Down to Earth

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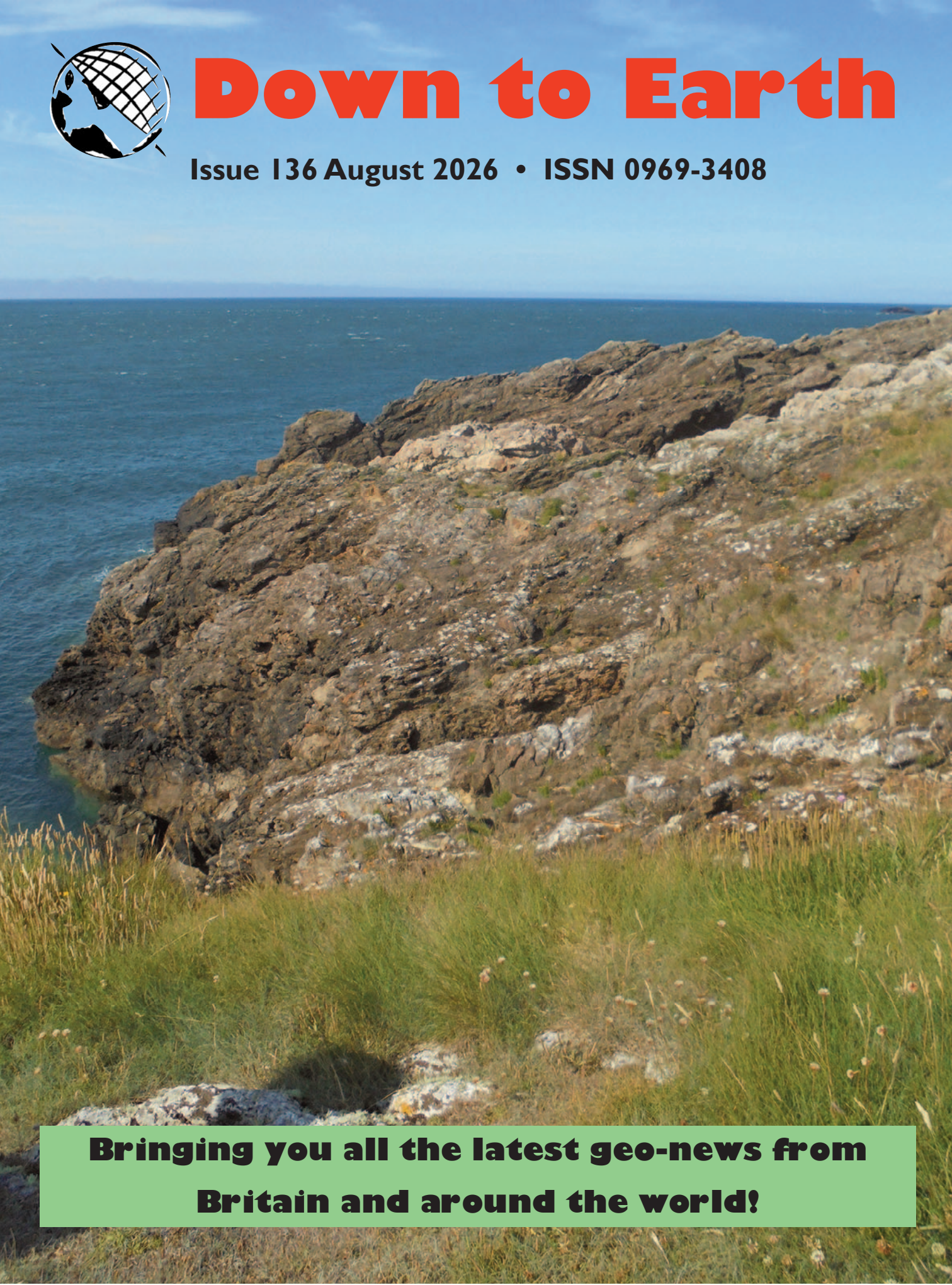

Bringing you all the latest geo-news from Britain and around the world!

Down to Earth
'Earth science learning for all'

The learning zone

Great geo-adventures in 2026/7 begin here...

How's this for stunning fjord scenery at its very best? This is a view in the Magma Geopark in Southern Norway which we will be visiting in May of 2027.
(Image: Courtesy of Fjord Norway)

Thanks to a cancellation, we can still accommodate a couple more people on the October 2026 trip to Melrose in the Scottish Borders.

We are now taking bookings for all of our 2027 trips. See opposite for the full programme. We hope that you can find something that suits you.

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We welcome your contributions, which should be with us no later than October 15th 2026 for the November issue.

If you would like to advertise with us, please ask for a media pack.

cover story

It's hard to imagine, but the large white blocks are quartzite set in a matrix of metasediments. Some of the quartzite blocks are more than 50 metres long.

This is the Gwna Melange at Llanbadrig on Anglesey's north coast and is an amazing locality. It's one of many on the island and the subject of our Editorial.

(Image: Chris Darmon)

editorial

Anglesey - the UK's geological treasure isle...

Your editorial team have just returned from a 5-day residential trip to the North Wales island of Anglesey, or Ynys Môn to give the island it's proper Welsh name. In that short time, it's only been possible to sample a small fraction of the amazing geology that's on offer within the Ynys Môn Geopark.

From the south coast of the island, around Newborough Warren, you can look across the Menai Straits to the majestic mountains of Eyri (Snowdonia). A glance at a geological map of the region reveals a simple geological fact, Ynys Môn is older and geologically very different to Eyri. In fact the only area with similar geology is a tiny coastal strip of the Llyn Peninsula further to the south.

Ynys Môn was first described geologically by the Rev John Stevens Henslow who made the first map in 1822. But the title of 'the father of Anglesey geology' goes to Edward Greenly. He devoted 25 years of his life to the task of mapping the island in intricate detail. The results of his work were a 2-volume geological memoir (1919) and a geological map (1920), still largely unchanged today.

It was Greenly who coined the term 'Mona Complex' to the ancient basement rocks of Anglesey. He also recognised many of them as being Precambrian in age and began the task of applying tectonic terms first used in Northwest Scotland to the relationships of some of the tectonic terranes.

Since then numerous high profile and well known figures in the geological world have added to our knowledge of the island's rocks. Among them have been Robert Shackleton, Wes Gibbons, Jana Horak and the husband and wife team, Jack and Susan Traegus.

In recent years research has continued from an unlikely direction, Brian Windley from the University of Leicester working with Japanese geoscientists have been examining elements of the quite extensive Blueschist metamorphic belt. This is something that Japan is all too familiar with at the present time with very similar tectonics.

For the amateur geologist taking a look at the geology today, there are numerous places, especially around the coast, where beautiful geology can be seen. On the north coast around Wylfa and Llanbadrig the amazing huge blocks of the Melange rocks can be seen. Similar rocks can also be seen on the south coast on Llanddwyn Island at Newborough,

If folding is something that excites you, there are some extreme examples at Rhosneigr on the small scale, or South Stack on the large scale. Everywhere you look on Anglesey, there's something to excite you and it's not confined to ancient metamorphics. There are younger sediments from the Devonian and Carboniferous and even the Quaternary. With Parys Mountain, close to the copper port of Amlwch, there's even something for those interested in mining and mineralogy.

Yes, whatever you call it, Anglesey or Ynys Môn; it has much to offer the geologist. Unlike many other areas, it has the benefit of a geopark and really good books and maps that can help anyone to go to the right places and understand what's going on. I recommend it highly!

Chris Darmon, Editor

Sotheby's sells 'Gus' the *Tyrannosaurus rex* for 50 M$ in New York...

Lot 20 at a Sotheby's auction in New York that took place on July 14th was estimated to fetch 20-30 million USD. But it achieved 50.1 million USD. Lot 20 was a 67 million year old almost complete Tyrannosaurus rex named Gus.

Gus standing proud as well he might at 50.1 M USD.
(Image: Sotheby's Matthew Sherman)

This is the Sotheby's auction catalogue description:

"An outstanding exhibition-ready mounted skeleton, with a body length of approximately 11.6 metres, a skull length of 1.37 metres, a femur length of 1.28 metres (larger than that of Stan), and rising to 3.8 metres tall, cementing "Gus" as one of the largest T. rex ever found. Gus is importantly a single specimen with an incredible 183 fossil bone elements, plus 30 of the 32 rarely found and rarely mounted gastralia (belly ribs, which are technically osteoderms and thus not traditionally reckoned within the formal bone count), it is approximately 61% complete by bone count, with these bones representing 75-80% of the bone mass of the animal, placing it firmly among the most complete T rex ever found.

Gus has an exceptionally preserved skull, with approximately 82% of the bones represented, including all six dentitions. The specimen also boasts a rare set of humeri; a very rare furcula (wishbone); two very well-represented feet (only one other specimen is known to have two well represented feet); a completely represented pelvis; a well represented axial skeleton including cervical, dorsal, sacral, and caudal vertebrae, and much more. Judging from the overall size and degree of bone development it can be determined that Gus's skeleton belonged to a very large, robust, adult individual.

Only large galleries should apply - imagine fitting this into a display case!
(Image: Sotheby's Matthew Sherman)

The skeleton displays a number of pathologies, including signs of tyrannosaurid bite marks to the skull bones and right dentary, as well as to several post-cranial elements, all sustained by either combat or post-mortem scavenging, in addition to injuries which occurred during the life of the individual, with fractured and healed bones discernable in several ribs and gastralia.

Gus's skull shows tell tale signs of damage caused by post-mortem scavenging.
(Image: Sotheby's Matthew Sherman)

Professionally prepared, and accurately articulated anatomically, Gus's skeleton, which is superbly fossilized, is mounted in a predatory pose on a custom steel armature. It is posed upright with tail extended, right foot slightly raised, giving the specimen a lumbering forward motion, head posed looking out slightly to the right. The huge teeth

are displayed within the gaping jaws. The body outline is beautifully accented by the rib cage being mounted with its gastralia, a feature seldom seen in actual *Tyrannosaurus* fossil mounts. The specimen was meticulously prepared to the highest standards, showcasing the fossils' natural beauty and preserving important contextual information. The rich sepia colouration and mineralization of the bones is consistent with fossils originating from the Hell Creek Formation."

'Gus' was found in 2021 on a remote area of private farm land in Harding County South Dakota. It took three summer field seasons in 2021, 2022 and 2023 to fully excavate the skeleton which comes from the Hells Creek Formation of the Late Cretaceous.

The extremely high price paid for this specimen puts it beyond anything that a museum could reasonably afford leading many to believe that this has been purchased by a wealthy individual. For the moment nothing is known about who is behind the purchase.

Talking of giant dinosaurs, how about this from the Cretaceous of Thailand...

A new type of long-necked plant-eating dinosaur – the largest ever found in Southeast Asia - has been revealed in a study led by researchers at UCL, Mahasarakham University, Suranaree University of Technology and Sirindhorn Museum in Thailand.

This comes from the UCL website:

Artistic illustration of a Natagitan.
(Image:: Patchanop Boonsai)

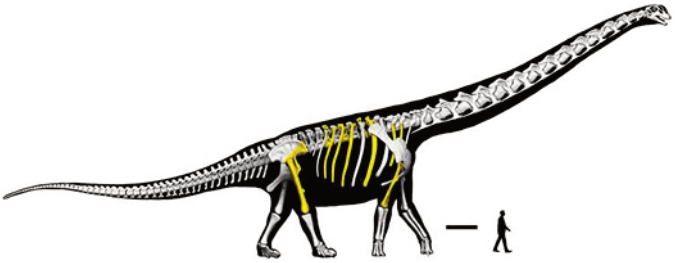
The dinosaur, described in a new paper in the journal ***Scientific Reports***, was identified from bones found at the edge of a pond in north-eastern Thailand 10 years ago.

Analysing spine, rib, pelvis and leg bones, including a front leg bone 1.78 metres long (as long as a human), the research team estimated that the dinosaur would have weighed 27 tonnes – about the same as nine adult Asian elephants – and measured 27 metres in length.

It has been named *Nagatitan chaiyaphumensis*, with "Naga" referring to a mythological aquatic serpent in Thai and Southeast Asian folklore, "Titan" referring to the giants of Greek mythology and chaiyaphumensis meaning "from Chaiyaphum", the Thai province where the fossils were discovered. It is the 14th dinosaur to be named in Thailand.

It belonged to the sauropod family of dinosaurs - long necked, long tailed plant eaters that included the Diplodocus and Brontosaurus - and lived in the Early Cretaceous period between 100 and 120 million years ago.

Lead author Thitiwoot (Perth) Sethapanichsakul, a Thai PhD student at UCL Earth Sciences, said: "Our dinosaur is big by most people's standards. It likely weighed at least 10 tonnes more than Dippy the Diplodocus (*Diplodocus carnegii*). However, it is still dwarfed by sauropods like Patagotitan (60 tonnes) or Ruyangosaurus (50 tonnes).



Skeletal reconstruction with specimens highlighted in yellow.
(Image: Thitiwoot (Perth) Sethapanichsakul et al)

"We refer to Nagatitan as 'the last titan' of Thailand. That is because it was discovered in Thailand's youngest dinosaur-bearing rock formation. Younger rocks laid down towards the end of the time of the dinosaurs are unlikely to contain dinosaur remains because the region by then had become a shallow sea. So this may be the last or most recent large sauropod we will find in Southeast Asia."

During the Early Cretaceous the environment would have been arid to semi-arid – a preferred habitat for sauropods who appeared to thrive in these environments, relying on the surface area of their long necks and tails to shed heat and regulate their body temperature.

The area where the specimens were found also appeared to be part of a meandering river system, which would have been home to fish, freshwater sharks and crocodiles.

Nagatitan would have lived alongside smaller plant-eating dinosaurs such as iguanodontians and early branching ceratopsians (cousins of the Triceratops), as well as big meat eaters including carcharodontosaurians and spinosaurids, and flying reptiles called pterosaurs eating fish from the river.

Nagatitan was a somphospondylan sauropod – a subgroup of sauropod that became widespread about 120 million years ago. The authors found that it specifically belonged to a narrower group within the somphospondylans called Euhelopodidae, which represents a group of somphospondylan sauropods only found in Asia.

Nagatitan is distinct from other species due to a combination of unique features on its spine, pelvis and legs. A life-size reconstruction of the dinosaur is on display at the Thainosaur Museum at Asiatique in Bangkok.

Sethapanichsakul said: "My dream is to continue pushing to get Southeast Asian dinosaurs recognised internationally. More international collaborations between Thailand and other institutions like UCL can further our understanding of the region's palaeobiology and apply it to a global context. This all starts with identifying and describing the specimens we have found first. We have a large collection of sauropod fossils that have not yet been formally described - these may include a number of new species. I've always been a dinosaur kid. This study doesn't just establish a new species but also fulfils a childhood promise of naming a dinosaur."

Sethapanichsakul and the front leg bone (humerus). (Image: Thitiwoot (Perth) Sethapanichsakul)

Co-author Professor Paul Upchurch, based at UCL Earth Sciences, said: "This discovery comes out of a new collaboration between UCL and colleagues in Thailand. The material was studied both in Thailand and at UCL - 3D scanning and printing has meant that we can study the specimen and collect data without having to travel (good for reducing carbon footprint).

"We have had a long-standing interest in the evolution of these gigantic plant eaters and have good collaborative links with researchers around the world. It is great to work with Thai colleagues and start to get insights into what was happening in Southeast Asia during the Jurassic and Cretaceous."

A team of five academics work on different aspects of dinosaur evolution at UCL, with strong collaborative links to the Natural History Museum. The extended research group comprises four research fellows and postdoc researchers, and more than 10 PhD students. At least four of the PhD students are working on dinosaur evolution, with the others looking at a wider array of other evolutionary questions relating to vertebrates, including crocodiles and birds.

Project leader and National Geographic Explorer Dr Sita Manitkoon, researcher at the Palaeontological Research and Education Centre, Mahasarakham University said: "Although Thailand is a small country within Asia, we have a very high diversity in dinosaur fossils, possibly the third most abundant in Asia in terms of dinosaur remains. We've only really been studying dinosaurs in Thailand about 40 years (since the first dinosaur was named in 1986), and already we have a surge of younger generation palaeontologists, who are actively undertaking research and promoting palaeontology and its importance within the country."

The new study received funding from the National Geographic Society.

South Wales coal mining - how a planning application refusal led to a little known mine...

Your Editorial team, here at Down to Earth may be small but we always try to stay abreast of news items in the field of geology, right across the UK. So when we saw that plans for an extension to the Glan Lash opencast coal mine (closed in 2019) had been refused we were naturally interested.

Bryn Bach Coal Ltd were seeking to extend the site over 10.3 hectares (25 acres), promising 11 jobs. But Carmarthenshire council refused plans to extract a further 85,000 tonnes of coal at Glan Lash mine near Llandybie, citing impacts on the local environment.

This was the last outstanding appeal to be heard into opencast coal mining and was therefore of historic importance. However, it was what the report (from the BBC) also revealed that was of much greater interest to us. The final line of the report stated: "Wales has one last remaining deep mine - at Aberpergwm, in Neath Port Talbot."

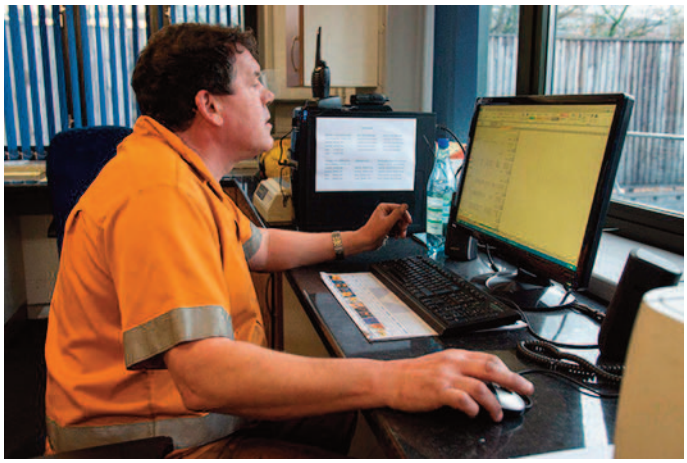
I suspect that the existence of this mine, the last deep pit in the entire UK, comes as a surprise to many people, including your editorial team. A quick search of the internet revealed that his indeed true and they are clearly very much in operation, employing around 160 people.

Aberpergwm Coal Mine is located in the Vale of Neath, near Glynneath, south Wales. The mine was closed in the mid 1980s by British Coal, but reopened in 1996 and is now managed by EnergyBuild Holdings Ltd. Aberpergwm mine and the adjacent underground anthracite coal reserves and resources located in the Neath and Dulais valleys, are being developed by EnergyBuild Holdings Ltd, to produce premium grade anthracite.

This comes from the website of owners Energybuild UK:

The mine produces high-grade anthracite, which has wide domestic and industrial use throughout the world due to its unique characteristics – high carbon content and calorific value for specialist uses.

An underground mining machine, working right now in South Wales. (Image: EnergyBuild)



Aberpergwm Mine is a modern mine that embraces computer technology in all aspects of mining and production. (Image: EnergyBuild)

Aberpergwm Mine is the only producer of high-grade anthracite in Western Europe. The area's geology contributes to the unique characteristics of the anthracite we produce – clean burn, low emission, low sulphur, high efficiency.

The operation has vast in-situ resources of High-Grade Anthracite (HGA) – measured to international JORC 2012 standards. Unique characteristics, low impurities, ideal specific gravity for water filtration and other processes.

Aberpergwm benefits from a high tech production unit and processing facility employing a skilled workforce from the locality. The underground mine includes a full complement of room and pillar equipment manufactured by JOY (Komatsu). The equipment includes a 12CM15 continuous miner, two 10SC32 shuttle cars, a feeder and four quad bolters. Production is currently taking place from the 9ft seam which has an in-situ resource of 70 million tonnes of high quality anthracite.

We have a state of the art dense medium hydro cyclone 400 tonne per hour processing plant. Our machinery processes and grades Anthracite in size ranges from 0.2mm to 65mm depending on specific customer product requirements.

The Editor comments: This story still amazes me. Yes, there's an active deep coal mine hidden in plain site in South Wales! How many more might there be dotted around the UK? Tell us of any 'hidden' mines in your area!

Collecting beach pebbles may be fun, but is it legal?

With the summer holidays in full swing, thousands of people will be descending onto our beaches. Some of those people, young and old will be indulging themselves in collecting beach pebbles. Such a pastime may be fun and enjoyable, but is it legal?

Clive Mitchell from BGS offers some timely advice:
The UK's enviable coastline boasts beautiful sandy beaches and distinctive sandstone and chalk cliffs, not to mention world-famous landmarks such as the Giant's Causeway and Durdle Door. It is a major draw for tourists and local day trippers alike, but this high footfall can put different pressures on these environments. Areas of such natural beauty are often subject to different legislation to protect them, as well as passionate support from local communities and organisations that recognise their importance. This can sometimes lead to confusion about what is and isn't allowed.

But is that claim true - is it illegal to take pebbles from the beach to commemorate a great holiday? In short: it depends, but is not currently the case for most beaches across the UK. The Coast Protection Act 1949 is designed to protect the UK from coastal erosion, natural flooding and loss of wildlife habitat. Section 18 of the Act sets out how restrictions on removing materials from beaches can be put in place. It stipulates that, on certain beaches and stretches of coastline, restrictions on collecting materials (for example, sand, gravel or rocks) from beaches may be enforced to protect the local area and ensure coastal defences are not eroded.

A local coastal protection authority can choose to apply these restrictions to a specific stretch of coastline by making an order under Section 18 of the Act. The order is subject to a statutory confirmation process and does not take effect until confirmed by the relevant Government minister. Once in force, it becomes unlawful to remove or excavate material from that area of the beach unless permission (a licence) has been granted by the authority.

This is the pebbly beach at Sidmouth, but are the pebbles protected or not? (Image: BGS/UKRI)

In other words, the Act does not ban people from collecting materials on all beaches: restrictions only apply in places where a formal order has been made and approved. Signs are usually in place warning you not to collect pebbles on beaches that enforce the act. If there are no signs, collecting one or two pebbles from your trip may not be breaking the law; however, it is always advisable to research any restrictions on specific beaches before visiting. For example, there may be other or additional environmental considerations such as Sites of Special Scientific Interest (SSSIs) and Marine Protected Areas (MPAs).

The Editor comments: It's good to get some clarification on this matter, even if there are some still some blurred edges in certain places.

There's a big difference between collecting a single pebble for scientific study and sackful for spreading on your drive. We often pick up pebbles on a beach, we did so recently in Anglesey, but we also put them back!

The best suggestion is to use common sense, and if in doubt about the status of the beach, abstain from collecting and put everything back.

Compiled by: Chris Darmon

Northern Venezuela hit by two deadly earthquakes, seconds apart

On June 24th. Northern Venezuela was hit by two earthquakes, less than a minute apart. The first was of magnitude 7.2 and struck at 18.04 VET, with the second magnitude 7.5 some 39 seconds later.

It impacted the densely populated coastal area that was home to many thousands of people, many of whom were housed in poorly built high rise developments.

To date there is no reliable figure for the number of people who may have died in the disaster, with the current figure of 4.700 expected to represent only around 10% of those still listed as missing.

Chris Darmon has compiled this account...

June 24th 2026 will forever be etched into the history of the South American country of Venezuela as they day when tens of thousands of their citizens lost their lives in a twin earthquake disaster.

So important was this event in terms of its tectonics and human impact that we devoted a large part of the July DtoE extra to an in depth analysis of it. We're reprinting that here, with updates where appropriate. We hope that you find it helpful in coming to terms with such an enormous disaster. It may also be that some of you might be moved to donate to the Disasters Emergency Committee (DEC) Venezuela Earthquake Appeal.

Devastation in the aftermath of the earthquakes. Modern high rise blocks pancaked in seconds, burying all who were inside them. Most of the people stood no chance. (Image: World Vision)

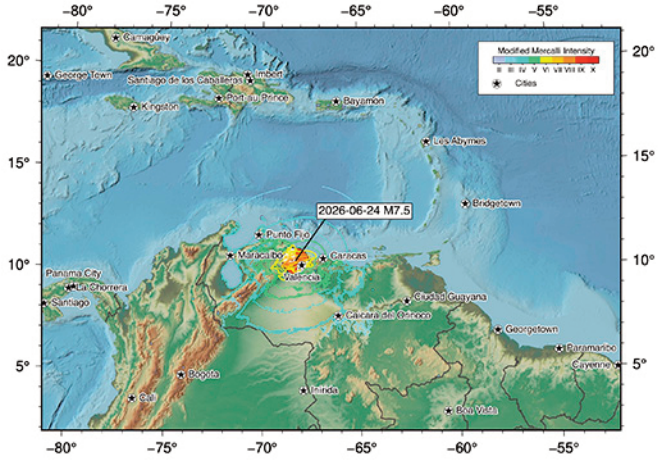
The timeline

24 June 2026, 18:04 VET (The First Shock): A shallow, magnitude 7.2 earthquake ruptured at a depth of 20.3 km, centred near Veroes, Yaracuy.

24 June 2026, 18:04 VET (39 Seconds Later): A second, even larger magnitude 7.5 mainshock struck the exact same fault system at a depth of just 10 km. The back-to-back sequence is classified by geologists as a rare "seismic doublet".

25 June 2026: Interim President Delcy Rodríguez declared a state of emergency. Initial reports confirmed 235 deaths as massive collapse zones were identified in the coastal state of La Guaira and the capital city of Caracas.

27 June 2026: The region registered more than 430 aftershocks, including a distinct magnitude 4.8 offshore tremor that sent panicked residents back into the streets



A map of the main M7.5 earthquake event (Image: Courtesy of USGS)

The background

There's a long history of earthquakes striking the northern part of Venezuela, going back in time.

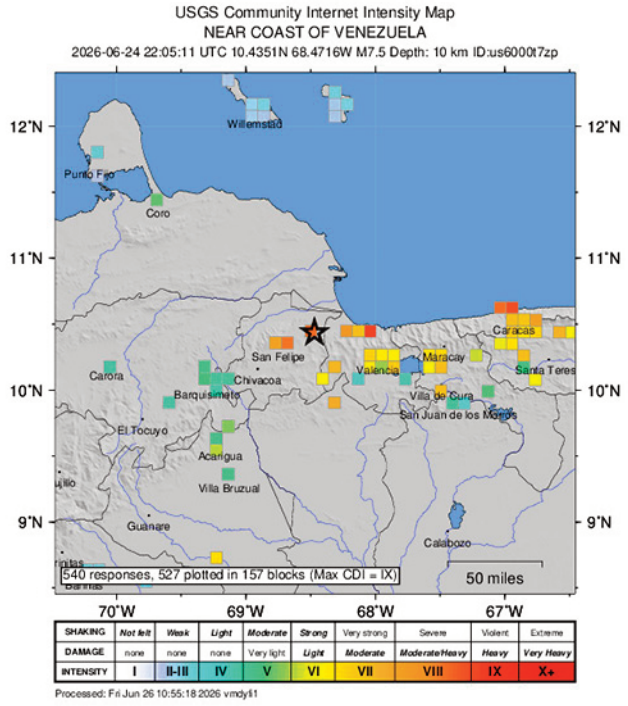
• 26 March 1812 (Caracas): A catastrophic magnitude 7.1 earthquake struck on Maundy Thursday along the Boconó fault system. It leveled Caracas and killed an estimated 30,000 people.

• 29 October 1900 (Miranda): Known as the San Narciso earthquake, this magnitude 7.7 tremor caused severe destruction in Caracas and northern coastal towns.

• 29 July 1967 (Caracas): A magnitude 6.6 earthquake hit the capital city. It collapsed several high-rise apartment buildings and claimed over 200 lives.

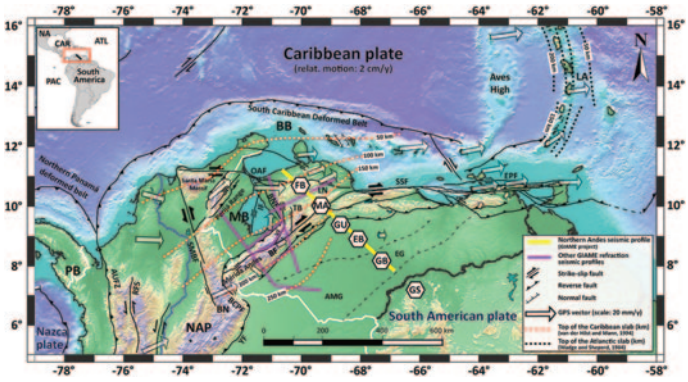
• 9 July 1997 Cariaco Earthquake (Magnitude 6.9): Striking inland Sucre, this severe tremor caused the collapse of several engineered structures, including schools and apartment buildings, resulting in at least 81 fatalities.

• 21 August 2018 (Sucre): A strong magnitude 7.3 earthquake struck the coastal region. Because its hypocenter was deep (123 km), it caused minimal casualties and minor structural damage.



This is another USGS image of the main M7.5 event, this time showing the intensity by community.
(Image: Courtesy of USGS)

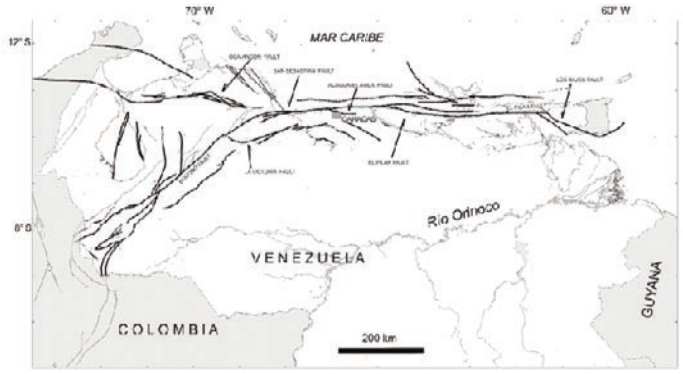
The local and regional tectonics



The regional tectonic picture. To the west the Nazca plate subducts beneath Central America and to the east the Atlantic plate subducts with the Caribbean plate moving to the east along a strike slip fault system that runs through Venezuela.
(Image: Courtesy of JGR Solid Earth)

To understand why this area has so many earthquakes we need to look at both the local fault systems and also take in the regional picture. Essentially Venezuela sits between to major subduction zones, to the west the Pacific ocean floor is being subducted beneath Central America and to the east the Atlantic ocean floor subducts in the Caribbean.

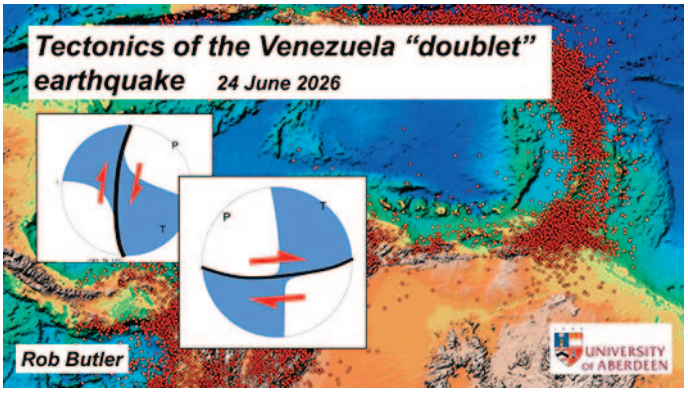
Between the two sits Venezuela and Colombia on an E-W right laterial strike-slip (or wrench) fault system, known as the San Sebastian fault



Quaternary fault pattern in Northern Venezuela. Note the E-W strike slip faults, and also the more northern faults which cross the area. Both of which Rob Butler suggests were responsible for the recent events.
(Image: Courtesy of Researchgate/USGS)

system. This accommodates the fact that the smaller Caribbean plate is moving eastwards at a rate of 16 or 17 mm per year. The second of the two recent earthquakes is entirely consistent with movement on that right lateral strike-slip fault giving us a M7.5 event. But the first M7.2 event, may well have been rather different in its origin. Remember that a M7.5 event is nearly three times more powerful in energy release terms than a M7.2.

Rob Butler of the University of Aberdeen thinks that the two earthquakes occurred on different faults. He bases this on the USGS detailed seismology, analysis of which reveals that they have different fault plain solutions. Butler believes that the M7.2 foreshock may have been caused by movement on a second fault that runs in a general N-S direction. In complex areas such as this its quite possible for movement on one fault to then trigger movement on another due to loading of stress in the region.



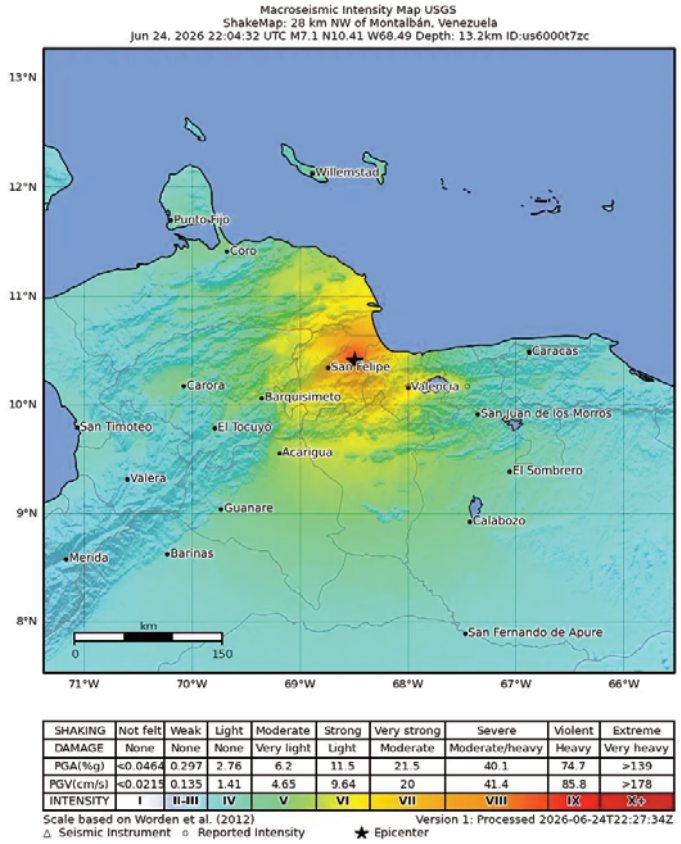
The two different fault plain solutions for the two earthquake events.
(Image: Courtesy of Rob Butler/University of Aberdeen)

Meanwhile, USGS issued the following tectonic summary...

The June 24, 2026, M 7.5 earthquake southeast of Yumare, Venezuela, occurred as a result of shallow strike-slip faulting near plate boundary between the Caribbean and South American plates. At the location of the earthquake, the Caribbean plate moves eastward relative to South America at a rate of about 20 mm/yr. This movement is primarily accommodated by a major system of right-lateral strike-slip faults traversing northern Venezuela – the San Sebastian fault system along Venezuela's northern coast (17 mm/yr), and the Bocono fault system extending westward from the epicenter into interior Venezuela (12 mm/yr). The earthquake's location, shallow depth (10.0 km), and

right-lateral strike-slip mechanism are consistent with rupture primarily along this plate boundary system along the San Sebastian fault system, which extends along the northern coast of Venezuela.

This event was the mainshock of a severe seismic doublet sequence, occurring just 39 seconds after an M 7.2 foreshock. A doublet sequence – defined as two earthquakes of similar magnitude that occur close in time and proximity - likely indicates a complex, rupture interaction process.



Earthquake intensity map for the Venezuelan 2026 events. (Image: Courtesy of USGS)

While commonly plotted as points on maps, earthquakes of this size are more appropriately described as slip over a larger fault area. The finite fault rupture model of this strike-slip earthquake indicates that the June 24, 2026, earthquake ruptured a fault approximately 175 km long by 20 km wide. Preliminary seismic and satellite analyses indicate that this earthquake ruptured unilaterally to the east from its on-shore epicentre along the Venezuela coast. The epicentre and finite fault models are consistent with the earthquake having started within either the eastern Bocono fault system or western San Sebastian fault system, then propagating offshore onto the San Sebastian fault where rupture propagated as far east as Caracas and La Guaira.

Northern Venezuela has a history of large, damaging earthquakes. However, in the immediate 250 km vicinity of these June 24, 2026, earthquakes, there have only been seven M6 and larger earthquakes in the past century. The region recently experienced a doublet in September 2025 consisting of an M 6.2 and an M 6.3 earthquake WSW of the 2026 event; the 2025 sequence caused at least one fatality, over 110 injuries, and extensive structural damage across Zulia and Lara. In September 2009, an M 6.4 earthquake to the ENE injured 18 people and damaged buildings near Morón, and an M 6.0 event in 1989 caused slight damage in the Valencia area. Farther west, an M 6.1 earthquake struck the region in April 1975.

The most devastating modern earthquake in the surrounding area was the July 1967 M 6.6 Caracas earthquake, centered approximately 131 km to the east, which caused around 240 fatalities, hundreds of injuries, the collapse of multiple high-rise apartment buildings, and widespread destruction. In broader Venezuela, there have been five M 7+ earthquakes in northern Venezuela or near the coast since 1900.

Ground conditions

One of the key factors to consider when a massive earthquake occurs are the ground conditions to be found in the area. Listed below are some of the conditions that may be encountered in the aftermath of this event.

• **Widespread Landslides:** The US Geological Survey (USGS) model indicated widespread slope failures across the mountainous regions west of Caracas and along the coastal range. Significant landslides have blocked transport corridors and isolated remote communities.

This is just one of many landslides triggered by the earthquakes. (Image: Taken from a locally shot video taken live during the events)

• **Soil Liquefaction:** Saturated, loose sediments along the northern coastal plains and river valleys suffered liquefaction. This causes the ground to behave like a liquid, shifting foundations and accelerating the collapse of coastal structures.

• **Sediment Amplification:** In Caracas, particularly in areas like Altamira, Los Palos Grandes, and San Bernardino, deep alluvial soil and thick soft sediments amplified the incoming seismic waves. This "site response" concentrated and extended the duration of the shaking, worsening surface impacts.

Hazards & structural conditions

The Venezuelan earthquakes demonstrate all to clearly the folly of poor quality construction. This has undoubtedly been a major contributor to what everyone agrees is going to be very high casualties. The sheer number of high-rise blocks that have collapsed is both frightening, but also predictable.

Even in downtown Reykjavik, where medium rise blocks abound, one wonders whether they would survive an earth M7.5, but they should not pancake like the ones in La Guaria.

Here's some of the hazards:

• **Unstable Rubble & Aftershocks:** Rescue and recovery teams are operating in a high-risk environment. Over 500 aftershocks have shaken the region since the initial main shocks, triggering minor secondary collapses of already weakened structures.

• **Street-Level Debris:** Cities like Caracas and La Guaira are dealing with immense blockages from shattered high-rise complexes and informal housing. Over 2,500 structures are completely collapsed or severely damaged, rendering surrounding roads unsafe.

• **Weather Complications:** A passing tropical wave is bringing heavy rainfall to the affected zones. This rain threatens to oversaturate loosened hillside soils, significantly increasing the immediate risk of secondary mudslides and flash landslides over search areas.

The relief efforts in the aftermath

In the immediate aftermath of these events of June 24th. there was initial shock for the people as they realised the enormity of the search and rescue task that awaited them. Venezuela was already a county in crisis, with an interim president in Delcy Rodríguez, effectively installed by Donald Trump. She was not prepared for such a disaster and neither was her country.

Devastation near Caracas. No wonder then that Venezuela needs foreign aid.
(Image: Courtesy of MSF)

Over the following 72 hours rescuers managed to pull many people from the ruins of their former homes, but now the search and rescue operation has morphed into one of the recovery of the many bodies that lie within the ruins. Officials and the country's armed force faced severe criticism from their own people as well as foreign observers, but could anybody have done enough to satisfy people desperate for news of loved ones?

Teams from many countries, including more than 70 firefighters from Northwest England, are working tirelessly pulling the dead and injured from the ground. We are also seeing aid in the form of tents and food coming in, some of it by air, from around the world.

What can we do?

A number of world charities with operations in the UK have launched emergency appeals for funds and supplies. Many of the charities are members of the umbrella body known as the Disasters Emergency Committee (DEC).

After events such as these earthquakes the DEC quickly swings into action coordinating rescue events and then moving into supplying vital aid, be it medical, food, tents or personnel.

To donate, go to:
https://donation.dec.org.uk/venezuela-earthquake-appeal?utm_source=google&utm_medium=cpc&utm_campaign=Branded%20Keywords&utm_content=DEC%20Venezuela&utm_id=9449780661980290337 17&gad_source=1&gad_campaignid=9449780666&gclid=EAIaIQobChMI0PbWia7UlQMVnX9BAh0VCye8EAAYASAAEgIcYvD_BwE

Amongst the individual charities are:

- World Vision
- The Red Cross
- MSF - medical aid charity
- UNICEF - helping children
- UNHCR - helping the thousands if displaced people

The Editor comments: Even researching this article has, a times been harrowing. I can only imagine how much worse it is for the people involved on the ground. A feeling of hopelessness mush pervade the whole operation.

Imagine if around 200 high rise buildings completely collapsed in your town or city. Natural disasters have been around for all of human history but they are no less shocking every time. They are a reminder that we may be able to send people to the moon, but we cannot stop earthquakes and the destruction that they bring.

Learn more about Venezuelan tectonics on our special Zoom session...

The Tectonics of Northern Venezuela
Special Session, Monday November 9
The tragic twin earthquakes of June 24th 2026 will probably go down as one of the worst natural disasters of modern times. In this specially extended Zoom session we will explain why this happened by looking at the regional and more local tectonics. We'll also examine what could have been done to minimize the number of casualties, by way of design for buildings and infrastructure, especially bridges and roads.
Cost: £15.00 or if two people share the same computer screen the cost is £22.00.

To enrol, go to: www.geosupplies.co.uk. enter our online shop FIRST and THEN find the course.
Or ring us on 0114 2455746.

Author: Patrick Gaffikin

Illustrations courtesy of author unless shown.

Travertine - an exotic rock

When I first arrived in Sheffield in 1974, I remember visiting the city centre branch of what was then the TSB Savings Bank on Norfolk Street. The grand Victorian building, now a cocktail bar, is situated just a stone's throw from the Crucible Theatre, home to the annual World Professional Snooker tournament.

I well remember that inside the TSB branch the floor and walls were adorned with what I came to understand was Travertine from Italy. I wonder what became of it?

Over to you Paddy...

'Yours, O Lord, is the greatness.....for all that is in the heavens and in the Earth is yours'

Book of Chronicles.

A sample of cut and polished travertine.

It is mainly composed of calcium carbonate (Ca CO3) and is a porous, usually fine-grained, relatively soft, creamy coloured sedimentary rock, which can also be rusty coloured, beige, white or brown. Because it contains calcium carbonate, it will bubble if a drop of dilute hydrochloric acid is applied. Usually it is banded with pits (small dents) on the surface. The pitting is caused by trapped gases during the formation process. Its hardness is 3-4 (on Moh's Scale) and so it is softer than, say, marble but harder than another calcium carbonate rock, chalk and it takes a good polish - a characteristic that enables it to be employed as a building / decorative stone.

How travertine forms

This rock is precipitated from hot water rich in calcium carbonate. The water is ground water especially around hot springs in geothermal regions and in caves where the travertine occurs in the form of stalagmites and stalactites. The ground water, which is mostly rain water, that collects below the Earth's surface, becomes rich in calcium carbonate because it dissolves this chemical as it seeps through limestone rock. In caves the mineral-rich water enters as drips from the ceiling. Travertine is closely related to deposits known as calc-tufa but they are not the same although they share some common properties (like both being mainly composed of calcium carbonate) but they differ in texture and appearance. Unlike travertine, calc-tufa occurs in Britain and Ireland (England, the Cairngorms (Scotland) and the Slieve Bloom Mountains (Ireland).

A sample of calc-tufa.

Places where travertine is found

The Colosseum in Rome.
(Image: Mr. D. Graham, England).

Turkey is the biggest exporter of travertine today. The quarries are mostly above ground in places like Denizli and Sivas among others. Although travertine can occur underground, it usually forms above the surface making quarrying of this rock easier to cut and access. At the foothills of the Apennines near Rome, in the Tivoli region of Italy, there are also (mostly) surface travertine quarries. This stone is over 100,000 years old (Quaternary) and has been extracted since ancient times making some of the Tivoli quarries among the oldest rock quarries in Europe.

The ancient Romans used it for the construction of aqueducts, temples etc. The famous Colosseum in Rome is composed of arches and

columns of travertine while, although constucted later, Saint Peter's Basilica has columns etc. of this rock. Many of the paving stones in Saint Peter's Square are made of travertine because, for at least one reason, this rock is less slippery underfoot than many other rock-types. Nearer to home, the Great Hall in the Parliament Building, called Stormont, located on the upper Newtownards Road, Belfast, has walls of polished Roman travertine and these can be seen in the background of television programme interviews which are often conducted in the Hall.

Other countries with travertine quarries are: the U.S.A., Mexico, Iran, Indonesia and Peru. The different quarries produce distinctive types of travertine. For instance, the stone from the Tivoli quarries in Italy is mostly a creamy colour while the Iranian rock exhibits striking colours.

Saint Peter's Basilica, Rome.
(Image: Mr. D. Graham, England.)

Reconstituted (travertine) stone

Reconstituted stone, sometimes called Engineered or Cast Stone, is often used to imitate the natural travertine stone. It has the advantage that it is less expensive than natural travertine and, because it is not quarried, is environmentally more friendly to produce than natural stone. Because it is usually less porous than the natural rock, it does not require regular maintenance as natural travertine. Being less porous results in it being less prone to weathering and so is more suitable for outdoor use.

It might therefore be asked: "Why use natural travertine in the first place?" Well, it transpires that many architects prefer the natural rock because it increases the value of the properties in which it is used and it is more prestigious. In the case of reconstituted travertine, it is manufactured using crushed calcareous sandstone and washed sand bonded together with cement. One distinguishing feature from the natural rock is that it is not pitted. If natural travertine is used externally it needs to be treated every few years with a sealant.

Treating travertine with a sealant

Firstly, any dust, dirt or previous sealant are removed from the surface of the rock and then left to dry for a couple of days after being treated with a suitable cleaner. An appropriate impregnating sealer is chosen – for example one called siloxane - and is carefully applied evenly without leaving a surface film then it is left to soak-in for about 20 minutes. After wiping off any excess, it is left to dry completely. If needed, a second coat of the sealer is applied. Sealing also extends the life of the rock and enhances its natural beauty.

Reconstituted (artificial) travertine stone

Uses of travertine

Because natural travertine is slip-resistant it is employed for flooring and paths such as garden paths. Other uses include wall cladding, columns, facades, counter tops, fireplaces, garden patios and bathroom tiles.

Although this rock is not found naturally in Britain or Ireland, it has uses that go back to ancient times. In appearance, it is indeed an exotic rock.

The Tivoli (Rome) travertine quarry.
(Image: Aretina Marmi Company)

article

Author: Martin Whiteley

Illustrations courtesy of author.

Bells ring out for James Hutton's tercentenary!

By their very nature anniversaries come and go. As this issue of Down to Earth comes out, the main celebrations for the tercentenary of the birth of James Hutton, the founder of modern geology have passed.

Hutton visited a number of places across the south of Scotland which, taken together, brought him to the realisation that, geological time was indeed immense - deep time had been born.

Nowhere is more synonymous with deep time than Siccar Point in Berwickshire. Martin Whiteley reports on an unusual celebratory event that took place there recently...

There have been many activities taking place this summer in Lothian to celebrate the tercentenary of the birth of James Hutton (1726-1797), the man who is widely regarded as the founder of modern geology. One such example was a specially arranged peal on the bells at Haddington church that involved eight bell ringers with varied interests in agricultural reform, medicine and geology, topics that would have resonated strongly with Hutton.

The peal required nearly three hours of non-stop ringing and as it was the first performance of its type, the ringers had the honour of naming it Siccar Point Surprise Major, after the world-famous locality a few miles away.

The peal taking place before a small audience at Haddington Church. (Image: Taken from Instagram)

After the Haddington peal was over, the band retired for lunch and at was joined by some members of the committee responsible for coordinating the tercentenary celebrations. We were thanked for ringing the peal and presented with facsimiles of field sketches made

Three geologists ringing handbells on rhe 'holy ground' of Siccar Point for James Hutton's birthday; (left to right), Richard Tibbetts, Stephen Jones and Martin Whiteley

at Siccar Point in 1788 by Sir John Hall, one of Hutton's scientific colleagues.

Then we drove south to Cockburnspath and walked out to the cliff edge to admire the recently constructed stone edifice that serves as a viewing platform and information point for Siccar Point itself, which is tucked away on the rocky foreshore some 60 metres below. Having scrambled down the grassy cliff we produced a set of six handbells and rang them whilst standing on the unconformity itself. It's fair to say that the small audience of wheeling seagulls and onlookers seemed rather baffled by this activity, but it felt very appropriate for bell ringing geologists to honour Hutton's birthday in this way.

James Hutton (1726-1797) (Image: National Galleries of Scotland)

in-house

A look at some of the new and exciting happenings in the world of Down to Earth & Geo Supplies - by Chris Darmon

'Cream of the Crop 2025' - available now!

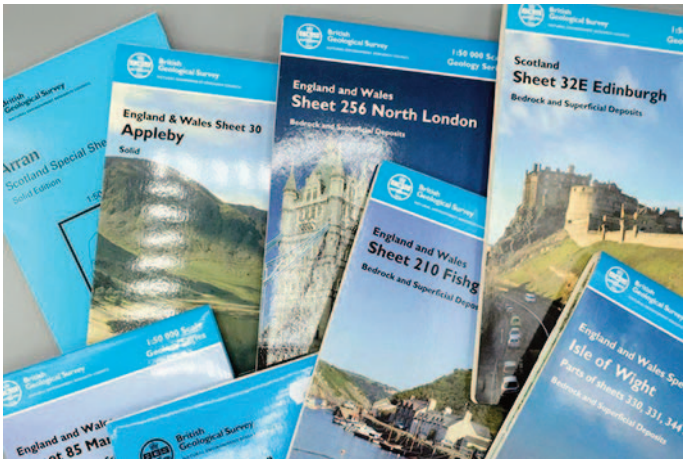
We are pleased to announce the (somewhat late) Arrival of our ***'Cream of the Crop 2025'*** special limited edition rock set! ***This is now available for immediate delivery.***

Your editorial team, Chris and Colin (mainly Colin) collect these specimens during our field trips in the year in question. You'll be pleased to learn that they are all collected from loose material and not hammered from the solid section. This year's collection comprises a total of 14 specimens and includes samples such as the oldest rock in England and Wales at 701 million years, a quartz porphyry from Cornwall and tonalite from the Ardnamurchan Peninsula of Scotland.

To get hold of our 'Cream of the Crop 2025' collection for the postage inclusive price of £54.95, either go to our website: www.geosupplies.co.uk or ring us on 0114 245 5746.

Shop BGS for books and maps...

Now that BGS has closed their shop at the Keyworth headquarters in Nottingham, may we suggest that instead you beat a path to our door.



We seek to stock all of the folded (and some flat) copies of the Solid or Solid & Drift versions of the 1:50 000 geological maps for England, Wales and Scotland. Along with the 1:25 000 maps and many other BGS book and map products.

In short, we have hundreds of BGS products ready for you to pick up. You will always pay less than you would do if you had the items delivered by mail. ***Most maps are £12.00, with some listed at £15.00. We also stock the popular BGS Regional Guides with prices from just £7.00.***

If you want to check whether we have a particular map in stock, why not contact us before you pay us a visit?

You can telephone us on 0114 2455746, or email us at: sales@geosupplies.co.uk

See below for our opening times. On street parking spaces may be available, or you can park in the nearby ASDA car park. We're just 5 minutes off the M1 motorway at Jn. 35.

We look forward to meeting you, when we hope that we can be of service to you. Remember that our professional advice is freely available!

Down to Earth readers welcome!

Just 5 minutes off M1 Jn 35 N. Sheffield

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If you haven't joined one of our residential field trips before, what can you expect?

- *Our residential field trips are suitable for adults of all levels of interest and geological knowledge.*
- *Our trips are friendly and informal and usually comprise 15-20 people. Overseas trips are usually larger.*
- *We usually make use of comfortable small hotels and guest houses and all meals are included.*
- *You have the services of Chris Darmon and Colin Schofield as field leaders. Both are highly experienced and knowledgeable field geologists.*
- *For some trips we have a hired minibus but on other trips we will use shared cars, or even public transport.*
- *Dates shown in this listing are the start and finish dates.*
- *Where prices are quoted, they are per person in a shared twin/double room.*

If you still have any questions or queries, don't hesitate to email us at: downtoearth@geosupplies.co.uk or tel: 0114 245 5746

Before you book one of our field trips...

We are always pleased to welcome new people along on our trips. So if you are thinking about it, what do you need to know before you 'take the plunge'?

Who are the trips aimed at?
The short answer is that they are not aimed at any particular group of people. Our participants are mainly older retired people who want to keep their minds and bodies active, but younger people are welcome.

Some people have lots of geological field experience whilst others are complete beginners. As one person put it to us "I've forgotten all I once knew and need to come along to hear it again." Our UK trips are all small groups of 15 to 20 people maximum so we can make lots of what we say personal to you.

Will I be able to manage the walking?
We always try to keep walking to a minimum, but, almost by definition, some walking will be involved. If you can't manage a particular walk, just tell us and it will never be a problem for you not do it. We have one person who really enjoys sketching - she's done some amazing sketches while the rest of us visit a quarry!

How do we get about on trips?
It varies a lot from trip to trip. Sometimes we hire a minibus, on other occasions we use public transport and at other times we'll make use of shared cars. Look at the details for each trip to find out.

What about accommodation?
We always try to use hotels or guest houses that have ensuite rooms as standard. Most of our accommodation will provide breakfast and evening meals, but sometimes we eat in local restaurants. We include the cost of all food, including a packed lunch for each field day.

We prefer to use small family run hotels and guest houses but they are getting harder to find, so sometimes we use larger hotels such as Premier Inns and hotels in the Leisureplex group. Once again, see the individual trip brochures for details.

Are your bookings safe with us?
Yes indeed they are! We've been in the business of running trips a long time and ensure that all the money you pay us is safe in a client trust account until your trip is completed.

But, above all, our trips are educational informative and FUN! We don't take ourselves or our geology too seriously. After all you are on holiday - and you are paying for it! We look forward to welcoming you on a trip sometime soon.

Still one last opportunity this year...

Due to a cancellation, we still have a couple of vacancies on our trip to Melrose in the Scottish Borders this October.

Melrose in the Scottish Borders, October 18-24 £995
We end the year with a good value 6-night trip to a new area of the Scottish Borders. Melrose is in the heart of an excellent area of fine geology, with sediments from the Ordovician, Silurian and Devonian along with a fine array of igneous rocks, both extrusions and intrusions that mainly date from the Carboniferous.

During this trip we'll be taking in the famous localities of Dob's Linn near Moffat where Charles Lapworth established the Ordovician and Silurian boundary and also James Hutton's famous inconformity at Jedburgh. We'll also have a day in Edinburgh exploring some of the famous sites in Holyrood Park.

Our base for the trip is the comfortable Waverley Castle Hotel which sits in beautiful grounds on the outskirts of the small town.

The Waverley Castle Hotel on the outskirts of Melrose is our base for this 6-night trip.

Don't worry, we don't bite!

All our educational classes and courses are friendly, informal and open to all.

Come and join us!

Welcome to our real world!

The big reveal - The full list of field trips for 2027...

We are now looking forward to another great season of field trips in 2027. As we are hosting two groups of Americans during the year, it means that the number of trips for general sale will be somewhat reduced. All the more reason to get your bookings in early!

Despite running these trips for a number of years, we've managed to find some great new venues for 2027 and, as a result, have more than 100 confirmed bookings, even at this stage.

If you haven't been with us before, you are particularly welcome, but please don't leave it too long before making your booking. this is particularly true if you are looking for a single room.

Prices shown are per person based on sharing a twin/double room.

Furness & the South Lakes. April 16-23 (7-nights) £1295
The Lake District is arguably our premier National Park and it's an area that many of you will have visited. But how many of you know or have ever visited the South Lakes, known as the Furness area? It's an area of scenic coastline with small coastal communities like Grange over Sands and Arnside. From our base in Grange we'll be able to explore a wide area taking in places such as Ravenglass, St Bees, Arnside, Lake Windermere from Lakeside and quarries around Millom.

The Cumbria Grand Hotel is in the tranquil resort of Grange over Sands - our base for the week

All this from the comfort of the Cumbria Grand Hotel in Grange over Sands. Take advantage of this excellent value package, just as the spring flowers come out!

Sorry, single rooms for this trip have now sold out.

Norway - Magma Geopark, May 4-13 (9-nights) £2595
We have been to Norway on two previous occasions to the Gea Norvegica Geopark where we saw great geology and landscape. This time we are staying in the south of the country but venturing to the Stavanger area which is the location of the fabulous Magma Geopark.

The tour commences with the first night in Oslo where we will be staying in an historic hotel which is actually within the main railway station. From there, we'll take a 7-hour train journey direct to the small town of Egersund, our base for the entire week. Here we stay in the historic Grand Hotel noted for its comfortable accommodation and excellent food.

Each day we'll venture out into the geopark with the geopark's own geologist. You'll see some amazing ancient rocks including anorthosite, that's much more common on the surface of the moon!

Some of the rocks in the geopark include anorthosite, which is more commonly found on the moon.
(Image: Magma Geopark)

There will be visits to former metal mines, a guided tour of a local quarry, as well as walks in the fjord landscape, a boat trip to a local island and much more!

We can still accommodate a few more people on this trip.

Strathpeffer & Cromarty, May 21-29 £1695
Another new location - not far from Inverness but so very different. The spa town of Strathpeffer was a Victorian favourite for 'taking the waters', But today our hotel has all mod cons and there's no cold baths! It's a great starting point from which to explore the local area which has much to offer the geologist.

The Ben Wyvis Hotel our base in Strathpeffer.

From the local Devonian rocks of Cromarty birthplace of Scottish geologist Hugh Miller to the metamorphics of the local Moine rocks. We'll take in a train trip to Kyle of Lochalsh as well as another to

Golspie on the coast to see the Jurassic and Triassic. We also see some of the younger sedimentary rocks around Lossiemouth to the east of Inverness.

We can still accommodate people in single, double or twin rooms.

Sussex Coast & South Downs, June 20-26 (6-nights) £1095
Based at the Queen's Hotel in the resort of Eastbourne this is a trip that will take in some of the classic chalk cliffs at places like Beachy Head and also some of the Lower Cretaceous rocks in places like Hastings, not forgetting the beautiful landscape of the South Downs National Park.

The Queens Hotel on Eastbourne's seafront

If you've never sampled some of our finest Chalk landscape then do so now! you won't regret it we can assure you. This is English landscape at its very best and tghis will be the first time that we've seen some of it on one of our trips.

Single, double and twin rooms are available at the moment.

The Abberley & Malvern Hills Geopark, July 18-23 (5-nights)
Your Editor has had the pleasure of being the President of the Abberley & Malvern Hills Geopark for the past five years and along with the geopark volunteers, knows the area well.

Based at the Abbey Hotel in Great Malvern, this trip will take you to places where you can enjoy rocks and fossils from many different periods. We go back to the Ediacaran of the Precambrian to see the hard igneous rocks of the Malvern Hills, right on our doorstep. During the Cambrian and Silurian periods we see fossiliferous sediments. The Devonian and Carboniferous see are very different sandstones and even coal seams in the Wyre Forest and around Highley in the Severn Valley. Around Bridgnorth we see the bright red Permian sandstones from a desert environment.

Gullet Quarry in the Precambrian rocks of the Malvern Hills (Image: Abberley & Malvern Hills Geopark)

The Abbey Hotel in Great Malvern, our base for this trip.

Come and enjoy geology and landscape at its very best! Suitable for all, including those who are new to field geology. Currently there are plenty of vacancies on this trip.

Why come and join our Summer School?

Our Summer School is modelled on those that used to be run by the Open University a number of years ago. All are based on a campus of one sort or another where we can sleep in largely single, en-suite study bedrooms and enjoy on site meals. They are also more than just field trips with dedicated transport each day. There's an evening programme of talks from local experts and also social events. In short - something for everybody, including those with limited mobility!

Summer School, University of Warwick, July 31-August 7 (7-nights) £1695
Our popular Summer School moves to a new location and you cannot get much more central than the University of Warwick, set in countryside on the southern edge of Coventry.

Beacon Hill, Charnwood Forest Geopark (Image: BGS)

This location will allow us access to the rich and varied geology of north Warwickshire around Nuneaton, Charnwood Forest in Leicestershire, the Black Country Geopark and the Jurassic rocks of

the local area and also the Cotswolds. In short, something for everybody, from the Precambrian to the Quaternary!
This is the last trip to be released and the brochure is now available on our website. Remember that mose of the rooms are singles, so take advantage and make that booking!

Oban & the Hebridean Isles, September 30-October 9 (8-nights) £1495

Yes, we've found a hotel base in Oban! Now that we can tick that box, we can bring you an action packed week of trips around the surrounding area. With luck we'll get you to the islands of Kerrera, Lismore, Mull, Iona, Luing and Easdale. We'll also take in some of the geology of the mainland, around the Falls of Cruachan, Crianlarich and Tyndrum. You'll see fabulous Scottish geology from the Lewisian through to the Tertiary volcanics with much in between.

The Royal Hotel is on Oban's seafront and is close to the harbour and railway station.

Enjoy the comforts of the 3-star Royal Hotel in Oban where we offer ensuite rooms and all main meals.
Sorry, single rooms for this trip have now sold out!

Whitby on the Yorkshire Coast, October 17-23 (6-nights) £1195

Whitby is the jewel in the crown of the Yorkshire Coast and is truly an all year round resort. We are lucky to have secured a slot in the prestigious Royal Hotel that sits atop the nineteenth century splendour of the West Cliff.

The Royal Hotel sits atop the West Cliff.

With so much geology right on the doorstep we won't be spending hours getting to our field locations. Almost all of the solid geology was formed during the Jurassic period and much of it is very fossiliferous containing everything from humble brachiopods and bivalves through to ammonites and the remains of giant sea reptiles. During this trip we will take in the geology of Whitby and local places including Robin Hood's Bay, Staithes, Grosmont and Sandsend. We'll use the local buses and also the train to get inland.

As it has been some time since we last visited Whitby, we expect this trip to fill up rapidly, so you are strongly advised to make your booking soon. Currently we still have single as well as twin and double rooms available.

To make a booking email us at:
downtoearth@geosupplies.co.uk or ring us on: 0114 245 5746

Booking forms are only available from us.
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or ring us on: 0114 245 5746

Autumn & Winter Zoom sessions...

This Autumn and Winter we will be presenting several series of mainly live, hour long Zoom sessions. Some are available as single sessions whilst others are courses consisting of 6 or 10 sessions. Most begin in the middle of November with some continuing after a break for Christmas and New Year.

All our Zoom classes and courses are available to all and are informal and designed to be botheducational and enjoyable. We have a great and varied online community. You would be most welcome to join us!

We will present the full programme in our August Down to Earth extra, but for now we bring you two special sessions as 'curtain raisers'. They are open for booking NOW!

The Geology of Oman and the Strait of Hormuz
Special Session, Monday November 2 £15.00

The country of Oman and Strait of Hormuz have hardly been out of the news for the past months, ever since the start of hostilities between the US and Iran. But aside from oil and gas, what else is in the geological story?

Explore with us in this extended Zoom session all about the geology of the region. You'll learn why this is such an important and interesting area - prepare for some surprises!

The Tectonics of Northern Venezuela
Special Session, Monday November 9 £15.00

The tragic twin earthquakes of June 24th 2026 will probably go down as one of the worst natural disasters of modern times. In this specially extended Zoom session we will explain why this happened by looking at the regional and more local tectonics. We'll also examine what could have been done to minimize the number of casualties, by way of design for buildings and infrastructure, especially bridges and roads.

If two people share the same computer screen the cost is £22.00 for these sessions.

To enrol, go to: www.geosupplies.co.uk. enter our online shop FIRST and THEN find the course.

Or ring us on 0114 2455746.

backyard geology

This is the place where we feature the stories that you tell us about geological happenings in your local area. Email your story to: downtoearth@geosupplies.co.uk

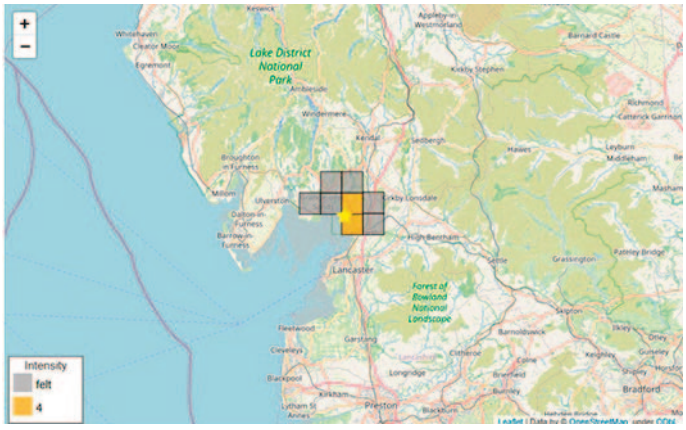
Another earthquake hits Silverdale...

They say that lightening nevers strikes twice in the same place, but that clearly does not apply to earthquakes. Back in DtoE 134 (February) Sylvia Woodhead told us about a magnitude 3.2 event that struck the small town of Silverdale in Lancashire.

Now it has happened again - as Sylvia reports:

At 10.15 am on the morning of 13 May 2026 we heard a loud thump, sounding like a heavy lorry impact, and our house in Lindale, Grange-over-Sands, seemed to shake and the windows rattled. This was logged by the BGS Earthquake record as magnitude 2.3, at 3km depth with an intensity of 4, centred on Silverdale, Lancashire. It was difficult to say where the sound came from, but it seemed to be the same as the earlier quake, possibly emanating from the Lindale Fault which runs across the field behind our house.

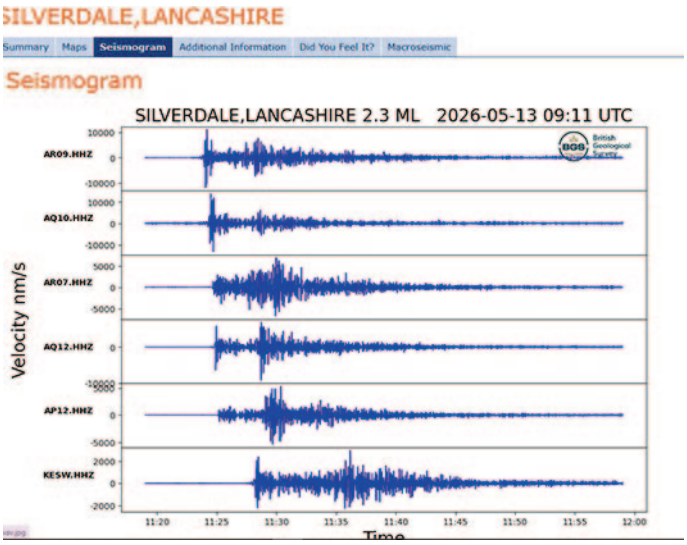
This is about the fourth in a series of earthquakes recorded at Silverdale. The first, at 11.23pm on 3rd December 2025, was reported in Down to Earth, Issue 134. This was a 3.2 magnitude quake, also at 3km depth. There were a series of smaller aftershocks, 0.8, not felt by most, continuing to 19 December 2025, magnitude 2.4, also at 3km. BGS GeoIndex maps reveal several faults in the Silverdale area.



Macroseismic intensities (EMS) calculated in 5 km grid squares from 38 felt reports. A minimum of five observations are needed to calculate an intensity. If there are less than five then the value is given as "felt". "not felt" means that reports explicitly stating that nothing was felt have been received.
(Image: BGS)

The BGS Earthquake pages hold much helpful background information, about this and other earthquakes. This one was felt in Silverdale, Carnforth, Arnside, Milnthorpe and Grange-over-Sands. People reported a loud thump, 'like a heavy lorry', and 'like a 'small explosion underground', but 'not frightening'. I (re-) learnt that the Richter local magnitude scale (ML), developed in the 1930s, used by the BGS, is used for 'local' earthquakes, up to 600km away. It is measured on seismometers at 140 monitoring stations operated by the BGS.

Intensity describes the degree of shaking, which decreases with



Seismogram for the May 13th Silverdale event
(Image: BGS)

distance from the epicentre. Its estimate requires a sample of felt responses. Intensity 4 in this case is classed a 'light', largely observed, felt indoors by many people, outdoors by very few. Windows and doors rattle. The focus this time was Silverdale, the point directly above where the earthquake originated, while the epicentre is where the fault movement occurred, at 3km depth. Finally, an interesting comment, that most earthquakes occur in the west of Britain.

The Editor comments: I wouldn't want to describe Silverdale as England's 'earthquake capital' but you can experience it for yourself when we visit Grange-over-Sands for a field trip next April!

Coastal defence plan has been agreed for Slapton in Devon following road collapse...

The A379 has been severly damaged on this coastal section.
(Image: Devon County Council)

We have previously reported serious and extensive damage to the A379 road that was washed away in February, between Torcross and Slapton. With the road closed, local people and tourists alike are having to negotiate a long detour.

Now a plan costing £19.8m has been announced by the Environment Agency that will address the issues an hopefully provide stability in the immediate and medium term.

The Environment Agency os reported as saying: "We are working at pace with our contractors on design, materials and securing the necessary consents. We will be holding a joint public event with Devon County Council and South Hams District Council before the summer to provide a further update on progress."

Sadly, the work will remove much of the existing beach material and access to the interesting geology may be restricted or even removed, reports ***Caz Donovan***, a ***Down to Earth*** reader who lives in the area.

The area is noted for the structural features seen the Devonian Meadfoot beds including folding and faulting as can be seen here. (Image: Caz Donovan)

Rutland Sea Dragon controversy, local MP enters the fray...

We have previously reported on the finding and preparation of a large and well preserved Jurassic Ichthyosaur that was recovered from Rutland Water with the help of Anglian Water.

Many local people were in favour of acquiring the fossil from Anglian Water and displaying it as the centrepiece of a newly revamped Museum in Oakham.

Now the Council's cabinet have discussed the plan and are not proceeding with it on the grounds of cost. This has split the local community and the local Conservative MP, Alicia Kearns has launched a petition.

The huge 'Rutland sea dragon' would be an amazing centrepiece for a display at the county's museum in Oakham. (Image: Anglian Water)

It states: "We urge Rutland County Council to use existing council funds plus any grants or donations to acquire the Ichthyosaur fossil ('the Sea Dragon') found in Rutland Water by 30th September 2026. We also urge the Council to make sure that the fossil can then be displayed at the Rutland County Museum. We further request that this petition be debated at a meeting of the full Council."

Clearly this story has further to run, we'll keep you informed of developments.

Help rescue the sea-rex, at the Etches Collection...

In August 2022, The Etches Collection - Museum of Jurassic Marine Life undertook one of the most daring fossil excavations in recent British history. Buried twenty metres down from the top of the cliff on

the Jurassic Coast was a skull. That of the apex predator of the Jurassic seas – the Pliosaur. This excavation tested the museum and the team to their limits and required a great deal of ingenuity, patience, and determination.

Hauling up the skull in its sledge was a tricky job. (Image: The Etches Collection)

Dr Steve Etches MBE led the team of experienced palaeontologists down the cliff face to dig a two-metre cave using air-powered CP-9 breaker guns. After exposing and loosening the skull away from the rock, the team wrapped it in hessian and Herculite plaster to protect it. With that done, they were left the challenge of getting the skull out of the cave and up to the top of the cliff. Rob Vearncombe, a local dairy farmer, designed and built what we called 'the sled,' which was a two-metre box with a battery-powered winch on two 6-metre skis. This was lowered down the cliff by an excavator and a tractor, whilst Steve and another member of the excavation team went into the cave to ensure that the skull was carefully winched into the box, it was then towed back up the cliff. A process that took more than 15 hours.

It was a difficult task, but at least two of the team seem to be enjoying themselves. (Image: The Etches Collection)

Once successfully excavated, the skull spent three months on Rob's farm before it could be transported to Steve's workshop. During this time, it was later discovered that a mouse had got into the box and made a nest, leaving straw everywhere, the mudstone in which the skull was encased had dried, resulting in the bone cracking and breaking up. Steve was left with a massive challenge ahead of him. After ten months of painstaking restoration and preparation, the skull went on display on the 2nd of January 2024 following the broadcast of BBC documentary 'Attenborough and the Giant Sea Monster' to more than 4 million people on the evening of New Year's Day. The skull was awarded a Guinness World Record for being the most complete Pliosaurus skull in the world. At 95% complete, it certainly is a remarkable specimen.

Today, we are on the cusp of undertaking another excavation. But this time, it'll be much bigger. The rest of the Pliosaur's body is still in the cliff. We are now in the final phase of fundraising to undertake this mammoth challenge. We are anticipating at least another five to seven metres of body to still be in the cliff, making this the most complete Pliosaur found to date. We will be aiming to undertake this excavation during the summer of 2027 and we will be undertaking another fundraising campaign to build an extension to our museum in order to display this magnificent specimen. These certainly are exciting times for our museum!

The Etches Collection – Museum of Jurassic Marine Life is open year round (excluding Christmas Eve, Christmas Day, and Boxing Day). You can pay once and return as many times as you like for a year. For more details and events taking place, please visit our website www.theetchescollection.org.

You can help to rescue the Sea Rex by going to the donation page: https://www.justgiving.com/campaign/searex

Visitors to the 'deep time trail' get an enhanced experience...

Sight and sound interpretation at Siccar Point. Surely something that James Hutton would approve of. (Image: Angus Miller)

Over the past months we've carried a lot about the events that have been arranged to celebrate the tercentenary of the birth of James Hutton.

During the year there are going to be some very obvious improvements to what is now termed 'The deep time trail'. Here we see the state of the art information pillar at Siccar Point. These are being carried out thanks, in part at least, to the crowd funding from enthusiastic supporters in the geological community.

Stori Brymbo, a unique visitor attraction near Wrexham is now open...

On 13th. July the major site that was formerly Brymbo steelworks opened to the public. The newly launched Stori Brymbo, comprising the steelworks and fossil forest visitor centre is operated and run by the Brymbo Heritage Trust, a registered charity led by Chief Executive Nicola Eaton Sawford and Chair Nick Aymes. Across the site there;s involvement from other organisations including CADW and local enterprises.

It has taken a long time to get to this place. I well remember visiting the site with Jacqui Malpas around 20 years ago and being told then how fragile they were. In the intervening years damage and loss must have inevitably occurred, but it's great that we have now got to this point and the general public can now see the Brymbo Fossil Forest for themselves and the fossils have been saved.

The trees are impressive. (Image: Brymbo Fossil Forest Project)

Let the Brymbo Heritage Trust tell you the story...

During work on the Brymbo steel works site in 2003 several large tree-like fossils were uncovered while open-cast mining overlying coal. After initial assessment by Peter Appleton and Dr Jacqui Malpas, five years of excavation revealed thousands of fossils and over 20 large tree trunk like structures with rooting networks perfectly preserved, some measuring up to 2.5 meters in height! Coal has been mined on the Brymbo site since the 1400's, all the while the miners blissfully unaware of the origin of the coal that they were labouring to extract.

The coal seams themselves were deposited as thick mats of plant debris approximately 300 million years ago in a period of deep geologic history known as the Carboniferous. This period of earths history is characterised by high levels of atmospheric oxygen (162% of the modern level) resulting from almost planet-wide tropical forests and swamps. At this point in history, North Wales was situated upon the equator, therefore the forest here would have been hot and humid, and the plants and animals unsettlingly unfamiliar.

The forest at Brymbo during this time contained no flowering plants. In fact, it would be quite difficult to find many living representatives of the ancient flora preserved at the site. Instead of deciduous and pine trees the forests contained giant relatives of horsetails and club-mosses along with many groups of primitive plants that bore no ancestors that survive today. In-between the layers of coal at the Brymbo are layers of mudstone and sandstone that represent devastating flash flooding events that buried much of the river-delta in the area in sediment. The exposed rock section at Brymbo represents discrete flooding events that have preserved a variety of environments that are uniquely preserved at Brymbo.

Karinopteris a fossilised fern from Brymbo. (Image: courtesy of Peter Appleton)

We helped ensure that the site attained 'Site of Specific Scientific Interest' status in 2015, and to then secure funding for the site to be fully fenced. We worked with Natural Resources Wales, the National Galleries and Museums of Wales and Wrexham County Borough Council to conserve and enhance a number of the fossils excavated in 2003-2008, and to mount Brymbo-specific exhibitions in Wrexham and Cardiff. In 2018 the same partners helped us to recruit a full-time palaeontologist to oversee future work. Since then we have provided a number of free 'crash courses' in earth science subjects to attract interested individuals and built a large volunteer base to help curate fossil material and protect the fossil forest.

You can now visit the Brymbo Fossil Forest site:

The site is open Tuesday to Sunday 10.00 - 5.00 (closed Mondays)

The admission price is £14.00 adult or £12.00 concession. Children under 14, £7.00. There are also family tickets that offer a discount.

The admission covers the all of Stori Brymbo which will occupy much of a day.

Book in advance: info@storibrymbo.com

picture story

Another in our occasional series where we let the picture tell the story - well almost. The pictures come from Jonathan Harris.

Last October we visited Fort William and in good weather to took a trip up Glen Roy, in search of the fabulous 'Parallel Roads'. We didn't go far enough up the glen to see them at their best, but Down to Earth reader Jonathan Harris returned in June of this year and took these splendid pictures.

Thank you Jonathan - we share them with you all...

This comes from BGS:

Three dominant parallel lines contour the valley at 350 m, 325 m and 260 m, and were originally thought to be artificial 'roads' or even works of art. Today we have a more logical and scientific explanation.

The Loch Lomond Stadial is now recognised as the last period where the climate sufficiently cooled in Britain to form glaciers after the previous ice sheet had melted. The geomorphology around Glen Roy and the surrounding area resulted from glaciers that nucleated in the Highlands. These glaciers advanced north and eastwards through valleys cut during previous ice ages, heading towards Glen Spean and north up into Glen Roy. It is now known that the Parallel Roads are a result of an ancient, ice-dammed lake, which carved stepped, narrow terraces into the landscape along its shoreline. As the climate sufficiently warmed, the ice receded and the glacial lake drained, leaving behind the shorelines, or 'roads', that we see today on the valley sides.

your feedback

Tell the Editor what you think about any geological subject or article in DtoE Email: downtoearth@geosupplies.co.uk or write to him at the usual address

Hi Chris

Another trackway (DtoE 134)

Thank you for the latest ***(DtoE 134)*** issue, a good read again. The piece by Paddy Gaffikin and the trackway photo on Valentia Island reminded me of the Arran millipede. I've attached a photo I took (not

easy to get decent image) of the clearest section of trackway last August. Which is in danger of fading fast because of wave erosion. I thought you might share it with readers and also with Paddy.

Best wishes.

Lawrence Heslop, Tyne & Wear

Dear Chris

Threlkeld Quarry

Just three miles east of Keswick we found the "must do" venue of Threlkeld Quarry. The indoor museum houses a comprehensive history of mining in Cumbria with information and samples of the numerous minerals. The quarry holds a unique, open air collection of about 80 machines, some antique, used in extracting not only the granite from the quarry but from all over Britain. It includes the oldest, "still working", steam extractor, Ruston Proctor 306 from 1909, which used rails to travel on before caterpillar tracks came into use during WW1. The narrow gauge railway, steam or diesel locomotive, takes you to the top quarry where you have a history and geology talk about the quarry. This runs past the middle quarry containing the collection of machinery which you can also walk round by taking a short walk from the museum.

The quarry opened in 1870 to supply ballast to the nearby Penrith to Keswick railway line. Originally only a few hundred tons was produced manually each year but by 1894, with increasing demand from railways, it rose to 80,000 tonnes. It closed in 1937 but reopened, with complete modernisation, in 1949. Finally, it closed in 1982 when demolition devastated everything. By 1992 repairs to buildings and recovery of the site had started and in 2005 the new

interpretive mining centre opened. The museum is now run by the Vintage Excavator Trust who preserve, maintain and operate the machines for the public.

Pamela Boult, Chesterfield

Hello Chris

Ejecta in the Bay of Stoer

When we left the hotel at Inchnadampf David and I went to the Bay of Stoer, which is point 6 on the Clachtoll walk in the Assynt walkers guide. We collected some rock samples from this Stac Fada Peninsula and wondered if these are the ejecta rocks we failed to find on our last day.

We attach some photos, we have a few more which we could send you if you wish. We look forward to hearing from you.

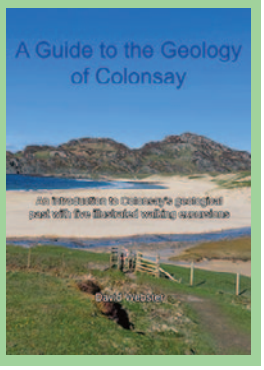
Stephanie & David Mawdsley, Ilkley

The Editor comments: Spot on, this is the material. In the ejecta breccia, fragments of so-called 'shocked' quartz glass can be found which are the tell-tale sign of an impact. The quartz has been melted by the heat from the impact, in an instance.

a good read

Reviewer: Chris Darmon

Book Choice



Title:	A Guide to the Geology of Colonsay
Author:	David Webster
Publisher:	Ringwood Publishin
ISBN:	97810 917011 07 5
Format:	Softback
Cost:	£9.99
Level:	Adult & general interest
My rating:	*****

I suppose Colonsay is one of those Scottish islands that very few people have heard of, and of those only a tiny proportion will have actually visited to enjoy its peace and beauty. As someone who has been and stayed, I can thoroughly recommend it. It might not be easy to get to by CalMac ferry, but it's well worth the effort.

For the geologist it has amazing rock outcrops that are often pristine. With little or no air pollution I remember lots of flowers, mosses and lichens. As for the beaches, they are to die for, but don't expect any facilities, ice creams or deck chairs!

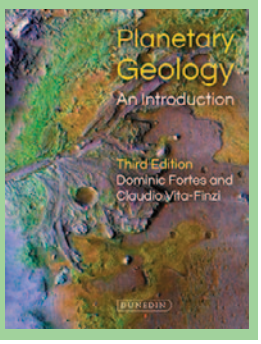
This little guide is designed to accompany the same author's Islay publication. Most people who visit probably do the two islands in the same trip. This volume provides five excursions on Colonsay which can all be undertaken on foot, which is just as well as roads are limited. All excursions can be accessed from the only village, but be warned some of the walks are fairly strenuous.

Most people who come to Colonsay do so to see the 2 billion year old gneisses of the Rhinns Complex, which also outcrop on Islay. There are some amazing places on the itineraries for you to visit. The excursion details are clear and easy to follow. Most importantly there are clear explanations of what you are looking at.

Many of the locations brought back vivid memories for me of my previous visit. This added to my warm feelings towards this guide, it's a friend in your pocket, not something that's trying to catch you out, or make things difficult for you.

This is a highly colourful and well designed book with some amazing maps and colour photographs. It's aimed at the interested visitor who may not be highly informed about the geology which is why there's also a section that introduces the subject and puts Colonsay into a geological framework.

No author publishing a book about the geology of Colonsay would expect it to be a bestseller. However what it can do is to help to encourage more people to visit the island and see for themselves its fabulous geology. An excellent book!



Title:	Planetary Geology - An introduction
Author:	Claudio Vita-Finzi
Publisher:	Liverpool University Press
ISBN:	978 1 780 46104 5
Format:	Softback
Cost:	£44.99
Level:	Student textbook
My rating:	****

When I was an undergraduate, back in the Stone Age, there was always something about textbooks that filled me with dread. To start with, they were heavy, which meant that they had a lot of pages, which pointed to the fact that there was a lot to learn. They rarely, if ever, had any photographs, and certainly not colour ones. Finally, they were dull and boring to read!

So what's changed in the fifty-plus years since my student days? Well to begin, there are many less textbooks around. These days most stuff is online rather than in print form, so that's unusual. Planetary Geology is heavy, in that is has slightly more than 300 pages, but that is the only way that's heavy.

It's extremely well designed with lots of full colour images, tables and figures throughout. As a text it wants to impart a lot of information and, let's face it, planetary geology is a massive subject. This is the Third Edition of this text since the original was published in 2013. It's testament to both the popularity of the book and the fact that many more students are now studying the subject. It's also an area where lots of research is going on and new discoveries are being made, almost on a daily basis.

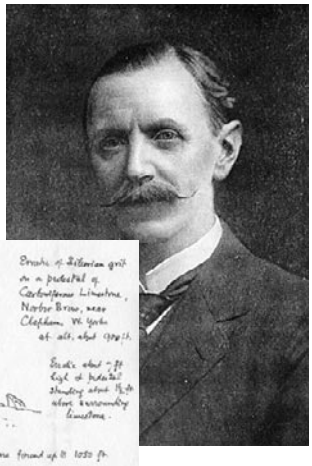
Amazon says:
Planetary geology today extends far beyond the study of rocks, encompassing planetary origins, interiors, tectonics, atmospheres, oceans, and biology. It is not limited to the planets within our own solar system either. The past decade has witnessed groundbreaking missions to asteroids and comets, as well as the discovery of thousands of exoplanets orbiting distant stars. This book offers a comprehensive exploration of the intricate geological processes shaping planets both within and beyond our solar system. It introduces fundamental concepts while framing the latest developments in planetary science.

With over 1,000 references from more than 170 journals, this fully updated 3rd edition: Focuses on geological processes rather than a planet-by-planet approach, essential for understanding the common mechanisms linking planetary bodies across the universe. It explains complex concepts in an accessible manner, avoiding undue reliance on mathematical formulas and equations. It takes into account the increasing globalisation and commercialisation of space exploration and planetary science. A best-selling student text, Planetary Geology serves as an approachable yet in-depth introduction to a field that can seem overwhelming in its scope. Throughout, authors Dominic Fortes and Claudio Vita-Finzi foster curiosity and critical thinking, driven by the belief that a deeper understanding of planetary processes will ultimately help us better understand Earth's place in the universe.

brainteaser

In this quirky brainteaser, we ask the Questions...

Who, What & Where?



This has been our most successful brainteaser ever. We've heard from quite number of you who have engaged with our subject - Alfred Harker and have told us how much you have enjoyed your research. Well done to those of you had a go, whether at home or who formally submitted a response.

Who? ***Alfred Harker (1859-1939)***

What? ***Harker was a talented petrologist who spent a lot of time working in Scotland. Wrote 'Petrology for students'***

Where? ***Harker was born in Hull giving his name to the University student Geological Society.***

This is a small part of Geoff Brambles response:

"Your issue 135 brain teaser features Alfred Harker (1859–1939), who enjoyed an illustrious geological career with both Cambridge University and the geological survey of Scotland. He was recruited into the latter by no less a luminary than Archibald Geikie, the then director general, to help decipher the structures and lithologies of Skye and the smaller islands of the Inner Hebrides. The 1903 map of Rum is testament to this work.

The mention of his name immediately evokes in me a nostalgia for my two years (1962–4) taking subsidiary geology with my geography degree, for his Harker's ***'Petrology for Students'*** was one of our standard texts. I still have my copy, which sits in my library next to the equally cherished ***Rutley's Elements of Minerology***, a pairing that no doubt adorns the shelves of many an elderly geologist. It is from his work on petrology, including his Pioneering use of thin sections, that Harker is now mostly remembered. In his studio portrait, he looks every inch the Edwardian professional gent, waxed moustache and all."

Richard Mann added:

"The map provided is from Harker's Isle of Rum mapping in 1903 and the Norber Brow erratic from his field note book sketch in 17 September 1885 which have formed part of the Proceedings of the Geological Association (Anderson 2014), revealing many of his uncovered works.

Paul Thornley added:

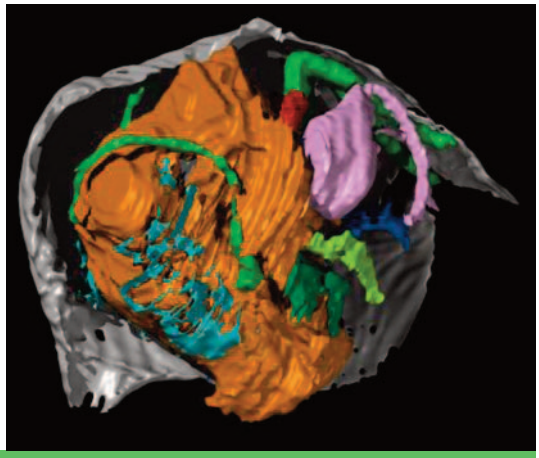
"I really enjoyed researching Alfred Harker. He connects with so many other aspects of the history of geology, like Sorby on thin sections. Other geologists he knew as friends, companions, colleagues. Then there's his links to Archibald Geikie and his work with the Geological Survey in Scotland. His work in the Small Isles, on metamorphism and igneous intrusions and extrusions. The establishment of professional standards in collections and museums, to name but a few."

The Editor comments: As a Hull graduate I've toasted the memory of Alfred Harker on occasion! Thanks for all your efforts.

This is our new brainteaser - it's not a competition with prizes! We'd like you to study these images and answer the Question: Who, What & Where?

Once again we're asking you to engage your little grey cells! Who is this person, what are they known for and which place is he/she most associated with? We've not provided you with a picture of our subject, that would be too easy!

Please contact us before October 15th. by email: downtoearth@geosupplies.co.uk



diary of events

Please be aware that a number of clubs/societies are currently oerating with a mix of live events and Zoom meetings. Please check with the organisers what model they are working to on each occasion.

lectures/zoom meetings

August
4 Members' finds
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Shenfield
11 Members' evening
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
15 "Then and now: Charles Darwin as geologist, followed by the Anthropocene - When did it begin?" by Anthony Brook
Organiser: Kent Geologists' Group Details: www.kgg.org.uk/
19 Members' evening
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
19 "The geology of Northumberland" by Geoff Smith
Organiser: Mid-Wales Geology Club
Details: https://www.midwalesgeology.org.uk/programme/
20 Members' finds
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Stanway)
27 "The geology of Shetland" by David Hill
Organiser: Hull Geol. Soc. Details: https://hullgeolsoc.co.uk/hgmeet.htm

September
1 "Rock Solid 10 - Rock Chemistry" with Ian & Ros Mercer
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Shenfield)
3 "The geology of Norfolk" by Mark Eller
Organiser: Mole Valley Geological Society. Details: www.mvgs.org.uk
3 "Geoarchaeology: Tehran alluvial plain and Caspian Sea caves" by Gavin Gillmour
Organiser: Bath Geol. Soc. Details: https://bathgeolsoc.org.uk/lectures/
7 "Adventures in volcanoland: from fuming volcanic vents to extinction events" by Tamsin Mather
Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com
8 "Rocks born of violence" by Richard Jarvest
Organiser: East Herts. Geology Club Details: https://ehgc.org.uk/8 "Earth's earliest traces of life" by Dr Hickman-Lewis
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
9 "Sea floor spreading" by Tony Morris
Organiser: Shropshire Geol. Soc. Details: https://shropshiregeology.org.uk/
9 "Dinosaur National Park in Alberta, Canada " by Jon Noad (Zoom)
Organiser: Harrow & Hillingdon Geol. Soc. Details: https://www.hhgs.org.uk/
10 "The deep geology beneath Southern Britain" by Chris Pullen
Organiser: Hertfordshire Geol. Soc. Details: https://www.hertsgeolsoc.org.uk/
11 "How geoscience is critical to the transition to a lower Carbon energy future" by Tristan Aspray
Organiser: Farnham Geol. Soc. Details: https://www.farnhamgeosoc.org.uk/
14 "Geology of the Bushveld" by Ian Warrington
Organiser: Huddersfield Geology Group
Details: https://www.huddersfieldgeology.org.uk/talks/
15 "The UK Onshore Geophysical Library (UKOGL)" by Malcolm Butler
Organiser: Kent Geologists' Group Details: www.kgg.org.uk/
17 "The late Carboniferous" by Bernard Besley
Organiser: Warwickshire Geol. Cons Group Details: https://www.wgcg.co.uk/
17 "Native non-metals and metalloids" by Alistair Rickards
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Stanway)
18 Marcasite from Shakespeare Cliff in Kent presented by Colin Brough
Organiser: West Sussex Geol. Soc. Details: https://wsgs.org.uk/
22 "Photography of minerals, samples and fossils"
Organiser: Sidcup Lap. & Min. Soc.
Details: http://www.sidcuplapminsoc.org.uk/
29 "Microscopes|" Organiser: Sidcup Lap. & Min. Soc.
Details: http://www.sidcuplapminsoc.org.uk/

October
1 Aspects of climate change during the Cenozoic" by Daniela Schmidt
Organiser: Bath Geol. Soc. Details: https://bathgeolsoc.org.uk/lectures/
5 "Anatomy of a Jurassic coastal lagoon - bringing the past to life" by Matthew Wakefield
Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com
6 "Crystals" by Ian Mercer
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Shenfield)
8 Book presentation - "The Meteorites" by Helen Gordon
Organiser: Hertfordshire Geol. Soc. Details: https://www.hertsgeolsoc.org.uk/
9 "Thirty years of discovery at the UK's largest dinosaur track site in North Oxfordshire" by Kirsty Edgar (by Zoom)
Organiser: Geol. Assoc. Details: https://geologistsassociation.org.uk/lectures/
9 "Ammonites, their history and geological significance" by Robert Chandler
Organiser: Farnham Geol. Soc. Details: https://www.farnhamgeosoc.org.uk/
13 "Building stones in 18th century Britain & Ireland" by Ruth Siddall
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
13 "Red and/or black minerals" Organiser: Sidcup Lap. & Min. Soc.
Details: http://www.sidcuplapminsoc.org.uk/
13 "Polar dinosaurs" by Jane Tabb
Organiser: East Herts. Geology Club Details: https://ehgc.org.uk/
14 "Megalosaurus and the Dinosaur Highway" by Emma Nicholls (Zoom)
Organiser: Harrow & Hillingdon Geol. Soc. Details: https://www.hhgs.org.uk/
14 "The Chengjiang Lagerstatte" by David Siveter
Organiser: Shropshire Geol. Soc. Details: https://shropshiregeology.org.uk/
15 "Radiometric dating"by Mark Matthews
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Stanway)
15 "Geology & Industrial Archaeology of Harlech" by Allison Barraclough
Organiser: Warwickshire Geol. Cons Group Details: https://www.wgcg.co.uk/
15 "Ordovician fossils of Shropshire & Mid-Wales" by Sally Whipple-Green
Details: https://www.midwalesgeology.org.uk/programme/
16 "A geologic field trip to Mars with the Perseverance Rover" by Alex Jones
Organiser: West Sussex Geol. Soc. Details: https://wsgs.org.uk/
19 "The Ediacaran Biota of Charnwood Forest: the behind the scenes story" by Mike Howe
Organiser: Black Country Geol. Soc. Details: https://bcgs.info/pub/
20 "What lies beneath? Geophysics and archaeology" by Lynn Cornwell
Organiser: Kent Geologists' Group Details: www.kgg.org.uk/
20 "Poisonous minerals" Organiser: Sidcup Lap. & Min. Soc.
Details: http://www.sidcuplapminsoc.org.uk/
22 "The geologist and his museum" by Mick Oates
Organiser: Hull Geol. Soc. Details: https://hullgeolsoc.co.uk/hgmeet.htm

November
2 "Past environments, past climates and impacts of major environmental change" by Stuart Robinson
Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com
3 "Rock solid 11 - Volcanoes" with Ian & Ros Mercer
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Shenfield)
4 "The shape of Spurn" by John Connor
Organiser: Hull Geol. Soc. Details: https://hullgeolsoc.co.uk/hgmeet.htm
5 "Cornish cliffs, Alpine peaks and salt intrusions - geological windows into Earth's mantle" by Jonathan Turner
Organiser: Bath Geol. Soc. Details: https://bathgeolsoc.org.uk/lectures/
9 "The longest delay: the slow recovery from the Hangenberg mass extinction" by Lila Blake Organiser: Huddersfield Geology Group
Details: https://www.huddersfieldgeology.org.uk/talks/
10 "The art of making dinosaurs: how science and imagination bring them to life" by Michael Benton (Zoom)
Organiser: Amateur Geol. Soc. Details: https://(amgeosoc.wordpress.com/

day field trips & visits

Please ensure that you contact the organisers in advance of any field trip advertised. Please don't just turn up, it may be for members only.

August
2 Field visit to the Cheviot area with Ian Killie
Organiser: North Eastern Geol. Soc. Details: https://www.negs.org.uk/
5 Field visit to Binsey area with Ian Francis
Organiser: Cumberland Geol. Soc.

Details: https://www.cumberland-geol-soc.org.uk/events/
5 Summer geological walk in Leek Wooton
Organiser: Warwickshire Geol. Cons Group Details: https://www.wgcg.co.uk/
6 Field visit to Northaw Village & Northaw Great Wood with Mike Howgate
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
8 Field visit to Ballachulish Slate Quarry with Joan Walsh
Organiser: Geol Soc. of Glasgow
Details: https://geologyglasgow.org.uk/events/
8 Field visit to the Shap Pink Quarry
Organiser: Liverpool Geol. Soc. Details: https://liverpoolgeologicalsociety.org/
14 Field visit to Skipsea for Rockwatch & young geologists
Organiser: Hull Geol. Soc. Details: https://hullgeolsoc.co.uk/hgmeet.htm
15 Family geology day at Novium Museum, Chichester
Organiser: West Sussex Geol. Soc. Details: https://wsgs.org.uk/
15 Field visit to Panarth Bay aimed at families with John Nudds & Cindy Howells. Organiser: GA South Wales Details: http://swga.org.uk/
17 Field visit to Chazey Heath with Ross Garden
Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com
19 Field visit to Clivigar area of Lancashire
Organiser: Manchester GA. Details: https://manchestergeology.org.uk/
22 Field visit to Highwood Quarry with John Walmesley
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/
22 Field visit to Elephant Rock, Montrose
Organiser: Edinburgh Geol. Soc. Details: https://edinburghgeolsoc.org/
22 Feld visit to Nidderdale, searching for Carboniferous trilobites
Organiser: Huddersfield Geology Group
Details: https://www.huddersfieldgeology.org.uk/field-trips
22 Field visit to Highwood Quarry with John Walmesley
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/

September
5 Field visit Braystones to St Bees with Jon Merritt
Organiser: Cumberland Geol. Soc.
Details: https://www.cumberland-geol-soc.org.uk/events/
5 Field visit Belhaven to Dunbar with Fiona McGibbon
Organiser: Edinburgh Geol. Soc. Details: https://edinburghgeolsoc.org/
5 Field visit to see the stones of Boxgrove Priory with Tim Pullen
Organiser: West Sussex Geol. Soc. Details: https://wsgs.org.uk/
5 Field visit to Gestingthorpe with Ashley Cooper
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/
9 Field visit to White Scar Cave and nearby Ingletonian
Organiser: Manchester GA. Details: https://manchestergeology.org.uk/
11 The urban geology of Cambridge with Gerald Lucy
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
13 Landscape and geology of the locality of Telegraph Hill, Woolbeding Common with John Lonergan
Organiser: West Sussex Geol. Soc. Details: https://wsgs.org.uk/
13 Field visit Brymbo Fossil Forest
https://liverpoolgeologicalsociety.org/outdoor-meetings

October
6 Field visit to see building stones of Canary Wharf with Mike Howgate
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
10 Field visit to Chafford Gorges with Peer Allen
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/
11 Field visit to Smestow Valley and Wightwick Bank with Andrew Harrison & Julie Schroder
Organiser: Warwickshire Geol. Cons Group Details: https://www.wgcg.co.uk/
11 Field visit to Brookwood cemetery with Diana Smith
Organiser: Farnham Geol. Soc. Details: https://www.farnhamgeosoc.org.uk/
17 Field visit to Ashridge House and Gardens
Organiser: Hertfordshire Geol. Soc. Details: https://www.hertsgeolsoc.org.uk/
18 Field visit to the sunken lanes of Southern England with John Boardmen
Organiser: Mole Valley Geological Society. Details: www.mvgs.org.uk
21 Field visit to The Lambourne area of Berkshire with Lesley Dunlop
Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com

residential field trips

September
4-6 The geology of the Barmouth Area
Details: https://www.midwalesgeology.org.uk/programme/
11-13 The Malvern Hills with Nick Chidlaw
Organiser: East Midlands Geol. Soc. Details: https://www.emgs.org.uk/
13-22 The North & Eastern Fjords of Iceland with Chris Darmon
Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk
15-23 Navarra & Arragon, north Spain
Organiser: Geologists' Association.
Details: fieldmeetings@geologistsassociation.org.uk
25-October 1 The geology of Jersey
Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com

October
18-24 Melrose & the Southern Uplands with Chris Darmon & Colin Schofield
Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk
20-23 Forest of Dean &Wye Valley with Dave Green
Organiser: Farnham Geol. Soc. Details: https://www.farnhamgeosoc.org.uk/

2027
April
16-23 Furness & the South Lakes with Chris Darmon & Colin Schofield
Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

May
4-13 The Magma Geopark Norway with Chris Darmon & Colin Schofield
Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk
21-29 Strathpeffer & Cromarty with Chris Darmon & Colin Schofield
Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

June
20-26 Sussex Coast & South Downs with Chris Darmon & Colin Schofield
Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

July
18-23 The Abberley & Malvern Hills Geopark with Chris Darmon & Colin Schofield Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk
31-August 7 Summer School Warwick with Chris Darmon & Colin Schofield Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

September
30-October 8 Oban and the Hebridean Islands with Chris Darmon & Colin Schofield Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

October
17-23 Whitby on the Yorkshire Coast with Chris Darmon & Colin Schofield
Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

fairs, shows & special events

August
29 Family Day in Tollgate Hall
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/

September
5 'Ask a geologist' at Market Hall Museum, Warwick
Organiser: Warwickshire Geol. Cons Group Details: https://www.wgcg.co.uk/
19 Hampshire Mineral & Fossil Show at Oasis Academy, Lord's Hill, Romsey
Organiser: Southampton Mineral & Fossil Show
Details: https://www.sotonminfoss.org.uk/smfsshow.htm
25-27 The Geologists' Association Annual Conference at York
Organiser: Geol. Assoc. Details: https://geologistsassociation.org.uk/lectures/

October
17 'Ask a geologist - under Dippy' at Market Hall Museum, Warwick
Organiser: Warwickshire Geol. Cons Group Details: https://www.wgcg.co.uk/
17 The Annual Broadhurst Lectures - a total of three lively talks during the day
Organiser: Manchester GA. Details: https://manchestergeology.org.uk/

November
7/8 GA Festival of Geology, Burlington House, London
Organiser: Geol. Assoc. Details: https://geologistsassociation.org.uk/
14 Sussex Mineral & Fossil Show, at Haywards Heath College
Organiser: Sussex Min. & Lap. Soc. Details: https://www.smls.online/show

pygidium

Our regular little 'tail-pieces' of information some serious, others light. If you've found something - share it with us all.

The highland pottery that uses glazes made from local rock materials...

During our recent field trip to Shetland, Colin and I were kindly presented with gifts of pottery mugs by one of the participants, ***Kate Copestake***.

Kate, who lives in Ullapool, naturally purchased them from her local craft pottery. They proudly incorporate local geological materials, especially in the glazes.

This is what Highland Stoneware has to say:
"Assynt, in the north west Highlands is famous geologically and is also located in the NW Highland Geopark, an UNESCO World Heritage Site. Highland Stoneware are proud to be Ambassadors for the Geopark.

One of the Ledmore mugs, incorporating local rocks in the glaze.

Being a working pottery, we have to earn our living from what we make, and have developed some glazes into limited production. The potter Fergus Stewart, was central to the project, along with our founder David Grant.

Fergus and David have been taking a practical approach to developing glazes, if it is too refractory – flux it, if it settles too quickly and doesn't apply – put clay in it. We have developed some unique qualities this way, but perhaps some of the most remarkable have been working with the pure materials with no additions and trying various ways of making them work.

We have two quarries in the area, each of which has given us two different materials in bulk. The Ledmore marble quarry has the very refractory and difficult marble, but also has a dark 'quartz' (actually silica from syenite) which gives a stunning gold crystal on cooling. At present we don't know why, as crystals are supposed to form on very slow cooling and we cool exceptionally quickly. Glad no one told the rock that!"

The Editor comments: It's nice to be able to think about Assynt when I'm having an early morning mug of coffee. Thank you Kate for such a lovely gift.

Staying in Scotland, how's this for an unusual sight...

The Shetland island of Unst has many claims to fame, some of them geological, such as being home to an ophiolite complex and also the most northerly granite, the Skaw granite which forms the most northerly beach.

However close to that beach at Skaw is this, the UK's only fully licensed vertical rocket launch site termed SaxaVord Spaceport. It's located on the Lamba Ness peninsula of Unst, which is the northernmost of the Shetland Islands in Scotland. It is perfectly positioned to launch small satellites directly into polar and sun-synchronous orbits.

Meanwhile, also on Unst...

If you are the UK's most northerly island, you can expect to take some liberties, even some risks.

Such as this, at Uyeasound. Is it the UK's only honesty rock shop? Yes you just help yourself and drop your money in the box!

More than anything else, this is a reflection of just how Shetland people perceive the honesty of their potential customers. It's because of this that I doubt whether it will catch on across the country. Within a few metres of this 'shop' many years ago a local man was polishing serpentine from Uyeasound beach and making models of simple croft houses and clocks. Unfortunately all the stones on offer here are imported from around the world.

Still on Shetland this is the 'geowall' on Fetlar...

We end our pilgrimage to Shetland with something a little more serious. The island of Fetlar, sits to the south of Unst and is described as 'the garden of Shetland'. It's about six miles E-w with only one main road, a single shop and a museum.

With a population of around 40, it's struggling, but we were pleased to be able to visit and even made use of the 'dial a ride' £2 per journey service.

As for the geology, it's seriously good with an amazing meta-conglomerate, a graphitic schist and some amazing talc bearing rocks. With this geowall, one of several across the Shetland Geopark you don't have to imagine a cross section you can see it and feel it.

The red-necked phalarope, photographed at Loch Funzie on Fetlar. (Image: Courtesy of RSPB)

For those of interested in ornithology, the loch behind called the Loch of Funzie (pronounced Finnie) is home to the Red-necked Phalarope. If you've never seen one - and we failed to do - here's one from earlier that somebody else caught!

It was a real privilege to go to Fetlar and engage with several of the local people. One crofter, who had lived in the same house for around 70 years, could recall geological stories from many years ago and was really interested in what we were doing. He also allowed us to eat our sandwiches outside his house.

Now this geowall is a model that could be rolled out across the UK, without fear of vandalism! Your Editor would like to see a geowall in the Charnwood Forest Geopark - hint, hint.

This Lorry stuck in a pothole it was sent to repair...

This lorry was sent to a rural road in Walton, Somerset to assist in the repair of a pothole. However, as can be seen t became the latest, and very high profile victim of the self same pothole!

Oh dear - are we about to make a claim against the local authority? (Image: Rik Keith-Hill via Facebook)

Is it bone, is it a fossil - no it's a prosthetic...

If you are unfortunate enough to have to wear a prosthetic leg, image what it must feel like to lose it whilst you are swimming in the sea. But that's what happened to 69-year old Brenda Ogden when she was open water swimming in Bridlington, East Yorkshire in April. Prosthetics don't come cheap and this one was more than £2000.

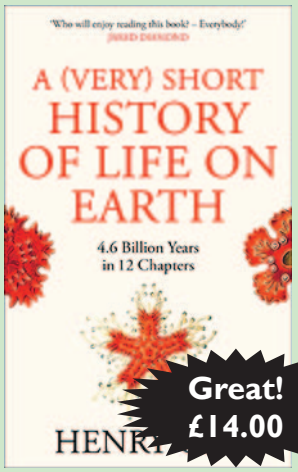
Fast forward to May and Elizabeth Forbes is out fossil hunting on the beach on the coast of Holderness, near Hornsea, some miles to the south. She could not believe her eyes when she spotted the prosthetic: "It looked like an upside down lemonade bottle with something on top then it sort of clicked that it was a prosthetic leg," she said.
She posted a photo of the curious find on social media, where it was identified as Brenda's missing leg. "I was kicking myself for not picking up the leg. I never thought we'd have someone say 'that's my leg'," she said. The prosthesis has been collected from the beach and is on its way back to Brenda. Amazingly despite being tossed around in the sea, the prosthetic still had a sock attached to it - which was what Elizabeth spotted.

Let's hope that Brenda can still use her prosthetic after its adventure at sea. May be the next time she's out wild swimming her prosthetic will come back to dry land with her.

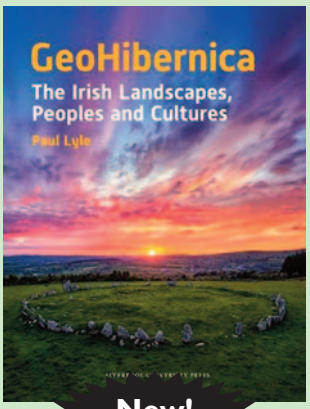
Brenda's prosthetic leg after its adventure. (Image: Elizabeth Forbes)

GEO Featured books August to October

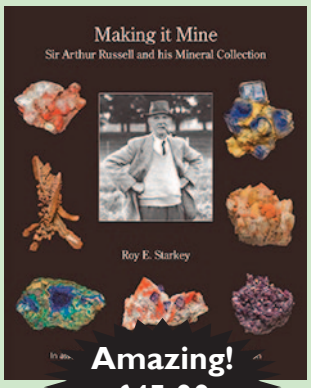
In each issue we are pleased to be able to introduce you to a range of featured books. Where they are being offered at reduced prices, these will be current to the end of October 2026 provided that stocks are available. Please note, all prices include UK postage.



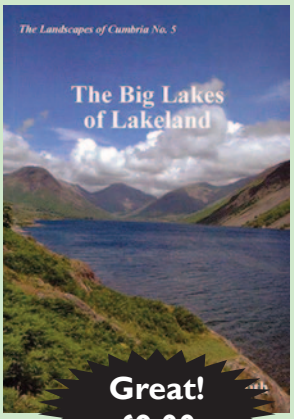
Great! £14.00



New! £50.00



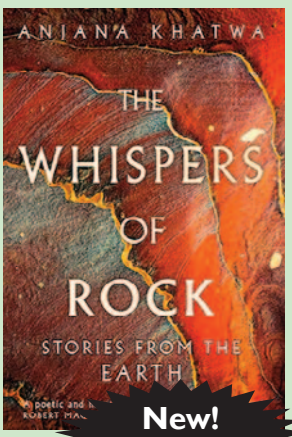
Amazing! £45.00



Great! £9.00

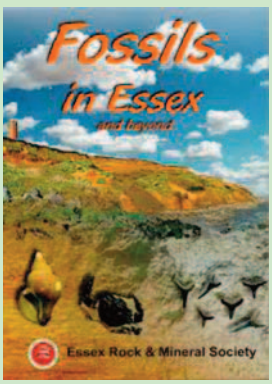
New! £22.00

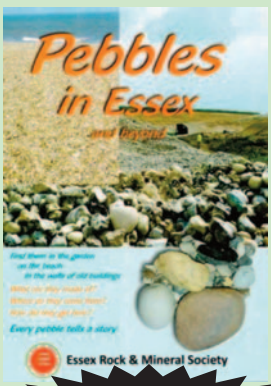
New! £7.00



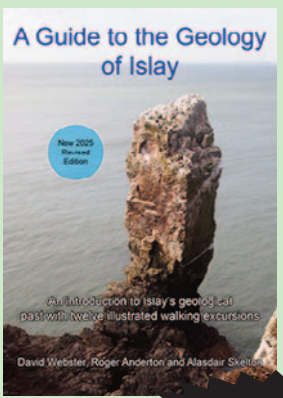
New! £25.00

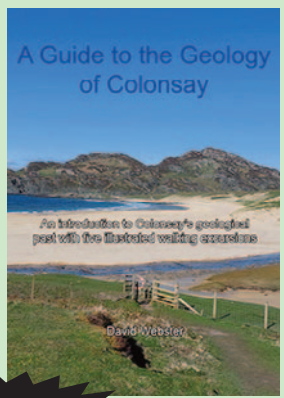
New! £14.00





All three titles £8.00





Both titles £26.00

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