



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



Portreath lies on Cornwall's north coast, just a couple of miles from Redruth the base for our May trip. It's home to some fine cliffs and fabulous rocks and structures. (Image: Chris Darmon)

We've added one final trip to our 2026 programme, so good have been the bookings! It's a 5-night trip to North Somerset's Jurassic Coast - get in NOW for a single room!

Several 2026 trips are either full or nearly so. We cannot accept any more bookings for Shetland and the Northwest Highlands and Iceland is now operating a waiting list.

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2026

- The Jurassic Coast of Dorset, March 27-April 1
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- NEW! Minehead & North Somerset, June 7-12
- Shetland, The Northern Isles, June 17-25 FULL
- Anglesey, July 5-10
- Summer School, Shropshire, August 8-15
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- Melrose, the Scottish Borders, October 18-24

Early booking is advised, especially if you are looking for a single room.

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November 2025

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Editor: Chris Darmon
Assistant Editor: Colin Schofield

Tel: 0114 245 5746 • FAX: 0114 240 3405
E-mail: downtoearth@geosupplies.co.uk

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

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

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cover story

This strange structure can be found near to the village of Kilve on the North Somerset coast.

It's the remains of a retort that was set up to extract oil from the Lias shales of the Lower Jurassic in the 1920's. Sadly, the whole enterprise was judged to be fraudulent and this is all there is to see today.

(Image: Chris Darmon)



editorial

Groundbreaking news - coal is no longer 'king' when it comes to electric generation...

Recently released data from the global energy think tank **Ember** claims that for the very first time renewable energy overtook coal as the world's leading source of electricity in the first half of the year. But this is against an ever rising demand for power, meaning that there was only a slight reduction in the amount of oil and coal used.

For the first time, it's developing countries, especially China, that are leading the clean energy charge. Against this has to be balanced the fact that the world's richer nations including the US and the EU relied more heavily on fossil fuels for their generation. This is not being helped by moves from President Trump to increase reliance on US oil and gas production.

Despite these regional differences we should celebrate what **Ember** calls a "crucial turning point" that "marks the beginning of a shift where clean power is keeping pace with demand growth."

The goal for the immediate future must be for clean power to outpace that rise in demand and here the picture is looking a little more hopeful. For the most part this is being driven by large falls in the cost of clean energy. At the top of the pile is solar energy which has fallen in cost by a staggering 99.9% in real terms since 1975. It's now so cheap that large markets can open up in countries where fossil fuels are expensive. in the space of a year or two.

Ember cites Pakistan as an example of this. They imported so many solar panels that their solar generation reached roughly a third of the country's energy needs in 2024. To do this they doubled the amount of solar generation in a single year.

The same is true in a number of African countries, where almost all of the extra demand for electrical power is being met by solar generation. Even former coal rich countries such as South Africa are now leading the way along with Nigeria and Egypt.

But these are only the first steps in what must continue to be a long uphill challenge. China, a country that knows all too well, what disasters climate change can bring, is in the driving seat when it comes to clean energy technology. This means that by August of this year China's clean technology exports hit a record \$20 billion.

No wonder then that the West is treading a very careful line when it comes to relations with that country. This is especially the case when it comes to the production of electric vehicles and battery technology. We in the West simply cannot afford to alienate ourselves from the Chinese yet that are things that the Chinese are doing that we can barely stomach, including its treatment of minorities within China.

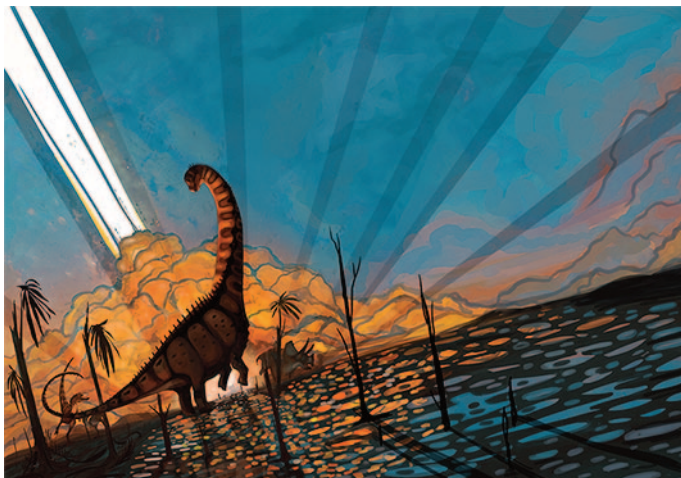
As we continue along the road towards a world dominated by cleaner energy we will surely encounter many more bumps in that road. What may seem like the course today could alter at any time. A major leap forward in any single clean power source, such as battery and other electrical power storage solutions, could make the building of a nuclear power station obsolete overnight. For once, I have sympathy with the politicians who are indeed damned if they do and damned if they don't.

Chris Darmon, Editor



New evidence that dinosaurs were thriving right to their sudden demise at the end of the Cretaceous...

Critical to an understanding of the final days of the dinosaurs is the availability of accurately dated fossil remains. Given that the most likely cause of their sudden demise at the Cretaceous/Tertiary boundary was an extraterrestrial bolide collision, data from the vicinity of the impact site on Mexico's Yucatan Peninsula is especially valuable.

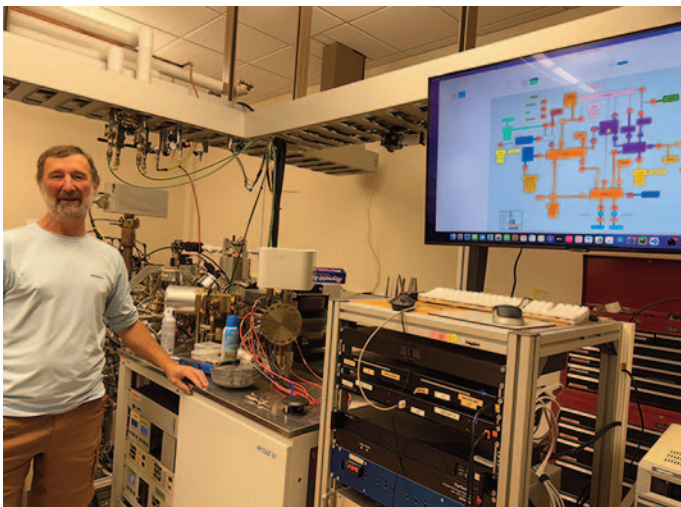


*Illustration of the last dinosaurs from southern North America, featuring the sauropod *Alamosaurus sanjuanensis*, from the Naashoibito Member in the San Juan Basin of northwestern New Mexico. (Image: Courtesy of New Mexico Tech)*

The latest finds which have been reported in the journal *Science* relate to dinosaur specimens from New Mexico. The dating of the samples was led by Matthew Heizler of New Mexico Tech.

This comes from New Mexico Tech:

Very near the time of their ultimate extinction, dinosaurs were more diverse than scientists previously believed and actually a thriving species, according to new research published in the journal *Science*.



Matthew Heizler in the Argon Geochronology Lab at New Mexico Tech (Image: New Mexico Tech)

Matthew Heizler, a New Mexico Tech emeritus researcher and former director for the New Mexico Geochronology Research Laboratory at the New Mexico Bureau of Geology, has developed an improved method for dating sedimentary rocks that do not contain obvious volcanic layers. This method led to new findings detailed in the paper ***"Late-surviving New Mexican dinosaurs illuminate high end-Cretaceous diversity and provinciality"*** authored by researchers from New Mexico Tech, New Mexico State University, Baylor University, the University of Edinburgh and others around the world.

The team's research took them to the San Juan Basin rocks of northwestern New Mexico, which holds one of the world's richest records of the evolution of mammals that bloomed almost immediately after the worldwide extinction of 75 percent of all life on Earth. All dinosaurs, except for birds, which are their modern descendants, became extinct about 66 million years ago when an asteroid slammed into the Yucatan Peninsula in Mexico.

In the San Juan Basin is the Naashoibito member of the Kirtland Formation, a rock unit with a rich occurrence of dinosaur fossils that is now determined to be late Cretaceous and only slightly older than the age of the asteroid impact.



Daniel Peppe, Utanah Denetclaw, Anne Weil, and Blake Gorman collecting paleomagnetic samples from the latest Cretaceous Naashoibito Member in the De-Na-Zin Wilderness area of the San Juan Basin in northwestern New Mexico. (Image: New Mexico Tech)

Heizler said that it is a prevailing notion that all non-avian dinosaurs may have been in decline, and ultimately more prone to extinction, millions of years before the final blow of the asteroid impact that wiped them out. This belief is primarily due to the lack of accurate age determination on dinosaur fossils from late Cretaceous rocks. Rocks spanning extinction of the dinosaurs in the San Juan Basin of northwestern New Mexico. The drab coloured rocks of the latest Cretaceous Naashoibito Member are overlain by the earliest Paleocene Ojo Alamo Sandstone in the De-Na-Zin Wilderness Area.

But Heizler said that improved geochronology methods developed at New Mexico Tech show that, in fact, "the Naashoibito non-avian dinosaurs were diverse and thriving right up until the time of the impact."

The dating method he helped pioneer called detrital sanidine builds

upon more conventional detrital mineral dating methods, which have been around for decades. By specifically targeting and extracting the potassium feldspar sanidine derived from volcanoes and individually dating hundreds of them one at a time from a single sample, the age of sedimentary rocks can be estimated. Sanidine crystals occur in small quantities in many sedimentary rocks, and some of the sanidines in the Naashoibito appear to represent hidden volcanic material that was included in the Naashoibito when it was being deposited. The youngest crystals dated tell researchers that the sedimentary rock can be no older than these youngest crystals.



Caitlin Leslie collecting paleomagnetic samples from the lower Paleocene Nacimiento Formation in the San Juan Basin of northwestern New Mexico. (Image: New Mexico Tech)

“In our current study, we dated 1,046 single sanidine grains and 10 of them gave ages between 66.4 to 66.8 million years old, telling us that the dinosaur fossils were no older than 66.4 million years, and thus several million years younger than previously thought,” said Heizler.

“In both the northern United States and New Mexico, and perhaps other locations in the world that are not well dated, we find very different and diverse dinosaur populations from region to region that are thriving right up to the time of their mass extinction,” he said.

Heizler’s research therefore reinforces the belief that the dinosaurs were indeed ‘taken out’ by a catastrophic event such as an asteroid impact on the Yucatan Peninsula or a series of such events spread over a short period of time.

Meanwhile back in the UK - a dinosaur ‘mega highway’ is revealed in an Oxfordshire quarry...

Back in 2024 a dinosaur trackway, the longest found anywhere in the UK was unearthed in an Oxfordshire Jurassic quarry. It was featured by the BBC at the time. Eagle eyed viewers spotted this when the same quarry made it onto the national news in recent days, some even thought it was recycled news. It wasn’t, this was a new even larger find in the same quarry!

Scientists from the Universities of Oxford and Birmingham returned for a second season of work in the summer of 2025 and have been rewarded with the discovery of hundreds of dinosaur footprints that have been labelled as a huge ‘dinosaur highway’ the longest in the world to date.



A reconstruction of Megalosaurus and Cetiosaurus walking across what is now a quarry floor leaving behind distinct trackways for us to unearth. (Illustrated by: Mark Witton)

The dig, carried out at Dewars Farm Quarry in Oxfordshire, uncovered five extensive trackways with evidence of more in the surrounding area. BBC TV viewers were treated to the sight and sound of a quarry blast that was reputedly used to uncover the tracks!

The longest continuous trackway measured more than 150 metres in length. Four of the trackways were made by gigantic, long-necked, herbivorous dinosaurs called sauropods, most likely to be *Cetiosaurus*, an up to 18-metre-long cousin of the well-known *Diplodocus*. The fifth trackway was made by the carnivorous theropod dinosaur, *Megalosaurus* which had distinctive, large, three-toed feet with claws. One area of the site shows the carnivore and herbivore tracks crossing over, raising questions about whether and how the two were interacting.



The full extent of the dinosaur trackway is revealed in all its splendour in this image.

(Image: Richard Butler / University of Birmingham)

The University of Oxford Museum of Natural History tells us more:

Following the success of the excavation last summer, which featured on BBC Two’s Digging For Britain, a new area of Dewars Farm quarry near Bicester has been uncovered. Teams from the Universities of Oxford, Birmingham and Liverpool John Moores joined forces for a week-long dig in the hot, dry summer of 2025. Hundreds more individual prints from four trackways were identified and documented, including Europe’s longest sauropod dinosaur trackway at some 220 metres from the first to the last exposed footprint.

The four new trackways found at the 2025 Dewars Farm site were each made by sauropod dinosaurs, large-bodied long-necked herbivores like *Cetiosaurus*, that made their way along an exposed mudflat on the edge of a lagoon some 166 million years ago – during the Middle Jurassic Period.



Part of the 2025 excavation team and the fantastic Smiths Bletchington quarry staff.
(Image: Emma Nicholls / Oxford University Natural History Museum - OUMNH)

The excavation was made possible through the continued collaboration with the quarry operators Smiths Bletchington, Dewars Farm and Duns Tew Quarry Manager Mark Stanway, and his staff. As in 2024, a team of more than 100 people worked at the site, co-led by Oxford University Museum of Natural History (OUMNH) and University of Birmingham (UoB) and joined by collaborators from Liverpool John Moores University. Over seven days, the teams battled against a much drier, harder surface than the previous year focusing on a set of around 80 very large (up to 1m long) sauropod prints, that ran approximately north-south across the entire quarry.



Sets of sauropod dinosaur footprints, each up to 1 metre long.
(Image: Emma Nicholls / OUMNH).

In addition to the largest sauropod trackway, three others were uncovered, one of which is a continuation of prints first found in 2022. Although not continuously exposed, it may prove to be an even longer trackway once all the data is pieced together. Smaller finds included marine invertebrates, plant material and a crocodile jaw. New for 2025, systematic sampling of the sediments that both underlie and fill the prints was undertaken, the analysis of which is underway.

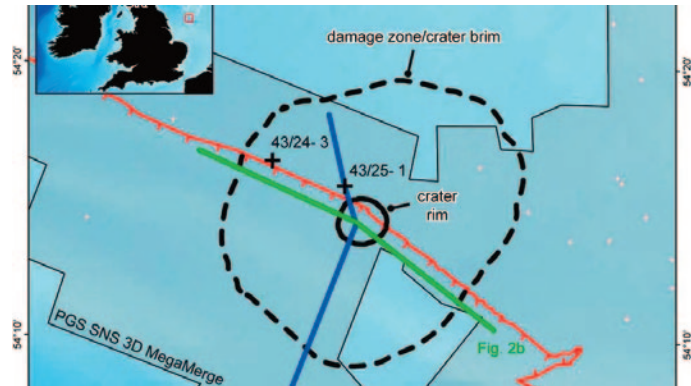
More of the footprint surface is likely to be exposed over the coming years, and a full description of the significance, new scientific discoveries and potential for future preservation of the site is expected soon.

The excavation was funded by the Geologists' Association, School of Geography, Earth and Environmental Sciences at the University of Birmingham, and the University of Birmingham Alumni Fund.

New research proves that there was a major asteroid impact in the North Sea, over 43 million years ago...

For around a decade there has been an ongoing scientific debate about the origin of what has been termed the 'Silverpit Crater' in the southern North Sea. Now a team led by Dr Uisdean Nicholson from Heriot-Watt University in Edinburgh, funded by the Natural Environment Research Council (NERC) has solved the riddle. They used seismic imaging, microscopic analysis of rock cuttings and numerical models to provide the strongest evidence yet that Silverpit is one of Earth's rare impact craters. Their findings are published in *Nature Communications*.

Since its discovery in 2002, the three-kilometre-wide crater, which is surrounded by a 20 km-wide zone of circular faults, has been at the centre of a heated debate among geologists.



The location of the Silverpit crater in the North Sea, showing the extent of the crater rim and the damage zone.
(Image: Heriot Watt University)

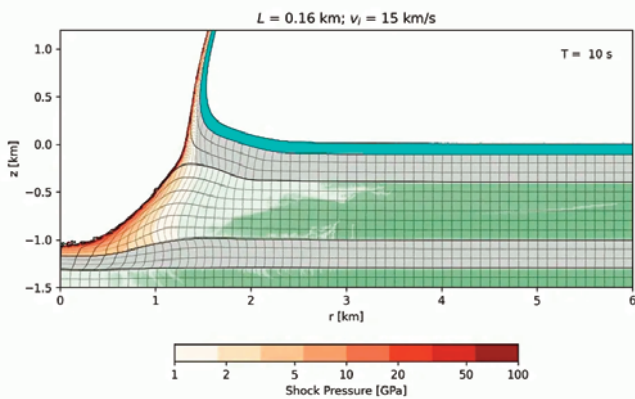
Initial studies suggested it was an impact crater. The scientists who found it pointed to its central peak, circular shape and concentric faults, characteristics often associated with hypervelocity impacts. However, alternative theories argued that the crater structure was caused by salt moving deep below the crater floor or the collapse of the seabed because of volcanic activity.

In 2009, geologists put the crater's formation to a vote, as reported in that year's December issue of *Geoscientist* magazine - a majority voted against the impact crater hypothesis. New evidence has proved them wrong.

The Heriot-Watt-led team used newly available seismic imaging data and evidence from below the seabed to prove the impact theory. Dr Uisdean Nicholson, a sedimentologist in Heriot-Watt University's School of Energy, Geoscience, Infrastructure and Society, said: "New seismic imaging has given us an unprecedented look at the crater.

"Samples from an oil well in the area also revealed rare 'shocked' quartz and feldspar crystals at the same depth as the crater floor. We were exceptionally lucky to find these - a real 'needle-in-a-haystack' effort. These prove the impact crater hypothesis beyond doubt, because they have a fabric that can only be created by extreme shock pressures."

Dr Nicholson said: "Our evidence shows that a 160-metre-wide asteroid hit the seabed at a low angle from the west. Within minutes, it created a 1.5-kilometre high curtain of rock and water that then collapsed into the sea, creating a tsunami over 100 metres high."



The impact would have produced a tsunami 100+ metres high.
(Image: Heriot Watt University)

Professor Gareth Collins from Imperial College London was at the Silverpit Crater debate in 2009 and also provided the numerical models for the new study.

Professor Collins said: “I always thought that the impact hypothesis was the simplest explanation and most consistent with the observations. It is very rewarding to have finally found the silver bullet. We can now get on with the exciting job of using the amazing new data to learn more about how impacts shape planets below the surface, which is really hard to do on other planets.”

Dr Nicholson said, “Silverpit is a rare and exceptionally preserved hypervelocity impact crater. These are rare because the Earth is such a dynamic planet - plate tectonics and erosion destroy almost all traces of most of these events. Around 200 confirmed impact craters exist on land, and only about 33 have been identified beneath the ocean. We can use these findings to understand how asteroid impacts shaped our planet throughout history, as well as predict what could happen should we have an asteroid collision in future.”

The confirmation of Silverpit as an impact crater places it alongside structures such as the Chicxulub Crater in Mexico – linked to the mass extinction of the dinosaurs – and the Nadir Crater off West Africa, which was recently confirmed as an impact site.

The research was funded by the Natural Environment Research Council (NERC), full project details are available online.

More information can be found on the Heriot Watt University's

Earthquake magnitude 3.3 strikes Perthshire...

A magnitude 3.3 earthquake was felt across wide parts of Perthshire in Scotland on October 20th. The epicentre was the village of Pubil in the Glen Lyon area. According to BGS its focus was at a depth of some 3km.

People in places like Crieff were awakened to shuddering and a low rumbling sound. Little or no damage was done with some people reporting the movement of things like house and garden ornaments.

Aside from recording the basic details of the earthquake, BGS made no further comment or added any further information. From that it can be assumed that this was simply related to minor movement on one of the local structures in the area.

Did you feel the earthquake? If so, do tell us.

Ecuador reveals first mesozoic amber with preserved insects...

Researchers from the University of Barcelona, working in Napo province Ecuador, have discovered the first Mesozoic amber deposits with preserved insects.

The discovery, published in the journal *Communications Earth & Environment*, reveals that 112 million years ago there was a tropical rainforest with ferns, cycads and angiosperm plants, and describes a unique scenario for understanding the rich biodiversity and Cretaceous ecosystems in the southern hemisphere, little studied so far in the fossil amber record.



A sample of the 112 Ma amber deposit from Napo province in Ecuador. (Image: University of Barcelona)

The University of Barcelona's website goes on:

“This is the largest Mesozoic amber deposit in South America and one of the richest in Gondwana with bio-inclusions. It is part of a recently discovered deposit in the Hollín Formation - detrital sedimentary rock levels of the Oriente Basin in Ecuador - and is dated to the Albian stage of the Lower Cretaceous, with well-preserved terrestrial arthropod remains (insects and spider web remains)”, says Professor Xavier Delclòs, from the Faculty of Earth Sciences and the Biodiversity Research Institute of the University of Barcelona (IRBio) and first author of the article.

The amber comes from a fluvial-lacustrine environment at the Genoveva quarry site (in the Tena region of the Amazon region). The resin-producing trees were probably araucariaceous conifers, according to geochemical and palynological analyses. “Everything indicates that the ancient ecosystem was wooded, humid and diverse, and has the oldest known association of angiosperm leaves in north-western South America,” says Delclòs, a member of the UB's Department of Earth and Ocean Dynamics.

This study outlines a new framework for understanding equatorial ecosystems during the Cretaceous and the biogeographical relationships of their components when the modern continents broke away from the supercontinent Gondwana.

Get the full story her:

<https://web.ub.edu/en/web/actualitat/w/first-mesozoic-amber-insects-south-america>



A new UNESCO Global Geopark to celebrate the chalk in two countries

UNESCO Global Geoparks are nothing new, we've currently got 10 of them with one straddling the Irish border at Marble Arch.

But the latest aspiring Geopark has the English Channel passing through its heart as it is partly in France and partly in the UK. I've been investigating what lies behind this celebration of our chalk landscape....



United by a chalk landscape: areas on both sides of the English Channel may be united in a UNESCO Global Geopark.

In what can be seen as a reflection of our failure to communicate within the geological world, I watched a fascinating edition of the popular BBC programme *Countryfile* which featured the work of two groups the Kent Downs National Landscape and Caps et Marais d'Opale Regional Nature Park. Until that programme I had no idea that this cooperative venture to create the Cross Channel Geopark Transmanche was going on.

Funding for the work that has got the project to the stage of being an 'aspiring geopark' has largely come from the Interreg - France (Channel) England (FMA) Programme administered through the EU. British funding has come through the Heritage Lottery Fund and the Department for Environment, Food and Rural Affairs.

The aspiring geopark already has an extensive web presence and what follows is taken from that material. As you will see, the people behind the bid, on both sides of the Channel have a well developed plan for both education and how they will manage and conserve the areas. These areas are core to the ethos of a UNESCO Global Geopark and need to be embedded if the bid is to be successful.

What follows is taken from the Transmanche Geopark website:



Chalk Cliffs like these, at Samphire Hoe are present on both sides of the Channel.

(Image: Kent Downs National Landscape)

What is the Cross-Channel Geopark?

The Cross-Channel Geopark is a cross-border partnership between the Kent Downs National Landscape and the Caps et Marais d'Opale Regional Nature Park that celebrates the geological, cultural, and historical ties between Kent in the UK and Pas-de-Calais in France.

Together, these regions form a single, remarkable landscape connected by a common geological story and shared heritage. We're committed to protecting and enhancing our heritage while promoting sustainable tourism and fostering cultural exchanges between our two nations.

We are in the process of applying for UNESCO Global Geopark status—a prestigious recognition that celebrates areas of international geological significance. Having a UNESCO designation would reinforce the importance of our geological heritage and ensure it's protected for future generations, while bringing worldwide attention to this remarkable region.

Our geological story

The Cross-Channel Geopark immerses us in a geological history spanning 400 million years. In the Devonian and Carboniferous periods, the region was emerging, forming a mountain range where life abounded, as evidenced by the fossils discovered in the Marquise Quarry Basin.

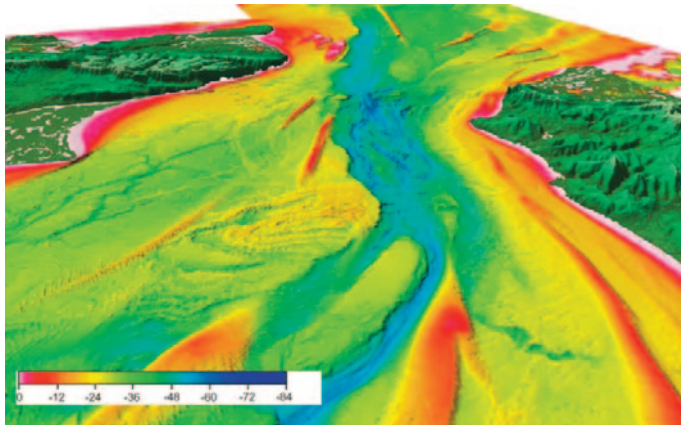


Avec la participation du



Over time, this range eroded, and during the Jurassic period, shallow marine environments took over, giving rise to stunning sandstone and clay cliffs, such as those at Cap Gris Nez, which attract more than two million visitors each year.

During the Cretaceous period, a greenhouse effect submerged Europe under the Chalk Sea, forming vast chalk hills. In the Geopark, these hills stretch from the edge of London to south of Boulogne-sur-Mer, only interrupted by the Channel, where they form the famous white cliffs of Dover and the Cap Blanc-Nez (this Chalk still connects us underneath the sea!). Composed of the shells of microscopic plankton (such as coccolithophores), chalk is the rock that connects our two regions and forms iconic features of the landscape, illustrating the deep connection between land and sea, as well as between two nations.



The forming of the English Channel - this is a 3D view of the seafloor in the 33km wide Dover Strait showing a prominent valley in the central part.
(Image: Imperial College London/Professor Sanjeev Gupta and Dr Jenny Collier)

The formation of the English Channel

Around 450,000 years ago, during one of the coldest periods in Earth's history, the Cross-Channel Geopark was frozen and covered in snow. A massive lake had formed in the southern North Sea and a ridge of chalk hills connected Britain and France. The hills were a land bridge, allowing early humans and animals to move freely back and forth.

As the planet warmed up and the ice melted, the lake got full and a catastrophic megaflood burst through the land bridge, carving out the Channel and separating our two nations. The force was so powerful, plunge pools more than 80 metres deep formed in the chalk rock that is now the seabed!

This extraordinary event reshaped the landscape, leaving behind awe-inspiring white cliffs and valleys that tell the story of our geological heritage. Explore the Cross-Channel Geopark and discover how more than 400 million years of shared history unites us across the Channel today.

Explore the Geopark's Hidden Stories

The Cross-Channel Geopark is full of geosites, places that highlight the geological, historical and cultural importance of our region. These geosites offer a fascinating insight into the history of the Earth and the dynamic processes that have shaped this region. From fossil-rich cliffs to beautiful nature reserves and monuments built with local stone, each geosite is a key part of the Geopark, telling a unique part of our

shared history and illustrating how these processes have combined to shape our landscape and our lives.

Here's three of our many great Geosites - one taken from each side of the Channel and one that joins the two sides!

Dryhill Quarry - Sevenoaks, Kent

The rocks here are actually some of the oldest rocks you can find in the Cross-Channel Geopark.



Dryhill Quarry, near Sevenoaks was the first Local Nature Reserve in Kent to be given the designation on the basis of its geology.
(Image: Kent Downs National Landscape)

They are around 120 million years old and were formed during the Aptian age (whilst this is quite old in our Geopark, it's relatively young when compared to all the other rocks found on Earth). This former quarry has been an important site for the understanding of rocks of this particular age and is considered to be of national geological significance.

Dryhill is a great place to visit with the family, with large open areas and woodlands to explore, and any budding geologists will have lots to discover here!



Dryhill is already on the radar of local geologists - this is someone from Kent Geologists' Group examining the strata up close.
(Image: Kent Geologists' Group)

Coteau de Wavrans-sur-l'Aa



*The area is made up of fine Chalk landscape.
(Image: Wikimedia commons)*

The Coteau de Wavrans-sur-l'Aa is a remarkable site formed from chalk deposits dating from the Cretaceous period. Erosion has sculpted the hillside, creating a landscape characterized by steep cliffs and chalk grassland, which are habitats conducive to biodiversity. There are several species of rare plants, as well as a variety of fauna. This site is also a privileged observation place for ornithologists, with many species of migratory birds. Hiking trails allow you to explore this site while enjoying the hilly landscapes.

In addition, the unique geological conditions of the Coteau de Wavrans-sur-l'Aa make it an ideal place for the study of the local geology and erosion processes. Visitors can also take in the spectacular vistas that span the Aa Valley, adding an aesthetic dimension to this natural experience.

The Channel Tunnel

You can't have a cross channel geopark without some consideration of the structure that links them. The Channel Tunnel is considered under the two aspect of 'industrial' and 'marine'. The fact that the tunnel is included in the bank of geosites is testament to the wide remit of a geopark. In essence it's about putting the geology and landscape into a cultural, political and social background.

The industrial setting

One of the modern engineering wonders of the world, the Channel Tunnel is the longest underwater tunnel in the world and the third-longest train tunnel in the world.

Tunnelled straight through the geology of the Cross-Channel Geopark, this extraordinary feat has also permanently reconnected France and Britain after over 450,000 years of separation since the Megaflood.

Not content with being an international engineering marvel, the chalk marl that was dug out to form the tunnel was repurposed to create a new piece of land at the foot of the White Cliffs of Dover which has since flourished into a thriving nature reserve, another of our Geosites – Samphire Hoe.

The unique geodiversity of the Cross-Channel Geopark was vital to the success of the Channel Tunnel project, as the layer of 'chalk marl' which sits at the bottom of the chalk, just above the older clay, forms an ideal layer for tunnelling through. Whilst chalk has tiny cracks running through it which allow water to flow through, making it permeable, the Marl layer is impermeable due to it being a mixture of clay, chalk and other materials, perfect for keeping the tunnel from filling with water!

The marine setting

Under the English Channel, an ancient rock links France and England: a huge layer of chalk formed millions of years ago. It is this rock, shaped by time, that has made it possible to build the longest underwater tunnel in the world.

100 million years ago, a warm sea covered Europe. Billions of tiny algae have left their calcareous skeletons here, which, over the ages, have accumulated and compacted to give rise to chalk. Later, movements of the Earth's crust lifted these layers, creating the cliffs of Dover and Cap Blanc-Nez.

But 450,000 years ago, a glacial lake broke through this natural barrier, triggering a huge flood that carved out the English Channel and separated Britain from the continent. This ancient connection is still visible through the white chalk cliffs of Dover and Cap Blanc-Nez, which share the same geological origin.

Digging a tunnel under the sea required relying on this geological history. Only an impermeable rock could guarantee the stability of the structure: blue chalk, richer in clay, was chosen to prevent water from seeping in.

The Transmanche Geopark and Eurotunnel have established a partnership to highlight the region's unique geological heritage, a symbol of the connection between France and England. The Channel Tunnel is not only a technical feat, it is also a testament to the deep connection between man and the Earth, reconnecting two formerly united territories.

Join Us on this Journey

Are you ready to discover the shared geological story of Kent and Pas-de-Calais? The Cross-Channel Geopark offers an unforgettable journey through time, connecting two regions through their natural beauty, history, and culture – all underpinned by our incredible, internationally significant geological heritage. Whether you're fascinated by the dramatic cliffs, interested in the fossils they hold, or curious about the stories of the people who have lived in this landscape for thousands of years, there's something here for everyone.

Join us as we work towards UNESCO Global Geopark status and help protect this incredible landscape for future generations. Your adventure across the Cross-Channel Geopark starts now—explore the land where geology and history unite!

Further information

We've only been able to sample some of the huge amount of data that's already available on the Geopark's main website. Visitors to both sides of the Geopark can enjoy full details of the geosites in their native language.

Go to: <https://geoparktransmanche.org/>
There you will also see a contact form for further information.



Celebrating the James Hutton tercentenary: The deep time trail

Siccar Point in the Scottish Borders has to be one of the loneliest and bleak places in the UK. But for geologists the world over it's a place of pilgrimage, for it was here in 1788 that the pioneer geologist James Hutton first declared 'deep time'.

No longer was the age of the Earth to be measured in Biblical time, it was, as we subsequently confirmed, many million of years old. However, as a place of pilgrimage visitors to Siccar Point find it sadly lacking even in basic facilities and information.

Next year marks the tercentenary of the birth of James Hutton in 1726 and now the Scottish Geology Trust is seeking to mark the occasion with the launch of 'the deep time walk'.

Angus Miller reports...

Celebrating James Hutton at Siccar Point: creating a destination for a wider audience

James Hutton is recognised as the “father of geology”, but his contributions to science and agriculture are not so well-known by the wider public. 2026 marks the 300th anniversary of his birth, and we are taking the opportunity to celebrate his work and highlight his achievements, with a particular focus on Siccar Point, the famous unconformity he discovered in 1788.

Who was James Hutton?

James Hutton (1726-1797) was a star of the Scottish Enlightenment

and a world-class polymath, with a doctorate in medicine; a farmer who introduced tremendous agricultural improvements at a time when food was scarce in Scotland; the first to make regular measurements of temperature variations with altitude; a successful businessman with a factory in Edinburgh making sal ammoniac (used in dyes) from soot; and the writer of the two volumes of his “Theory of the Earth”.

How will we celebrate his life and work?

Hutton sought the proof for his theory of the Earth in the Scottish Borders. He mapped out the tightly folded Lower Palaeozoic rocks and the much less deformed overlying Old Red Sandstone, and predicted an unconformity between the two different successions. He found this unconformity at Siccar Point, demonstrating the concept of “Deep Time” and the processes of the Earth.

Many geologists consider Siccar Point to be the most important historical geological site in the world (Figure 1). Indeed, it is the first site in the UNESCO-supported book of the 100 International Union of Geological Sciences (IUGS) Geological Heritage Sites (IUGS, 2022).

If you have visited, perhaps you recall your first impressions of this remarkable site? It is a truly inspirational place. But not easy to get to, the route is not clear, there may have been a bull in the field. For non-geologists, does it give that sense of Deep Time and the international importance of this place?

Can we improve access? Improve information? And make it more engaging to the public? We think we can, without damaging the



The shoreline view of Hutton's famous unconformity at Siccar Point. However, Hutton himself would have first seen it from his boat out in the sea.

You have to be a determined geo-pilgrim to descend the cliff to see it today.

(Image: James Souza/ Geological Society of Glasgow)

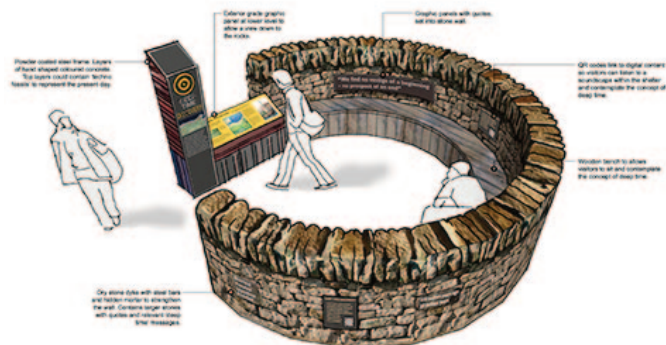
A photograph showing a dramatic coastal scene. In the foreground, a steep, grassy cliff slopes down towards the water. The cliff face is covered in patches of yellowish-brown lichen or moss. Below the cliff, the ocean is a deep blue, with white foam from breaking waves visible. The rocks in the water are dark and jagged, with some showing horizontal layering. The overall scene is one of natural beauty and ruggedness.

This is the view that most visitors get from the clifftop of Hutton's Unconformity at Siccar Point
(Image: Angus Miller / Edinburgh Geological Society)

The Deep Time Trail Crowdfunder

The Scottish Geology Trust, Edinburgh Geological Society and the James Hutton Institute are launching a Crowdfunder on 15 September 2025 to raise funds to develop the new Deep Time Trail at Siccar Point.

Donations will be rewarded with high-quality facsimile copies of John Clerk of Eldin's "Lost Drawings" from Hutton's Theory of the Earth, donated by the family of John Clerk. Other unique gifts including a "Hutton Hat" – hand-knitted showing Hutton's three most significant outcrops. You can find out more about the crowd-funder and how to donate, together with plans for Siccar Point and other tercentenary activities at <https://james-hutton.org/>.



***Outline proposal for the new viewpoint structure
(Image: CMC Associates / Edinburgh Geological Society)***

This comes from the James Hutton website:

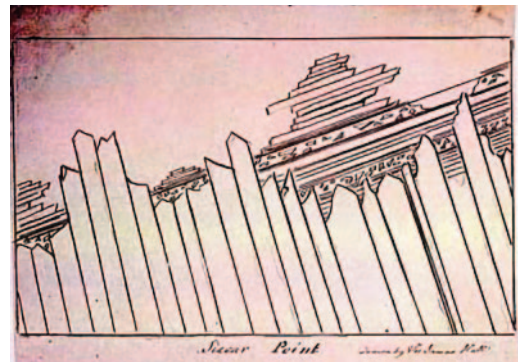
“The new Deep Time Trail at Siccar Point will mark the 300th anniversary of James Hutton’s birth, and help secure his story and discovery of deep time at Siccar Point in the Scottish Borders. The trail will lead visitors along the 1.3 km route from the nearest road to the viewpoint above Siccar Point. Along the way, Hutton’s story will gradually unfold.”

Part of the IUGS description of what it calls Site 001

An iconic and important site where James Hutton recognised the significance of unconformities and the possibility for ‘deep time’ in geoscience.

James Hutton (1726–1797) envisaged in his *Theory of the Earth* (1795) not only processes that weather and destroy rocks, and thus ruin a perfectly created world, but also processes capable of regenerating the Earth.

This led Hutton to propose the existence of continual, cyclical Earth processes which could drive change over long timescales. The spectacle of the unconformable relationship between the two different rock sequences at Siccar Point provided Hutton the empirical evidence for previous cycles of his Earth machine. Hutton used the location to demonstrate the existence of cycles of deposition, folding, and further deposition of rocks that which the unconformity represents. He understood the implication of unconformities in the evidence they provided for the enormity of geological time and the antiquity of the Earth.



A sketch by Sir James Hall which records the observations made by James Hutton of the unconformity at Siccar Point.

Siccar Point is a coastal promontory that beautifully displays in three dimensions the spectacular angular unconformity with Upper Devonian beds resting discordantly on folded, near vertical, Lower Palaeozoic strata.

The Lower Palaeozoic beds are turbiditic dark grey, fine grained wacke sandstone and interbedded finely laminated, fissile mudstone of the Gala Group, of early Silurian (Llandovery Epoch) age (Browne and Barclay, 2005).

These rocks were strongly deformed, being folded and cleaved, during the Caledonian Orogeny. Subsequent erosion, pre-Late Devonian times, formed an irregular surface with considerable palaeorelief through differential rates of weathering and erosion of individual beds in the Silurian succession; beds of wacke sandstone standing up more sharply and prominently than others.

Upon the sharp angular unconformity there rests Upper Devonian strata, comprising reddish brown breccia and conglomerate, of the Redheugh Mudstone Formation of the Stratheden Group. In marked contrast to the underlying Silurian strata the Upper Devonian beds have only a gentle inclination produced during the later, here less intense, Variscan Orogeny. The unconformity played a key role in James Hutton's insight that geological processes are not just "destructive" but also capable of restoring thus leading to a rock cycle of indefinite duration so "that we find no vestige of a beginning, – no prospect of an end."

Such is the esteem in which the geological world holds this special site at Siccar Point.



The transition of life from the sea to land

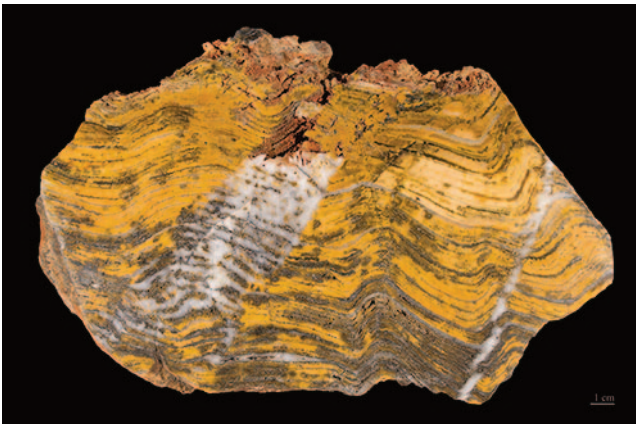
After examining the rock marble in the last issue of Down to Earth, Paddy turns his attention once again to fossils, an area that often gets his unique treatment.

As always, over to you Paddy...

‘.....the only direct evidence for understanding past life is provided by fossils....’

**A. Lee McAlester, palaeontologist
(1933-2017).**

The origin of life



An ancient stromatolite – aged 3.4 billion years. (Image: Wikipedia)

All life commenced in water. For about the first billion years there was no life on our planet but, when conditions were right, early life consisted of microorganisms like bacteria. The oldest fossils are of stromatolites of age around 3.5 billion years old found in places like southern Africa and western Australia although fairly recently stromatolites around 3.7 billion years old have been discovered in Greenland. Stromatolites occur today, for instance at Shark Bay, W. Australia, and consist of alternate layers of cyanobacteria and sedimentary material such as limestone.

The cyanobacteria, sometimes called blue-green algae, provide the ‘glue’ to enable the particles of sediment to bind together. Cyanobacteria are able to photosynthesise and in the process oxygenate the sea and, eventually, the oxygen bubbles through the water to the atmosphere and so, over millions of years complex life was able to develop. (The early atmosphere of the Earth was hostile to life being composed of gases like ammonia, methane and hydrogen.) All life requires water, even the most primitive like bacteria and viruses, while carbon and other chemical elements like nitrogen, hydrogen, oxygen, phosphorus and sulphur are necessary.

Now a tantalising question that has exercised the minds of theologians, philosophers and scientists for centuries is how did

inanimate matter convert to living things? Theologians propose it involved the intervention of a Supreme Being while scientists can not find any satisfactory explanation. Maybe it will always be a scientific mystery.

The transition of plant life from the sea to the land

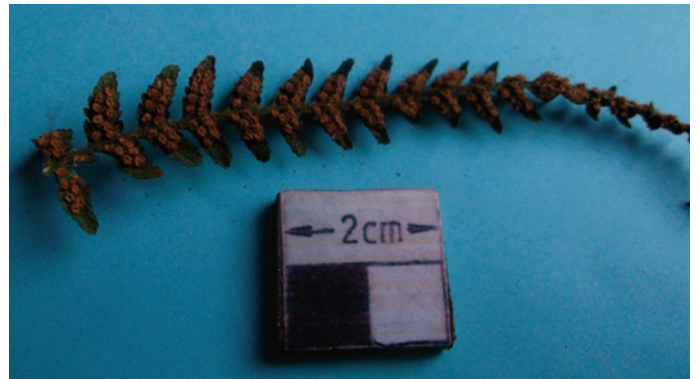


Photo showing brown casings, each one containing numerous spores, at the underside of a present-day fern leaf.

It is very likely incursions of the sea, containing algae spores, left behind some of them when it retreated. Spores are minute, hard grains that still exist today on plants such as ferns and these can be distributed by the wind to eventually reproduce the plant. Algae reproduce by spores. Strictly speaking, they are not plants, though, like plants, they can photosynthesise. However, they do not have all the main characteristics of a plant, such as a vascular system, which enables nutrients and water to be transported within the plant. Nor do they have roots, stem and leaves. Moreover, they are in a group known as protists.

In the Late Precambrian, millions of years after the severe Ice Age, the algae on land evolved into (non-vascular) plants such as mosses and liverworts (which are classified as plants because they share some of the features of plants like rigid cell walls composed of cellulose, are multicellular etc.).

Over further millions of years these evolved into plants, with features adapted to live on land, that possessed a vascular system and leaves with cuticles (wax-like covering to retain moisture) as well as stems with lignin (to provide support), stomata (minute pores to enable breathing etc.) in the leaves and stem and roots to extract moisture and nutrients from the soil.

From fossil evidence the first vascular plants are about 430-440 million years old and among the earliest one is the genus *Rhynia*, discovered in the early 1900s. Well-preserved fossils of this plant have been found in the Rhynie Chert in Aberdeenshire, Scotland. At first, plants reproduced, like their ancestors, for instance mosses, from spores but over a long space of time developed into seed-bearers. It was not until the Cretaceous, around 100 or so million years ago, that

flowering plants were common and, next to microorganisms like bacteria and viruses and larger forms like insects these are the most numerous life forms (in terms of individuals and species) today.

They play an essential role in providing food and habitats for other creatures and are the main plants on Earth today. The fossils of plants, however, are not very common – especially not as common as the fossils of shelled marine animals. Usually most plants, because they are composed of relatively soft material, are found in the form of carbonised impressions.



A carbonised plant fossil. It is a seed fern, genus Pecopteris, from south Wales. Seed ferns became extinct around 66 million years ago.



Another carbonised plant leaf. It is a ginkgo leaf of Mid-Jurassic age found in Yorkshire.

The transition of animals from the sea to the land

The transition of marine life to live on land is one of the most eventful and remarkable episodes in the history of life on Earth. When marine creatures made the move to land they had, in the course of time, to make quite a few adaptations. For instance they had to adjust to breathing on land and some had to be able to acquire locomotion on land and avoid drying out among other things.

The ancestors of insects developed a network of fine ‘tubes’ to absorb oxygen, which was delivered to other parts of their anatomy while other animals, like those descended from fish-like creatures, had to acquire lungs. Some of the animals, which formerly lived in water, had more or less already the means for walking on land. An example

would be the amphibians whose progenitors, the lobe-finned fish, could use their lobe fins for transport and arthropods, like the crustaceans, had limbs enabling them to walk on land, while they also had an exoskeleton, which prevented them from drying out in terrestrial conditions.

Now a question that has to be asked is: “why did animals leave the sea to inhabit terrestrial environments?” It may have been to escape from predators or/and to access the plentiful availability of food on land. The transition of animals to land took place around 400 million years ago and by this time plants had proliferated on land and also oxygen was a significant component of the atmosphere.



The fossil of a marine crustacean – a trilobite.



A present-day crustacean - a woodlouse. They can be found under stones etc. in gardens.

(Image: The Wildlife Trusts)

Some annelid (segmented) worms also made the transition. Today we can find fossils of serpulid (a type of annelid worm) ‘tubes’ are found in ancient rocks. These worms, because they were composed of soft material, did not leave any body fossils, but instead the ‘tubes’ they secreted can be found in some sedimentary rocks. These are described as ‘trace fossils’ as they leave a trail of what the animal did, or where it has been in the rock.

Leaving the sea necessitated them developing a mechanism for keeping moist and navigating their way through soil and sediment; earthworms are present-day examples of annelid worms.



Picture of modern serpulid worm 'tubes'.

Today, gastropods (snails and slugs) are the most numerous molluscs on land. They are descended from forms that, millions of years ago, lived in a marine habitat.

While many marine animals left the sea, some did not; for example corals and brachiopods which, to this day, are exclusively marine. According to fossil discoveries, so far anyway, the oldest evidence of a land animal is a millipede. (Millipedes are classified as arthropods.)

Its fossil was found on a Scottish island (Kerrera) in 1899 and much later, in 2020, an American research team dated it as Late Silurian – around 425 million years old.



A fossil of a marine gastropod.

Fossils and ancient life

Our planet is the only one in our solar system (so far) that's known to harbour life and, as far as is known to date, is the only one in the universe in which life, as we know it, exists. As in his 1977 very readable book – 'The history of life' - A. Lee Mc Alester points out that we know about ancient life from fossil evidence. Fossils have only been found on Earth. All the life – plants and animals – we see around us today had ancestors which lived in the sea hundreds of millions of years ago.



rockstars

Another famous rock...

Mylonite

We've gone to the other side of the world to get this concise description of what mylonite is. It comes from the University of Auckland, New Zealand:

Mylonite is a metamorphic rock formed by ductile deformation during intense shearing encountered during folding and faulting, a process termed cataclastic or dynamic metamorphism. This process involves nearly complete pulverisation of the parent rock so the original minerals are almost completely broken down and recrystallise as smaller grains which are tightly intergrown, forming a dense, hard rock.

As a result of the shearing encountered during formation, recrystallised minerals grow preferentially along planes of foliation parallel to the direction of shear. Mylonite may also be characterised by the smearing, flattening or rotation of any porphyroblasts formed during metamorphism. Not surprisingly, the word mylonite is derived from the Greek word for mill.

Historically, mylonite became associated with major tectonic events involving major thrusts and nappes, first in the European Alps and then later in the Northwest Highlands of Scotland. Pioneer geologists Ben Peach and John Horne worked in the Assynt area of Scotland, where they recognised mylonites.

Today you can find them most convincingly on the Moine Thrust at a

number of localities including on the Southwestern part of the island of Skye.

I've also found good mylonite in a narrow vertical zone associated with a fault lane on the Shetland Isles.

You are most likely to distinguish from other rocks by its very fine grains and planar structure and its association with high grade metamorphic rocks. It can also have a distinctive cream colour as exhibited by the specimen shown below



This is a specimen of folded Moine mylonite from the famous Knochan Crag section in Assynt. (Image: University of Oxford)

See more images at:

<https://users.earth.ox.ac.uk/~oesis/nws/nws-a98-kc3.html>



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 to 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.

The 2026 programme...

We are delighted with how well our programme of field trips for 2026 has been received. That said, we still have vacancies on most trips especially for couples or people willing to share a twin room. If you haven't been with us before, you are particularly welcome, but please don't leave it too long before making your booking. Over the past year we've lost count of the number of people who have left it too late and we have had to decline their booking.

The Jurassic Coast of Dorset, March 27-April 1 £995

Believe it or not, we have not visited the famous Jurassic Coast of Dorset since 2017, so it's high time that we put that right! As on the last occasion, we're basing our trip at the seaside town of Weymouth which is well connected in terms of public transport and also has suitable accommodation for us to use. We're going early in the season so that we can offer you a good value trip, but with the recent pattern of mild winters, we hope that by the end of March it will be reasonably warm.



The magnificent Durdle Door (Image: Visit Dorset)

As for the magnificent geology what can we say? We hope to take in some of the area's 'gems' including Durdle Door, Lulworth Cove and Swanage. It would also be good to call in on Mary Anning's favourite stomping ground of Lyme Regis. We also hope to take in the amazing fossil collection on show at Dorchester Museum.

Get in soon to secure your places on this early 2026 trip!

The Northwest Highlands of Scotland, April 14-22 £1695

Ask Colin and Chris what their favourite trip is and they will answer "the Northwest Highlands". It combines their favourite hotel with their favourite geology and landscape! Accordingly we are once again offering this 8-night gem even though we were last there in 2024.

Welcome to our real world!



*Loch Assynt is but a stone's throw from the Inchnadamph Hotel
(Image: Wikimedia Commons)*

On this trip we pay homage to Britain's oldest rocks in the form of the 3 billion year old Lewisian Gneisses, along with the overlying Torridonian Sandstones and the Cambro-Ordovician sediments. These all came together as a result of the Caledonian Orogeny some 420 million years ago. In much more recent times, the Ice Ages of the last 2 million years have given us the most beautiful and unspoilt landscape that we can enjoy today.

This trip is now full, ask us about cancellations.

Central Cornwall, May 1-8

£1595



Old mines and magnificent coasts. (Image: Into Cornwall)

We discovered Tricky's at the Tolgus Inn in Redruth in time to take two groups of Americans during 2025. Now we are offering the location to our regular clients! Redruth is centrally located on the main railway line from London Paddington and allows us to reach most of the main parts of Cornwall without long journeys.

During this week we'll be taking in the granites of Lands End, the ophiolites of the Lizard, the china clays of St Austell and the amazing folded rocks of North Cornwall around Tintagel and Boscastle. We'll also go down a tin mine and visit Wheal Martyn China Clay Museum. We'll have the use of a locally hired minibus or coach to get around on this trip, making it possible for everyone.

There are still twin and double rooms available on this trip.

Teesdale and the North Pennines, May 16-23

£1395

We've been looking to visit this area for some time and have never

quite got around to it until now! Finding the wonderful family run Teesdale Hotel was the final piece in the jigsaw and hey presto - here we have a new location!

We'll be taking in the wonderful Upper Teesdale with its Lower Palaeozoic inlier along with High Force, Lowe Force and Cauldron Snout. There's great limestone scenery as well as the Great Whin Sill. Over in Weardale we'll take in the lead mines around St John's Chapel and Killhope as well as the Frosterley Marble and the fossil tree at Stanhope.

This trip is now full, ask us about cancellations.

NEW! Minehead & North Somerset, June 7-12

£995



*Fabulous cliff scenery at Watchet in North Somerset
(Image: Chris Darmon)*

Everyone knows about Dorset's 'Jurassic Coast', but similar fossiliferous rocks also outcrop to the east of the seaside resort of Minehead, around Watchet & Blue Anchor on Somerset's North Coast. During this 5-night trip we'll be taking in these rocks, as well as fabulous coastal scenery to the west around Ilfracombe and the Valley of Rocks at Lynton which are carved in Devonian strata. We will also take in some great Carboniferous limestone strata around Weston super Mare and Portishead that also includes rare basalt.

Private minibus transport will be provided each day allowing everyone to enjoy the beautiful scenery of the Exmoor National Park. We stay at a 4-star guest house in Minehead and enjoy excellent food in local restaurants for our evening meals. All this with the added bonus of a ride on the Lynton cliff railway!

We expect this trip to fill up fast, so get your bookings in NOW!

Shetland - the North Isles, June 17-25

£1895

Everyone should visit the Shetland Isles at least once in their lives, so says Chris, who's been there around a dozen times over the past 40 years. The best time to visit Shetland is around mid-Summer when it never really gets dark. We invite you to join us as we take in the North of Mainland and the Northern Isles of Unst, Fetlar and Yell, home to some of the most amazing geology in the entire UK. Visit the Moho in a small quarry in Unst and get yourself a sample of serpentine to rival any from Cornwall.

This trip is now full, ask us about cancellations.

NEW! Anglesey, July 5-10

£995

We love going to Ynys Mon, or as the English know it, Anglesey. As a long established geopark it's geology is superb and also unique as the main location to see rocks of the Mona Complex.

Based at the former copper port of Amlwch in the north of the island we will explore some of the best sites on the island, many of which are close to our base.



The Dinorben Arms Hotel, our base on Anglesey

Come with us to see some very rare rocks and also experience some fine coastal scenery. On this trip you get to see sedimentary, igneous and metamorphic rocks of many types!

There are still twin and double rooms available on this trip.

What is 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 at Harper Adams University in Shropshire

August 8-15

£1495

For our ever popular Summer School week, we are returning to the campus of Harper Adams Agricultural University which sits in lovely grounds in Shropshire. We last visited in 2018 and have a packed itinerary planned including some new localities.



Highly fossiliferous Silurian limestones at the Wren's Nest National Nature Reserve in Dudley.

(Image: Visit Birmingham)

Shropshire is home to a wealth of geology spanning many time periods and covering many types of rocks and landscape. We'll be taking in the Precambrian rocks of the Church Stretton area, the Lower Palaeozoic sediments of Wenlock Edge and the Lickey Hills as well as later rocks in Cheshire and the Black Country.

Yes, there's something for everyone and that's before we add in the evening talks and activities as well as the excellent company.

Still plenty of single rooms available!

Iceland - the North & East Fjords, September 13-22

£2695



The Eastern Fjords are beautiful in any season!

(Image: Chris Darmon)

These days a lot of people go to Iceland, but they very rarely visit the north and east of country. In this trip with our usual guide and driver Ingi, we'll begin at Keflavik near the airport and then travel to Akureyri before working our way clockwise to Myvatn to the volcano Krafla before heading to the beautiful east Fjords.

We'll stop in the amazing geo-village of Borgarfjarðar Eystrí to see Iceland's most colourful rhyolitic rocks. The last time we were here we did see the Northern Lights in all their glory! Iceland is an amazing place but these days much of it is over visited by tourists. This cannot be said for some of the places that we will be visiting on this trip. This is the real Iceland, where natural wonders and beauty are able to shine without the smell of hamburgers!

To complete our trip we travel back from Hofn to Keflavik completing our circuit of Iceland. There's an option of an additional night at the end to have a day looking at the most recent volcanic activity on the Reykjanes peninsula and viewing the recent - and still hot - lavas.

This trip is now full, ask us about cancellations.

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 unconformity at Jedburgh. We'll also have a day in Edinburgh exploring some of the famous sites in Holyrood Park.



The Waverley Castle Hotel on the outskirts of Melrose is our base for this 5-night trip.

Our base for the trip is the comfortable Waverley Castle Hotel which sits in beautiful grounds on the outskirts of the small town. Unusually, we have been offered a number of single rooms, at a very modest supplement - but get in quickly to secure your place!
Bookings have been coming in for this trip.

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.
email: downtoearth@geosupplies.co.uk
or ring us on: 0114 245 5746

Learning with us is FUN...

We've been offering online and distance learning since before Covid and over that time hundreds of people have taken part in our learning programmes from the UK and around the world. All our learning programmes are created and delivered by our in-house team of Chris Darmon and Colin Schofield. Both are experienced teachers of distance learning over many years. No one is required to carry out any sort of assessment and there's no entry requirements or formalities. Just sign up and go!

There's still time to join an Autumn class, but hurry! See below for details of new courses commencing in early 2026.

What's on offer this Winter?

The Geology of the British Isles in around 100 minutes!

A number of years ago Chris was invited to present a lecture with this title in the Darwin Centre at The Natural History in London. It was arranged by the late Dr Richard Fortey and was attended by quite a large audience that included Chris's late parents Eric and Norah as well as a number of **Down to Earth** readers.

With the recent passing of Richard Fortey it seems apt to recreate that lecture for the Zoom platform. Hang on to your hats, get yourselves a large glass of wine and get ready for the 'ride of a lifetime' as we take you on a journey from the oldest rocks in Northwest Scotland to the last glaciation that ended a mere 10,500 years ago!

This extended live Zoom session includes some video material as well as up to date information on the British Isles' geological journey. Wednesday, January 7th at 2pm or 7pm (you choose)
£15.00 or £22.00 for 2 people studying on the same computer.

Simply Rocks! - a course aimed at people wanting to know about the basics of rocks, sedimentary, igneous and metamorphic. What are they and how are they formed?

This 6-week course is supported by a set of basic rocks, the cost of which is included in the course fee. You will be shown how to study rocks for yourself in a practical way. By the end you should be able to describe and identify many different rocks.

Course dates: Starts Tuesday February 3rd - March 10th

Cost: Six hour-long Zoom sessions with electronic background papers and a set of basic minerals £65.00 for one person or £85.00 for 2-people studying together. Printed background papers cost an additional £15.00. Zoom sessions on Tuesdays at 2.00 pm and 7.00 pm (you choose).

The Wednesday Club

We started this eclectic mix of subjects on Wednesday afternoons and evenings last year and they've proved to be highly successful. We hope that you like this new selection - they are all designed to bring you up to speed on some of the very latest ideas.

November 5	Terror birds - are they the new dinosaurs?
November 12	Plate tectonics - is it time for a rethink?
November 19	A new look at the geology of the Southwest
November 26	The evolution of the North Atlantic - new ideas
December 3	Beyond conventional metamorphism
December 10	Rare earth elements where and what are they?
December 17	Castle Bank - a new Welsh Lagerstätte

Cost: Individual talks £11.00 or £16.00 for 2 people.

Take all 7 sessions for £60.00, or £90.00 for 2 people.

Timings: Wednesdays at 2.00 or 7.00pm - your choice.

Wednesday club in the New Year

More exciting topics for you to delve into with our informative Zoom sessions.

January 21	The geology of the North Sea
January 28	The ultramafic rocks
February 4	Rocks deep beneath the pavements of London
February 11	A new look at the geology of the Peak District
February 18	The North Wales slate industry
February 25	The geology of the Scottish island of Raasay
March 4	The China Clay industry of Cornwall
March 11	Fabulous plants of the Rhynie cherts

Cost: Individual talks £11.00 or £16.00 for 2 people.

Take all 8 sessions for £65.00, or £95.00 for 2 people.

Timings: Wednesdays at 2.00 or 7.00pm - your choice.

Time Travellers Coastal Britain

We first presented these topics back in 2021 so it's high time that we looked at them again. The UK's geology often presents itself at our rich coastline. We'll be taking in 8 great areas, including North Cornwall, Berwickshire & Northumberland, County Antrim, North Somerset, the Orkney Isles, Suffolk, Mull & Iona and Pembrokeshire.

Course dates: Starts Monday January 22nd - March 12th

Cost: Ten hour-long Zoom sessions with electronic background papers £65.00 for one person or £85.00 for 2-people studying together. Printed background papers cost an additional £20.00. Zoom sessions on Thursdays at 2.00 and 7.00 pm (you choose)

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Storm Benjamin causes more damage at Hemsby...

Storm Benjamin, the most recent named storm to hit the UK, has caused additional damage to the vulnerable cliffs at Hemsby in North Norfolk, media reports say.

Storm Benjamin struck the area in mid-October and the high seas left a trail of destruction with further erosion of the already fragile cliffs which are composed of unconsolidated Quaternary deposits. The only tangible defence is a line of concrete blocks at the foot of the cliff line which help to dissipate some of the wave energy.



Angry seas at Hemsby during Storm Benjamin. Notice the rock and concrete blocks offshore, Hemsby's only defence. (Image: James Bensly - Courtesy of Great Yarmouth Mercury)

At the end of October, the local council served notice on the owners of a number of properties that have been deemed to be at imminent risk of toppling over the cliff edge. Great Yarmouth Borough Council has the responsibility to look out for the safety of its residents. In effect these homes, both permanent and holiday lets have been condemned.

But a number of the owners, some of them elderly people who have lived here for many years aren't happy. One of them 80-year old Carol Boyes said: "I'm hoping I'm going to be here for Christmas, But the way things are going at the moment I can't see it happening. I've got no Plan B at the moment if this all goes."



These two pictures, taken at Hemsby Gap show how much erosion has occurred in just one year, 2023 (left) and 2024 (right) (Image: Mike Page Courtesy of Great Yarmouth Mercury)

Another local resident who's home is at risk, is Lance Martin. His wooden house, named 'Dunefall,' has already been moved twice in recent years and now is back on the frontline, just a couple of metres from the cliff edge. Now vandalised, it awaits demolition.

The problems of Hemsby in particular and North Norfolk in general have been known about for some time. In 2023 BGS devoted a blog to the problem at Hemsby and the wider scale of the challenges faced by our coastlines.



Flashback to storm surge in December 2013, this was the scene at Hemsby as a home slips over the edge in a surprisingly good state of repair. (Image: BGS)

In that BGS Blog, Jonathan Lee the BGS Regional Geologist said: "Beaches are great natural coastal defences because they act to dissipate wave energy, but at Hemsby, because the beach is so narrow, the erosional susceptibility of the geology is enhanced because of direct wave action on the cliffs. This occurs under both normal tidal and weather conditions and especially during high tides and storms. There is unfortunately a long history of coastal erosion at Hemsby, documented in a wide range of historical (and more modern) accounts"

You can read the full BGS blog by going to: <https://www.bgs.ac.uk/news/hemsby-coastal-erosion-the-scale-of-the-transformational-challenge-around-the-coastlines-of-england-and-wales/>

Abberley and Malvern Hills Geopark extends its visitor information profile...

Dr Peter Oliver of the Abberley and Malvern Hills Geopark shares some exciting news concerning it's expanding range of GVIPs (Geopark Visitor Information Points).

The Geopark Forum of 24 member organisations has a policy of creating dedicated information points at various visitor centres operated by Forum members. This summer a new one was opened at the popular Severn Valley Country Park and now with new funding



The new visitor information section at Severn Valley Country Park in Shropshire. As well as the main panel there are rock samples, a video screen and leaflets. The latter includes a self led local geology trail. Financial support for the project came from the Tomlinson Brown Trust.

(Image: Peter Oliver / Abberley & Malvern Hills Geopark)

another one will open early next year at Forestry England's Wyre Forest location. These add to the two existing ones at Bewdley Museum and Malvern Hills GeoCentre. The total footfall at these four locations exceeds 400,000 each year thus providing an amazing opportunity to tell visitors about geology, landscape, wildlife and history across the Geopark.



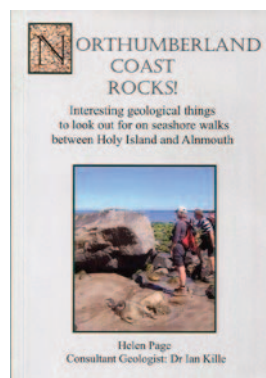
The first Geopark Visitor Information Point was established at Bewdley Museum. This dedicated facility has been in place for over 10 years seen here is 2016. It is regularly updated by the Museum. Scientific support comes from Geopark members from the group 'Geologists in the Geopark'.

Each of the locations which are known as GVIPs provide information panels, free leaflets, displays of specimens and places to visit in the locality. They are located in Shropshire, Worcestershire and Herefordshire. There are plans to establish two more; one in Gloucestershire and another in Herefordshire. A detailed geology map of the Geopark can be seen at each centre.

The Editor comments: The visitor information points are a great way for the Geopark to connect with a wide visitor base. It's something that would be good for all geoparks across the country to adopt.

Popular coastal guide being updated and reprinted...

One of the best selling geological field guides in the country is currently unavailable and is being revised and reprinted.



Northumberland Coast Rocks! is an amazing guide to the rocks around Berwick upon Tweed and was largely written by a group of U3A members from Alnwick.

Ian Kille has taken on the responsibility for the title and has told us in an email:

"Northumberland Coast Rocks!" is out of print at the moment. I'm working to remedy that and will be in touch as soon as I get there. There's a fair amount to do with some important updates and some improvements I want to make. Hope to have it sorted in time for Christmas."

For those of you looking to make a purchase, as soon as it's back we'll tell you and it will be back up on our website!

Talking of books, how about this for a 'golden oldie'...



Back when I was in school teaching there were a couple of 'go to' textbooks for the teaching of geology at GCSE level. There was a fairly academic book by someone called Bradshaw originally written for 'O' level and another by David Webster called '*Understanding Geology*' that was more a more lively approach to the subject.

Imagine my surprise when I recently took a call from Down to Earth reader Kathy

Chilver who runs the Driffield U3A group in East Yorkshire.

Kathy's group uses this book as the basis for their studies. Not surprisingly they are having trouble finding copies, even secondhand. She contacted me a few weeks ago to ask if anyone had any.

The good news is that they've now got all that they need, having contacted past members who no longer have a need for them. I've still included this piece because anyone looking for a basic geology textbook will still find it a really good buy.

Sad news about Dr Andy Lane...

In the last issue of Down to Earth (DtoE 132, August 2025) we carried an article by Dr Andy Lane formerly of Sunderland University about the Aberfan Disaster entitled "After Aberfan a backwards look at the 1966 disaster".

After the publication we heard from Andy's wife Sandra with the sad news that he had died suddenly in August. She wanted to update us with news following the publication of Andy's article.

"I thought you might like to know that his Aberfan article elicited a response from The Coal Action Group and I have since sent off all his reports in the hope they may prove useful.

Tips are still slipping over roads, one near my sister's home in Quakers Yard not far from Cardiff.

Andy had an enormous collection of specimens, maps and teaching aids. I am slowly sorting things out and offering local schools and geologist friends the chance to look through them."

The Editor comments: It's very sad to hear of the sudden passing of Andy. He's has been a great supporter of this magazine over the years both before and after his retirement from University teaching. Not only has he shared with us some of his work via several articles, he's also been with us in the field in his local area. Like many a field geologist you only really got to know him in this environment, the equivalent of being in a kitchen with a Michelin star chef.

He leaves behind him a legacy of an excellent local guide to Sunderland rocks as well as the fact that he's passed on his enthusiasm for his local rocks and landscape to others in the area.

It's good to hear that some of his past work will also be passed to people who will use it, for the good of themselves and others.

Homeowners in South Wales to get advice about disused coal tips...

Down to Earth reader Peter Ganesh has sent us a link to a BBC News item about former coal tips in South Wales.

Andy Lane talked about the 1966 Aberfan disaster and it's pain that former coal tips continue to cause issues for homeowners in the affected parts of South Wales.

Some 800,000 homes and businesses are being leafleted as part of a campaign of awareness around safety issues associated with former coal tips. This comes in the light of two recent landslips, one of which saw coal slurry in the streets of Cwmtillery.

Last year, around 40 homes had to be evacuated in Cwmtillery,

Blaenau Gwent which saw tonnes of coal slurry and debris collapse into the streets of the village.

With the onset of more severe weather and increased risks of intense rainfall, the Welsh Government has sent around £100 million on improvements and this awareness campaign is also part of their campaign.

From 2027, a new body the Disused Tips Authority for Wales will oversee the work to monitor and stabilise these former coal tips. Just like was the case in Aberfan all those years ago, there are still places in the South Wales where old coal tips sit on slopes above settlements.

The Rothbury Estate is for sale and Sir David Attenborough backs a plan to buy it...

Rothbury is a small village in a beautiful part of rural Northumberland and as such might not normally expect to hit the headlines. But the forthcoming sale of its large estate has attracted interest from people across the nation with news that non other than Sir David Attenborough has championed a bid by local conservationists to buy the whole of this vast upland estate.

The Wildlife Trusts and Northumberland Wildlife Trust need to raise around £30 million and have a year to do so. They are attempting to buy the 15 square mile Rothbury Estate, in its entirety. They want to avoid the risk that is former grouse moor, with extensive peat bogs could be broken up and sold off. They enlisted the help of David who fronts a video about the estate sale.

In just hours after Sir David's endorsement, the conservationists were able to announce that they had raised more than £500,000 to boost their chances of success.

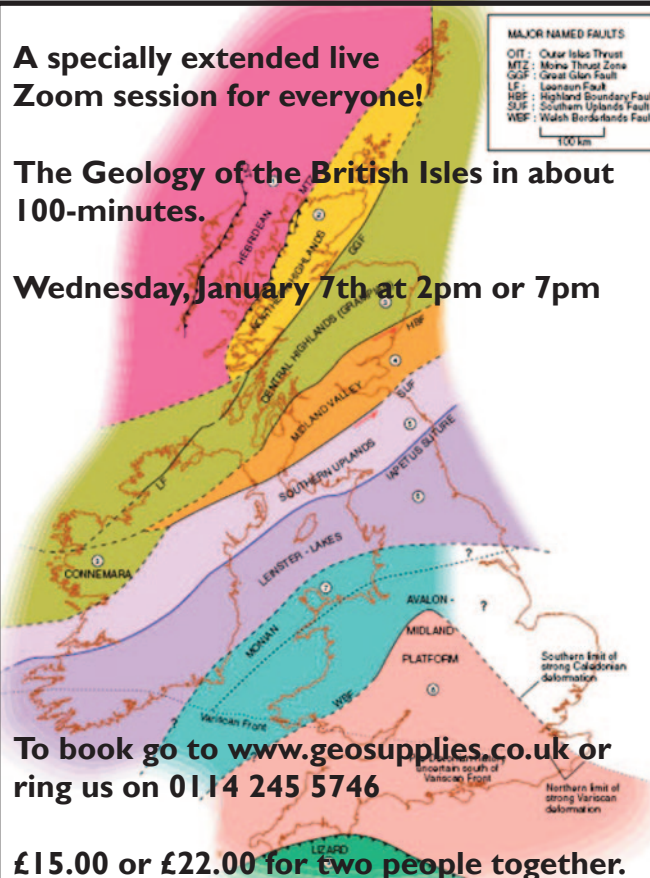
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MAJOR NAMED FAULTS

- CIT: Outer Isles Thrust
- MTZ: Moine Thrust Zone
- GZF: Great Glen Fault
- LF: Leine Fault
- HBF: Highland Boundary Fault
- SUF: Southern Uplands Fault
- WBF: Welsh Borderlands Fault

100 km

Geological map of the British Isles showing major named faults and geological features. The map is color-coded by geological period: Palaeozoic (pink), Mesozoic (yellow), Cenozoic (green), and Quaternary (blue). Key features include the Outer Isles Thrust (CIT), Moine Thrust Zone (MTZ), Great Glen Fault (GZF), Leine Fault (LF), Highland Boundary Fault (HBF), Southern Uplands Fault (SUF), and Welsh Borderlands Fault (WBF). The map also shows the Central Highlands (CH), Scottish Lowlands (SL), and the English Midlands (EM). The map is titled 'The Geology of the British Isles in about 100-minutes' and includes a scale bar for 100 km.

Book reviews are back!

In the last issue, I was bemoaning the fact that for the first time ever, there were no new books for me to review. I'm pleased to say that there are this time! A big thank you to those of you who took the trouble to tell me about a couple of books. I checked and these will be upcoming in the next few months.

Cream of the Crop 2025...

Our popular rock set *'Cream of the Crop'* will be back shortly. It features rocks that have largely been collected during our field season in 2025, plus a couple of 'special rocks' from our back catalogue.

We won't be able to produce these in time for the Christmas market but they will be available early in the new year. We'll keep you posted in *Down to Earth extra*. In the meantime, if you are looking for a specimen set as a Christmas present, we've plenty available on our website.

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Book Choice

Title: The Stones of Britain - A History of Britain through its Geology
 Author: Jon Cannon
 Publisher: Constable
 ISBN: 978 1 4721 168 3 3
 Format: Hardback
 Cost: £30.00
 Level: Adult & general interest
 My rating: *****



There's a well known phrase, that's particularly applicable to book reviewers and it's never judge a book by its cover! That certainly applies to this rather sombre volume that is certainly not been given a modern cover illustration and is even printed on off-white paper.

So, aware of that phrase I opened the book and got inside this volume and I'm very glad that I did! I would actually describe this book as charming and most certainly engaging.

Starting with the author, the late Jon Cannon (he died earlier this year) would not describe himself as a geologist. As an architectural historian he worked for the Royal Commission on the Historical Monuments of England and also for English Heritage. As an author he's written on English Cathedrals and other sacred buildings. He's also fronted a TV programme: *How to Build a Cathedral BBC4 2008*.

With this background it's not at all surprising that the book should have an endorsement from the Dean of Westminster, the Revd. David Hoyle. So how does someone with this background engage with stones - and stones is what he calls them?

For Jon, stones make places. It's another way if saying that rocks make landscapes and that's something that every geologist can and does embrace, every time we go into the field. But this relationship is one that Jon lovingly embraces and shares with us. It shines through each and every page. It's like he's having a landscape love affair.

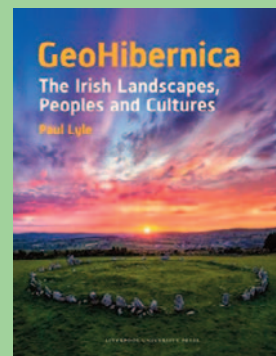
What I really like about this book is that it makes very few assumptions of its readers. I know that I often say that I'm assuming no knowledge when speaking about geology to people, but before long, I lapse into using words that show that I'm not really.

Not for Jon, he knows that he's got to go down to basics if people are to understand and appreciate the difference between an upland granite landscape of Dartmoor and a softer East Devon landscape of sedimentary sandstones.

In the context of a relaxed approach such as this, where the emphasis isn't on geological facts tumbling out at 100 mph, instead we can focus on the language. At times I felt that this was more like a novel in which the landscape is the hero of the piece. I wasn't waiting for the next colour photograph to break up the words.

This is a book that takes the reader on a journey of Britain through geological time, not all in a rush but with time to admire the view and take in the ambience. Yes, this is a really good read!

Title: Geo Hibernica -The Irish Landscapes, Peoples and Cultures
 Author: Paul Lyle
 Publisher: Liverpool University Press
 ISBN: 978 1 0484 155 0 0
 Format: Hardback
 Cost: £44.99
 Level: Adult & general interest
 My rating: ****



Paul Lyle is a geologist who has written extensively about the geology of his native Ireland. Some of you may be familiar with his field guides that were published by the former Dunedin Academic Press. This is effectively a book that charts the geological history of Ireland but it's not written for the geological academic or professional.

This is a book that is aimed firmly and squarely at a much more diverse audience. Accordingly it's not too heavy on the witten word, but instead relies more heavily on some excellent full colour figures, maps and photographs. I think of it as being the sort of book that would be found on the coffee tables of a number of homes in Ireland and beyond.

GeoHibernica explores how Ireland's diverse geological foundations have shaped its people, culture, and heritage over millennia. From ancient megaliths to modern artistic interpretations, the book examines the deep connections between landscape and identity, offering a scholarly yet personal perspective on Ireland's evolving relationship with its natural environment.

Paul begins the book with an excellent chapter on the Foundations of the Irish Landscape, making use of well known images of plate tectonics and drifting continents. Readers are left in no doubt about where the natural landscape regions came from and how they were assembled. This is followed by Chapters covering the mapping of the landscape and chronicles of the landscape.

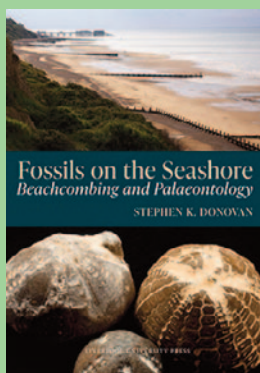
With the foundations laid, he's able to let himself explore some of the ways that the landscape has invited people such as artists in to work with it, whether as painters or sculptors.

More than this he takes a close look at how mankind has worked with and alongside the landscape, hence there's a Chapter on the evolution of communications including ancient roadways that goes on to take in the routes of modern roads and motorways.

In what is quintessentially an Irish book, he takes in something of Irish history from the Neolithic to the famine. It's a story of how the Irish people have often been engaged in a struggle working against as well as with the landscape. No wonder then that there were crop failures especially of the potato that led to deadly famines and a mass exodus of people from the island. Paul ends with a short chapter that covers a little on the castles and cloisters of Ireland.

Yes, this is a very personal book for Paul. He has chosen what aspects of the Irish landscape he wants to embrace, but what's wrong with that? Well worth buying!

Title: Fossils on the Seashore
 Author: Stephen K Donovan
 Publisher: Liverpool University Press
 ISBN: 978 1 7804 610 9 0
 Format: Hardback
 Cost: £29.99
 Level: Adult & general interest
 My rating: *****



If the sun is shining and the tide is out, there's nothing more exciting than being down on the beach with a bucket and spade and young children in tow. Let's be honest, everyone loves a good bit of beachcombing.

Along the Yorkshire coast, in places like Robin Hood's Bay, a good proportion of the families on the beach will also be taking in a spot of fossil hunting amongst the pebbles. Hunting for fossils on the seashore goes back at least to the times of Mary Anning.

It's amazing to think that, until now, there hasn't been a comprehensive and authoritative guide to the subject. In his retirement and after along academic career as a serious palaeontologist, Stephen Donovan has decided to share his expertise with this charming book.

In this book, Stephen Donovan balances his scholarly knowledge with practical guidance. Designed for easy reference in the field, each chapter is concise and self-contained, equipping readers with the knowledge to identify fossils, understand ancient ecosystems, and appreciate the processes behind fossilisation.

I liked some of the basic practical tips such as separating the modern shells from the fossils and little tips like examining closely the high tide strand line for some of the little gems such as the tiny ammonites you can find at Robin Hood's Bay.

No book on the seashore would be complete without a nod in the direction of health and safety and the author does this but it's not over the top, just sound practical advice.

After a first part of examining aspects of the beach, Stephen goes on to take in what we might look for and finally a section entitled 'Where to go and what to see'. In the first of these we get some sound palaeontology with excellent illustrations. In the second there are some nice brief guides to place from the Isle of Wight to the Isle of Mull.

Fossils on the Seashore brings the author's extensive field experience to life, unlocking the geological and palaeontological secrets of the past from Britain's remarkable coastal landscapes. It is an indispensable resource for both amateur enthusiasts and emerging palaeontologists.

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Book Choice

Title: Defined by Stones
 Author: Ian Jackson
 Publisher: Northern Heritage Services
 ISBN: 978 1 7394 861 8 1
 Format: Softback
 Cost: £12.00
 Level: Adult & general interest
 My rating: ****



Ian Jackson isn't new to geological photography as his two previous books on Cumbria and Northumberland bare witness. This new book takes him beyond pure geology to examine the relationship between the natural processes that have placed the stones where they are and the human endeavours that have used them.

This comes from Ian Jackson's press release

Who were the skeletons in a cave in Sunderland? Whose was the ancient body buried in a bog near Carlisle and lost in London? How did the remains of hippos, rhinos and hyaenas, found in caves in North Yorkshire, challenge the story of Noah's flood? What or who did the heavy lifting of the huge megaliths in northern stone circles?

Just how did bits of Cheviot granite and Pennine and Lake District stone axes turn up in Southern England? When did the first people inhabit the north? Did the real Brexit actually take place 6000 years ago? From frozen wastes to tropical bones, preserved bog bodies to far-travelled stones, the facts about the north's hidden past are much stranger and more dramatic than fiction. The clues are there for us to see in the landscape, its rocks and the monuments and objects left by our ancestors. But how to decipher them?

Curious? Then a newly published book is for you. The book and its full colour photography will transport you to 50 places across the north, but perhaps you'd like to go see the evidence for yourself? That's what local author and geologist, Ian Jackson, hopes many will do. *'Defined by Stones'* - makes the connections between the landscape and the ancient people who lived in it.

Says Ian: "Prehistoric people left no written records, their history is documented in the stones they used. Rocks provided them with shelter, tools and weapons, jewellery and ornaments, tombs and their monuments. To understand our ancestors, we need to understand the landscape they inhabited and the natural resources they relied on, from hard rocks and soft clay, to iron and copper, peat and coal. I've always been fascinated by ancient people and their landscape. I wanted to know more but there wasn't a book that described the prehistoric landscape of the north in an accessible way. So I decided to write one - a geologist's science-based perspective - one that does pose some questions about traditional archaeological interpretations of our past".

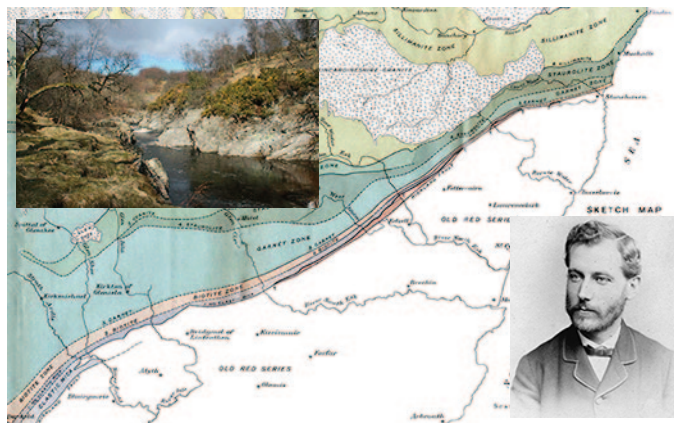
Like Ian's previous books this is essentially a collection of his fine photographs accompanied by extended captions. Both are high in quality.

The book is supported by The Society of Newcastle Antiquaries and its proceeds are being donated to the local mental health charity Tyneside and Northumberland Mind. An excellent present for the Christmas season



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

Who, What & Where?



I hope that you were all able to recognise that the map was pointing towards the Northeast of Scotland with Stonehaven on the North Sea coast. But maybe the location and person were harder.

Well done to those of you had a go whether at home or who formally submitted a response.

Who? George Barrow (1853-1932)

What? Pioneer metamorphic geologist who gave us the so called 'Barrovian metamorphic zones' to classify metamorphism.

Where? Barrow was born in London. He graduated from London University in 1871. His main interest was the Dalradian Metamorphic rocks of Scotland. The image shows a section in Glen Esk which Barrow worked on.

Paul Thornley writes:

"I did a little research on George Barrow and the Barrovian Zones of Glen Esk. I write a monthly geology blog for the Yorkshire Philosophical Society and included the following in the September version:

Women and Men in Geology - George Barrow (1853-1932) and The Highland Boundary Fault. He immortalised his name in geological literature by discovering the metamorphic zonation of the Highlands in the 1890's, since referred to as the Barrovian Zones.

Richard Mann writes:

"George Barrow was the first BGS survey geologist to produce a BGS map in 1912 showing metamorphic mineral boundaries where thermal affects had overprinted a larger regionally metamorphosed area. His recognition that metamorphism produced crystal overgrowth or changed earlier formed minerals allowed him to select when a new mineral **first** made its appearance in the rock sample named as an Index Mineral.

Mapping the Index Minerals zones (later known as isograds) indicated a change in metamorphic grade and became a classic universal standard for intermediate pressure/temperature 'Barrovian-type Metamorphism' now known to be commonly associated with continent-continent collision."

This comes from the IUGS website:

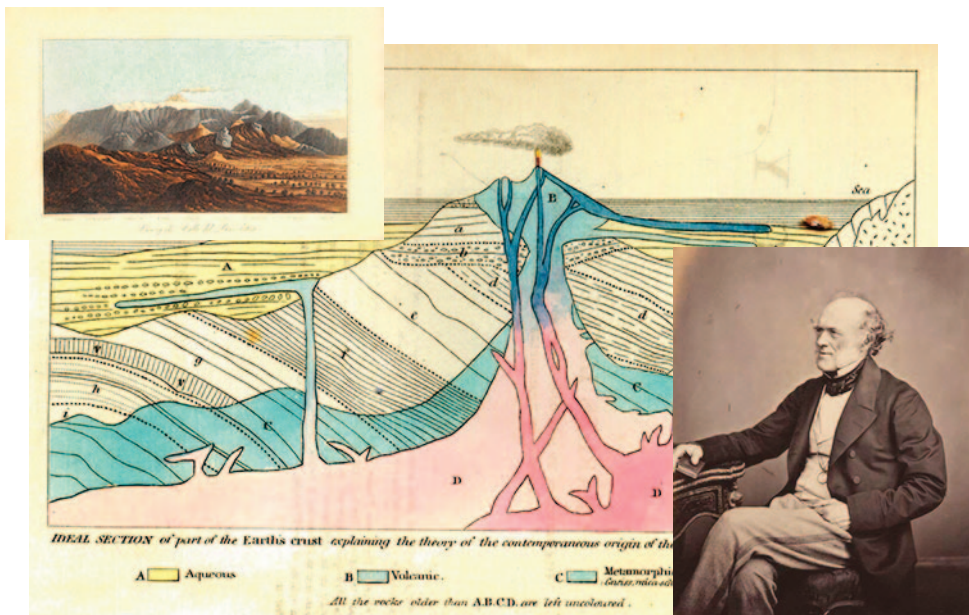
In the words of Tilley (1925), the Barrow zones represent "the first attempt in the petrological literature to bring precision to the study of regional metamorphism, by laying upon a map zonal lines indicative of varying grades of metamorphism". In essence, Barrow was the first to provide convincing field evidence of a sensitive thermal structure for regional metamorphism (Evans, 2007).

The mineral sequence has become entrenched in the literature as the classic example of intermediate pressure/temperature metamorphism, typically as a consequence of continent-continent collision, and such metamorphism is often referred to as Barrovian-type (e.g. Weller et al., 2013).

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 was he, what's he known for and which places is he most associated with?

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





diary of events

lectures/zoom meetings

November

3 "Volcanoes in the spotlight" by Dougal Jerram
 Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com
 4 "Highlights of The Natural History Museum gem collection" by Robin Hansen
 Organiser: Essex Rock & Min. Soc. Details: <http://www.erms.org/> (Shenfield)
 6 "Geological and geochemical controls on the Au-Co mineralisation of Rajapalot, Finland" by Lily Dickson
 Organiser: Leeds GA Details: <https://leedsga.org.uk>
 6 "The day the Mediterranean dried up - the Messinian salinity crisis" by Rachel Fletcher
 Organiser: Bath Geol. Soc. Details: <https://bathgeolsoc.org.uk/lectures/>
 8 "Geoscience for a sustainable future" by Karen Hanghøj
 Organiser: East Midlands Geol. Soc. Details: <https://www.emgs.org.uk/>
 8 "Keeping hazardous fluids safely locked up: Using geology to dispose of waste products" by Cat Daniels.
 Organiser: South Wales GA Group Details: <http://swga.org.uk/>
 11 "Geology as a route to developing self-awareness and wellbeing" by Ruth Allen
 Organiser: West of England GA Details: <https://www.wega.org.uk/>
 11 "Forensic micropalaeontology from crime to fine art" by Haydon Bailey (Zoom) Organiser: Amateur Geol. Soc. Details: <https://amgeosoc.wordpress.com/>
 12 "Past environments of the Isle of Wight" by Eve Horsfall (Zoom)
 Organiser: Harrow & Hillingdon Geol. Soc. Details: <https://www.hhgs.org.uk/>
 12 "The Stoer Group stromatolites of Northwest Scotland" by Peter Gutteridge
 Organiser: Shropshire Geol. Soc. Details: <https://shropshiregeology.org.uk/>
 12 "The Trainor's Rocks gritstone conglomerate of the Mourne Mountains" by Norman Moles
 Organiser: Edinburgh Geol. Soc. Details: <https://edinburghgeolsoc.org/>
 12 "Glacial readvances in Western Cumbria" by Jon Merritt
 Organiser: Cumberland Geol. Soc. Details: <https://www.cumberland-geol-soc.org.uk/events/>
 13 "The onset of modern-style plate tectonics" by Craig Storey (Zoom)
 Organiser: Hertfordshire Geol. Soc. Details: <https://www.hertsgeolsoc.org.uk/>
 13 "A new treatise on Invertebrate Palaeontology" by Kristian Saether
 Organiser: Hull Geol. Soc. Details: <https://hullgeolsoc.co.uk/hgmeet.htm>
 13 "The Anthropocene and its implications for our future climate" by Colin Summerhayes
 Organiser: Mole Valley Geological Society. Details: www.mvgs.org.uk
 13 "Sedimentary systems in the Palaeocene lava fields of the Inner Hebrides" by Brian Bell Organiser: Geol Soc. of Glasgow Details: <https://geologyglasgow.org.uk/events/>
 14 "New insights into the break-up of the North Atlantic Ocean" by Chris Darmon & Colin Schofield (Zoom)
 Organiser: Farnham Geol. Soc. Details: <https://www.farnhamgeosoc.org.uk/>
 15 "Coastal ecosystems and their role in climate change mitigation" by Hilary Kennedy (plus 2 more speakers)
 Organiser: Manchester Geol. Ass. Details: <https://manchestergeology.org.uk/>
 15 "Women in geology" - celebrating women in geoscience
 Organiser: Yorkshire Geol. Soc Details: <https://www.yorksgeolsoc.org.uk/>
 17 "Medicine & geology - an exploration" by Albert Benghiat
 Organiser: Black Country Geol. Soc. Details: honsec@bcgs.info
 18 "Is the evidence concrete or set in stone?" by Anne Padfield
 Organiser: Kent Geologists' Group Details: www.kgg.org.uk/
 18 "Darwin's 'beloved barnacles' solving evolutionary problems with fossils" by Andy Gale
 Organiser: Dorset GA Group Details: <https://dorsetgeologistsassociation.org/>
 18 "Soil" by Alan Muhr
 Organiser: East Herts. Geology Club Details: <https://ehgc.org.uk/>
 19 "Edge of Empire" by Ian Jackson
 Organiser: Westmorland Geol. Soc. Details: <https://westmorlandgeolsoc.org.uk>
 20 "Deep geothermal fluids & geothermal energy" by Chris Rochelle

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

Organiser: Warwickshire Geocons. Group Details: <https://www.wgcg.co.uk/>
 20 "Charlesworth - an eminent but controversial Victorian geologist" by Dominic Davey
 Organiser: Essex Rock & Min. Soc. Details: <http://www.erms.org/> (Stanway)
 21 "The relationship of English vineyards to Wealden strata" by Mark Eller
 Organiser: West Sussex Geol. Soc. Details: <https://wsgeolsoc.org.uk/>
 21 "Looking beneath the ice: mapping the geology of Greenland & Antarctica" by Guy Paxman (Zoom)
 Organiser: North Eastern Geol. Soc. Details: <https://www.negs.org.uk/>
 26 Talks by School of GeoSciences research students
 Organiser: Edinburgh Geol. Soc. Details: <https://edinburghgeolsoc.org/>

December

1 "Cetaceous amber - frozen in time" by Ricardo Perez de la Fuente
 Organiser: Reading Geol. Soc. Details: togs.secretary@btinternet.com
 3 "The origin & evolution of life: the story from asteroids" by Ashley King
 Organiser: Brighton & Hove Geol. Soc. Details: <https://www.bhgs.org/> (Zoom)
 4 "Meteorites explained" by Mike Simms
 Organiser: Bath Geol. Soc. Details: <https://bathgeolsoc.org.uk/lectures/>
 4 AGM & Conversazione
 Organiser: Leeds GA Details: <https://leedsga.org.uk>
 5 "The Mull dyke swarm" by Joe Cartwright (Zoom)
 Organiser: Geologists' Association Details: <https://geologistsassociation.org.uk/lectures/> (Hybrid)
 6 "How did the formation of the Isthmus of Panama help shape the modern Earth?" by David Buchs
 Organiser: South Wales GA Group Details: <http://swga.org.uk/>
 6 Ask a geologist
 Organiser: Warwickshire Geocons. Group Details: <https://www.wgcg.co.uk/>
 9 "Fossil bryozoans from the chalk" by Paul Taylor (Zoom)
 Organiser: Amateur Geol. Soc. Details: <https://amgeosoc.wordpress.com/>
 9 Social & quiz night
 Organiser: East Herts. Geology Club Details: <https://ehgc.org.uk/>
 9 "How the famous fish beds of Lebanon have informed on life & evolution in the Cretaceous" by Hady George
 Organiser: Dorset GA Group Details: <https://dorsetgeologistsassociation.org/>
 10 "The Castle Bank fauna near Llandrindod Wells" by Joe Botting
 Organiser: Shropshire Geol. Soc. Details: <https://shropshiregeology.org.uk/>
 10 "Volcanoes lecture series - Campi Flegrei" by Christopher Kilburn
 Organiser: Harrow & Hillingdon Geol. Soc. Details: <https://www.hhgs.org.uk/>
 10 "Why James Hutton is not called 'the father of modern diagenesis'"
 Organiser: Edinburgh Geol. Soc. Details: <https://edinburghgeolsoc.org/>
 10 "The Windermere Supergroup" by Ben Kneller
 Organiser: Cumberland Geol. Soc. Details: <https://www.cumberland-geol-soc.org.uk/events/>
 11 Christmas soirée and geo-karaoke
 Organiser: Mole Valley Geological Society. Details: www.mvgs.org.uk
 12 "The value & potential of the UK's dinosaur track sites" by Richard Butler
 Organiser: Hertfordshire Geol. Soc. Details: <https://www.hertsgeolsoc.org.uk/>
 12 Three short talks by members
 Organiser: North Eastern Geol. Soc. Details: <https://www.negs.org.uk/>
 12 "The geology of Switzerland in 30 minutes" by Jon Lonergan
 Organiser: West Sussex Geol. Soc. Details: <https://wsgeolsoc.org.uk/>
 12 "Lost landscapes of Tibet" by Robert Spicer (Zoom)
 Organiser: Farnham Geol. Soc. Details: <https://www.farnhamgeosoc.org.uk/>
 13 "Late Quaternary hydroclimates" by Matthew Jones
 Organiser: East Midlands Geol. Soc. Details: <https://www.emgs.org.uk/>

January

7 "The geology of the British Isles in around 100-minutes" by Chris Darmon
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk (Zoom)
 7 "Palaeozoic early vertebrates (jawless fish)" by Richard Dearden (Zoom)
 Organiser: Brighton & Hove Geol. Soc. Details: <https://www.bhgs.org/>
 10 Holiday geology co-ordinator John Nudds
 Organiser: South Wales GA Group Details: <http://swga.org.uk/>
 10 "Ordovician magmatism in Eastern England" by Tim Pharaoh
 Organiser: East Midlands Geol. Soc. Details: <https://www.emgs.org.uk/>

13 “Dinosaurs: new visions of a lost world” by Michael Benton (Zoom)
 Organiser: Amateur Geol. Soc. Details: <https://amgeosoc.wordpress.com/>
 13 “Greenland glaciers, ice and physics on the world’s largest island”
 by Lawrence Dyke (Zoom)
 Organiser: West of England GA Details: <https://www.wega.org.uk/>
 14 “The geology of the core-mantle boundary” by Sebastian Rost
 Organiser: Shropshire Geol. Soc. Details: <https://shropshiregeology.org.uk/>
 14 “Ardley dino tracks” by Tim Pharaoh (Zoom)
 Organiser: Westmorland Geol. Soc. Details: <https://westmorlandgeolsoc.org.uk>
 14 “New interpretations of the Skiddaw Group” by Phil Davies
 Organiser: Cumberland Geol. Soc.
 Details: <https://www.cumberland-geol-soc.org.uk/events/>
 14 “Exploring a metamorphosed VMS system in Scotland” by Cendi Dana
 Organiser: Edinburgh Geol. Soc. Details: <https://edinburghgeolsoc.org/>
 16 “The influence of geology on London’s Underground railways”
 by Jonathan Gammon
 Organiser: West Sussex Geol. Soc. Details: <https://wsgeol.org.uk/>
 16 “The impact of permafrost thaw on climate change” by Catherine Hirst
 Organiser: North Eastern Geol. Soc. Details: <https://www.negs.org.uk/> (Zoom)
 28 “The geographic origins of the builders of Stonehenge” by Gane Evans
 Organiser: Edinburgh Geol. Soc. Details: <https://edinburghgeolsoc.org/>

February

2 “Snowballs in the desert - the glacial history of Oman” by Ross Garden
 Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com
 4 “Little things can make a big difference - calcareous nannofossils”
 by Liam Gallagher
 Organiser: Brighton & Hove Geol. Soc. Details: <https://www.bhgs.org/>
 7 “Brymbo fossil forest” by Tim Astrop
 Organiser: South Wales GA Group Details: <http://swga.org.uk/10> “A glimpse into the wonders of Idar Oberstein” by Ian Mercer (Zoom)
 Organiser: Amateur Geol. Soc. Details: <https://amgeosoc.wordpress.com/>
 10 “Calcareous nonnifossils - little things can make a big difference”
 by Liam Gallagher
 Organiser: West of England GA Details: <https://www.wega.org.uk/>
 11 “Darwin and Wallace” by John Fraser King
 Organiser: Shropshire Geol. Soc. Details: <https://shropshiregeology.org.uk/>
 11 “Acadian arcuate fold trends” by Alastair Baird
 Organiser: Cumberland Geol. Soc.
 Details: <https://www.cumberland-geol-soc.org.uk/events/>
 11 “Whence the Rudston Monolith” by John Connor & Martin Clarke (Zoom)
 Organiser: Hull Geol. Soc. Details: <https://hullgeolsoc.co.uk/hgmeet.htm>
 11 “The critical metals of Scotland” by Chris MacKenzie
 Organiser: Edinburgh Geol. Soc. Details: <https://edinburghgeolsoc.org/>
 14 “Mineralogy in art” by Chris Duffin
 Organiser: East Midlands Geol. Soc. Details: <https://www.emgs.org.uk/>
 18 AGM & Presidential Address by Hugh Tuffen
 Organiser: Westmorland Geol. Soc. Details: <https://westmorlandgeolsoc.org.uk>
 20 “How to build a 25,000 sqm natural history museum from scratch”
 by Phil Manning (Zoom)
 Organiser: North Eastern Geol. Soc. Details: <https://www.negs.org.uk/>
 25 “The role of Scotland’s geology in the energy transition”
 by Katriona Edlmann
 Organiser: Edinburgh Geol. Soc. Details: <https://edinburghgeolsoc.org/>

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.

November

1 Field visit to Harwich
 Organiser: Essex Rock & Min. Soc. Details: <http://www.erms.org/>
 15 Field visit to explore the building stones of Blandford with Kelvin Huff
 Organiser: Dorset GA Group Details: <https://dorsetgeologistsassociation.org/>

December

4. Field visit to Thorndon Park pebble trail with Ros & Ian Mercer
 Organiser: Essex Rock & Min. Soc. Details: <http://www.erms.org/>

February

28 Field visit to Lulworth with Tony Cross
 Organiser: Dorset GA Group Details: <https://dorsetgeologistsassociation.org/>

residential field trips

November

23-December 2 La Palma Canary Islands
 Organiser: Volcanic Experiences. Details: www.volcanicexperiences.co.uk/

2026

March

19-23 Iceland the beauty & power of geology
 Organiser: Geologists’ Association.
 Details: fieldmeetings@geologistsassociation.org.uk
 27-April 1 The Jurassic Coast of Dorset with Chris Darmon & Colin Schofield
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

April

14-22. The Northwest Highlands of Scotland with Chris Darmon & Colin Schofield. Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

May

1-8 Central Cornwall with Chris Darmon & Colin Schofield
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk
 16-23 Teesdale & the North Pennines with Chris Darmon & Colin Schofield
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

Jun

7-11. Minehead & North Somerset with Chris Darmon & Colin Schofield
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk
 17-25 Shetland the Northern Isles with Chris Darmon & Colin Schofield
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

July

5-10 The Anglesey Geopark with Chris Darmon & Colin Schofield
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk
 8-10 A celebration of James Hutton - Edinburgh based field trip
 Organiser: Geologists’ Association.
 Details: fieldmeetings@geologistsassociation.org.uk
 17-19 Flamborough & East Yorkshire
 Organiser: Geologists’ Association.
 Details: fieldmeetings@geologistsassociation.org.uk

August

8-15. Annual Summer School at Harper Adams University, Shropshire
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

September

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

October

18-24 Melrose & the Southern Uplands with Chris Darmon & Colin Schofield
 Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

fairs, shows & special events

November

1 GA Festival of Geology at University College London
 Organiser: Geologists’ Association.
 Details: conference@geologistsassociation.org.uk
 29 Wealden Geological Assembly - a day of geological lectures and discussions concerning Wealden Geology. Held in Kings Church Hall, Lewes from 10.00-17.00.
 Organiser: Anthony Brook Details: anthony.brook27@btinternet.com

February

21 Essex Gem & Mineral Show at Collier Row RM5 3QJ
 Organiser: Essex Rock & Min. Soc. Details: <http://www.erms.org/>

A piece of Wales beneath East Anglia...

I always enjoy being contacted by *Down to Earth* readers, and all the more so when they give me some interesting bits of information that can be shared with everyone.

Ros Mercer from the *Essex Rock and Mineral Society* was eagle eyed and spotted something of interest about the Open University terrain map of the UK that formed the background to our British Isles lecture advertisement (see page 22 of this issue) that we also put in *DtoE extra*.

Ros wrote:

"I was interested in the 'terrain' map you used in your Geology of the British Isles advert with a ? mark over East Anglia. We did our best to answer this in our *Essex Rock* book - see Chapter 4, but with no economic target below the Chalk, there is very little data. However, we do think that we have a slice of Wales beneath our feet here."



The proof - this is 'a small piece of Wales' from the Weeley core that was drilled beneath Clacton in 1896.

In 1896, a piece of slate of unknown age, was recovered some 1150 feet down at borehole at Weeley near Clacton. Today we also recognise, from geophysical evidence, that there are igneous intrusives beneath the area. These are thought to be of Ordovician age.

Another crazy idea for Donald to consider...

Down to Earth reader **Tim Coleman** sent us a newspaper cutting stating that the Kremlin was urging Elon Musk to build a tunnel across the Bering Strait to link Alaska with Russia.

It would be seen by some as the 'ultimate vanity project' for two leaders in the shape of Donald Trump and Vladimir Putin. Although it sounds crazy it comes from a sound source, Karil Dmitri, who is head of Russia's sovereign wealth fund (IRED).

He states that it would cost \$8 Bn to build what would be a 70-mile cargo link between the two continents. He further proposes that Moscow would build this with funding also from 'international partners'. There's no mention of the minor complication of a plate boundary along the route! It will come as no surprise that news of this emerged after one of Trump and Putin's recent telephone calls concerning Ukraine!



*Dinosaurs are alive and well in Torquay!
(Image: Chris Darmon)*

Dinosaurs are on the loose in Torquay...

It's good to see that dinosaurs still make for good box office takings at this seafront museum in Torquay. Set up outside 'Dinosaur World' are two ferocious looking specimens. That said, plenty of people put their hands inside the open jaw, including one magazine editor!

Talking of dinosaurs - how about this 'dino-seat'...



During a visit to the Dan yr Ogof caves in South Wales two of the people on the Down to Earth trip, take advantage of the dino-seat that happened to be on offer! A little later on, during the same visit, Chris Darmon took an 'early bath' in one of the caves!

Does this count as a safety failure?



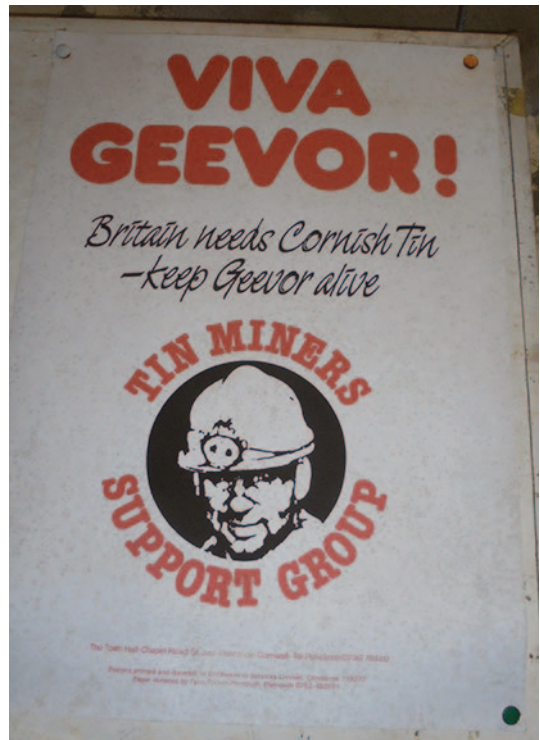
This somewhat unhelpful sign was spotted during a visit to the site of Buckfast Abbey church in Buckfastleigh in Devon. To be honest, no sign was really necessary to discourage me at least from going any nearer than this!

The other Copacabana Beach...



A visit to Rio de Janeiro isn't complete, I'm told, without a visit to the famous (and beautiful) Copacabana Beach. This beach of the same name is a long way from Rio. It's in Dubrovnik, Croatia and it's not a patch on its Rio cousin - trust me!

Fabulous recent social history at Geevor Tin Mine in Cornwall...

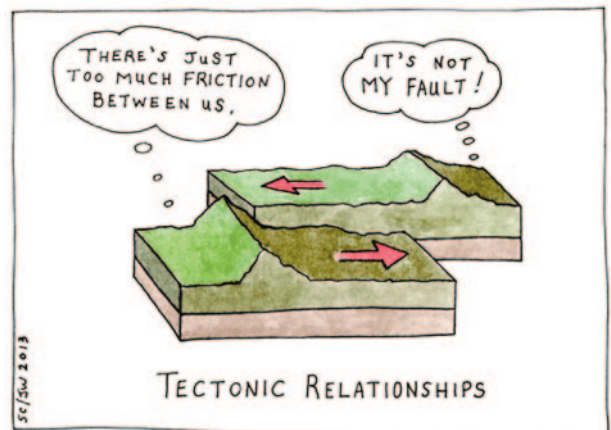


During 2025 we've visited Geevor Tin Mine in Cornwall with two groups of American visitors. On both occasions we had the same enthusiastic and highly knowledgeable guide. Geevor Mine was a relatively early casualty of the worldwide collapse of tin prices in 1985, closing in 1990.

On the last occasion we were in his company for more than two hours and spent a considerable amount of time in the former miners' locker room and shower area, known as the 'dry', where there's a lot of what can best be described as social history.

This area is just as it was when it was last used in 1990, almost as the last shift would have left it. There are lots of pictures of the miners and also some of their possessions, including underwear! I was struck by one item, a poster from the Tin Miners Support Group that tried unsuccessfully, to keep the mine open. Thirty five years ago, it wasn't an internet or social media campaign, but good old fashioned posters!

And finally...

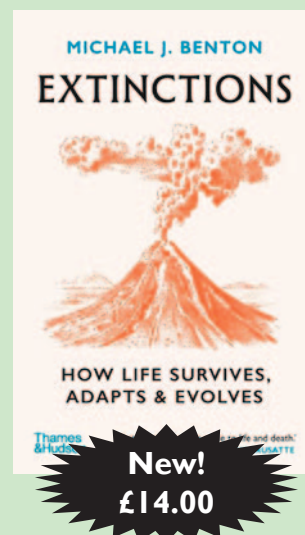
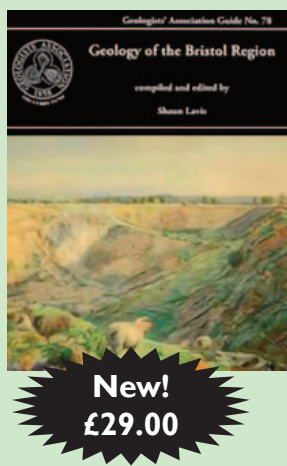
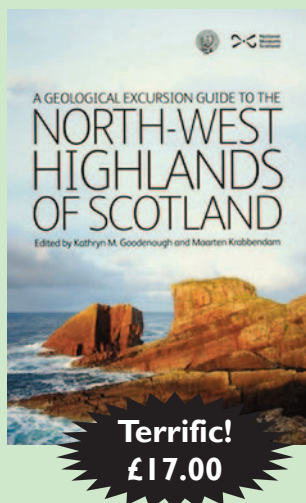
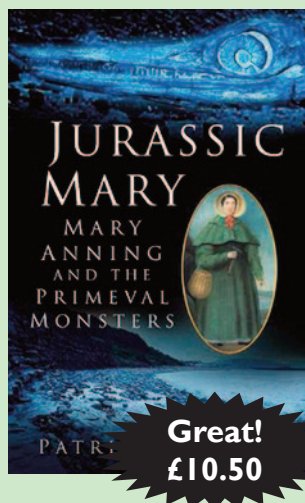
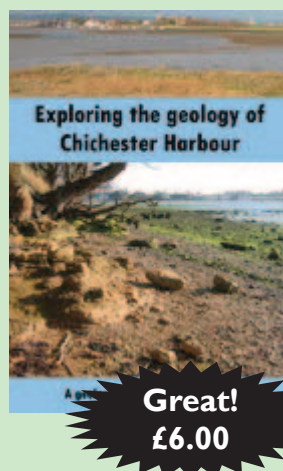
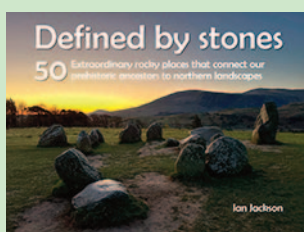
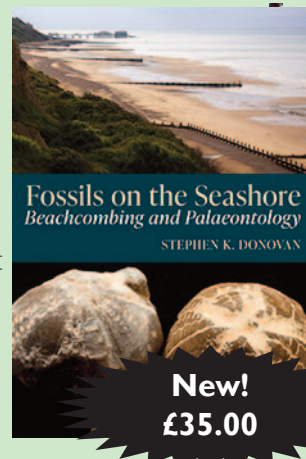


This comes from ZME Science in the USA - says it all!



Featured books November to January

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 January 2026 provided that stocks are available. This month we feature some great new books. Please note, all prices include UK postage.



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