east coast to Freshwater Bay, returning to the Bill via Sweet Hill and the medieval fields. We shall see 2 raised beaches from the last two interglacial times (125 and 250kyr), many coastal landforms (wave-cut platforms, blow-holes, sea-caves), the Upper Jurassic-Lower Cretaceous Portland-Purbeck strata with fossils, microbiolites, and the effects and relicts of quarrying the Portland stone.

We will be walking on the wide coastal path – mostly flat, a little rough, care needed. This is around 4 miles and with stops will take about 3 hours.

After a picnic lunch, we will visit the disused Tout Quarry, NW corner of the Island. Here we will see the Purbeck strata and spectacular views (visibility permitting) of Chesil Beach and the cliffs, relics of the quarrying industry, as well as the 50+ sculptures there in the old quarry.

Time (and enthusiasm) permitting, we will examine Chesil Beach at Chiswell to see its features close up and discuss its origin. Aim to finish 4:30pm.

From our Archivist

In last year's Journal, Elizabeth Devon wrote an article on her reminiscences of the Bath Geological Society (2020 BGS Journal No.38, pages 17 & 18). At the end she wondered if anyone remembers the Bath Geological Society T-shirt and badges.

So, in an effort to justify being the 'archivist' I have unearthed my T-shirt! Today, the first warm(-ish) day of 2021 Gill took the photo of me modelling the 1980's style which for a few years was 'de rigeur' on field trips, holding appropriately a piece of rock!! (If you look closely one can see it's a bit yellow with age (not me, the T-shirt!) Just thought members might be interested!

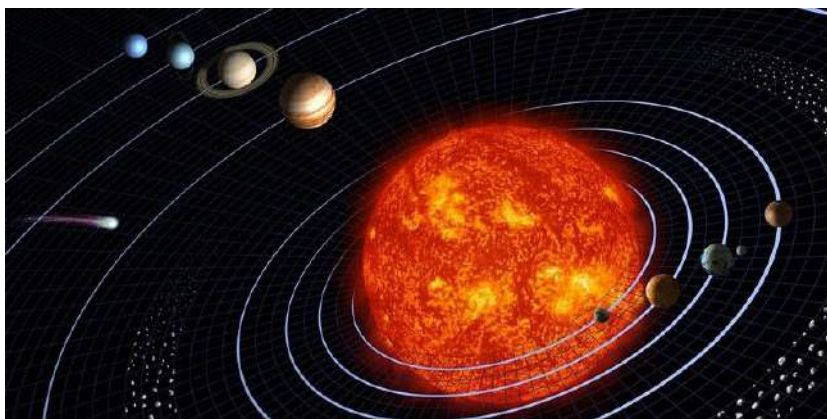
Regards,
Charles Hiscock



Out of this world...

The Geological Society of London has a number of Zoom lectures which might be of interest to BGS members.

2021 Year of Space lecture series is a geological journey through our solar system and beyond. This lecture series will take you on a journey all the way from Mercury to Pluto and



beyond and show you how geologists here on Earth can examine rocks from space and the Earth itself to unpick the mysteries of our Solar System.

2021 Year of Space lecture series can be booked via the link below free or with a donation
<https://www.geolsoc.org.uk/Events/2021-year-of-space>

Recordings are also available on their YouTube channel after the live lecture has taken place.
<https://www.youtube.com/playlist?list=PLNksJlpAKcLhds0lyLWup-KNbOKRS2YCb>

Bomb Damage on Buildings in Bath: Part 3 - Impact Marks and Other Features on Bath Stone.

By Maurice Tucker

maurice.tucker@bristol.ac.uk

As Part 3 of my article on the bomb damage to heritage buildings in Bath, following the lecture of Prof Tom Blenkinsop (Cardiff University) on impact damage and meteorite craters to the Bath Geological Society in February. I explore the possibilities that some of these small holes have nothing to do with WW2 at all and are something completely different.

One explanation could be that these holes (or some of them) derive from the impacts of nails being hammered into stone to hold up trellis work, or to fix clematis, vines or wisteria (as in *Bridgerton*!) to the wall (Figure 9); of course, some creepers like ivy and Virginia creeper have their own mechanisms for attaching to a wall. What awful jobs were done if this is the origin of the holes, really spoiling, nay, damaging the stone. It would almost be a type of self-inflicted vandalism to produce so many holes on the front wall of your house – although of course you would not see them until the creeper came down!! There are actually relatively few 18th–19th C houses in the City with creeper growing on their front walls. Is that because of vegetation damaging the stone or just fashion? I wonder, what was the fashionable creeper for houses of the Georgian-Victorian era?

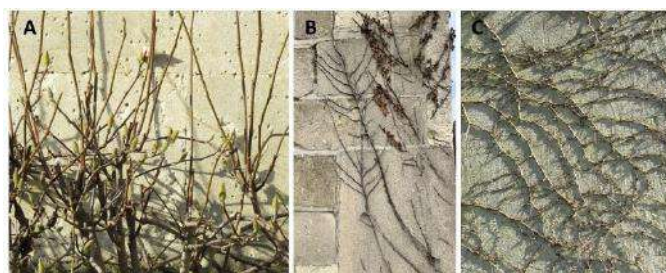


Figure 9. Vegetation growing on / against the front walls of buildings in A) the Royal Crescent (magnolia), B) Dorset Street (ivy) and C) Queen Square (wisteria).

If connected to holding up a creeper one might expect the holes to be better ‘organised’, occurring in a line or more regularly spaced out rather than their apparent random scattered arrangement. However, hammering masonry nails into Bath Stone does produce holes similar to those on the walls (Figure 10), and if the nails broke off or rusted away, there could be a bit of metal left in there. The effect of knocking a nail into the stone is to produce a powder which forms a coating inside the hole.

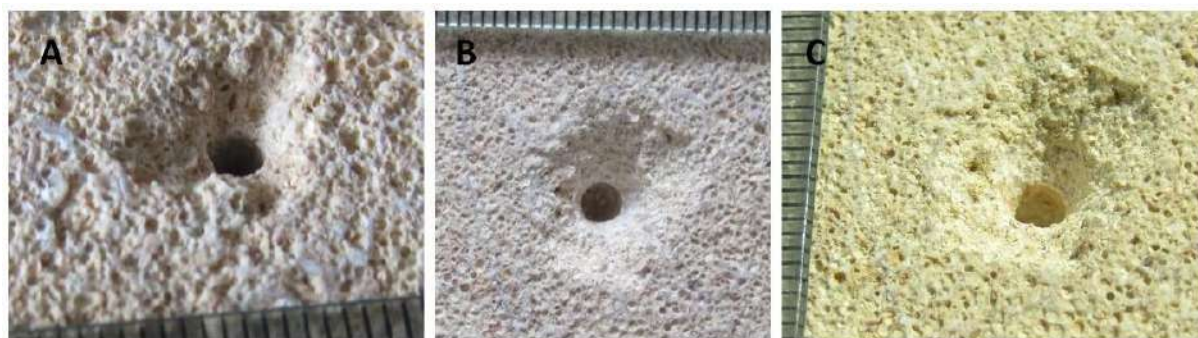


Figure 10. Holes created from the impact of banging a nail into a block of Bath Stone.

Finally, in terms of man-made holes on Bath Stone, the front walls of a few heritage buildings in Bath are patterned with ridges and hollows, or pitted by circular chiselled or drilled holes of various sizes. These kinds of decoration are referred to as vermiculation (reminiscent of worm tracks) and can be seen on the Guildhall and the former bank at the top of Milsom Street. There is one building where the front wall at ground floor level is covered in small pits of a similar size to those small impact marks that are puzzling me: The Hospital of St John the Baptist, built in 1727 by John Wood, the Elder (Figure 11); in fact this was his first project, which was followed by Queen Square.



Figure 11. The Hospital of St John the Baptist, built in 1727 by John Wood, the Elder; the whole ground-floor wall is covered in simple impact marks, presumably a form of decoration.

What other possible origins could there be for these holes? Are there any likely natural explanations? Some of these structures could be cross-sections through burrows. Bath Stone is an oolitic grainstone. A lime sand composed of ooids deposited in a shallow, moderate-energy sea like the Bahama platform today; Joulters Cay for example. In such a location there would have been animals living within the sediment, annelids (worms), but especially crustaceans (like *Callianassa*), and there are definitely some burrows in the stone. Some of these burrows are lined with slightly better cemented sand and within the burrows themselves, well-cemented sand; holes could have formed in the oolite on weathering of the burrows as in Figure 12. Although a few of the holes could be burrows, this cannot be the explanation for all of them.



Figure 12. Holes in Bath Stone likely to be burrows from Jurassic crustaceans (or worms).

And then I thought about stone or masonry bees!! Perhaps not although in some places there are concentrations of holes in the mortar between the stone blocks (Figure 13), so maybe



Figure 13. Could these be the holes of masonry bees? Or more nails for the clematis (or both).

Thus, these small impact marks are a conundrum; perhaps, like many features in geology, they are the result of several different processes rather than just one ...

Any comments welcomeMaurice Tucker

Acknowledgements: For comments and suggestions, thanks to Tom Blenkinsop, Ollie Campbell, Oscar Gilbert, Lisa Mol, Mark Lewcun, Jim Warren, Stuart Burroughs, Tim Lunt, Vince Baughan, Graham Hickman (and for use of air-rifle), Phil Burge and two stone masons I bumped into at Bath Riverside.

Neolithic Scraper – by Dr Sam Medworth

After one of our Zoom lectures I was talking about a Neolithic scraper I found on our field trip to Marlborough Downs in June 2018. I attach some pictures; these are the scraper showing the edge (Right) and face (Left). I found it lying on the path at the start of the walk. It is about 40mm in diameter and at first I thought it was a human patella (kneecap). However it is weathered flint.



Geo-Poetry

Graham and I attended a geo-poetry workshop this month. The poem below is the consequence of 5 minutes guided writing. It got rave reviews at the workshop; Graham submitted it under his name!

Set in stone family life,
A Graptolite's life, extending
Outwards, meshing together.
Set in stone, a fragile life.

Set in stone, route of development.
A myriad of life forms
Fiercely holding together.
Set in stone, fossil record holds.

Kerry Hickman



Membership

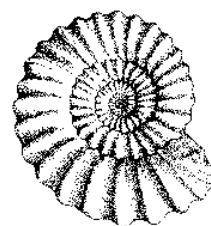
Thank you for your support of the Bath Geological Society. The online lectures have been a great success and there has been continued interest with people joining the society all the way through the year despite the circumstances.

If you have not yet renewed your membership please may I encourage you to do so now? You can do this by visiting the Membership area of the website at <https://bathgeolsoc.org.uk/membership.html> and filling in the online form. You can also download the form and return it by email or post. The membership fee can be paid via bank transfer or by sending a cheque. There is also an option to set up a standing order.

The rates remain the same as last year: individual £30, student £15, family £45.

Best wishes

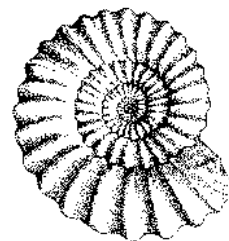
Polly Sternbauer
membership@bathgeolsoc.org.uk
Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

June 2021



May has seen further lifting of COVID-19 restrictions and with the sunny weather over the end of May bank holiday weekend it feels like summer has finally arrived. The UK seems to be recovering from the pandemic with large numbers of people now vaccinated. Our borders however, remain closed to non-essential travel as the threat of new variants continues.

The Bath Geological Society field trip to Portland went ahead on 22nd May 2021, our thanks to Maurice Tucker who led the event and to the society members who attended. As our first face to face meeting for over a year it was good to see one another and enjoy the geology of the Isle of Portland.

As we look forward to restarting physical lecture meetings at BRLSI there are a number of issues the committee will be investigating; the possibility of live streaming a physical lecture via Zoom, the social distancing measures and room capacity restrictions on BRLSI meeting rooms. As always we will keep you informed.

The May monthly lecture, using Zoom, was given by Professor Malcom Hart. He spoke about the many projects he had worked on using microfossils to solve geological and engineering problems.

Our next virtual lecture will be held on Thursday June 3rd 2021. It will be given by Dr Doug Robinson and is about the making of the Mendip Hills. This will be followed by a Field Trip also led by Doug to Deer Leap and Ebbor Gorge in the Mendips. As always the lectures are free to members, they will be automatically registered and sent the meeting ID and password. Non-members are invited to attend but will need to register through Eventbrite to join the lecture. We are asking for £5 donations from non-members.

This newsletter brings you an article by Charles Hiscock and an interesting BBC article which points out that moving to net zero will mean more mining, at least in the short term.

We hope you enjoy reading this Newsletter. If you have news or articles to share we would love to hear from you. Stay positive and stay safe.

Graham Hickman

chairman@bathgeolsoc.org.uk

In this issue;

1. Upcoming Lecture June 3rd 2021 and field Trip June 9th 2021
2. The Silurian/Upper Old Red Sandstone Unconformity at Buckover, near Thornbury Re-exposed. by Charles Hiscock
3. Moving to net zero 'inevitably means more mining' BBC article

**Bath Geological Society Zoom Lecture
Thursday 3rd June 2021 @ 7:00pm
Title : The Making of the Mendip Hills**



Dr Doug Robinson, Bristol University

Bath Geological Society Lecture: Thursday June 3rd 2021 @7pm

Title: The Making of the Mendip Hills

By: Dr Doug Robinson, Bristol University

Abstract: A 200 million year, 6,000 km journey from the southern tropics across the equator into northern latitudes. The Making of the Mendip Hills is focussed on the area around City of Wells, which sits in a beautiful position at junction between the Somerset Levels and the Mendip Hills, with the backdrop of Pen Hill that forms part of the Mendip AONB. In this small area rocks from four geological periods are found – Devonian, Carboniferous, Triassic and Jurassic. These rocks tell a story of a ~ 6,000 km journey from the southern tropics across the equator into northern sub tropics. The talk will also cover the controversy over a sequence of Coal Measure rocks occurring in Ebbor Gorge; the only record of a metamorphic rock in the Mendips; and an excavation to provide the first exposure of a thrust fault in the Mendip overthrust belt.

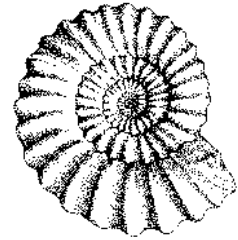
To register please email: programme@bathgeolsoc.org.uk

We will send you joining instructions and the Zoom meeting info
£5 donation via Eventbrite requested from non-members and visitors.

[Get Tickets](#)

<https://www.eventbrite.co.uk/e/the-making-of-the-mendip-hills-tickets-155504226327>

Bath Geological Society Fieldtrip to the Deer Leap & Ebbor Gorge



Wednesday June 9th 2021, 10:30am-4:00pm

Leader: Dr Doug Robinson

**IN ORDER TO COMPLY WITH COVID RESTRICTIONS THIS TRIP IS
LIMITED TO 30 PARTICIPANTS OUTDOORS.**

To register please email Bob Mustow at field@bathgeolsoc.org.uk
joining instructions, risk assessment, field guide and meet up location will
be given on Registration

Field Trip Description: The first BGS field trip, held fifty years ago, was to Ebbor Gorge. Our return visit includes Deer Leap and the Wookey Hole area.

The morning (2 – 2.5 hours) will be spent in the Deer Leap area, near Ebbor Gorge. This area is on the southern limb of the North Hill pericline where a sequence from Lower into Upper Carboniferous (the only Coal Measures outcropping in the southern Mendips) is exposed. The Ebbor thrust (part of the Wells-Cheddar thrust belt), juxtaposing the oldest Carboniferous Limestone unit (Black Rock Limestone) against the younger Coal Measures will be crossed, and the only exposure of this thrust that has been recorded will be seen.

The picnic lunch stop will be at Deer Leap, which has great views south across the Somerset Levels.

The afternoon will involve a stop at Ebbor Gorge to view the remains of a coal shaft that was sunk into the Coal Measures back in 1871! Then the rest of the trip will be spent around the Wookey Hole area looking at tectonic (normal fault/shear zones, extensional veins), and karst features in the Carboniferous Limestone and Triassic rocks.

Meet at 10.30 a.m. in the car park at Deer Leap (ST 5190 4928; 51.24064 - 2.690464) – note this is a different car park from the one at the National Trust Ebbor Gorge. Bring a picnic lunch.

The Silurian/Upper Old Red Sandstone Unconformity at Buckover, near Thornbury Re-exposed.

By Charles Hiscock

Most geologists are familiar with the famous Hutton's unconformities of Siccac Point, Berwickshire, and Laggan, near Lochranza on the Isle of Arran. In both cases the Upper Old Red Sandstone forms an angular unconformity with the underlying Silurian, tilted greywacke at Siccac and metamorphosed schists at Laggan. The two Scottish sites are not the only unconformities of the Upper Old Red Sandstone on Silurian rocks in Great Britain but the others have not attracted quite the attention of geologists. However, near Thornbury on the southern edge of the Silurian Tortworth Inlier there is the well-documented unconformity of the Upper Old Red Sandstone on the Silurian, Wenlock Brinkmarsh Beds.

In 1963 Gloucestershire County Council eliminated a dog-leg in the A38 by opening a 3/4 mile cut between the White Horse Inn at Buckover and Whitfield. A cutting was excavated from 1/4 mile NE of the White Horse pub to the existing A38 at Whitfield. The cutting was surveyed by MLK Curtis, Geological Curator at Bristol Museum and a colleague, R Cave, who logged the westerly dipping beds which were uncovered. The beds run obliquely across the cutting with progressively younger beds being exposed as traced in a SW direction. The lowest strata were purplish-red mudstones of the Silurian Wenlock Brinkmarsh Beds which were found to be overlain unconformably by the Upper Old Red Sandstone. The section is situated on the eastern limb of a sharply south pitching syncline with the axis running through Buckover, very similar to the syncline of the Bristol Coal Basin. The beds dip consistently at about 35 degrees west in the Brinkmarsh Beds with the overlying Devonian dipping at 33 degrees at the angular unconformity but lessening to 20 degrees in the highest beds. A number of faults cross the formation but due to the growth of soil and vegetation cover in the intervening years, only one remains visible just south of the unconformity exposure where the Quartz Conglomerate has been exposed by the new clearance.

Over the intervening years vegetation and erosion had completely obscured the outcrop. In 2002 English Nature funded a digger and workers to clear the site and expose the relevant beds of the section and articles appeared in the Bristol Evening Post and Thornbury Gazette (photo 1) where the importance of the site was stressed, highlighting that it is an SSSI and a "great project which will restore this part of our nationally important network of sites for research and enjoyment" and "is one of the most important sites in the south-west and the country. Since then little has been done to maintain the site until early 2021 when a small area was cleared to expose the topmost purplish-red and silty mudstones of the Brinkmarsh Beds, the unconformity, the overlying Old Red Sandstone and a small exposure of the Quartz Conglomerate 15 feet south of the main exposure where a fault with a down-throw of 7 inches to the south has been re-exposed.

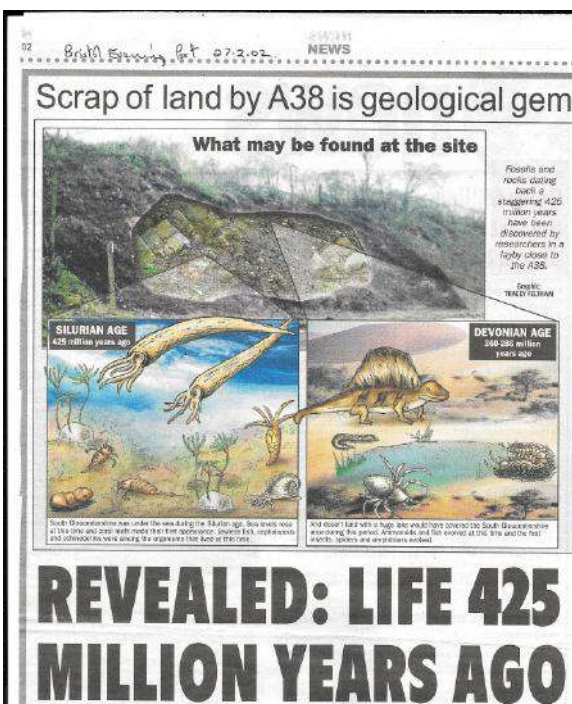


Photo 1 – Article in Bristol Evening Post 27.2.02

The Brinkmarsh Beds are characterised by a great thickness of purplish laminated mudstones, particularly fossiliferous elsewhere in the Inlier. At Buckover, the beds are limited to the top 4 feet by vegetation and have not yielded any fossils. At the recently exposed cutting the unconformity is open to interpretation but by referring to Curtis and Cave 1964 where there are full logs of the Silurian and Devonian sequences, the unconformity can be identified. Their paper lists the top Silurian bed as 1ft 6ins of “hard yellow current-bedded fine-grained calcareous sandstone weathering to a brown rottenstone and containing abundant crinoid ossicles” underlain by 4 feet of “silty mudstone with some silty sandstone bands”. Above these beds the log describes a “hard purplish sandstone, the lowest 4 ins are pebbly in some places with quartz pebbles up to 1/4in and pebbles and fragments of green mudstone and yellow decalcified sandstone similar to bed 18 of the underlying Silurian’. The current exposure displays these features.



Photo 2 – The exposure on the western side of the A38 (hammer head rests on unconformity).



Photo 3 – Close-up of the unconformity



Photo 4 – Upper Old Red Sandstone beds above the unconformity.



15 feet south of the exposure the Quartz Conglomerate shows the fault with a down-throw of about 7 inches to the south.

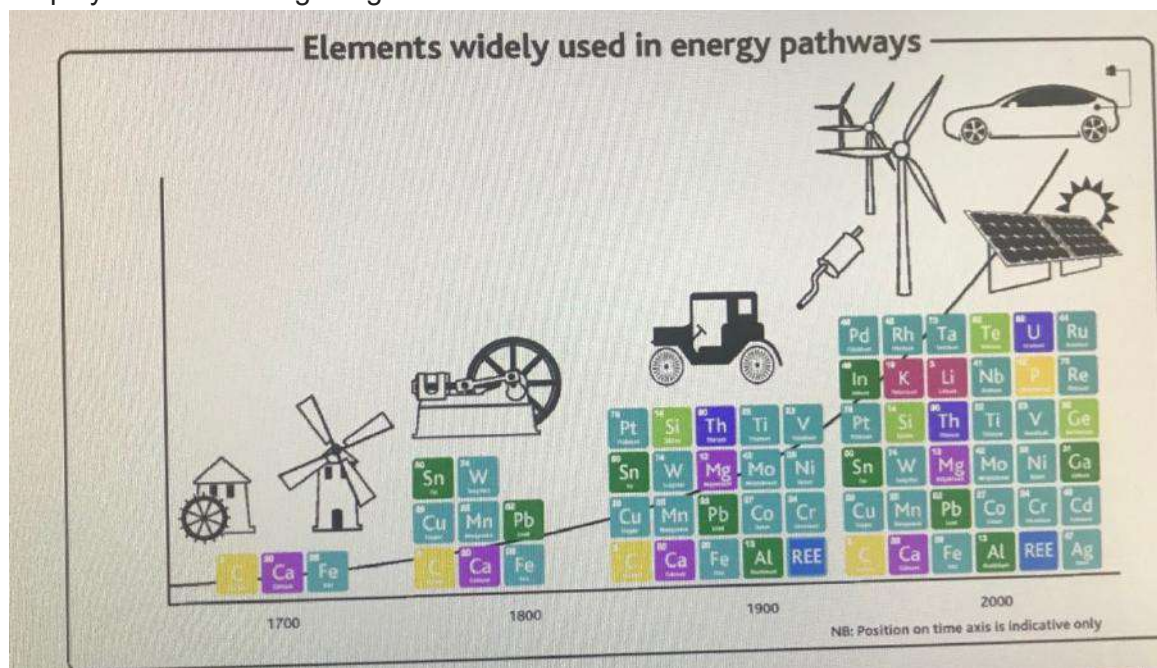
Photo 5 – Quartz Conglomerate showing fault with down-throw approx. 7 " to the south.

The Silurian Brinkmarsh Beds/Devonian Quartz Conglomerate Unconformity at Buckover, marking a break in the rocks of 55 million years, does not have the importance of others in the country but it a good exposure to see the feature in the local area.

Charles Hiscock

<https://www.bbc.co.uk/news/science-environment-57234610>

Below is a graphic from a recent GSL lecture which illustrate the point that more rare earth elements will be needed for batteries and electric cars. It was quoted that four times the amount of copper is needed for electric cars versus petrol cars. A consequence of that will be employment for more geologists who will be needed to find all these resources.



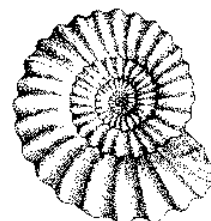
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Best wishes

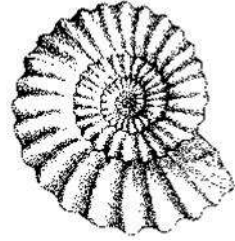
Polly Sternbauer
membership@bathgeolsoc.org.uk
 Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

July 2021



During June the lifting of COVID-19 restrictions were delayed by a further four weeks as a result in the rise of cases of the new "Delta variant". Everyone over 18 is being offered the vaccine. The UK borders mostly remain closed to non-essential travel with a few exceptions. Meanwhile the Bath Geological Society continues with virtual lectures and outdoor field meetings.

The June monthly lecture, using Zoom, was given by Dr Doug Robinson. He spoke about the Making of the Mendip Hills. This was followed up by an excellent field trip to Deer Leap in the Mendips on 9th June 2021, our thanks to Doug Robinson and David Scarth for leading this event. It was well attended, enjoyed good weather and interesting geology. A follow-up trip to the Wookey Hole caves will be planned, outside of the tourist season, to allow us to linger and observe the geology underground.

As we look forward to restarting physical lecture meetings at BRLSI, probably in September, there are a number of issues the committee will be investigating; the possibility of live streaming a physical lecture via Zoom, the social distancing measures and room capacity restrictions on BRLSI meeting rooms. As always we will keep you informed.

Our next virtual lecture will be held on Thursday 1st July 2021. It will be given by Dr Haydon Bailey on the subject of Forensic Palaeontology. We will also be holding an additional local field trip to Murhill, Avoncliff and Winsley on Wednesday 7th July 2021. We also plan on holding a Zoom lecture on Thursday 5th August 2021 when Dr Sam Medworth will talk about his ancestor Arthur Hutchison and petroleum geology during the 1930s and 1940s. As always the lectures are free to members. They will be automatically registered, sent the meeting ID and password. Non-members are invited to attend but will need to register through Eventbrite to join the lecture. We are asking for £5 donations from non-members.

This newsletter brings you an article by Phil Burge on dinosaurs and another of Mell's rocks.

We hope you enjoy reading this Newsletter. If you have news or articles to share we would love to hear from you. Stay positive and stay safe.

Graham Hickman

chairman@bathgeolsoc.org.uk

In this issue;

1. Upcoming Lectures & field trips 1st July, 7th July and 5th August 2021
2. More Dinosaur Snippets by Phil Burge
3. Jurassic Ark exhibition at BRLSI
4. Mell's Rocks

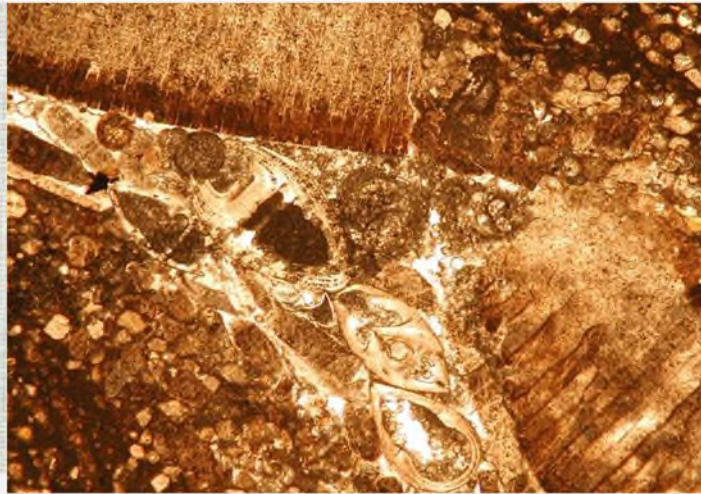
Bath Geological Society Zoom Lecture

Thursday 1st July 2021 @ 7:00pm

Title : Forensic Palaeontology - The Forensic use of calcareous microfossils, with particular reference to the Soham murder case.



Tudor (16th Century) portrait of
"A man in a red suit".



Inoceramid rich, foraminiferal chalk, Soham

Dr Haydon Bailey, Network Stratigraphic Consulting Ltd.

Title: Forensic Palaeontology - *The Forensic use of calcareous microfossils, with particular reference to the Soham murder case.*

Speaker: Dr. Haydon W. Bailey, Network Stratigraphic Consulting Ltd.

Abstract: Chalk is a very unusual rock. It's dominantly biogenic, being formed from the microscopic remains of minute golden brown algae (coccoliths), other microfossils (foraminifera, ostracods, calcispheres) and fragmentary remains of macrofossils (bivalve molluscs, echinoderms, belemnites). Whenever and however it is used by man it retains a trace of this biogenic origin and, with careful research, we can use this trace like a fingerprint, tracking it back to its source.

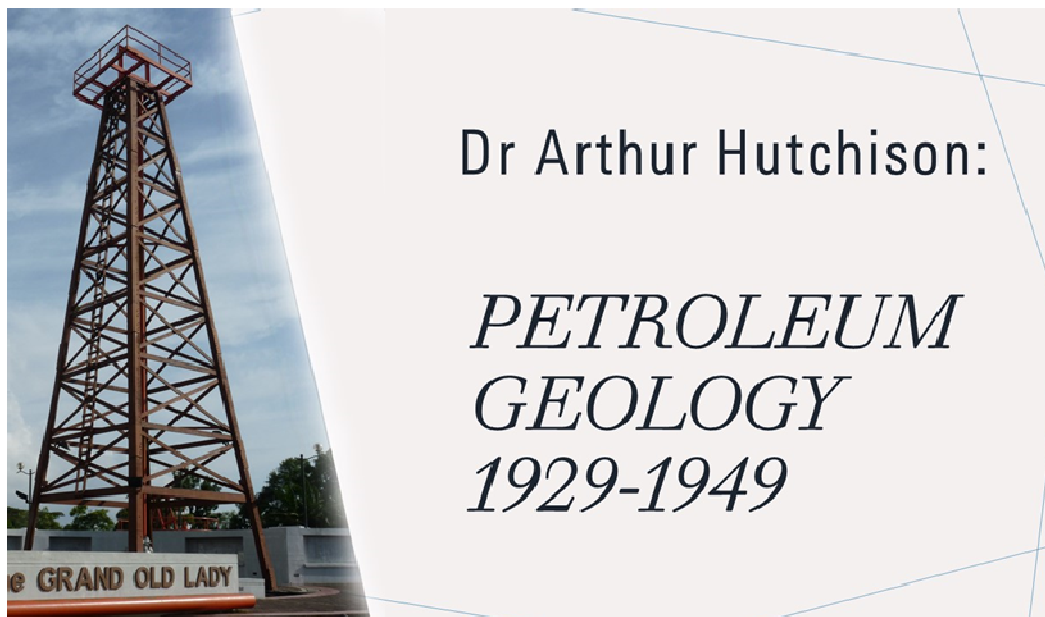
Such provenance studies have curious applications in both the fine art world and in criminal investigations. Two examples are presented here in order to provide an insight into how chalk has been used in previous provenance studies and might be used in future applications.

To register please email: programme@bathgeolsoc.org.uk

**We will send you joining instructions and the Zoom meeting info
£5 donation via Eventbrite requested from non-members and visitors.**

[Get Tickets](#)

<https://www.eventbrite.co.uk/e/the-forensic-use-of-calcareous-microfossils-tickets-159965455985>



Bath Geological Society Zoom lecture

Thursday August 5th 2021 @7pm

Title: Dr Arthur Hutchison - Petroleum Geology from 1929-1949

Speaker: Dr. Sam Medworth (Bath Geological Society)

Abstract: This talk describes what life was like for a Petroleum Exploration Geologist in the momentous decades of the 1930s and 1940s. Researched from original letters, photos and documents - Arthur Hutchison's story reads at times like something from the Boys Own Paper. This historical biography includes a lot about petroleum geology and will be of interest to both professional and amateur geologists alike. Join in on Zoom and you will find out!

To register please email: programme@bathgeolsoc.org.uk

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£5 donation via Eventbrite requested from non-members and visitors.

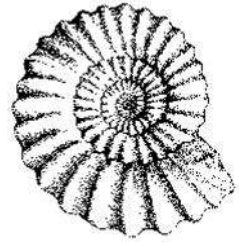
[Get Tickets](#)

<https://www.eventbrite.co.uk/e/dr-arthur-hutchison-petroleum-geology-1929-to-1949-tickets-159100553037>

Bath Geological Society Fieldtrip to Murhill, Avoncliff and Winsley

Wednesday July 7th 2021, 10:30am-2:30pm

Leaders: Maurice Tucker & Graham Hickman



To register please email Bob Mustow at field@bathgeolsoc.org.uk
Joining instructions and meet up location will be given on Registration

Field Trip Description: The trip will be a 5km circular walk starting and finishing in Winsley visiting the disused Murhill quarry, inclined tramway, K&A canal, Avoncliff aqueduct, tufa spring and pumping station, Turleigh Trows spring and a few geological features in walls around Winsley.

The morning will start at the Murhill quarry looking at the old workings. Then we will descend to the canal via the route of the old tramway. A few of the original rails can be seen near the wharf where the stone was loaded onto barges on the Kennet and Avon canal. From here we will walk to Avoncliff along the canal towpath.

At Avoncliff we will examine a tufa spring near the railway station and the old pumping house which, depending on the time available, we may visit before or after lunch. There are benches on the Aqueduct for a lunch stop. Refreshments and toilets are also available at the Cross-Keys public house.

The afternoon will involve walking uphill to Turleigh where the Trows Spring occurs at the boundary of the Fullers Earth and Great Oolite. Our route back through Winsley takes us past some Sponge Stone arches and ammonites incorporated into a wall.

Meet at 10.30 a.m. in Winsley. (Details given on Registration)

Bring a picnic lunch.

Health and Safety: Uneven conditions exist on some footpaths and suitable footwear is advised. The descent on the Murhill tramway is steep (1 in 4) however the surface is tarmac and we will take it slowly. A short section of the footpath beside the canal is fairly narrow so care will need to be taken. The route backup to Winsley is more gradual, the ascent is 120m.

More Dinosaur Snippets by Phil Burge

Footprints

85 dinosaur footprints from the Lower Cretaceous, made by up to 13 different species, have been found in the Ashdown Formation in East Sussex. A collection such as this provides super information as to which species made up the community and ecosystem at the time. The fossil footprints are very well preserved showing details of skin, claws and scales. Identified species include Iguanodon, Ankylosaur, Stegosaur and other sauropods and Therapods.



A close up of skin impressions from an iguanodontian footprint. Credit: Neil Davies



An ankylosaurus print with claw impressions. Image credits: University of Cambridge

Reference: <https://www.sciencedirect.com/science/article/pii/S0031018218305522>

Migration

Following on from the footprints, there is a related item of research that shows that herbivorous dinosaurs took 15 million years to migrate from the southern hemisphere to an area in what is now East Greenland. The authors of this research note that a snail could have traversed the 10,000 km in much less than 15 million years! Herbivorous dinosaurs first appeared in South America around 230 million years ago during the Norian period of the Late Triassic. The continents were joined Pangea, which in principle allowed dinosaurs to roam unhindered. Something else must have prevented their migration to Greenland. In a 350 metre unbroken series of sediments the researchers found bones from 10 herbivorous dinosaurs. Dating showed that these dinosaurs arrived 214 million years ago which coincided with a major climatic shift resulting from a dramatic decrease in atmospheric CO₂ 215 million years ago. Thus it was that 15 million years of extreme warm climatic conditions prevented dispersal of these creatures to northern high latitudes. Oddly, carnivorous dinosaurs arrived in Greenland some 600,000 years before the herbivorous varieties. Perhaps the carnivores were better able to withstand the extreme temperatures or some aspect of carnivorous ecology allowed them to go where no herbivore had gone before.

Reference: <https://www.sciencedaily.com/releases/2021/03/210309114330.htm>

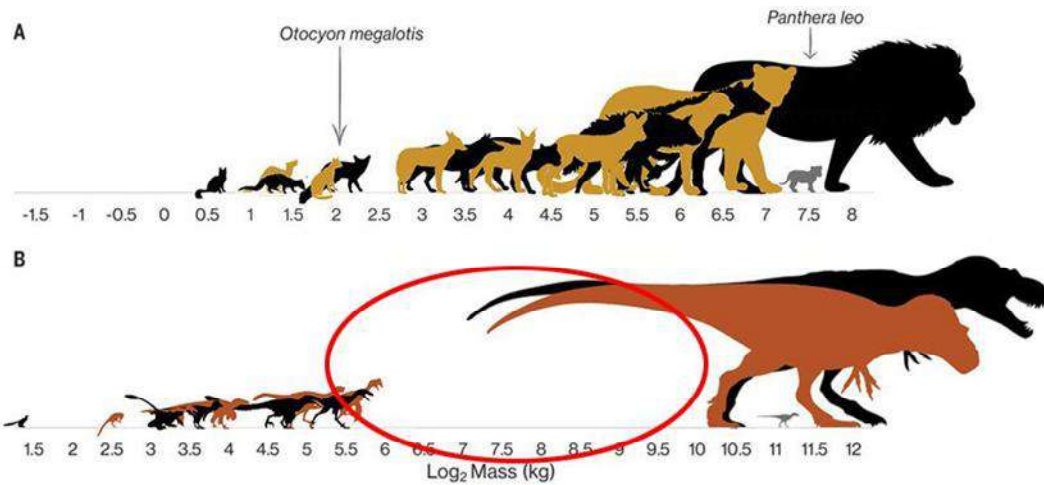
Bite Force

A metal replica of a juvenile T. rex was used to calculate the bite force of said creature. The results showed that a juvenile could have exerted a force of 5,641 newtons, equivalent to a modern hyena or crocodile. Adults of the species had a bite force calculated at 35,000 newtons. Knowing the bite force of juveniles tells is something about the ecosystem in which dinosaurs lived. The data shows, not surprisingly, that the juveniles occupied a different part of the food web being unable to crush bones, as would an adult.

Reference: <https://www.sciencedaily.com/releases/2021/06/210602091409.htm>

Body Mass Gap

Moving on from Tyrannosaurus teeth, we look at the degree of speciation within the Dinosaurian. Unlike modern carnivore communities that span a range of body sizes filling a spectrum of ecological niche, this did not apply to the Megatheropods (>1000kg) such as the Tyrannosaurus. Analysis of 550 dinosaur species, organised by mass and diet, revealed a clear pattern. There are very few carnivorous dinosaurs between 100 and 1000kg in communities that have Megatheropods. The gap is filled by juveniles that, as they grow and mature change their behaviour as they fill different ecological niches. In addition, Jurassic communities had smaller gaps in species size while Cretaceous communities had larger gaps. Within Jurassic Megatheropods juveniles are much like the adults and the middle order niches are filled by other non Megatheropods Dinosaurs. This leaves room in the community for other species to evolve and fill various niches. The Cretaceous is more dominated by Tyrannosaurs and Abelisaurus which change considerably between juvenile and adult.



The dinosaur gap versus modern carnivorous mammals. Credit...Schroeder et al., Science (2021)

Reference:

<https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1860&context=bioscifacpub>

<https://www.nytimes.com/2021/02/25/science/tyrannosaurus-teenagers-dinosaurs.html>

Let's go back to teeth!

A haul of *Spinosaurus aegyptiacus* teeth have been found in Morocco. From the location of the find it has been suggested that this species was truly a water dwelling "river monster", adding to the existing controversy that *Spinosaurus* was either wholly terrestrial or only occasionally aquatic. Watch this space!

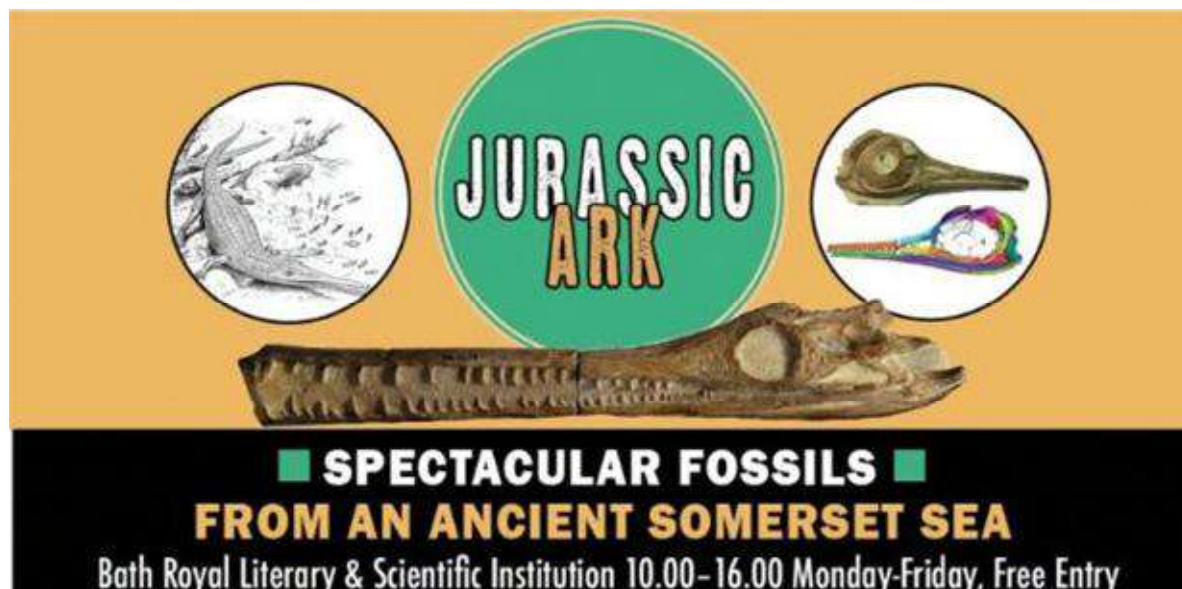


Reference:

<https://www.nationalgeographic.com/science/article/first-spinosaurus-tail-found-confirms-dinosaur-was-swimming>

BRLSI Exhibition - Jurassic Ark

BRLSI is opening the doors again for the summer exhibition 'Jurassic Ark'. This is a display of the exceptionally well preserved fossils from Strawberry Bank collected in the 19th century. In addition finds from the recent excavation at the site will be displayed.



The exhibit is open to the public for free. BRLSI, 16 Queen Square, Bath BA1 2HN. 10am–4pm Monday–Friday

There is also a lecture series to accompany the exhibition. If you missed the first ones they can be watched on the [Youtube channel](#).

A poster for a lecture series titled 'The World of Jurassic Ark'. At the top, a green circular logo contains the text 'The World of JURASSIC ARK' in white and orange. The background is a light brown color with a faint illustration of a marine reptile and a fish. Below the logo, the text reads 'Four talks on what the Strawberry Bank fossils reveal of life in an ancient Somerset sea'. Below this text is a table with four columns, each containing a date, time, title, and speaker. The table is enclosed in a dotted border.

2 June 19:30 The life of the Mesozoic sea dragons Mike Benton Professor of Vertebrate Palaeontology, University of Bristol	25 June 19:30 Digital ichthyosaurs and rebuilding in three dimensions Dr Ben Moon Palaeobiology and Biodiversity Research Group, University of Bristol	7 July 19:30 Strawberry Bank's exceptionally preserved fossils in geological context Dr Crispin Little School of Earth and Environment, University of Leeds	21 July 19:30 Strawberry Bank Lagerstätte, from Victorian hammer to 21st century laboratory Matt Williams Collections Manager BRLSI
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Mell's Rocks - Dunite

This was a holiday gift from one of my nieces following a trip to Lanzarote and is most likely Dunite which is an ultramafic rock that is composed almost exclusively of olivine. It is a very dense rock and is considered to be the major constituents of the Earth's mantle, above a depth of about 400 kilometres. It would have been brought up the vent/conduit of an erupting volcano on the island during one of its active phases. The iron in the olivine weathers to a dark rusty crust on the outside.



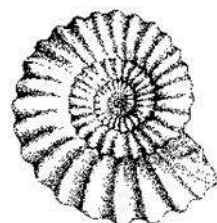
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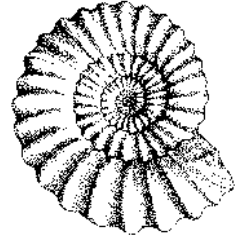
Polly Sternbauer
membership@bathgeolsoc.org.uk
Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

August 2021



Following the lifting of most of the COVID-19 restrictions in June, life is starting to return to normal. Over the summer the Bath Geological Society has continued with virtual lectures but we have held three outdoor field meetings and we plan to hold two more in September.

The Society does not normally hold an August lecture, but as these are not normal times we held an August lecture, using Zoom. It was given by Dr Sam Medworth who is a retired GP and member of the Bath Geological Society. Sam gave a very interesting talk about his ancestor, Arthur Hutchison, who was a petroleum geologist during the 1930s and 1940s. His talk was based on a number of historic documents and photographs passed down to him.

On **Wednesday September 8th 2021** we plan to return to BRLSI to hold our first physical lecture since March 2020. Matt Williams will speak to us about the **Geological Collections held at BRLSI and also the Strawberry Bank temporary exhibit** which is currently on in the ground floor room. Members will be encouraged to arrive early for this private evening viewing. Following the lecture, we are hoping to enjoy some light refreshments and drinks together. We have rented the larger lecture room to ensure there is adequate room capacity to maintain social distancing measures. We are investigating the possibility of live streaming but at this stage are unsure whether we have the technology to be able to do this. More to follow.

We have a further two field trips planned in September. On Thursday 23rd September Steve Hannath and Isobel Geddes will lead a trip to the Vale of Wardour. On Saturday 25th September Charles Hiscock will lead a field trip around Thornbury in South Gloucestershire. Details of both trips are contained in this newsletter.

During September our Journal editor Mellissa Freeman will start to compile and edit the journal. We are still looking for articles for this year's edition so if you have news or articles to share, any geological photographs or even a book review then we would love to hear from you.

We hope you enjoy reading this Newsletter which advertises some of our upcoming events.

Graham Hickman

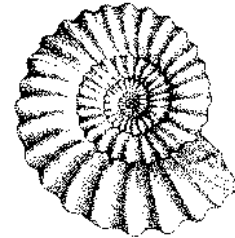
chairman@bathgeolsoc.org.uk

In this issue;

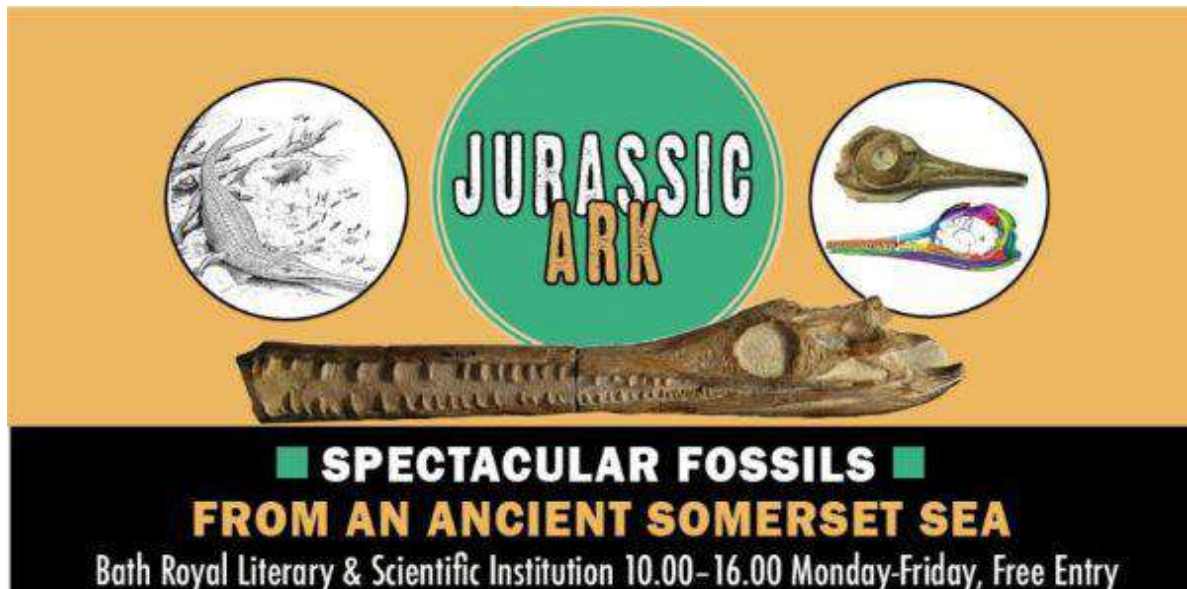
1. Jurassic Ark exhibition and Lecture at BRLSI - **Wednesday 8th September 2021**
2. Vale of Wardour field trip – Thursday 23rd September 2021
3. Thornbury field trip – Saturday 25th September 2021

Bath Geological Society Lecture & Exhibition

Wednesday 8th September 2021, 7pm
Location: BRLSI Queen Square, Bath.



Speaker: Matt Williams, Collections Manager BRLSI.



As the first return to physical indoor meetings the Bath Geological Society members are invited to an exclusive viewing of the exhibit and lecture from Matt Williams the Collections Manager at BRLSI.

7pm - The Exhibit; The temporary 'Jurassic Ark' exhibition will finish at the end of September. Normally only viewable during the daytime, Members will have an exclusive evening viewing of these wonderfully preserved fossils.

7:30pm – Lecture; about the Geological Collection held at BRLSI and the Strawberry Bank exhibit, including information about the recent excavation.

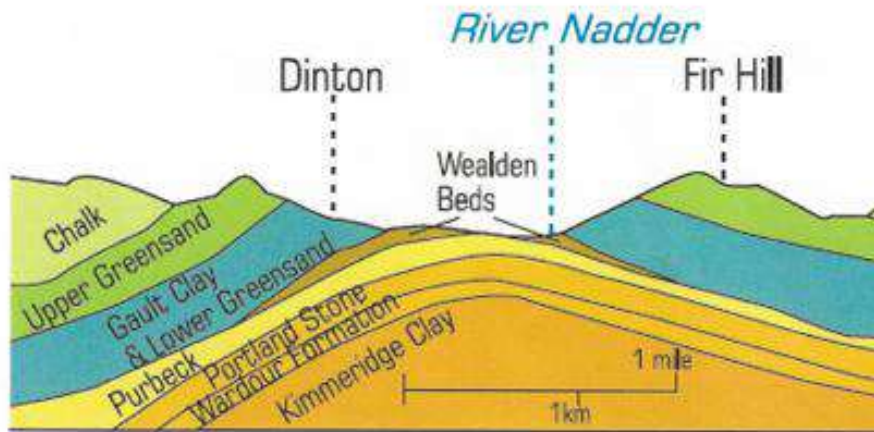
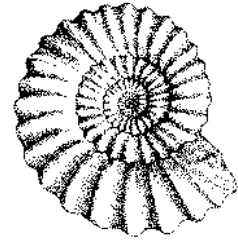
8:30pm – Light refreshments and Drinks; An opportunity to socialise and reconnect.

Bath Geological Society

Fieldtrip to Vale of Wardour

Thursday 23rd September 2021, 9:45am

Leaders: Steve Hannath & Isobel Geddes



Field Trip Description: This trip will be a c.5-mile circular walk in the Vale of Wardour in the morning and a visit to the Chicksgrove Quarry in the afternoon. The walk has one or two steeper climbs as we go over the top of Greensand Ridge and several stiles. Risk Analysis form: stiles, roads to cross, river alongside quarry. The quarry can be very muddy, so wellies may be required. Hammers may be brought. Hardhat and a Hi-Viz gilet for the quarry.

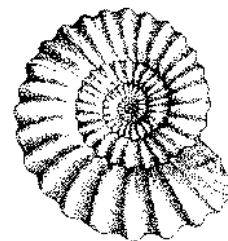
Meeting Place: Dinton Park details provided on registration.

Lunch in the Wyndham Arms pub and be pre-order from their menu. After lunch we will travel to Chicksgrove Quarry (about 15 minutes away) where Isobel Geddes will be leading the group at the quarry.

Laminated Vale of Wardour guide produced by Wiltshire Geology Group will be available to purchase for £2.

To register please email Bob Mustow at field@bathgeolsoc.org.uk
Joining instructions and meet up location will be given on Registration

Bath Geological Society Fieldtrip to Thornbury, South Gloucestershire



Saturday 25th September 2021, 10:30am-3:00pm

Leaders: Charles Hiscock

Field Trip Description: This trip will examine the Silurian/Devonian unconformity at Buckover. Followed by a short drive to Alveston Hill, Thornbury where we will walk around Thornbury examining the building stones and geomorphology. Most of the walking will be on tarmac surfaces but some will be over grass. Stout shoes/boots are recommended. The circular walk will be around 4km in length.

Lunch: bring a picnic lunch which we will eat at a suitable location en-route.

We will meet at 10.30am and aim to finish around 3:00pm.

To register please email Bob Mustow at field@bathgeolsoc.org.uk
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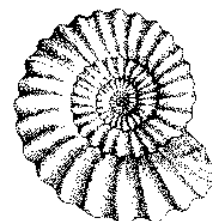
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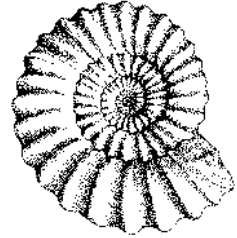
Polly Sternbauer
membership@bathgeolsoc.org.uk
Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

October 2021



September has been a busy month for the Bath Geological Society, with two field trips and a 'live and virtual lecture' along with the BRLSI Strawberry bank exhibit! It feels like we have been making up for lost time.

We returned to BRLSI on Wednesday September 8th 2021 to hear Matt William's lecture about Geological collections held at BRLSI. About 30 people attended the event in person and a further 11 people joined virtually via Zoom. There was quite an excitement in the room as we came together for the first time in 18 months and were able to communicate with those who were unable to attend in person. We hope to continue live streaming our lectures and hopefully we can investigate how to improve the sound quality.

The Strawberry bank exhibit ends soon it can be viewed between 10am-4pm Monday to Friday in BRLSI ground floor area.

The September field trips were well attended and we would thank the leaders; Steve Hannath, Isobel Geddes and Charles Hiscock for sharing their knowledge and time to put on these events. A few photos of the field trips are shared on the last page of this newsletter. Hopefully we will have a fuller write up of this trip in the next newsletter or the Journal.

Our next lecture is on **Thursday October 7th**. Dr Chris Spencer will be talking to us about extreme wave events. This will be a live lecture at BRLSI and we intend to live stream in on Zoom.

On Saturday **October 16th 2021**, Maurice Tucker will lead a field trip to Clevedon. Details are contained in this newsletter. We encourage you to come along and register with Bob Mustow.

At this time of year our Journal editor Mellissa Freeman starts to compile and edit the journal, it's not too late if you have news or articles to share, we would love to hear from you.

We hope you enjoy reading this Newsletter which advertises some of our upcoming events.

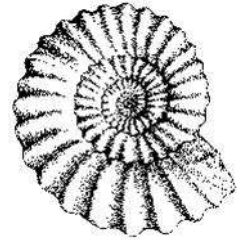
Graham Hickman

chairman@bathgeolsoc.org.uk

In this issue;

1. Lecture – Extreme Wave Events – Dr Chris Spencer - **Thursday 7th October 2021**
2. Clevedon field trip – Maurice Tucker – **Saturday 16th October 2021**
3. Lothar Respondek remembered – long-time member and former secretary of BGS

Bath Geological Society Zoom lecture
Thursday October 7th, 2021 @7:30pm



Title: Extreme Wave Events

Speaker: Dr. Chris Spencer (University of the West of England)



Abstract: Surveys of coastlines in the Yucatan peninsula, Mexico and the Iberia coastline have demonstrated the presence of large coastal ridges consisting of very large boulders, the deposition of which is believed to be Extreme Wave Events (EWE). In the Yucatan Peninsula these ridges are up to 5m in height and consists of boulders some of which are >1m in size. In Iberia the ridges studied are up to 4m above sea level and again consist of blocks >1m in size. Two possible modes of deposition are considered, deposition as a result of major storm activity or deposition as a part of a tsunami event and models applied to determine which of these is more likely at each location.

Dr Chris Spencer is a Senior Lecturer in the department of Geography & Environmental Management at the University of West of England, Bristol. His teaching and research is in the areas of coastal geomorphology and management and also in reconstructing past environments and managing future climate change.

This will be a live and virtual lecture at BRLSI, Queen Square, Bath

7:30pm on 7th October 2021.

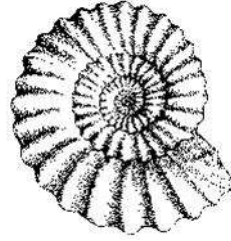
Lectures are free to members. We will email the joining instructions and the Zoom meeting info to members. We are asking non-members for a £5 donation.

BATH GEOLOGICAL SOCIETY

FIELD TRIP TO CLEVEDON

Saturday 16th October 2021

Leader Maurice Tucker



Clevedon Pier Photo attributed to CC BY-SA 3.0

On this fieldtrip we will look at the complex but fascinating geological history of the Clevedon area in the vicinity of the pier and beach with its Devonian, Carboniferous and Triassic rocks and Jurassic faulting and mineralisation. After lunch we will take the cliff-top coastal path north to Ladye Bay and Walton Bay (2 miles), to see the Devonian Old Red Sandstone and overlying Triassic scree-fluvial Dolomitic Conglomerate and lake-margin oolites with a backdrop of the wonderful views across the Bristol Channel to Wales. Returning back to Clevedon by the same path. We will also see the effects of sea-level and climate change of the last million years on the coastal landscape, in wave-cut platforms and raised beaches.

Clevedon Pier itself is an interesting place, a grade 1 listed construction, opened 1869, described by John Betjeman as the most beautiful pier in England and winner of the best pier of the year award 2021. Entry is £3.50 and it opens at 10.30. Café at the end of pier too. See you there.

There are free parking places by the beach just before the pier or continue up the hill past the pier (going N) and park in the street towards Ladye Bay.

Meet at 10.30am. Bring a packed lunch or eat in one of the cafés. We will aim to finish 4-4:30pm.

To register please email Bob Mustow at field@bathgeolsoc.org.uk
Joining instructions and meet up location will be given on Registration

Lothar Respondek Remembered

It is with sadness that we have to report the death of one of our longstanding members. Lothar Respondek who died earlier this year aged 95. Lothar, originally from Germany, was a member of the Bath Geological Society from at least 1981 through to 2015.

The photo taken on the BGS 25th anniversary walk in 1995 shows Lothar Respondek (left) with Bob Whitaker (right).

Between 1992 and 1995 Lothar Respondek was the Secretary of our Society, working alongside Charles Hiscock (chairman) and Sonia Chant (treasurer). Charles remembers "He was a very efficient secretary and I enjoyed working with him. One thing which struck me was his politeness, always shaking hands when we met. He was a good geologist and his interests extended into archaeology."

Lothar made a significant contribution to our Journal submitting many articles between 1997 and 2006. Some of these have been digitized and are available on our website. For instance, his article on the Chalk and Flints of Wiltshire:

https://bathgeolsoc.org.uk/journal/articles/2001/2001_Chalk_Flints.pdf



His longest article (12 pages) on Silbury Hill, Water and Geology has yet to be added to our website. Lothar wrote this article for our Journal in 2002 and later went on to publish a book entitled the Mystery of Silbury Hill in 2005. The Wiltshire Gazette and Herald interviewed Lothar and asked him about his book. <https://www.gazetteandherald.co.uk/news/7268302.geologist-believes-hill-was-an-accident/> Lothar's theory tied the creation of the hill to trenches dug to reach a sunken water table during a climatic warming 3,000 BC. Perhaps one of our members has a copy you can read?

We are grateful to Lothar for his long support of the Bath Geological Society, he will be missed.

	<p>About his Book...</p> <p>Silbury Hill is an enigma. For centuries people have wondered why such a hill in the bottom of a waterlogged hollow was built. Despite many investigations the largest man-made hill in Europe remains a mystery. The author has tried to redress the imbalance by researching climate, the landscape and the natural environment of the Neolithic people some 4500 years ago. The results of his study are rather surprising.</p> <p>Lothar Respondek lives in Wiltshire and is a well-travelled amateur geologist. He has thoroughly researched the origin of the Sarsen stones on the Marlborough Downs and their use in the construction of Stonehenge and Avebury monuments. His work also embraced the effect of springs, rivers and streams on the local chalk scenery and the formation of coombes and asymmetrical valleys. His other geological main interest are volcanism and plate tectonics</p>
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A good turnout for the Vale of Wardour field trip led by Steve Hannath and Isobel Geddes



Charles Hiscock introduces Thornbury building stones

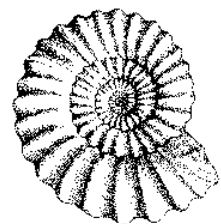
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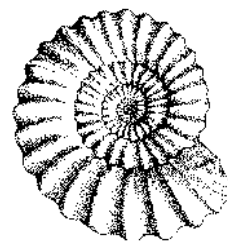
Polly Sternbauer
membership@bathgeolsoc.org.uk
 Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

November 2021



During October we enjoyed an interesting lecture by Dr Chris Spencer who spoke to us about extreme wave events. This was our second live lecture at BRLSI and it was live streamed using Zoom. Unfortunately, we ran into a few difficulties and although the slides were projected clearly the sound continued to be an issue. As a result, we are in the process of purchasing a lapel microphone for the Society to overcome these issues – watch this space, and hopefully listen as well.

On October 16th Maurice Tucker led a very successful field trip to Clevedon. Some remarkable rock types were found on Clevedon beach over a very short distance. We saw Devonian, Carboniferous and Triassic sediments, a hundred-million-year unconformity, faults and mineralisation. A write up will appear in our Journal.

Our next lecture is on **Thursday November 4th**. Peter Larkin will be talking to us about 'Geoscience and some aspects of the global offshore energy sector...and a day in the life'. This will be a live lecture at BRLSI and we intend to live stream in on Zoom.

On Saturday **November 6th 2021**, the Geologists' Association are holding their annual festival of Geology. This is a free online event with an excellent line up of speakers and events for all ages. Details of how to register and join this event can be found at;
www.festivalofgeology.org.uk

On Saturday November 25th 2021, the Geologists' Association are holding a half day of virtual talks on fossil crustaceans to commemorate the life of Joe Collins. This is a free online event. Details are available here <https://geologistsassociation.org.uk/conferences/joecollins/>

Our Journal editor Mellissa Freeman has begun to compile and edit this year's Journal, if you have promised an article, please endeavour to get it to her soon. James McVeigh (Webmaster) and Katie Munday (Secretary) have been working hard to digitise past journals and this newsletter carries an article on their progress. We hope you enjoy reading this Newsletter

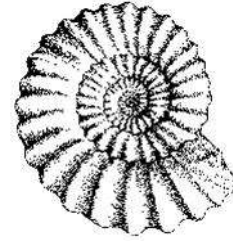
Graham Hickman

chairman@bathgeolsoc.org.uk

In this issue;

1. Lecture – Geotechnical Engineering - **Thursday 4th November 2021**
2. GA Festival of Geology – Free online event – **Saturday 6th November 2021**
3. The Bath Geological Society Journal ...an update – **by James McVeigh**
4. GA Joe Collins conference – **Saturday 25th November 2021**
5. Tom Ralph remembered

Bath Geological Society Zoom lecture
Thursday November 4th 2021 @7:30pm



Title: Geoscience and some aspects of the global offshore energy sector and a day in the life.

Speaker: Peter Larkin (Director and owner Maven Energy Services Ltd.)



Certainly, a current 'hot topic' for a number of reasons - this lecture will be broad reaching and highlight the role of the geosciences in planning, constructing and installing the infrastructure associated with the offshore and marine energy sector. Managing the risk associated with the seabed and 'shallow' geology is paramount to the safe, efficient and effective development of an offshore energy project. Peter will highlight the processes involved and the role each plays in characterising and understanding the geology and more specifically the geohazards associated with a given project – the sector is currently not without its challenges and polemics!

Peter has a background of 40 years' experience in the geoscience and offshore energy industry having had a variety of technical and project management roles with contractors, consultancies and operator/developers. Peter has a wide knowledge of the geosciences in general and in particular marine geology and geotechnics, particularly regarding the technologies and their application in offshore survey, site investigation, offshore construction and subsea installation within the offshore oil and gas and renewables sectors. Based in Bath, Peter is also a long-time member of the Bath Geological Society. This will be a live and virtual lecture at BRLSI, Queen Square, Bath

This will be a live and virtual lecture at BRLSI, Queen Square, Bath

7:30pm on 4th November 2021.

Lectures are free to members. We will email the joining instructions and the Zoom meeting info to members. We are asking non-members for a £5 donation.



FESTIVAL TALKS

10.30 - 11.30 Professor Michael Benton from University of Bristol "The Permian-Triassic Hyperthermal Crisis: How Heat Kills

11.30 - 12.30 Eur Ing Brian RL Catt "More Powerful Than We Imagined? - Can Submarine Volcanoes Change Climate?"

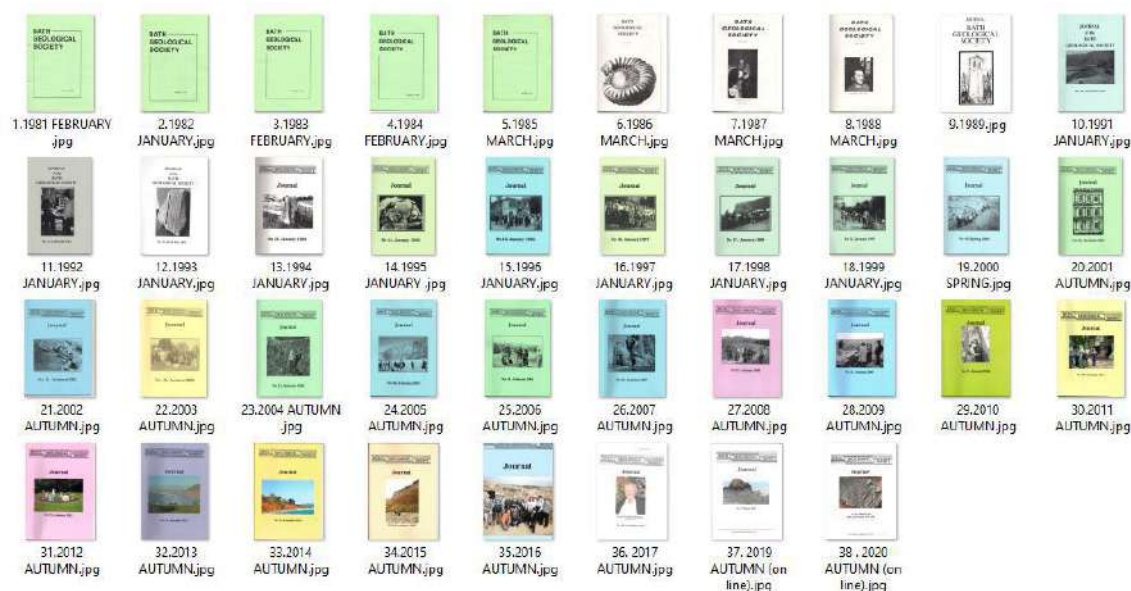
14.00-15.00 Dr James B. Riding " What has pollen ever done for us? (or palynology in the service of man)"

Sit in on live talks and go shopping at the virtual stalls. Explore virtual exhibitions from museums and local groups. Get involved in the interactive Discovery Room and take part in the Rockwatch festival challenge!

For more details visit; www.festivalofgeology.org.uk

The Bath Geological Society Journal ... an update

Since 1981, the Bath Geological Society has published six hundred and eighteen articles across thirty-eight annual journals. The articles are a treasure trove of local geological knowledge, society history and interesting accounts from past and present society members. It is in the society's strong interest to ensure these records are not lost and we thus maintain a journal archive on our website. Unfortunately, the website archive has only ever dated back to the year 1999 and some of the archived journals from the 2000s remained incomplete.



The figure above shows the scan images of all 38 journal front covers.

Recently, an opportunity arose to remedy this. The society archivist Charles Hiscock shared with me a complete list of all the journal articles published, allowing me to identify every article missing from the archive. It was also brought to my attention that the entire journal back catalogue is stored within the Bath Record Office. I thus scheduled a day off work to visit the Record Office & take photos of every missing article from the stored journals.

Our new membership secretary (Katie Munday) then assisted by using an optical character recognition (OCR) tool to extract the text from the photos. Whilst the raw photos could be converted to PDF, by extracting the text first, this allows the documents to be machine readable. That's important because it allows Google Search & Scholar to process the text and rank the articles appropriately.

The next step was to create a web page template for journal articles extracted in this manner and tidy up the OCR tool output before feeding the data into our website's database. This process has now been completed for the entirety of the first journal from 1981. The results of this can be found here:

<https://bathgeolsoc.org.uk/journal/archive.html>

For example; select 1981 using the 'year' dropdown menu. Lookout for further articles and journals which will be added in the months to come.

Completing the archive could also bring other benefits to the Society. Most visitors to our website arrive searching for quite niche and specific (known as long tail) search terms and land on archived journal articles. By expanding the archive, we will thus increase the number of website visitors and raise awareness of the Society, potentially increasing membership numbers and visitors to our events.

James McVeigh



25 November 2021

A free virtual conference sponsored by the
Geologists' Association

Fossil Crustaceans

Conference to celebrate the life and work of

JOE COLLINS



Convenors: Claire Mellish & Lil Stevens (NHM), Diana Clements & Haydon Bailey (both GA and NHM)

**Deadline for abstracts
15th October 2021**

Members and non-members
please register your interest and you will
be sent a link and a pdf of the abstracts
nearer the time.

crustaceans@geologistsassociation.org.uk



www.geologistsassociation.org.uk/conferences

Details of the programme will be published on the website in due course
www.geologistsassociation.org.uk/conferences

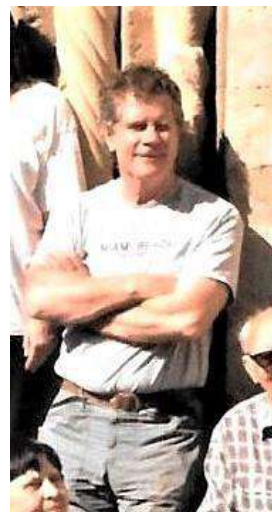
To Register or submit abstracts contact:
crustaceans@geologistsassociation.org.uk

Tom Ralph Remembered

It is with sadness that we have to report the death of William Thomas Ralph, who died on 15 May 2020, aged 76.

Tom Ralph, from Trowbridge, was a long-time member and supporter of the Bath Geological Society and the Geologists' Association. In 1975 Tom Ralph and Mike Curtis were instrumental in the discovery of Thecodontosaurus remains north-east of Bristol.

Charles Hiscock remembers "He was a very pleasant chap, always a pleasure to chat to him. I didn't know him well but he obviously was a keen geologist particularly as he was FRGS. I think he joined the Society about the same time as me, 1982- ish." He will be missed.



Membership

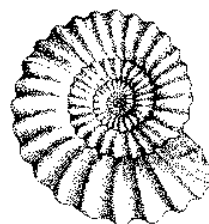
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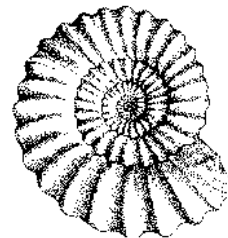
Polly Sternbauer
membership@bathgeolsoc.org.uk
Bath Geological Society Membership Secretary



Bath Geological Society

Newsletter

December 2021



This December newsletter reaches you at an interesting time in the fight against, and recovery from, the Covid-19 pandemic. Many of us are now fully vaccinated, some with additional booster jabs!

The unsettling news of the new Omicron variant brings back memories of the early days of the pandemic. As a society we are proceeding cautiously with our lecture program of in-person talks, at BRLSI, but also with live streaming on Zoom for those members who are unable to attend in person. This has received good feedback; we have booked the larger lecture room to allow more space for social distancing. But this also provides a challenge for planning ahead, what will we do if more people choose to watch at home than show up in BRLSI?

The November lecture was given by **Peter Larkin**, he spoke to us about 'Geoscience and some aspects of the global offshore energy sector...and a day in the life'. This was a very interesting talk and Peter has kindly made his slides available on the Members section of our website. There was some excellent questions and discussion about the need for geoscientists as we make the Energy transition away from fossil fuels and towards renewables. Hopefully the newly purchased lapel microphone has overcome the audio issues we were experiencing with our first few attempts to live stream our lectures. Your feedback is always welcome.

The December lecture will be given by **Professor John Marshall** from the School of Ocean and Earth Science, National Oceanography Centre, University of Southampton. He will be talking to us about the extinction event at the Devonian Carboniferous boundary. This will be a live lecture at BRLSI and we intend to live stream in on Zoom.

This newsletter also brings you an interesting article written by Professor Maurice Tucker about the burial history of the Bath Oolite. Maurice describes many features seen in the building stones around Bath and relates these to the burial and tectonic history that these rocks have been subjected to.

At this time of year, your committee is busy putting together the program for 2022. We have an exciting line up of speakers and some field trips in the planning. Our Journal editor Mellissa Freeman is putting together the final edits for our Journal which we hope will make good reading over the Christmas holidays! We trust that you have enjoyed the 2021 program and will be continuing to support the Bath Geological Society with your membership in 2022.

Graham Hickman

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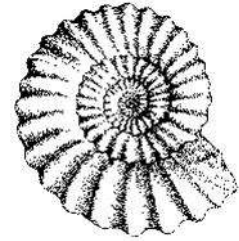
In this issue:

1. Lecture **live at BRLSI** – Devonian-Carboniferous extinction - **Thursday 2nd December 2021**
2. **Xmas Zoom Social** – **Thursday 16th December 2021**
3. The Burial History of Bath Oolite – by Maurice Tucker

Bath Geological Society lecture
Thursday December 2nd 2021 @7:30pm

Title: UV-B radiation was the terrestrial killer at the
Devonian-Carboniferous boundary

Speaker: Professor John Marshall, School of Ocean & Earth
Science, University of Southampton



Some 359 million years ago there was a terrestrial mass extinction at the boundary between the Devonian and Carboniferous Periods. Major extinctions include all the armoured fish and important land plants groups. In East Greenland there are a number of localities where we can find the terrestrial extinction layer. These were in the arid centre of the Old Red Sandstone Continent some 1000 km from the sea. The boundary is found in a large deep wide lake that represents a highly active monsoon system showing the climate was globally warm. It is from these lake deposits that we can isolate the tough outer wall layers of pollen and spores that normally protect the cellular DNA from UV radiation. In the middle of the lake bed there are malformed pollen and spores that demonstrate that the extinction was coincident with elevated UV-B radiation and a reduced protective ozone layer. Mercury analyses show there is no evidence for continental scale volcanic eruptions as were responsible for the end Permian, end Triassic and Late Devonian mass extinctions. A possible cause of ozone loss is increased transport of naturally ozone destroying chemicals into the atmosphere. An important conclusion is that ozone loss during rapid warming is inherent in the Earth System and that we should be alert for the same process occurring in our rapidly warming world. Other suggested and now restated causes include a cosmic ray blast from an exploding star, i.e., a supernova.

This will be a live and virtual lecture at BRLSI, Queen Square, Bath

Lectures are **free to members**. We will email the joining instructions and the Zoom meeting info to members. £5 donation is requested from non-members and visitors via Eventbrite.

[Get Tickets](#)

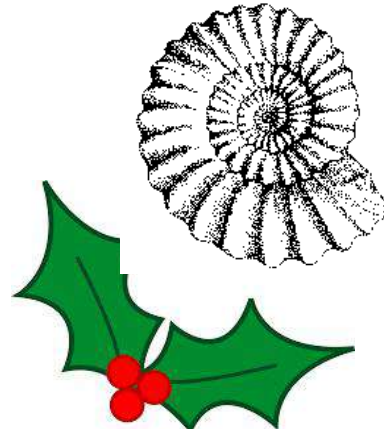
www.eventbrite.co.uk/e/uv-b-the-terrestrial-killer-at-the-devonian-carboniferous-boundary-tickets-213482109737

Bath Geological Society

December 16th 2020

@ 7pm

Zoom Social:



Please join us for an informal Xmas Zoom get together.

Raise your with us glass and celebrate the close of 2021. We will try out a short geological Zoom photo quiz (David Hall has suggested "geology of kitchen worktops"). No pressure to participate, we just want to encourage contact and conversation at the end of the year.

Topic: Bath GS Xmas get together

Time: Dec 16, 2021 07:00 PM London

Join Zoom Meeting

<https://us02web.zoom.us/j/83563648370?pwd=K1pDMEpNQ0xIV1hmamdNTkc1UHVhdz09>

Meeting ID: 835 6364 8370

Passcode: 005512

On the evening

- You will be able to join the waiting room from **6.45pm**. We will ensure that everyone is admitted by **7.00pm**.
- If you can only stay a short time that's fine, pop in and say Hi.
- We aim to close the meeting by **8:00pm**.

The Burial History of Bath Oolite

by Professor Maurice Tucker

Have you ever thought about the geological history of Bath after the Bath Stone (Great Oolite, Middle Jurassic) was deposited? The Bath Oolite now is located towards the top of the seven hills around Bath, at Lansdown, Odd Down, Combe Down, Bathwick Hill, Bathampton Down, Claverton Down and Solsbury Hill. How deep has the Bath oolite been buried before it was uplifted to where it is now at 150 to 200 m above sea level? To deduce the burial history of Bath Stone one needs to determine the thickness of the rocks deposited on top of the Bath Oolite, but of course the problem is these have been eroded. Nevertheless, estimates of the thicknesses can be made for these younger rocks where they do occur, notably to the east-southeast of Bath.

The region around Bath has generally been a quite 'positive', relatively slowly subsiding area for many 100s of millions of years. In mid to upper Palaeozoic times, it was close to the Mid-Wales - London ('St George's Land') - Brabant (in Belgium) upland platform against which on the southern side Devonian (Old Red Sandstone) and Carboniferous (Limestone and Coal Measures) strata were deposited. After the hectic, turbulent, end-Carboniferous Variscan orogenic events and north-ward thrusting and folding (forming the Mendip Hills), the Bath region was re-established as a positive area through the Mesozoic. This contrasts with the Wessex Basin to the south (Dorset-Hampshire) and the Wealden Basin to the southeast (Sussex-Kent) where rifting and extension along old Variscan fault-lines created rapidly subsiding troughs where thick packages of mudrock, plus some sandstone and limestone accumulated during the Jurassic.

Bath is located on a relatively solid foundation of folded Carboniferous strata, located at relatively shallow depths (50 m); indeed, there are exposures of Pennant Sandstone at Willsbridge and Saltford and the coal of course was exploited in the shallow mines at Twerton and in the Somerset coalfield. The Mesozoic strata of Wiltshire have a gentle dip to the east/south-east, a result of regional tilting in that direction during the Tertiary. This was the time of formation of the Thames Valley-London Basin when a thick succession of mudrocks and some sandstones was deposited, mostly in the Eocene (London Clay). From the post-Bath Oolite strata exposed to the east and southeast of Bath, towards Swindon, Chippenham, Devizes and Warminster, maximum and minimum thicknesses of the various formations can be determined and from this information a burial history plot can be compiled (Figure 1).

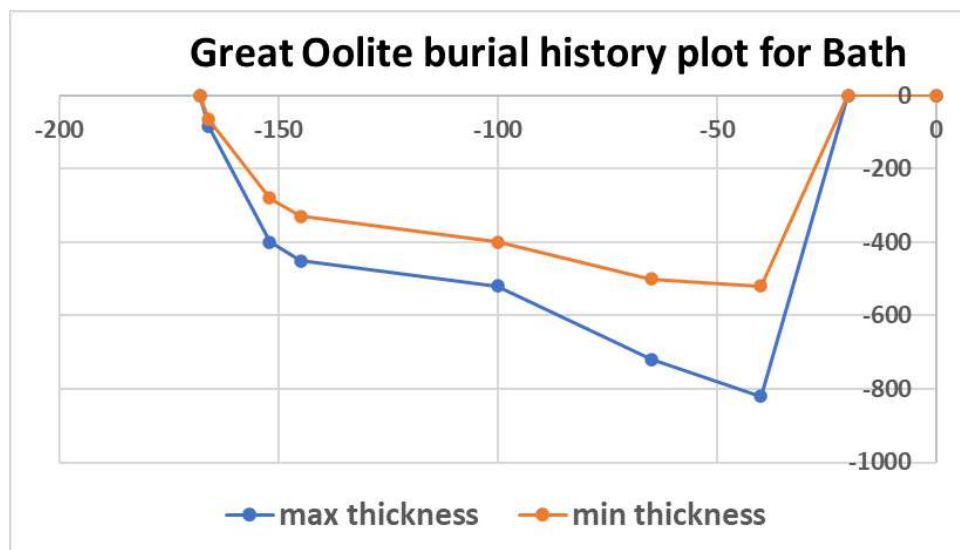


Figure 1. Burial history plot for the Great Oolite in the Bath area.

The burial history plot shows stratal thickness against time and indicates that by the end of the Cretaceous (after deposition of the Chalk, probably in a sea 100-200 m deep, 65 million years ago), the Bath Oolite was buried to a depth of 500-700 m. The amount of sediment deposited in the Bath area in the Tertiary was probably quite small (10s of m), but then the region was uplifted and the younger strata were eroded over the next 20 million years or so to bring the Bath Oolite up to the surface where we see it today. In the Weald Basin, the Great Oolite is still at considerable depths; there was no major phase of Tertiary uplift there as we can see here in Bath. In fact, the Great Oolite is an oil reservoir at several sites in Sussex (e.g., Humbly Grove, Storrington), occurring at depths of 1500 to 2000 metres.

Looking at the Bath Stone in the buildings of Bath and in the old quarries, evidence of the burial of the oolite to depths of several 100 metres is seen in the fractures in the stone (Figure 2). They are generally vertical – subvertical to the bedding and mostly filled with calcite crystals. These cracks were referred to as ‘snail creep’ or ‘snail trails’ by the quarrymen and are the result of mechanical compaction and fracture of the stone as a result of increasing overburden pressure.

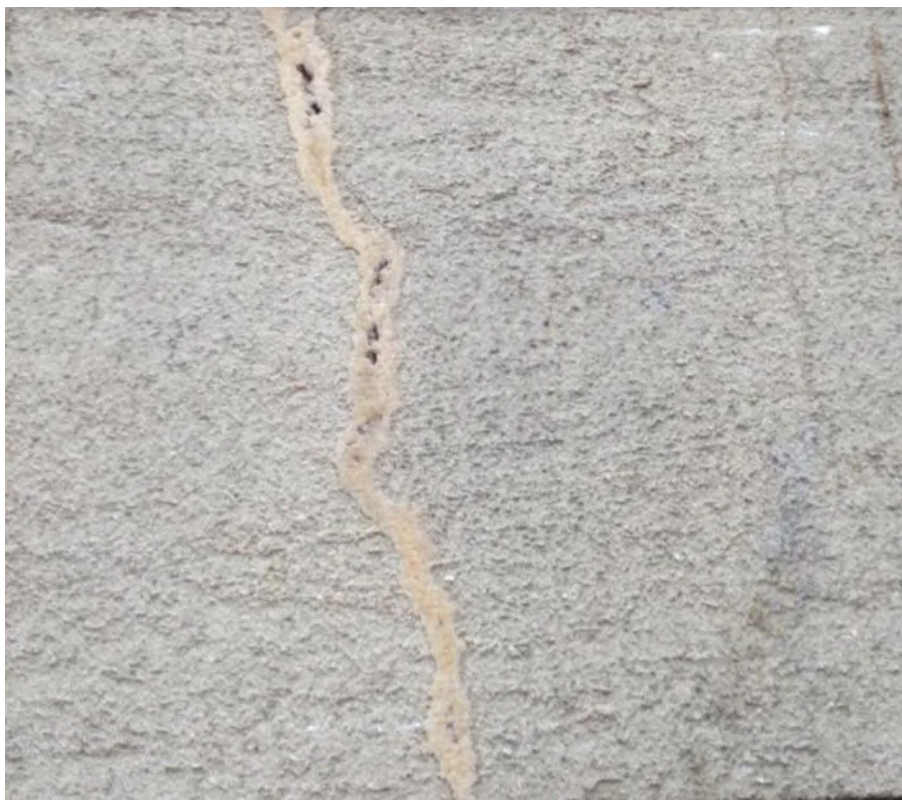


Figure 2. A near-vertical fracture in oolitic-bioclastic Bath Stone, filled with calcite. Milsom Street, Bath.

Stylolites, can occasionally be seen in Bath oolites. Stylolites are secondary (chemical) sedimentary structures consisting of a series of small zigzag sutures across the rock face. They are believed to represent zones of pressure dissolution, that is chemical compaction. There is usually a thin layer of clay (the insoluble residue) along the stylolite. Although rare in the Bath oolite; these are generally horizontal to sub-horizontal sutured cracks in the limestone, produced at greater depths (>500 metres) than the simple fractures. Figure 3 shows an example where the stylolite has offset a near-vertical fracture, demonstrating its later formation, probably at a greater depth (and so higher pressure).



Figure 3. A subvertical fracture in shelly bioclastic Bath Stone filled with calcite, which is offset by a sub-horizontal stylolite, along which there is a thin insoluble residue (clay). Great Pulteney Street, Bath.

In very rare cases, the stylolites are vertical (note from the way the stylolites cross-cuts the sedimentary bedding - Figure 4). This orientation is unusual, since it suggests the rock was subjected to a maximum horizontal stress, rather than a vertical one. Such horizontal stresses are normally related to tectonic pressure, so this is intriguing for the Bath oolite, which is mostly flat lying and not folded. However, there are major faults in the Palaeozoic strata of the Bath-Bristol region, and their reactivation during Tertiary compression could have affected the Jurassic strata and given rise to these vertical stylolites in the Bath Oolite.



Figure 4. Horizontal stylolite in oolitic-bioclastic Bath Stone. Belvoir Castle public house, Lower Bristol Road, Bath.

After the uplift of the Great Oolite in the mid to late Tertiary, several 10s of millions years ago, glaciation affected much of the northern hemisphere during the Pleistocene, with many glacial advances and retreats over the last couple of million years. There was much erosion of the landscape during these ice ages, although the Bath area itself was probably not affected by ice directly, being on the margin of the glaciers, affected more by periglacial conditions and intense erosion during periods of deglaciation. But that story of the Quaternary history of Bath is for another time!

Membership

Thank you for your support of the Bath Geological Society. The online lectures have been a great success and there has been continued interest with people joining the society all the way through the year despite the circumstances.

You can do this by visiting the Membership area of the website at;

<https://bathgeolsoc.org.uk/membership.html> and filling in the online form. You can also download the form and return it by email or post. The membership fee can be paid via bank transfer or by sending a cheque. There is also an option to set up a standing order.

The rates remain the same for 2022 as 2021: individual £30, student £15, family £45. Best wishes

Polly Sternbauer

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Bath Geological Society Membership Secretary

