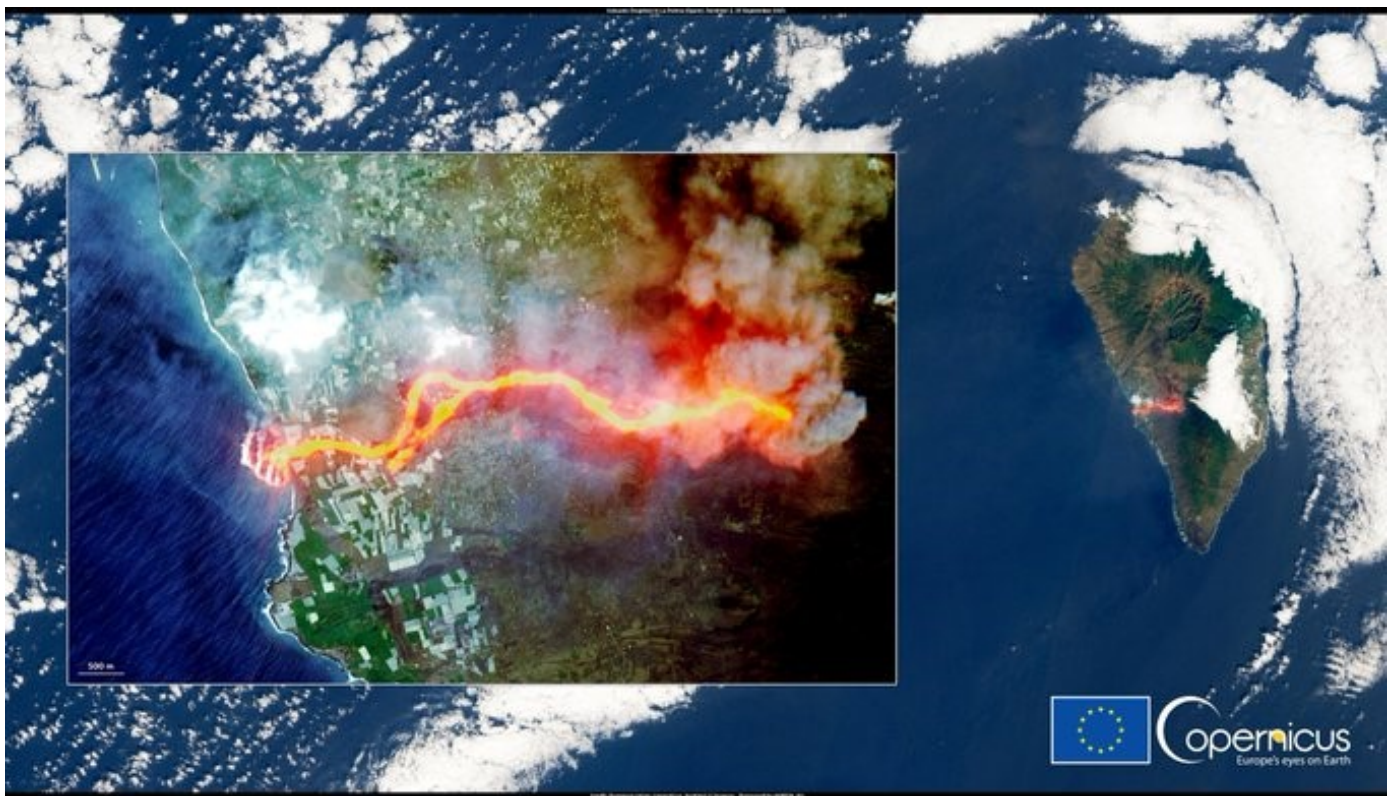
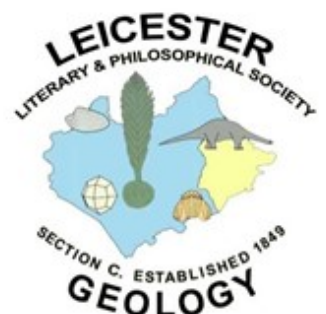


CHARNIA

Newsletter of the
Geology Section
Of the Leicester Literary and Philosophical Society



September 2021



Cover image: Lava flow from La Palma volcanic eruption reaches the sea,
September 2021.

Copernicus satellite image.

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Editor's Notes

Welcome to the autumn edition of Charnia. Our new programme for the winter is underway on Zoom still and details are later in this edition at the end. There are joint meetings with the Warwickshire Geology Conservation Group included again which broadens the range of speakers and topics. There are still some details to fill in but the first few talks are fixed and Tom Harvey has put together an interesting programme with something for everybody.

Thanks to Roy Clements for his latest article in his series "With Geology in mind—out and about in Leicestershire and Rutland" about a find in the River Welland. Roy's contributions are keeping the technical content of Charnia going. I have more space available and need more of the same please! If you need help with preparing anything do ask. The next deadline is mid-January 2022.

Roger Latham has used the lockdown to catch upon reading and has sent me some book reviews. The first is included with more to follow.

Still with books, geological activity is in the news at the moment and Diana Milne sent in the following note:

We should be concerned about the eruption in La Palma. John and I were there in 2000, a splendidly scenic island but all quiet then. I have obtained a book I knew of by Bill McGuire: Waking the Giant: How a changing climate triggers earthquakes, tsunamis, and volcanoes (OUP 2011, 302 pp, £11.99).

In 2000 he had discussed with Simon Day in a BBC Horizon programme the threat of collapse of the Cumbre Vieja volcano, causing alarm with the suggestion of a megatsunami. (In this book he also cites the computer modelling in 2001 by Steve Ward and Simon Day.) But here he also looks at climate changes in the history the planet, causes and effects of ice ages etc. Timely interest both in this eruption and a climate-change conference.

Finally Rob Tripp has put some of the lectures recorded from Zoom on-line to view again—or for the first time. Details of what is available and how to access them are on page 11.

If you receive this in the post, have you considered taking the pdf version? Just drop me a line.

Brian Waters

bdh2o@hotmail.co.uk

***Bos taurus* and the Bridge**

It is but a short walk from Barrowden down the Wakerley Road to Wakerley Bridge – a bridge over the River Welland (which is the boundary between Rutland and Northamptonshire in these parts). At the time of the visit, 7th October 2018, it was a relatively quiet walk. The road was officially closed to traffic (but still informally(!) in use) to allow the quite major restorative work on the bridge that we had come to see.

The bridge (at National Grid Reference SP9555 9975) is an ashlar-built structure of presumably local, oolitic limestone (Lincolnshire Limestone Formation). The new ashlar blocks of the current refurbishment stand out quite starkly (figure 1). The original bridge dates from medieval times (14th century – and remains in this original structure form on the downstream half of the bridge). The bridge was renovated and widened in 1793 (the up-stream half of the bridge). The contrast between the two architectural styles of arch is shown in figure 2 (looking downstream – to the east).



Figure 1: Wakerley Bridge from the north bank, looking south-east. Showing refurbishments in progress.



Figure 2: Wakerley Bridge from upstream, looking east. Showing contrasting arch styles.

As part of the current restorative work, there seemed to have been some excavation of the river bed, and it is an object found lying on the bank, clearly from this source, that caught my attention (figure 3). The object is a piece of fossil* bone, and it is simply the dark brown colouration (iron oxides) which suggest it is not of recent mortality. The bone is the distal half of the left humerus of a cow (*Bos taurus* Linnaeus) and it can be readily compared with various standard osteological drawings based on Recent material (see for example figure 4).

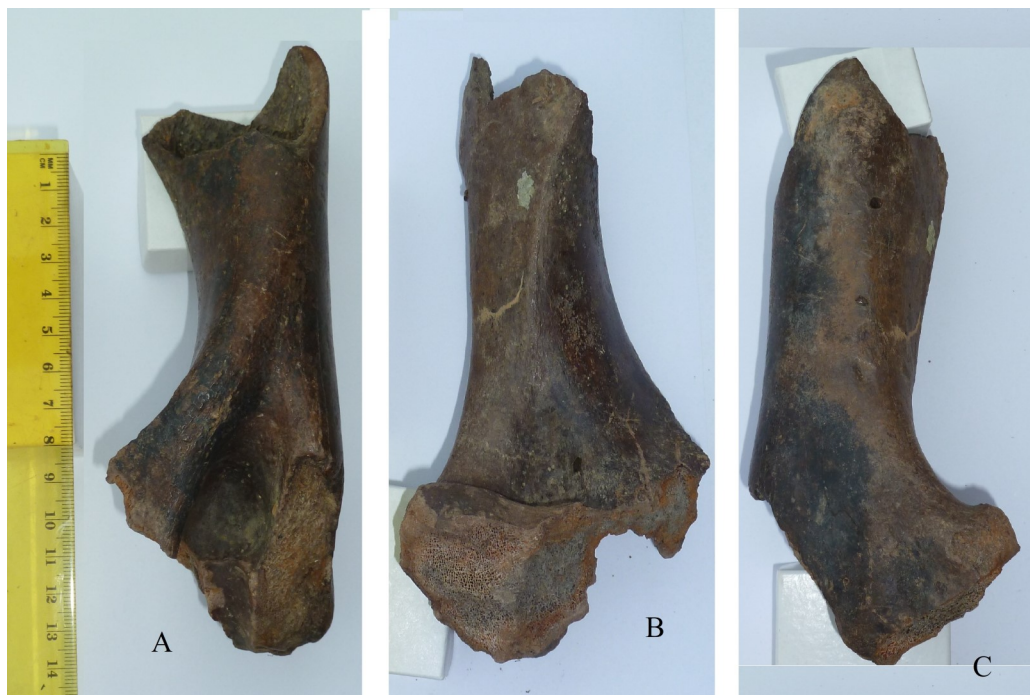


Figure 3: *Bos taurus* L. Three views of the partial left humerus. Distal end towards base. Scale in centimetres.

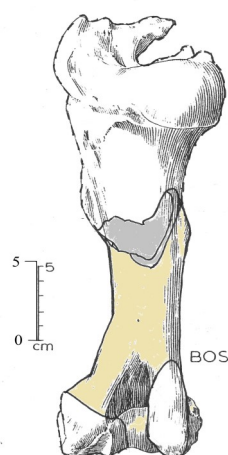


Figure 4: *Bos taurus* L. Sketch of the current specimen, superimposed on a standard osteological drawing (modified from Schmid, E., 1972: Atlas of Animal Bones, p.107). Left-hand scale relates to the current specimen, the right-hand scale to the original drawing.

Such a comparison suggests that this bone came from a relatively small individual (compare the scales in figure 4); the actual dimensions of the specimen are 175 x 80 x 62 mm. The broken shaft of the bone (figure 5) shows what may be described as a 'spiral fracture' – suggesting butchery at the time of death. The hollowed shaft of the bone suggests active removal of the marrow. Somebody's meal(s)! The distal articular surface (equivalent to the elbow joint) is incomplete and shows a new fracture surface (figure 6) – a fracture presumably inflicted at the time of excavation from the river bed.



Figure 5: *Bos taurus* L. Fractured end of bone shaft, and view of the marrow cavity.

Figure 6 clearly shows two colour zones on the interior of the bone – an inner blue/grey zone, and an outer brown zone. These zones represent differing oxidation states of iron mineralisation (equivalent to the blue-heart in limestones, and the green-heart in ironstones that we are familiar with locally). Figure 7 shows this in more detail. Figure 7A shows the cells of the bone structure lined with black iron sulphides(?) under reducing conditions presumably produced by being buried in organic-rich alluvial sediment. In figure 7B the cells are lined with brown iron oxides/hydroxides representing re-oxidisation of the sulphides under oxidising conditions of the stream waters that re-exposed/reworked the specimen. Quite a diagenetic story in something that is perhaps only a few hundred years old, or so!



Figure 6: *Bos taurus* L. Recent fracture of the distal articular surface showing diagenetic colour zones.

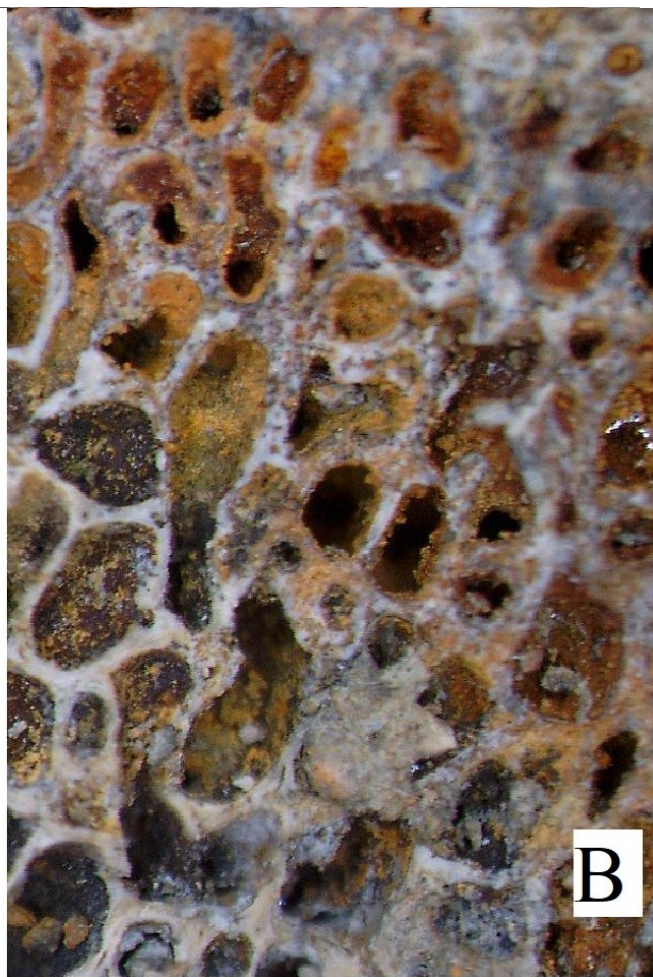


Figure 7: *Bos taurus* L. Detail of recent fracture surface, showing details of the diagenesis (see text for further explanation).

As a reworked fossil lying on the floor of a healthy stream (and like reworked fossils through geological time), our bone became a suitable base for epibionts – encrusting organisms. The following epibionts have been found on our specimen:

1. Figure 8 is one of a number of Caddis Fly cases found on the specimen. They are about 2mm in diameter by about 6-8 mm long. The structure consists of cemented together sand grains (a constructional strategy widely adopted by organisms met with in both zoological and palaeontological circles!);



Figure 8: Caddis Fly case.

2. Figure 9 is an organic-walled cocoon of a leech - who knew(?) – about 4mm by 2.5 mm. Again, a small number were seen;

3. Figure 10 shows fresh-water bryozoan statoblasts which were quite abundant – again something I was not expecting!.



Figure 9: Leech cocoon.



Figure 10: Freshwater bryozoan statoblasts.

It is worth noting that the recent fractured surface (see above and figure 6) has none of the epibionts!

Perhaps we can summarise the story told by our specimen as follows:

1. PRE-FOSSIL PHASE:
 - 1.1. death;
 - 1.2. butchery;
 - 1.3. consumption.
2. MAKING-A-FOSSIL PHASE:
 - 2.1. incorporation into alluvial(?) sediment;
 - 2.2. diagenesis under reducing conditions.
3. EMBELLISHMENT-OF-THE-FOSSIL PHASE:
 - 3.1. reworking to become part of the stream bed;
 - 3.2. diagenetic modification under oxidising conditions;
 - 3.3. encrusting biota/epibionts;
 - 3.4. breakage and removal from the system.
4. COLLECTION.



Perhaps, if in surveying the scene Mr. Sourface (figure 11) looked more to the geology, and less to his history, he would be much happier!

Figure 11: Carved head on the middle of the up-stream facing middle arch of Wakerley Bridge

Footnote: * The word fossil comes from the Latin fossilis meaning 'dug up', and is usually applied on its own to the remains and traces of organisms as found in the geological record. I see no merit in putting a minimum age limit (of say, at least 10,000 years) before something is to be recognised as a fossil, although this is done in some published definitions. I also doubt the value of the terms 'fossilisation' and 'fossilised' – but that is another story!

Roy G. Clements

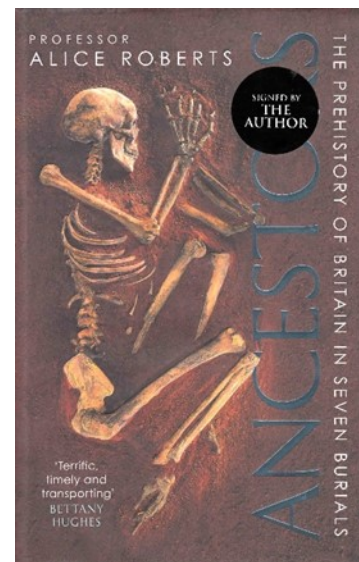
22nd September 2021

Book review by Roger Latham

Ancestors – The Prehistory of Britain in Seven Burials.

Alice Roberts – Simon and Schuster 2021.

Over the last few years Prof Alice Roberts has become the “go to” osteoarchaeologist for the BBC. As a result she seems to pop up in front of several programmes dealing with the excavation of graveyards and single burials, speaking to the archaeologists involved and fronting their findings for the general public.



The access this has given her has enabled her to draw together this book detailing seven important burials which she uses to illustrate the prehistory of Britain. The burials are:

The Red Lady of Paviland.

The Neanderthals of Pontnewydd.

Gough's Cave.

Cheddar man.

The Tomb of the Otters.

The Amesbury Archer.

The Pocklington Charioteer.

Many of these burials have been excavated in the past and the advent of oxygen and strontium isotopes and DNA testing has significantly improved our understanding, but it allows her to contrast the relative skill of some of the earlier excavators without this technology. Inevitably there are some howlers. The Red Lady, who was confidently expected to have been a pre-Roman Celtic woman, turns out to be an early hominid, and a man, of the Gravettian culture type. Because this is development immediately after the last glacial maximum, Prof Roberts is able to give a swift understanding of how Great Britain was void of human activity during the last glacial maximum and is yet to be connected to the continent through Doggerland as the glaciers retreated. Some of the questions that she addresses go to the heart of ancient controversies – were some of the early hominids cannibals for example. For those interested in the Paleolithic of Britain many of these excavations will be familiar territory, but Prof Roberts draws together both existing and new information about them and writes a very readable book. A couple of the excavations may be more unfamiliar – the Tomb of the Otters on Orkney is not far from the more famous Tomb of the Eagles – and the Pocklington Charioteer leaves one wondering how it became possible to bury an entire chariot and its horses in an upright position in a huge pit, particularly since it does not appear that the horses in question had been slaughtered before being buried. The ingenuity of our ancestors continues to amaze us.

A very readable book, and even if you know the stuff backwards is always worth getting her perspective on our ancestors, and the enduring controversy of where they came from.

Past lectures available to view on-line

Whilst the Section has been using Zoom for our Winter Programme presentations, it has been possible to record the talks given with permissions by the speakers.

We have five talks recorded, which are available to view again on YouTu.be. The channel provides three levels of availability - 'Private'; 'Unlisted', and 'Public'. Because of the authors concerns regarding the security of as yet unpublished materials, most authors have elected to have their talks listed as 'Unlisted' ! One has requested 'Private'. Only one has agreed to go 'Public'.

Hence, the Section C's YouTu.be Channel looks, shall I say, spartan. We are unable to show that the recordings exist.

However, the recordings are hidden away in there. Should any Member, who may have been unable to watch at the time, or may wish to view again, any, or all, of the presentations in the Channel, then please drop me a request - r.newford@icloud.com , and I shall respond with the link, (the url), by which access can be made. Some of you may find it to be easier to view on YouTu.be than by Zoom.

The titles available so far are:

Charnwood's Canadian Cousins - Dr Jack Matthew

Earthquakes and normal faulting in Italy - Dr Zoe Middleton

The discovery of a meteoric-ejecta layer at the base of Palaeocene lavas on Skye - Dr Simon Drake

Parent Body Lecture - Ethiopia from top to bottom; the Rift Valley, seismology and tectonic plates - Dr Ian Bastow

Dinosaurs and Deserts in Southern Wales - Cindy Howells

Many of you are aware that I have many video recordings of talks over several years. To put any of those on the Section C Channel would involve requesting umpteen permissions. That's a big ask!

Rob Tripp

Leicester Literary and Philosophical Society, Section C (Geology)

Programme 2020 –21

This listing includes lectures by the Geology Section and those by invitation of the Warwickshire Geology Conservation Group (WGCG).

ABSTRACTS 2021

Wednesday 19th May: Iapetus No More – the continental collision that shaped Scotland (WGCG).

Angus Miller (Centre for Open Learning at the University of Edinburgh).

Five hundred million years ago, the Iapetus Ocean lay between three continents in the southern hemisphere. The tectonics of the next 100 million years brought different segments of continent together, formed the grain of the land and created the building blocks of much of Scotland's landscape. This talk will explore the closure of the Iapetus Ocean, the formation of most of the metamorphic and igneous rocks of the Highlands and Southern Uplands, and the complex events that together make the most significant event in Scotland's geological history.

Wednesday 16th June: Mary Anning, the fossil woman (WGCG).

Tom Sharpe (Geology lecturer and travel guide).

It has been said that more has been written about Mary Anning, the fossil dealer of Lyme Regis, than about any other geologist, apart from Charles Darwin. But how much do we really know? How much is speculation? And how much is myth that has developed through the uncritical telling and retelling of her tale over the course of two centuries? Are we seeing a new Anning myth in the making, thanks to a recent film? Separating the facts from the fictions about Mary Anning can be challenging, but her story is a remarkable tale in its own right. This talk will examine what we know of the life of this extraordinary woman, her famous - and less well-known - discoveries, and her part within the wider network of the developing science of palaeontology in the early nineteenth century, and will seek to dispel at least a few of the Mary myths.

Wednesday 15th September: Subsurface engineering and water resources of Greater London. (WGCG).

Dr Jonathan Paul .

Wednesday 29th September : Dinosaurs and deserts in south Wales.

Cindy Howells (National Museum Wales).

Recent discoveries of new footprints and fossilised dinosaur bones have increased our understanding of the terrestrial environments and faunas that existed during the Late Triassic and early Jurassic in south Wales. Hot deserts were subject to seasonal flooding events that preserved many footprints of both dinosaurs and other reptiles in harsh environments where bone material did not fossilise. Subsequent sea-level rise created an island archipelago where a diverse fauna of small vertebrates, including dinosaurs, lived within a karst landscape which preserved their fossilised bones and teeth in fissure deposits. Theropod dinosaurs are poorly represented from the earliest Jurassic, so the discovery of a partial articulated skeleton will bring better insights into the evolutionary relationships of this group .

Leicester Literary and Philosophical Society, Section C (Geology)

Winter Programme, 2021-22

For the foreseeable future, all meetings will be held at 7.30 pm online via Zoom. Instructions for joining the online meetings will be circulated by email shortly before each event.

Some meetings are hosted by Warwickshire Geological Conservation Group (WGCG) which we have been invited to attend.

2021

Wednesday 27th October: Celebrating Scotland's geological heritage with the Scottish Geology Trust.
Dr Katie Strang, Scottish Geology Trust.

Wednesday 17th November: Arden Sandstone. Stuart Burley. (WGCG)

Wednesday 24th November: Volcanic Tsunamis: Krakatau, 1883 and 2018. Dr Seb Watt, University of Birmingham.

Mid December (date TBC) Christmas Meeting social?

2022

Wednesday 12th January: The secret life of the starfish/crinoid TBC. Dr Aaron Hunter

Wednesday 19th January: BGS speaker (TBC) (WGCG).

Wednesday 9th February: Ethiopian volcanics (exact title TBC). Dr Ben Clarke, University of Cambridge.

Wednesday 9th March: TBC.

Winter programme—continued

Wednesday 16th February: Topic different from the meteorite talk he gave to LLPS in 2021.

Dr Simon Drake. (WGCG)

Wednesday 16th March: TBC Dr Stephan Lautenschlager, University of Birmingham (WGCG)

Monday 4th April: From Greenhouse to Icehouse, From Forests to Frost: Antarctica's Climate History.

Prof. Jane Francis DCMG FRS, Director, British Antarctic Survey. Joint meeting with the Parent Body

Wednesday 20th April: TBC. (WGCG).

SECTION C COMMITTEE 2021 – 2022

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