CHARNIA

Newsletter of the

Geology Section

Of the Leicester Literary and Philosophical Society

Summer 2024

CONTENTS

EDITOR'S NOTES

The last edition of Charnia was at the end of 2023 and I commented then on the shortage of material. This edition is no different, but it is time to get some news out.

The AGM, held on the 27th March 2024 left several vacancies in the Committee. We are still without a Chair, Vice Chair, Lecture Programme Secretary, Field Secretary and Student Representative. Despite this, the Committee is endeavouring to keep the Section alive in the following ways:

- Working together to identify speakers for the next lecture programme.
- Looking at possible summer visits.
- Expecting to continue our relationship with the Warwickshire Geological Conservation Group, sharing lectures and possible field trips.
- Talks with the Parent Body and the University to try to reinvigorate the Section and strengthen links with the Geology Department – now part of the School of Geography, Geology and Environment.

The problems that the Section faces are not unique. The Lit and Phil and other societies that rely on voluntary support are all facing similar problems. The membership of our Section is slowly declining: a good recruiting event was the annual seminar, but the last one was in 2019. Fewer events due to COVID has not helped. Action is required if we want to avoid a slow decline to obscurity. How can you help?

- Suggest speakers or topics for the lecture programme. Offer help in recruiting those that you know personally or have contacts with.
- Offer to lead a field trip.
- Do you want an annual seminar? If so, ideas for topics and offers of help are required. Sharing the tasks makes it easier to organise.
- Write something for Charnia!

If you feel moved to help, please contact any member of the committee (at the end of this edition). If you have any comments, suggestions or complaints please respond to this editorial and I will share them with the Committee and publish a summary next time (subject to the laws of libel etc.).

Brian Waters bdh2o@hotmail.co.uk

Dennis Gamble

Obituary

Dennis Gamble was a warm, friendly polymath, whose enthusiasms ranged from stamps, to trains, to birds and natural history generally. Members of the Section will have known him as a keen, and knowledgeable, amateur geologist – the latest of many such in the history of the Section and Parent Body.

Following a career in business as a plantsman/nurseryman, Dennis worked for many years as a porter in the University, where he was able to get close to books and learning, and where, incidentally, he gained many friends in the Geology Department.

On retirement, Dennis was able to spend much more time adding to and curating, a remarkable collection of rocks and fossils. The collection consisted of material he himself collected, and of material he rescued from abandoned old collections. He had collection open days at his home for members of the Geology Section. He was an enthusiastic member of the Section, and was a long-term stalwart of the Section's Committee, having a long, and successful stint as Field Secretary, and latterly until his death, serving as the Section's representative on the Council of the Parent Body.

He supported education of the public and school students, manning stands in Leicester Museum and elsewhere and could always be relied upon to bring specimens from his collection to Section events.

His rather sudden death on the last day of 2023 came as a great shock to his fellow members (and many friends) in the Section. His enthusiasm and demeanour belied his 73 years and he will be sadly missed.

Roger Latham adds a personal recollection:

Dennis was a great personal friend and a great supporter of the Section, both on the Committee and in his commitment to the work of the section in its lectures, and particularly in its field work. Dennis had a comprehensive knowledge of anything that had a shell on it. And you could take a fossil or half broken item to him and he would instantly identify it. He would also so do this in a very non condescending way, sharing information with a fellow collector. I well remember an early visit to a quarry with Angela, my wife, who was vaguely interested in palaeontology but not greatly, and she found something and was able to take it to Dennis and have it properly identified. And he did it graciously and with great knowledge.

On field trips, Dennis was always after the most unusual or largest specimen that he could find, and would spend hours in extracting it from the matrix in which it was bound. I remember particularly the field trip that we did to the Vale of Wardour to look at some of the Upper Cretaceous Chalk deposits. While most of us in the quarry were looking for smaller items, Dennis managed to locate the famous Titanites, probably one of the biggest ammonites ever, which could reach a span of around 8 feet. The specimen, Dennis found, was a little bit smaller than that, but it certainly was at least three or four feet across, and it weighed a ton! He spent virtually the whole day extracting it, and when he had done so, it was clearly too big to lift by a single person. So he called a number of us round to help. Even then we couldn't lift it, with three or four of us giving him a hand. And eventually the quarry manager came along with a forklift truck and gently lifted the item and pulled it over to my Volvo, in which I had given Dennis a lift down into the quarry. Somewhat anxiously, I watched as it was slid into the boot. The car visibly settled on its suspension, and I drove out of the quarry at the end of the day very cautiously. Eventually we got it home to the car park of the hotel in which we were staying, where Dennis's car was parked. With the two tailgates raised, Dennis slowly backed his estate waggon up to the rear of my Volvo and we slid the titanites into the back of Dennis's car. Similarly, the car clearly dropped as his suspension took the weight. I often wondered how Dennis got that Titanites home, but he did. He must have done so very slowly, with quite a lot of weight in the back.

It wasn't just on collecting major fossils that Dennis was a real expert, he was also keen to make sure that anything that had been found and was in danger of being destroyed would be conserved and if possible, curated by him in the numerous sheds that he had to keep his collection in. Two things illustrated this to me. First, on a trip to Must Farm outside Peterborough, a clay pit, he found that they had unearthed two tusks from a mammoth which had emerged on the production belt and had been taken off and stuck in the clay at the top of the quarry slope. Dennis immediately got the permission to remove these items and took them home and curated them by wrapping them with burlap soaked in PVA to make sure that they were properly cemented together and weren't allowed to crumble into dust as they ivory cracked in the open air.

I also remember that Dennis, when he heard that the Wigan Mining Institute was closing and that they were disposing of all their fossils that had been found in the coal deposits, took a trip up to Wigan and went through the things that were going to go into the skips and rescued some of the better specimens to bring them back and add them to his collection. He was always keen on making sure that things did not get rubbished and simply dumped, but that somebody took care of them and that extended to things like Victorian collection drawers which he rescued and recirculated to keep his extensive collection of fossils in.

I was told, perhaps apocryphally, that Dennis's collection was so good that two museums, the Sedgwick in Cambridge and the Natural History Museum in London, had both had approached him to ask that their his collection would be donated to them on his death. That loss has come all too soon and I do hope that Dennis's tremendous collection of material is not dispersed but finds its way into a permanently curated collection and hopefully with his name on it as a memorial to all the expertise and care that he devoted to making sure that the fossil record of this country was properly collected, curated and preserved for future generations.

He will be greatly missed.

Dennis manning a stand in 2019

Other pictures are in Charnia for June 2021

The Bernard Price Museum at Witwatersrand University.

Roger Latham

In 1996 I was visiting South Africa and after several meetings in Cape Town one business took me to Johannesburg. The trip arranged by my hosts was to Western deep levels goldmine. That was a truly unique experience. I have never been in a mine so deep that the walls had to be sprayed with water because they were hot the touch. We were warned before we visited to bring a spare pair of underpants! They were quite right, even though they kitted us out fully for a visit underground, by the time you had emerged everything was not only soaking wet, it was practically unusable. I have nothing but respect the miners who have to work in such arduous conditions so far underground everyday. I was exhausted just by walking around the galleries.

On the way back I was given a lift by one of the mines geologists and while we were driving back I mentioned that I was interested in getting to see the Bernard Price Museum which I believed had some of the key Permian fossils from the great Karoo, but it had proved impossible to locate the museum or its opening hours. He explained that the museum was actually within Witwatersrand University and was not generally open to the public. However, the professor of palaeontology there had been one of his PhD supervisors, and while bowling along the road, or should I say track, at around 50 or 60 mph he promptly got out his mobile phone and called him. I was described as someone interested in seeing the fossil collection and could he the open the museum up for me. I got see a museum which isn't generally open to the public, or rather wasn't open to the public then.

The museum consisted of one large room with a number of displays set out in cabinets. Light level was exceptionally low, and it proved extremely difficult to get the camera to focus through the glass, and when I did manage to get focus shutter speed was so slow many of the pictures approved impossible to view properly because of camera shake. However, the museum did have a great collection of original fossils excavated from the Karoo. Unfortunately, I've been unable to get a good picture of the probe saw upon dinosaur muscle spondylitis, even though they had the type specimen there. I did manage to pick up the picture of the early Triassic dinosaur in Figure 1.

Also of interest was the display they had of hominid skulls that been excavated in South Africa. Most of them had been displayed to demonstrate the evolutionary pattern—Figure 2.

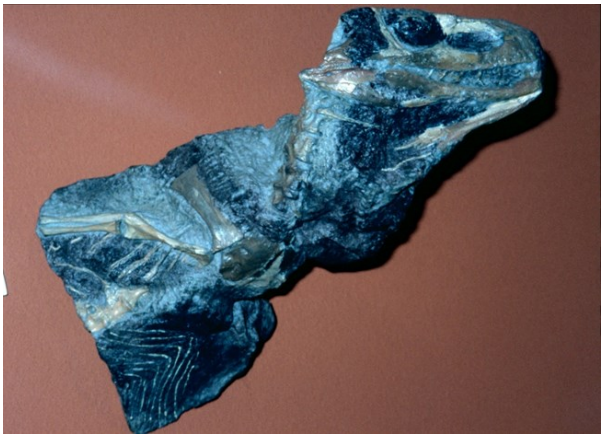

Figure 1

Early Triassic dinosaur

Figure 2

Hominid skulls from South Africa

However, the most important group of fossils that they had with the Permian fossils from the Karoo. First, the Cynodonts.

An example from the Dicynodonts – Platycyclops now called Rhachiocephalus.

Then the Dinocephalians.

And finally the Gorgonopsids.

If you would like larger images of the Figures in this article, please email me at bdh2o@hotmail.co.uk - ed.

Leicester Literary and Philosophical Society, Section C (Geology)

Winter programme 2023—2024

Abstracts 2024

Wednesday 10th January 2024: Celebrating the Origins of Animal Life: Building a UNESCO Global Geopark in Charnwood Forest, UK. Dr Jack Matthews, Geoheritage Officer, The National Forest Company.

Charnwood Forest in Leicestershire is host to some of the oldest animal fossils in the world, many of which have been key to our understanding of the rise of animals during the Ediacaran period around 570 million years ago. In addition to its internationally significant palaeontology, the area is also home to a number of working and historic quarries whose lithologies have shaped the built environment of the United Kingdom for more than 2000 years. This presentation will outline the internationally significant geodiversity of Charnwood Forest - including the outstanding ancient fossils - and the ways it has shaped the landscape, communities, and people of Britain's 'unexpected upland'. The talk will also outline the work being undertaken towards applying for UNESCO Global Geopark status for the area.

Thursday 18th January 2024: Volcanoes in the spotlight; Exciting examples from La Palma, Stromboli and the ancient rock record. Dougal Jerram (WGCG).

Recent advances in the capture of 3D geological data has re-invigorated the way in which we study volcanoes and their deposits. The recent eruption on La Palma and ongoing active volcanoes such as Stromboli act as modern-day laboratories to observe and record, while the ancient rock record is the legacy of such eruptions. Here we will explore some exciting footage and details of the 2021 La Palma eruption which Dougal visited in person. We will learn about techniques developed for mapping volcanoes in 3D on Stromboli and will look forward to the role of digital geology in the ancient rock record.

Wednesday 14th February 2024: Metal capture by tufa: natural processes to engineering solutions? Dr Susan Cumberland, The University of Leicester.

The leaching of heavy metals from legacy post-industrial slag and other anthropogenic waste sites is detrimental for human health and the wider environment.

Tufa is a surface mineralised material that forms naturally when calcium-rich groundwater is exchanged with atmospheric CO2 at mid to hyperalkaline pH resulting in a precipitation of calcite (CaCO3). Anthropogenic tufa may occur at old industrial sites (e.g. mining, steel works, paper mills) across northern England and Scotland. At the Howden Burn, near Consett in N.E England, tufa forms in the stream as it emerges from the slag from the old steel works. Analysis of the streamwater downstream of the tufa shows metal concentrations are lower compared to those upstream. Examination of the solid tufa shows the presence of lead, arsenic, vanadium and zinc up to several 100 ppm. Cross-sectional element maps at high resolution of the tufa using synchrotron µ-X-ray fluorescence (µXRF) reveal interesting pattens of metal distribution within the tufa laminations. This leads to the hypothesis that the metals precipitate together with the tufa during formation. Understanding and exploitation of artificial tufa for metal capture could have potential as a CO2 positive solution for sustainable in-stream remediation. This potential led to conducting experiments in engineering tufa to clean up metal leaching as part of a doctoral project, and some preliminary results are shown.

Thursday 15th February 2024: The caves of North Greenland - physical records of cryptic geological intervals. Paul Smith, Oxford University Museum of Natural History (WGCG).

Carbonate rocks of Neoproterozoic to Silurian age are abundantly distributed around the coasts of North and North-East Greenland. Large cave entrances are distributed across the whole of North Greenland, an ice-free area larger than England, from 80–82.5°N and they constitute the northernmost documented karst caves globally. Data relating to the caves in this remote region have been collected on field expeditions over a 40-year period, and they provide information about palaeoclimates in otherwise poorly documented geological intervals. These geologically young caves are mainly phreatic (sub-water table) conduits, and they are consistently located a few 100 m beneath the distinctive plateau that characterises the topography of the northern coast. Their identical context suggests that they developed in a single phase of cave formation, and the timing of cave development is constrained by the mid- to late-Miocene (15–5 Ma) uplift of the plateau surface and the onset of fjord-forming glaciation in the latest Pliocene – earliest Pleistocene (c. 2.7–2.5 Ma). The caves of North and North-East Greenland offer a glimpse of large-scale phreatic drainage systems that developed below an uplifted coastal peneplain during Neogene time. They preserve an important part of the

geological history of North and North-East Greenland that is otherwise absent from the physical geological record.

Wednesday 13th March 2024: Lincoln Cathedral – Back to the Future. Dr Michael Ashton.

Lincoln, arguably England's finest Gothic Cathedral, is unique amongst English cathedrals in being built on the stone from which it is constructed: Lincoln Stone. For over 150 years its on-going restoration programme has been sourced from the Cathedral's own quarry in the northern outskirts of the city. However, in 2021 the quarry was decommissioned triggering two actions: the acceleration of a review of the Cathedral's external fabric, and the search for an alternative source of stone to supplement existing stocks and ultimately provide a sustainable supply for decades to come.

The talk will briefly identify some of the Cathedral's main characteristics prior to describing the stratigraphy and sedimentology of Lincoln Stone in the context of the Lincolnshire Limestone Formation, drawing particular attention to why it differs from the more famous building stones of the Lincolnshire Limestone: Ancaster, Barnack, Clipsham, Ketton and Weldon. From this framework the actual fabric of the Cathedral will be explored with both surprises and enigmas illustrated – these broaden the understanding of the 'fabric team' of masons, conservators, archaeologists, and geologists alike, and colour the 900-year history of the monument. Finally, the current work to find a new stone source for the Cathedral will be discussed in terms of the geological and societal challenges. Ultimately, the prize is matching the honey-yellow majesty of Lincoln Stone that has for centuries crowned the historic city of Lincoln.

Monday 25th March 2024: Critical Technology Metals and Mining in the 21st Century, Dr Philip Bird, DEScycle and University of Leicester. Joint meeting with parent body.

Life in the 21st century is intrinsically linked to the use of metals. Common base metals such as copper weave through the structure of our homes as electrical wires and pipes, we carry gold and other precious metals with us as jewellery, and exotic technology metals lace the circuit boards of our phones, computers, and televisions; we live our lives surrounded by metal. Modern industry and technology now use a greater diversity of metals than at any other point in history, with over 60 metals being 'critical' to everyday life. Of these, the technology metals are perhaps the most urgent, possessing characteristics required for technologies including those vital to the low-carbon energy transition.

The security and sustainability of the supply of metals has become a key issue for governments, businesses and communities across the world. While the supply of

base and precious metals is considered secure, the extraction of these commodities is energy and water intensive and produces significant rock waste and CO2 emissions. The supply of the vital technology metals is less certain. Many of these elements are produced only as by-products during the refining processes associated with the major base and precious metals, making their production dependent on demand for the related commodity. Even those with more robust supply chains, such as lithium and the rare earth elements (essential for electric vehicle and green energy technologies) are often geographically restricted in their distribution, making supply dependent on geopolitical conditions.

The talk will explore concepts around mining and resource extraction in the 21st century and the challenges of meeting long-term demand for metals in a sustainable way. With metal demand projected to peak in the 2040s, as the bulk of low emission infrastructure is constructed, we have a limited window to ensure the production of metal is done responsibly and to the benefit of all involved.

Wednesday 27th March 2024: Section AGM.

Thursday 18th April 2024: Gondwana Landscapes: Geology on a Plate, Brian Ellis (WGCG).

Using examples from Australia (mainly South Australia) the talk will examine existing landscapes which are directly inherited from Gondwana. It will consider the role of their location on the Australian Plate in the conservation of those landscapes and the significance of the dating of the breakup of Gondwana to the evolution of the geology of Australia. The talk will reflect on the difference between interpreting landscapes in Britain and on interpreting those in Australia.

Summer programme

Under preparation at time of writing—look out for emails.

The next two pages were waiting for your contributions.

Printing has to be in multiples of 4 pages!

SECTION C COMMITTEE 2024—2025

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Note the vacancies. Volunteers always welcome.