Down to Earth

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Celebrating James Hutton's tercentenary - 'The father of modern geology'

Down to Earth
'Earth science learning for all'

The learning zone

Great geo-adventures in 2027 begin here...

Great geo-adventures



Great coastal scenery around Cromarty - Devonian rocks near McFarquhar's Cave.
(Image: Scotland off the beaten track)

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2027

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We welcome your contributions, which should be with us no later than January 15th 2027 for the February issue.

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cover story



A new addition to the cliff top at the remote spot known as Siccar Point. This is where James Hutton 'the father of modern geology' recognised deep time in 1788, declaring that "(Time) had no vestige of a beginning, no prospect of an end".

(Image: Chris Darmon)

editorial

James Hutton - the inspiration for two very different approaches...

As 2026 draws to a close it just so happened that our final field trip of the year involved us visiting the Southern Uplands of Scotland. This was the area, along with the Midland Valley, which were the stomping ground of one James Hutton. This year marks the tercentenary of his birth in 1726 so it seems even more appropriate to pay homage to him and his pioneering work during the 1780s.

Hutton was a farmer and landowner and it was during his extensive travels around the country that he began to study the soil and the rocks that they came from. For instance, he recognised that red soils were linked to red rocks. Slowly, through field observations he came up with the idea that we now call the rock cycle.

His involvement with the movement known as the Scottish Enlightenment, encouraged him to think outside the box, something that his English counterparts did not, largely due to the constraints of the established church at the time.

Acores Scotland, first at Lochranza on Arran, then at Jedburgh and finally at Siccar Point he found what we now call unconformities where the rocks of two cycles come up against each other. Siccar Point finally convinced Hutton of the enormity of geological time allowing him to utter the words that are etched into our thinking and define the background of modern geology. He gave this definition of geological, or deep time, declaring it had "no vestige of a beginning, no prospect of an end."

To mark the tercentenary geologists have come together to create 'the deep time trail' at Siccar Point. Talented local people have come together to build a magnificent seat and viewpoint above the geological site.

For the first time, visitors can sit above the site and see what Hutton and his two companions saw in 1788. Along the trail there are several additional stops where evocative prose is used to set the scene and introduce us to Hutton and his ideas. They combine to bring Hutton to life for a modern audience.

Meanwhile in the centre of Edinburgh, within sight of Hutton's Section where he recognised that Salisbury's Crag is composed of a rock that had once been molten, lies the extraordinary attraction known as 'Dynamic Earth'.

Opened in 1999 it remans controversial to this day. It was first conceived by John Sunderland, a creative consultant with Coopers and Lybrand in 1987. With land donated by the brewer Scottish and Newcastle, it became a millennium project, and was opened by Her Majesty Queen Elizabeth.

It manages to blend the traditional with the modern with its use of high-tech to present our views on planet earth. Crucially, given its proximity to Hutton's section, it uses James Hutton himself as the narrator who sets the scene for all that follows. Dynamic Earth does that right thing in paying homage to James Hutton and some of the other pioneers right at the beginning of the story, where he belongs. I'm not sure whether he would approve of the rest of the story though!

Chris Darmon, Editor

news up front

A digest of some of the latest Earth Science news from around the world.

The Earth's crust is being torn apart off the Pacific Northwest, new study finds...

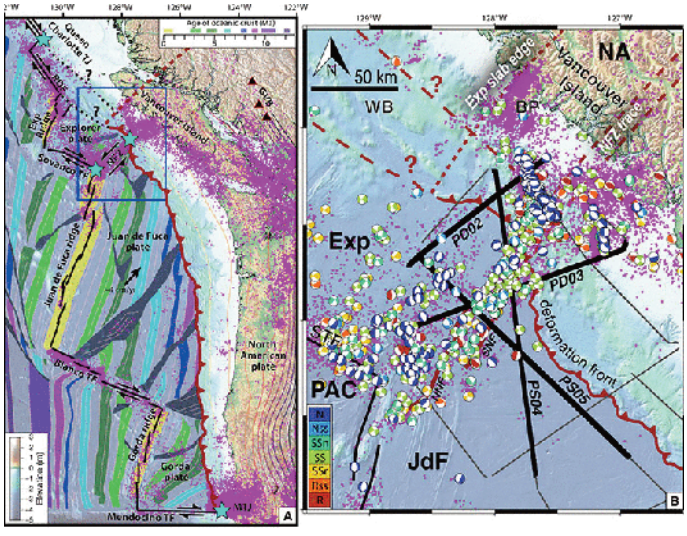
Scientists from Louisiana State University (LSU) led by Professor Brandon Shuck have identified a new subduction zone forming off the Pacific Northwest. It has now been published in Science Advances (September 2026).

This comes from the LSU website:
With unprecedented clarity, scientists have directly observed a subduction zone—the collision point where one tectonic plate dives beneath another—actively breaking apart. The discovery, reported in ***Science Advances***, sheds new light on how Earth's surface evolves and raises fresh questions about future earthquake risks in the Pacific Northwest.

The Cascadia subduction zone, where the Juan de Fuca (JdF) and Explorer (Exp) plates slowly move beneath the North American plate, is gradually shutting down piece by piece, with slabs breaking off while the remaining plate continues to subduct until the next rupture occurs.

Subduction zones are among the most powerful forces on Earth. They drive continents across the globe, unleash devastating earthquakes and volcanic eruptions, and recycle the planet's crust deep into the mantle.

But they don't last forever. If they did, continents would endlessly collide and stack up, erasing oceans and wiping out the record of Earth's past. The big question geologists have wrestled with is; how exactly do these mighty systems finally shut down?



An image from the research showing some of the seismic plots. (Image: Courtesy of LSU)

"Getting a subduction zone started is like trying to push a train uphill - it takes a huge effort," said Brandon Shuck, a geologist at Louisiana State University and lead author of the study. "But once it's moving, it's like the train is racing downhill, impossible to stop.
Ending it requires something dramatic - basically, a train wreck."

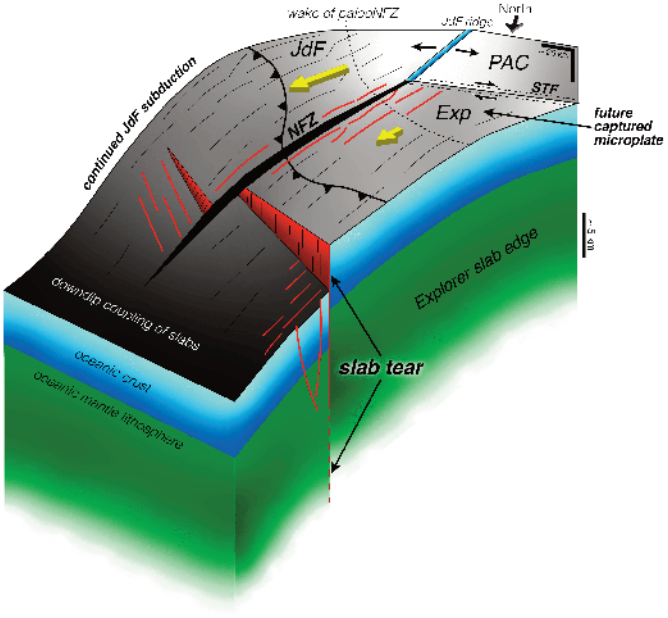
Off the coast of Vancouver Island, in a region of Cascadia where the Juan de Fuca and Explorer plates slowly move beneath the North American plate, scientists have found the answer. Using a combination of seismic reflection imaging - essentially an ultrasound of the Earth's subsurface - and detailed earthquake records, the team has captured a subduction zone in the process of tearing itself apart.

The seismic data was collected during the National Science Foundation (NSF) funded 2021 Cascadia Seismic Imaging Experiment (CASIE21), when researchers sent sound waves from a research ship into the seafloor and recorded the echoes with a 15 km long streamer of underwater listening devices. This produced high-resolution images of faults and fractures deep beneath the ocean floor, revealing places where the plate is literally snapping.

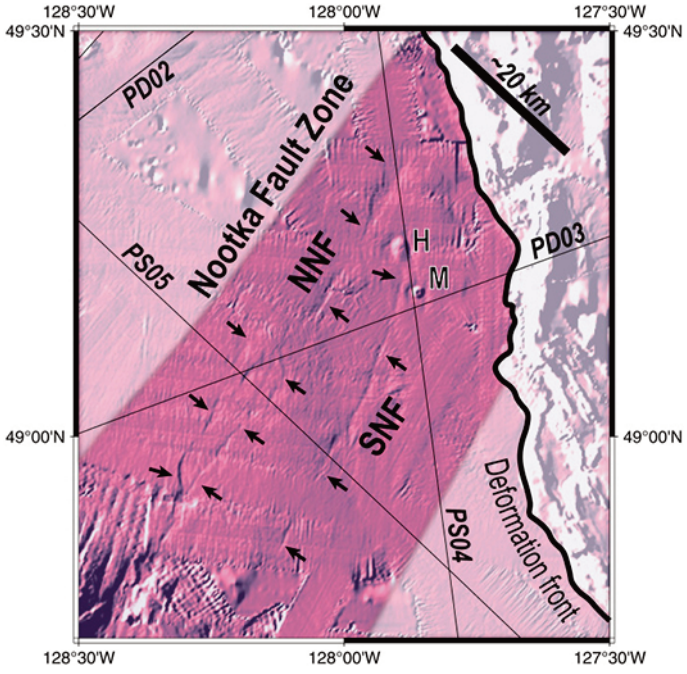


Researchers and crew aboard the R/V Marcus G. Langseth during the CASIE21 experiment, which collected the seismic data. (Image: Courtesy of LSU)

"This is the first time we have a clear picture of a subduction zone caught in the act of dying," said Shuck. "Rather than shutting down all at once, the plate is ripping apart piece by piece, creating smaller microplates and new boundaries. So instead of a big train wreck, it's like watching a train slowly derail, one car at a time."



A cartoon reconstruction of the burgeoning subduction zone. (Image: Courtesy of LSU)



Seafloor expression of the Nootka Fault Zone in northern Cascadia. (Image: Courtesy of Science Advances)

The team observed tears slicing through the oceanic plate, including a massive offset where the slab has dropped by about five kilometers. "There's a very large fault that's actively breaking the plate," Shuck explained. "It's not 100% torn off yet, but it's close." Earthquake records confirm the pattern: along the 75 km long tear, some sections are still seismically active, while others are eerily quiet. "Once a piece has completely broken off, it no longer produces earthquakes because the rocks aren't stuck together anymore," he said. That missing gap of seismicity is a tell-tale sign that part of the plate has already detached and the gap is growing slowly over time.

The study found that this breakup happens in stages, through what researchers call "episodic" or "piecewise" termination. Rather than a sudden break across the entire tectonic plate, the plate gradually tears apart one section at a time. Transform boundaries - faults where plates slide past each other - play a key role in this process. Acting like natural scissors, these faults cut across the plate, perpendicularly to the tear, allowing one piece to detach and form a microplate while subduction continues in neighbouring sections.

By tearing off in smaller chunks, the larger plate loses momentum, like cutting the cars off a runaway train and eventually stops being pulled downward. Each piece that breaks away is a process that takes several million years, but together these episodes gradually shut down an entire subduction system.

This episodic breakup helps explain puzzling features in Earth's history preserved elsewhere, such as abandoned fragments of tectonic plates and unusual bursts of volcanic activity. A striking example lies off Baja California, where scientists have long observed ancient microplates - the shattered remains of the once-massive Farallon plate. For decades, researchers knew these fragments must be evidence of dying subduction zones, but the mechanism that created them was unclear. Cascadia is now providing that missing piece: subduction zones don't collapse in a single catastrophic event but unravel step by step, leaving behind microplates as geological evidence.

And the process isn't over. As each fragment detaches, it reshapes Earth's surface. The torn edges may create "slab windows" where hot mantle rises, fuelling bursts of volcanic activity. Over time, the plate boundaries migrate, new microplates form, and the cycle repeats. "It's a progressive breakdown, one episode at a time," said Shuck. "And it matches really well with what we see in the geologic record, where volcanic rocks get younger or older in a sequence that reflects this step-by-step tearing."

You can read more here:
https://www.brandonshuckgeo.com/research

Or go to the paper in Science advances here:
https://www.science.org/doi/10.1126/sciadv.ady8347

The 1.5 billon year old fossils found in Western Australia and how this ancient archive is at risk...

Writing in the online Science Blog 'The Conversation', Heidi Jane Allen, Palaeontologist at the University of Melbourne, says:

Today, our planet is teeming with life, but it has not always looked the same. Long before forests reached skyward, animals walked on land, and the rise and fall of dinosaurs, our planet was shaped by a much smaller, more unassuming form of life. And we can still find traces of it today.

These ancient fossils, the earliest visible evidence of life on Earth, are known as microbialites. Western Australia contains an extraordinary record of microbialites: from the oldest known examples, preserved in rocks almost 3.5 billion years old in the Pilbara, to living examples in the UNESCO World Heritage area of Shark Bay.

Our review of 50 years of microbialite research in Western Australia, published today in the journal ***Alcheringa***, summarises what this archive can tell us about the evolution and resilience of life on Earth.



Fossil microbialites preserved in rocks almost 3.5 billion years old in Western Australia's Pilbara region. (Image: Heidi Allen)

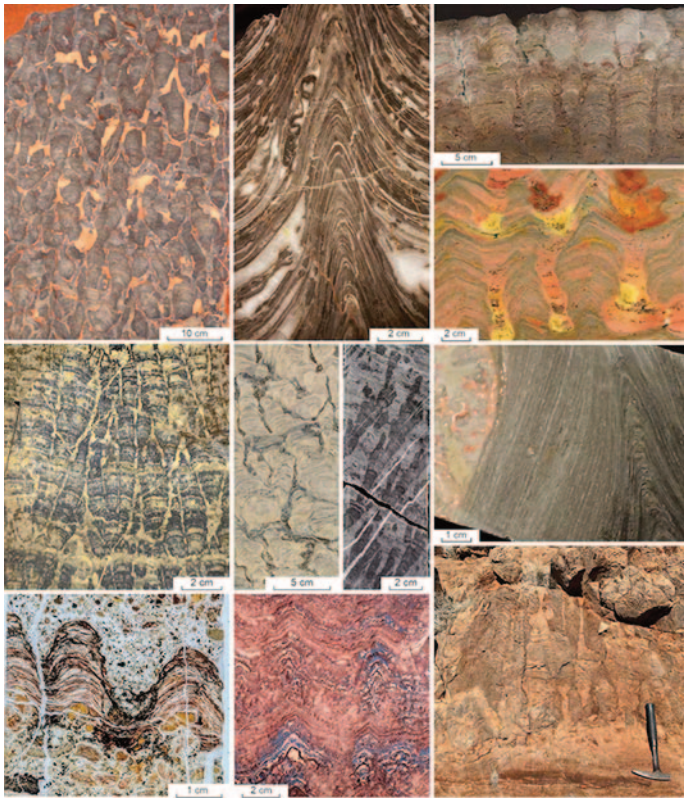
Despite a fossil record that spans billions of years, microbialites are surprisingly fragile. Fossil sites remain vulnerable to over-collection and degradation, while living microbialites are facing growing pressures.

At sites such as Lake Clifton and Shark Bay, some events may have already caused irreparable damage. One such example was in May

2024, when dozens of aurora chasers trampled 2,000-year-old thrombolites in a restricted area at Lake Clifton.

Microbialites are mounded structures that come in many shapes and sizes. They form when communities of microbes either precipitate minerals, or trap and bind sediment.

Types of microbialites can be characterised by their internal structure. Stromatolites are the best known, and have distinctive layers. Thrombolites, by contrast, have a clotted texture.



Proterozoic stromatolites preserved in an array of shapes and sizes. (Image: Heidi Allen)

The microbialite record can tell us a great deal about life on Earth. It gives us clues about where some of the earliest life lived, where we might look for life beyond Earth, and how our atmosphere became oxygen rich, paving the way for more complex life to follow.

Modern sites are particularly important because they help us better understand processes that formed microbialites in the ancient rock record. Living microbialites from Shark Bay have even been described as a "Rosetta Stone" for understanding their fossil counterparts.

Microbialites also preserve evidence of how life responded to environmental upheaval in the past. Western Australia's microbialite record spans at least one, and potentially two, of Earth's five major mass extinctions.

This deep-time record suggests microbialites may act as early indicators of ecological stress. Evidence suggests that the sudden increase of microbialites often preceded or coincided with major ecological disruption and mass extinction in the past. Yet our review highlights several significant knowledge gaps.

Scientists are still debating how to distinguish structures built by life from those produced by non-biological processes. We also cannot always say with certainty what environments ancient microbialites formed in.

There is further uncertainty about what controls the shape and structure (morphology) of microbialites. We also don't fully know how closely modern examples reflect fossil forms.

Why the internal structure of thrombolites is clotted rather than layered, as in stromatolites, remains a conundrum. So does how far back they extend in the geological record. Western Australia may contain some of the oldest known thrombolites, but these examples have not yet been documented in detail.



2.7-billion-year-old thrombolites from Western Australia that remain undescribed. These may represent some of the oldest known thrombolites in the world. (Image: Heidi Allen)

In short, Earth's oldest biological record is not a finished story, although the gaps are slowly being filled. Preserving the evidence, both living and fossil, is essential if future scientists are to answer questions we don't have answers for yet, or perhaps even to ask questions we have not yet thought to ask.

Despite their geological longevity and seemingly unchanging nature, microbialites are surprisingly fragile. Their rock-like appearance can make this difficult to appreciate.

Living microbialites can be highly sensitive to environmental disturbance. Their extremely slow growth rates mean physical damage can take decades or centuries to repair, if at all.

Many modern microbialite sites face growing pressures from changes in water quality, climate change and increasing visitation.

Fossil microbialites are also vulnerable. Across Western Australia, tourism, inappropriate collecting and even scientific sampling can damage or diminish these irreplaceable sites. As geological features, their protection falls under geoheritage.

Yet geoheritage remains poorly recognised and under resourced in Australia at both the federal and state levels. The 2021 Australian State of the Environment report concluded that "the overall outlook for geoheritage is poor" due to the lack of national frameworks, focus and resourcing for this area of heritage. Unfortunately, little has changed.

Today, we face an unprecedented and accelerating loss of biodiversity.

The microbialite archive offers a deep-time perspective on how ecosystems respond to environmental change, ecological disruption and changing conditions. How far these insights can inform our understanding of the challenges facing life today remains an open question.

Just as important is whether the archives themselves, both living and fossil, will remain intact and accessible for future generations to investigate not only the questions we are asking today, but those we have yet to conceive.

BGS celebrates half a century at Keyworth

This year BGS marks 50 years since it opened it's headquarters at Keyworth on the outskirts of the Nottingham in the East Midlands. In that half century an awful lot has happened, not least to BGS itself with reductions to its head count and what its national role.

The way BGS uses the site has also greatly changed, but what does BGS itself have to say on its 50 years tenure at Keyworth?



The Keyworth site when it was home to Mary Ward College. (Image: BGS/UKRI)

On 1 September 1976, after years of planning and numerous site visits, the Institute of Geological Sciences (which was re-named the British Geological Survey in 1984) finalised the purchase of Mary Ward College, a teacher training institute in Keyworth, Nottinghamshire. The aim was to create a centralised office to suit a multinational geological survey and global geoscience organisation. Fifty years ago this October, the first 30 members of staff moved from their offices in London and Leeds to begin BGS's life in Keyworth.

Since moving to the Keyworth site, BGS's headquarters, which is now home to around 500 staff, has seen many changes and milestones. One of these was the opening of the National Geological Repository (NGR) in 1985, the UK's most comprehensive collection of geological materials, which includes more than 600 km of drillcore and 16 million specimens from the UK and its continental shelf. In 2010, the NGR underwent another transformation, with a large extension and the installation of high-density mobile racking for storing drillcore.

The Core Store and records areas were extended in 2002 using funding provided by Nirex, the Coal Authority (now the Mining Remediation Authority) and BGS's parent body, the Natural Environment Research Council (NERC). The funding included a contribution to the building of the new extension, the transfer of data and its re-housing, with an additional contribution to the staffing required to carry out agreed indexing and digitisation. New racking and shelving were also installed.

In 2005, BGS took a bold step into the world of virtual reality (VR), pioneering 3D visualisation in geological surveying with the installation of BGS's first 3D visualisation facility in Keyworth, enhancing our understanding of geological formations. The site has also benefited from major sustainability investments over the past five decades, including the installation of more than 1700 solar panels in 2021 and 2022 as part of a solar carport array in the main car park.

The site has also welcomed several famous faces over the years, including broadcasters, government officials and even royalty. In 1997, HRH The Princess Royal made a visit to the BGS cartography team and she returned in 2009 to officially open the William Smith Building. In 2004, Alan Titchmarsh visited Keyworth whilst filming the BBC TV series British Isles: A Natural History and, in 2010, Sir David Attenborough was a guest speaker at the BGS 175 Symposium and celebrations, which saw BGS commemorate its 175th anniversary.



The Keyworth site today, now a multi-use scientific research facility (Image: BGS/UKRI)

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Dr Karen Hanghøj, BGS Director said: "During the half-century of BGS's presence in Keyworth, generations of staff have undertaken research that has improved understanding of the UK's geology and helped address challenges including natural hazards and environmental change.

We are proud of our long connection with Keyworth and Nottinghamshire, and grateful for the support of the local community over the past five decades. As we celebrate this milestone, we look forward to the next 50 years of scientific discovery and innovation delivered as part of a vibrant and growing community."

Editor's note: We congratulate BGS on this important milestone. Over the years it has touched the lives of many of us. On behalf of ***Down to Earth***, I'd like to thank so many past and current staff for what they have done to help us, particularly by providing so much \ geological news.

Author: Patrick Gaffikin
Illustrations courtesy of author unless shown.

Gneiss - a banded rock!

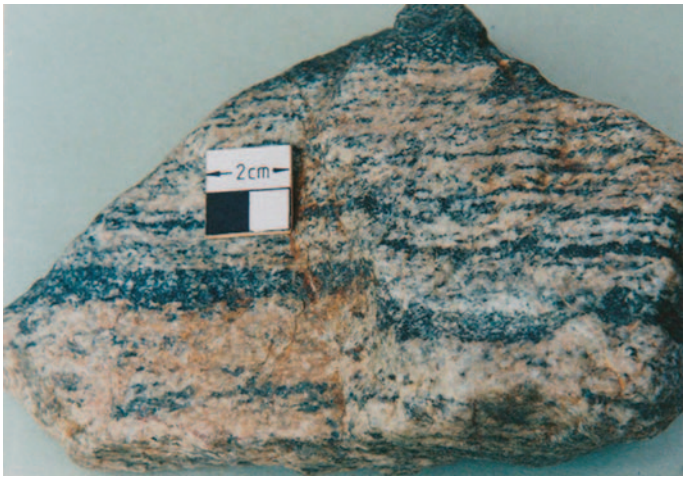
After many years of fieldwork across the UK and around the world my favourite place has never really changed. It's the Northwest Highlands of Scotland. It is home to the UK's oldest rocks and they are all highly metamorphosed.

They are the Lewisian Gneisses that date back more than 3 billion years. They contain within them a series of geological events that together span more than 1.5 billion years. In his latest submission Paddy Gaffikin tackles gneisses.

Over to you Paddy...

"Gneisses were at one time regarded as granites."

Professor Arthur Holmes D.Sc., F.R.S. (1890-1965)



A fine sample of Lewisian gneiss.

Gneiss (pronounced 'nice' because the 'g' is silent) is a banded (metamorphic) rock. It is sometimes described as 'foliated' because it has a layered appearance. The bands consist of alternate dark and light coloured minerals – the dark minerals are often biotite mica while the light coloured minerals are usually feldspar and quartz. Minerals like quartz contribute to enabling it to be a hard and durable rock and making it resistant to mechanical weathering. On Moh's Scale of Hardness it is between 6 and 7.

The protolith (parent rock) may be igneous, quite often a granite but can be sedimentary like shale or sandstone. It is coarse-grained and therefore the main component minerals can be seen without using a hand-lens and, like granites, the minerals are interlocking, contributing to making it a strong rock. Being a very hard rock it can be relatively difficult to split by hammering.

How gneiss forms

Like all metamorphic rocks gneiss forms by recrystallisation of the original minerals in the protolith. High pressure and high temperature are involved making gneiss what we call a high-grade metamorphic rock. These conditions are prevalent deep in the Earth's crust and thus it is here that these rocks form. If melting occurs, the resultant rock is igneous - not metamorphic. The recrystallised minerals are realigned and the banded texture is developed due to the high pressure and temperature.

Aside from not being molten the other thing to realise about a metamorphic rock like gneiss is that overall chemistry of the rock does not significantly change. What does change is the texture and the minerals within the rock.

The mineral composition of gneiss



Quartz crystals. In rocks crystals do not form perfect shapes because they compete with each other for space.

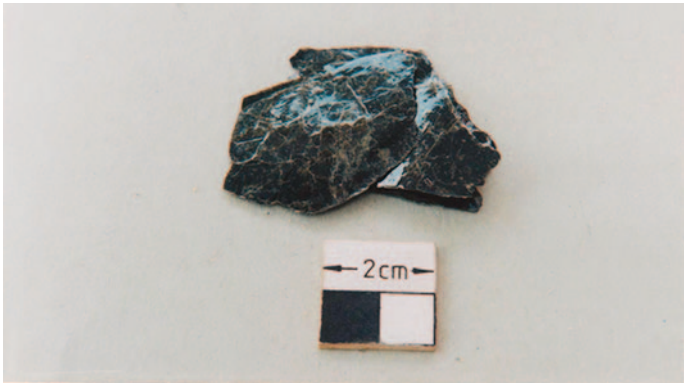
The mineral composition of gneiss depends on the protolith and the metamorphic conditions under which it forms. Common minerals are largely quartz, feldspar (can be orthoclase or plagioclase) and mica (usually biotite). It is the feldspar that provides the colour to the rock and the mica its sheen. However other minerals, albeit in small amounts, can also be present.

These can be listed as follows:-

- Amphibole e.g. hornblende, which can contribute to the dark bands. If the protolith was a basalt, then we can get a very dark rock called an amphibolite gneiss.
- Garnet – often red in colour.
- Chlorite – can give gneiss a greenish hue.
- Graphite – a form of carbon, which can add to the dark appearance and produce a slippery sensation.
- Talc – gives a soapy feel to the rock.

The origin of the name 'gneiss'

A long time ago it was thought to be from a Slavonic word meaning 'nest' because, in the middle ages, miners in central Europe considered the rock to be the 'nest' of ores. However, a later explanation was that the name was derived from a German word – 'gneis' – which means 'sparkle' or 'glitter' because of the shiny appearance of the mica in the rock.



A sample of biotite mica.

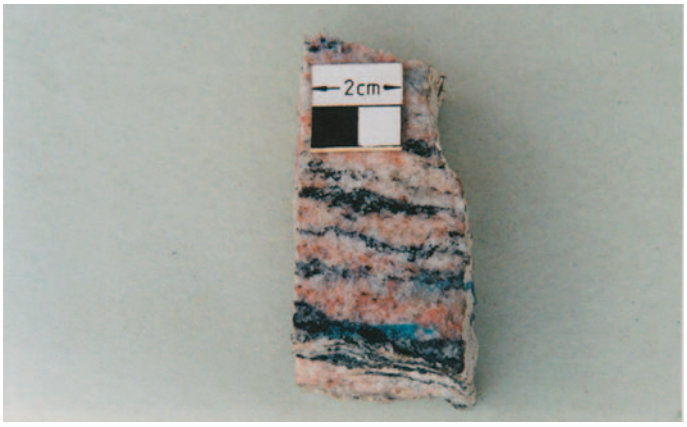
Uses of gneiss

Because of its resistance to weathering and erosion and because of its attractive appearance it has been used as a building stone. Also, because of its alluring appearance, it has been used as a worktop in kitchens etc. and, due to its ability to withstand wear and tear, it has been employed for floor-tiling. Garden features such as rockeries, landscaping and fountains use the rock. Sadly, most of the gneiss used for such purpose comes from India. Some Scandinavian gneiss goes to China for cutting and polishing.

However, probably one of its main uses is for aggregate (when broken into small chips) mixed with cement and sand to produce concrete.

Some of the main places worldwide where gneiss occurs

North-west Scotland



A cut and polished sample of Lewisian gneiss.

Lewisian gneiss, which is the oldest rock found in Britain being around 3,000 million years old, is not confined to the island of Lewis but occurs on other Scottish islands in north-west Scotland and on the Scottish mainland.

Europe
Exposures of gneiss are extensive in places like Norway, Sweden and Finland. In central Europe, for instance in the Black Forest in Germany, outcrops of gneiss can be seen.

Asia
This rock is found in parts of India – e.g. in the Dharwar region. These gneisses are around 3,000 million years old. Gneiss also forms portions of the Himalayas.



This is ancient Proterozoic gneiss from Joshi, India (Image: Courtesy of flikr)

South America
Particularly in Brazil and Patagonia there are occurrences of gneiss.

North America

The oldest rocks in the world are gneisses found in the Northwest Territories of Canada. These are around 4,000 million years old. In Ontario and Quebec ancient gneisses also occur. The Appalachian mountains, especially the Blue Ridge Province and in Piedmont. The Minnesota River Valley, in the mid-west of the U.S.A., has outcrops of gneiss.

Africa

Exposures of this rock can be seen in Kaapvaal in South Africa and in Tanzania in the north.

Australia

Parts of western Australia hosts some gneisses which are among the oldest rocks in the world. Gneiss also can be found in south-east Australia.

Ireland

The oldest rocks in Ireland occur on the island of Inishtrahull, which lies off the north coast of Donegal. They are around 2,000 million years old. In County Mayo, there are exposures of gneiss which are the oldest rocks on the mainland of Ireland.



Gneiss on the Mullet Peninsula in County Mayo. (Image: Mr. P. Millar, Belfast Geologists' Society.)

A postscript - The metamorphic rock psammite



Psammite at Kinnagoe Bay, Inishowen, Co. Donegal. (Photo: Mr. P. Millar, Belfast Geologists' Society.)

Psammite (pronounced 'sammite' – a silent 'p'), which is a metamorphosed sandstone rich in feldspar (arkose), was in the past erroneously diagnosed as a gneiss maybe because of the interlocking minerals and its hardness but it does not exhibit the banding that is a characteristic of gneiss.

However, any metamorphic rock that is banded is regarded as a gneiss. For example granulite, amphibolite, paragenesis and migmatite. Migmatite is a very interesting rock. Like gneiss, it has been subjected to high intensity heat and pressure but partial melting occurred making it partly igneous as well as a metamorphic rock.



Cliffs formed of folded Migmatite at Teelin, Co. Donegal (Image: Geologician via Wikimedia Commons

A significant rock

As Dr. Arthur Holmes pointed out, gneisses were, in the past, taken to be granites probably because of their interlocking minerals and hardness but the main distinguishing difference is that, unlike granites, gneisses are banded. Gneisses are among the oldest rocks in the world and geologists who studied them have obtained vital information about the history of the Earth and its crust in the very distant Precambrian times making gneisses very significant rocks.

rockstars

Another famous rock...

Blueschist

Sticking with the theme of metamorphic rocks, we bring you what is arguably one of the most unusual rocks in the category.

To start with, it's unusual to get a rock with a blue colour. We generally associate blue colours with the copper mineral azurite or sapphires, neither of which form metamorphic minerals. The only bluish metamorphic mineral is kyanite but this isn't what gives us blueschist.

The blue tint comes from the presence of the mineral glaucophane which is a kind of amphibole. Blueschists form in very specific conditions of high pressure and low temperature. Such conditions occur in island arcs today and in the geological past. Today they are forming in the island arc systems off Japan.

In the UK, the best blueschists can be seen in the crags beneath the Marquis of Anglesey's Column at Llanfair PG on the island. Here it is a slaty rock with a bluish tint. I also have a more crystalline example with distinct blue glaucophane crystals from China.

Blueschist can also be spotted on the Llyn Peninsula of North Wales around Morfa Nefyn and also in a couple of places in the Ballantrae area of Southwest Scotland. In all such occurrences it is associated with ancient island arc development.



Glaucophane blueschist beneath the Marquis of Anglesey's Column (Image: Geomon Global Geopark)

Author: Laurence Heslop

Illustrations courtesy of author unless shown.

In search of the Mell Fell Conglomerate

Laurence Heslop is one of a very small band of Down to Earth readers who has the courage to not only carry out his own personal research in the field, but also to then share his findings with us all.

Here, we find out more about one of the Lake District's most enigmatic rocks, the Devonian Mell Fell conglomerate. It outcrops on and around Great Mell Fell close to Ullswater.

Over to you Laurence...

A pastime, that I regularly enjoy, is searching for rocks and trying to understand what on earth could be going on.

Situated several miles West of Penrith close to the A66 are the two Mell Fells, Great and Little (the 'bare' fells) although shadowed by the lofty hills of the Helvellyn & Blencathra Ranges, they stand sculpted by glaciers, isolated and distinctive in this grand landscape.



Looking east from the slopes of Blencathra. The A66 road between Penrith and Keswick is clearly seen left of photo with both Great Mell Fell & Little Mell just behind in the upper right of photo. The distant hills are the North Pennines
(Image: Derek Walmsley)

On many holiday visits to this north easterly part of the Lake District I have searched in vain for decent exposures of the rocks which form Great Mell Fell (537m/1,762ft) and Little Mell Fell (505m/1,657ft). Land use of the Mell Fell area is mainly livestock farming and forestry which presents the formidable issue of access and confined my exploring to public rights of way and roads. (I am sure this matter of access must be a thorny problem for the majority of geology enthusiasts.)

Despite attempts at 'reading' the topography, studying the OS Map, delving into geology books and Googling, clear clues proved elusive. In fact I had all but given up on my quest to find the only Devonian is sedimentary rock I know of from England's northern counties, I began



This view of Great Mell Fell was taken from the Ordovician andesitic lavas of Eycott Hill looking south.

to question if any outcrops existed. Then, this year I took a rarely trodden footpath, tucked behind some buildings and a trickling stream marked as a spring on the OS map, all concealed by tree cover, to my complete surprise I stumbled upon a magnificent exposure. During my research there was no mention of this locality at the foot of Little Mell Fell's western flank.

The Mell Fell Conglomerate is a 15 kilometre square wedge of generally rounded clastic material, 1,500 metres thick, deposited in the Mell Fell Trough, structurally a fault bounded graben within the "Old Red Sandstone Continent". And unconformably superimposed upon the Borrowdale Volcanic Group. Three rock types including the latter now encircle the wedge. Carboniferous limestone to the east, Ordovician Eycott, Borrowdale volcanics to the north and south and generally Skiddaw Slates, the area's oldest deposits to the west.

Early descriptions of these conglomerates are known from 1876, when opinion considered them to be an 'accumulation of torrent detritus

formed in an arid climate' My photos show a poorly sorted mix of pebble to cobble and boulder grade material. Cemented by a finer interstitial sediment of mud, silt and very small rounded pebbles including a few sub-angular fragments and vein quartz granules.



A view of Laurence's 'new' exposure of the conglomerate.

Analysis of the conglomerate reveals it to be free of fossils, therefore making it difficult to assign its age. However the source of the clastic content provides some answers. The Skiddaw and Borrowdale Volcanic Groups were initial contenders but recent studies reveal that Silurian greywacke clasts predominate. These rocks are common in the present day southern lakes. Though once thought to be more widespread, covering land around Ullswater, Haweswater and beyond. The alleged find of a single monograptid of Ludlow age on Great Mell Fell adds support to a Silurian source of material.

The Acadian Orogeny uplifted these Silurian and early Devonian rocks that formed when they were part of the southern hemisphere landmass of Avalonia as it drifted northward. The diversity of rocks in Britain is often the result of this northerly flow of plates from one climatic zone to the next. These conglomerates are a good example.

As the parent rock moved into desert latitudes a wider range of diurnal temperature was introduced. This enhanced effective mechanical weathering causing the rocks to split, exfoliate, crumble and shatter. Assisted by intense cloudbursts, flash flooding and braided rivers swept the rock debris into alluvial fans which spread out and coalesced into substantial continuous aprons known as a bahada bajada).

As the fans spread there was a loss in energy controlling the degree to which the setng deposit was sorted. (Today, notable examples are known from Death Valley, California and wadis of the Middle East).

Over time continued weathering produced some finer sediment forming the matrix which now binds the conglomerate. Conditions were also excellent for the oxidation of iron minerals giving the deposits the reds and purple colours. The orogenic upheaval was also responsible for re-activating the major WSW-ENE Causey Pike Fault creating a rift valley graben into which these flash floods deposited the alluvial fans. And it could be said that this tectonic good fortune preserved our area of conglomerate contributing to the district's geodiversity and scenic topography.



The coarse conglomerate, inset, a sample of the finer material.

To conclude, the absolute age of the Mell Fells is unknown but is estimated to be upper Devonian. Correlations have been made with the nearby Shap Wells Conglomerate Formation whose contents include feldspars weathered out of the Shap Granite Pluton and the Polygenetic conglomerates of the Cross Fell Inlier thought to be Carboniferous basement beds.

However all three conglomerates seem to have uncertain field relationships. Perhaps future studies will yield and confirm accurate dates and connections.

And I hope to keep on searching...

POSTSCRIPT

Readers should be made aware of a cutting on the approach to the popular tourist village of Pooley Bridge and across the road an adjacent section on Ullswater's shore. Here the Conglomerate is exposed, however the cutting is overgrown and fenced off and the lakeside access is tricky. Therefore I have not yet risked a closer inspection of this site.

Lawrence Heslop
July 2026.

article

Author: Sylvia Woodhead

Illustrations courtesy of author.

Anthropocene Local Geology Site designations - slag heaps at Ormsgill, Barrow & Harrington, Cumbria

Over the past couple of years people have been taking much more interest in the affect that human civilisation and activity has left behind as evidence in our landscape.

The period of time known as the 'anthropocene' is yet to be formally recognised and indeed that could take some time. Away from the controversy this does not stop us from recognising such an episode when we see it in our local landscape.

Sylvia Woodhead describes just such a site in her home area of Cumbria....



Ormsgill bank, looking north. The beach and hills are composed of blast furnace waste.

The Anthropocene article in ***DtoE 131, May 2025*** resonated strongly with Cumbria GeoConservation (CGC), as we have recently designated, not one, but two new 'Anthropocene' Local Geological Sites (LGS): Ormsgill Bank in Barrow-in-Furness and Harrington shore, Workington. These coastal slag banks are the industrial waste from former iron smelters.

In his ***DtoE*** article, Tony Elger explained why the proposal to formally define the Anthropocene as a new geological Epoch, marking the end of the Holocene, was rejected for not meeting international boundary setting protocols. Nevertheless, anthropogenic landforms such as slag heaps are widely recognised, and the term Anthropocene remains in common use. Both of our proposed sites met the criteria for LGS designation, including educational, scientific, aesthetic, and historical value.

Located north of Barrow in Furness, Ormsgill Bank forms a striking, steep sided white ridge running along the eastern edge of the Walney Channel. It is composed of a distinctive new type of rock: as the molten slag cooled it mimicked volcanic textures. The King Charles III Coastal Path follows the crest of the slag hills, offering spectacular views south to Barrow, west to Walney Island, and north to Black Combe, an inlier of Cumbria's oldest rocks, the Skiddaw Group. The site has excellent potential for educational visits and represents the last physical trace of Barrow's once major iron industry.



Pahoehoe texture in a slag pudding, Ormsgill Bank.

Ormsgill Bank is owned by Barrow Council and is generally considered to be Open Access. A convenient car park lies off the A590 road at SD 192712. Barrow Iron and Steel Works began production in 1859, with two blast furnaces, expanding rapidly after the discovery of large deposits of high-quality haematite. By 1866 the works operated ten blast furnaces and 18 Bessemer converters, producing steel rails. Molten waste was transported in containers along a railway and tipped, red hot, to the east and west, forming the slag heaps. Some of these 'puddings' remain visible today, displaying cooling features similar to pahoehoe lava. The slag, largely lime-rich, varied in composition as smelting technology improved. A 1971 reference estimated nine million tonnes of slag had accumulated.



Different slag layers, Ormsgill Bank.



Clearly layered slag cliffs at Harrington.

Haematite slag is known to break down easily. At Ormsgill the highly vesicular slag fragments readily into blocks, creating an 'anthropoclastic' landform. Exposure to atmospheric CO_2 turns the slag white, effectively making it a carbon sink. Tufa deposits also occur where lime has leached out and reprecipitated.

The slag becomes younger toward the north and at higher elevations, illustrating principles of relative dating. Along its northeast edge, sedimentary-like layers reveal changes in appearance and composition as steel making evolved. Adding further interest, a nearby horseshoe arrangement of 30 very large Borrowdale Volcanic Group blocks provides an opportunity to compare tuff and volcaniclastic sedimentation from the Ordovician.



Highly distinctive slag 'skulls' at Harrington.

Harrington Shore LGS, accessed from Harrington Sailing Club NX 989253 offers a 900-metre level walk north along the shore. The artificial ground provides an excellent introduction to vulcanology, displaying fine examples of pahoehoe lava, vesicles, magma drips, pipe vesicles, radial cracking, Spinifex textures, volcanic glass and cross stratification. The walk along the coast shows many of these different features.

The Harrington Haematite Company ironworks were established in 1865, operating two blast furnaces, that reduced iron oxide to metallic iron using local iron ore and coke, and limestone as flux to reduce the melting temperatures. Slag was poured into railway-mounted ladles and tipped along the coast. Early furnaces produced viscous slag that cooled into 'puddings', or 'skulls', many of which dominate the shoreline today. Some fractured as they cooled; in others, the hot liquid drained away, leaving cavities. The distinctive Spinifex texture formed through rapid cooling.

Details of both new sites are available at www.cumbriageoconservation.org.uk.

A mobile-friendly GeoTrail, devised by Phil Davies and John Lackie, also uses the term Anthropocene, reflecting its widespread informal adoption.

These two coastal slag heaps formed at roughly the same time, through their long-term stability is uncertain. Coastal processes continue to reshape them, creating slag beaches. Visits to both sites are highly recommended.

The Editor comments: A big 'thank you' to Sylvia for bringing this to us. I know of similar Anthropocene remains in areas like Scunthorpe or in the former coalfields of South Yorkshire. Like the sites in Cumbria they provide us with some unique fieldwork opportunities.

Just like their much older cousins these materials give us with plenty to talk about and study. Let's embrace such opportunities!

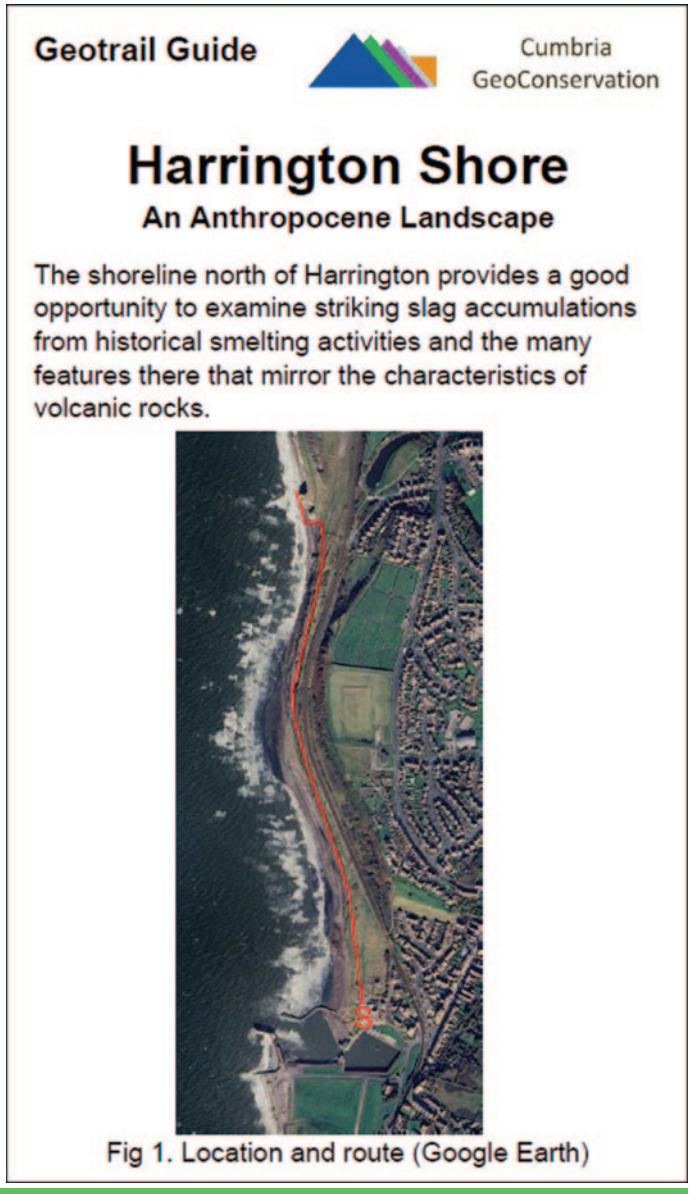


Fig 1. Location and route (Google Earth)

in-house

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

'Cream of the Crop 2025' - available now - 'Cream of the Crop 2026' available in time for Christmas!

We still have a few sets of the Cream of the Crop 2025 available for sale and immediate dispatch. We're already working to bring you another unique set of samples collected during our exploits this year and we will ensure that it comes out in time for Christmas.

Your editorial team, Chris and Colin (mainly Colin) collect these specimens during our field trips in the year in question. You'll be pleased to learn that they are all collected from loose material and not hammered from the solid section.

The 2025 set comprises a total of 14 specimens and includes samples such as the oldest rock in England and Wales at 701 million years, a quartz porphyry from Cornwall and tonalite from the Ardnamurchan Peninsula of Scotland. The 2026 set may include more samples!

To get hold of our 'Cream of the Crop 2025' collection for the postage inclusive price of £54.95, either go to our website: www.geosupplies.co.uk or ring us on 0114 245 5746. For the 2026 set, contact us at the end of November for details.



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

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

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

Before you book one of our field trips...

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

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

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

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

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

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

We prefer to use small family run hotels and guest houses but they are getting harder to find, so sometimes we use larger hotels such as Premier Inns and hotels in the Alfa Hotels 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.



Participants on the recent trip to Iceland enjoy fine weather and superb geology at Teigarhaorn in the southeast of the country. (Image: Chris Darmon)

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

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

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

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

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



Don't worry, we don't bite!

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

Come and join us!

Welcome to our real world!

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



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

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

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

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

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



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

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

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

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



The Ben Wyvis Hotel our base in Strathpeffer.

From the local Devonian rocks of Cromarty birthplace of Scottish geologist Hugh Miller to the metamorphics of the local Moine rocks. We'll take in a train trip to Kyle of Lochalsh as well as another to Golspie on the coast to see the Jurassic and Triassic. We also see some of the younger sedimentary rocks around Lossiemouth to the east of Inverness.
We can still accommodate people in single, double or twin rooms.

Sussex Coast & South Downs, June 20-26 (6-nights) £1095



The Queens Hotel on Eastbourne's seafront

Based at the Queen's Hotel in the resort of Eastbourne this is a trip that will take in some of the classic chalk cliffs at places like Beachy Head and also some of the Lower Cretaceous rocks in places like Hastings, not forgetting the beautiful landscape of the South Downs National Park.



The magnificent Seven Sisters cliffs are a jewel in the crown of the landscape of southern England.
(Image: Wikimediacommons)

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

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

Based at the Abbey Hotel in Great Malvern, this trip will take you to places where you can enjoy rocks and fossils from many different periods. We go back to the Ediacaran of the Precambrian to see the



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

hard igneous rocks of the Malvern Hills, right on our doorstep. During the Cambrian and Silurian periods we see fossiliferous sediments. The Devonian and Carboniferous see are very different sandstones and even coal seams in the Wyre Forest and around Highley in the Severn Valley. Around Bridgnorth we see the bright red Permian sandstones from a desert environment.



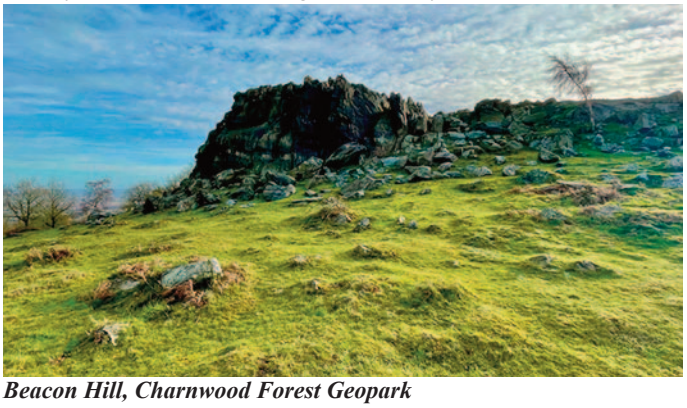
The Abbey Hotel in Great Malvern, our base for this trip.

Come and enjoy geology and landscape at its very best! Suitable for all, including those who are new to field geology. Currently we have room for one more single as well as double and twin rooms.

Why come and join our Summer School?

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

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



Beacon Hill, Charnwood Forest Geopark
(Image: BGS)

This location will allow us access to the rich and varied geology of north Warwickshire around Nuneaton, Charnwood Forest in Leicestershire, the Black Country Geopark and the Jurassic rocks of the local area and also the Cotswolds. In short, something for everybody, from the Precambrian to the Quaternary!
This is the last trip to be released and the brochure is now available on our website. Remember that most of the rooms are singles, so take advantage and make that booking!

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

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



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

Enjoy the comforts of the 3-star Royal Hotel in Oban where we offer ensuite rooms and all main meals.
Final double room left on this trip!

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

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



The Royal Hotel sits atop the West Cliff.

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

As it has been some time since we last visited Whitby, we expect this trip to fill up rapidly, so you are strongly advised to make your booking soon. Currently we still have twin and double rooms available, but no more singles.

Booking forms are only available from us.
email: downtoearth@geosupplies.co.uk
or ring us on: 0114 245 5746

You can enrol via our online shop at: www.geosupplies.co.uk
or ring us on: 0114 245 5746

Autumn & Winter Zoom sessions...

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

All of the courses and sessions shown below are open for booking NOW! They are available at 2pm or 7pm on the date shown.

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

The Wednesday Club per session £11.00, or for all 6 £50.00

November 11	**Geological riches of the Yorkshire Coast**
November 18	**Alfred Harker - an extraordinary geologist**
November 25	**Anorthosite - a rock that's out of this world!**
December 2	**The unique geology of Islay, Jura & Colonsay**
December 9	**Extremes & extinctions in the Tertiary**
December 16	**Tyrannosaurus rex from bones to Hollywood**

In the steps of the pioneers (6-weeks) commences November 12 and runs until December 17 £50.00

The history of geology is closely linked to a few individuals, many of whom were British. They each made their indelible mark on our subject in a unique way. In this course we'll take a look at the life and achievements of 'six of the best'. We'll be studying these pioneers: Adam Sedgwick, Roderick Murchison, Charles Lapworth, Mary Anning, Henry de la Beche and George Barrow.

Metamorphic Rocks - rocks from the pressure cooker (10 weeks) commences November 16 and runs to December 14, starting again on January 18 for a further 5 weeks. £80.00

Over the years this has proved to be our most popular course. We take the mystery out of metamorphic rocks by taking a close look at how they form from existing rocks of all types.

The course is arranged in a way that covers all the basic elements of metamorphic rocks. It takes you through how metamorphic rocks form, the textures the rocks exhibit and the minerals that make them up. You'll learn about contact, regional and dynamic metamorphism and how we classify these enigmatic rocks.

The prices quoted here are for one person, when two people study together using the same screen you can save a lot.

If you prefer the course materials in printed form, this can be arranged for a small additional sum.

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

Or ring us on 0114 2455746.

backyard geology

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

A fossil found on Lavernock beach solves a 200-year old mystery...

This comes from Amgueddfa Cymru (National Museum Wales) in Cardiff:
A fossil discovered on Lavernock Beach has helped researchers uncover new information about the fish that swam in the seas around Wales more than 200 million years ago during late Triassic times.

Welsh fossil hunter Jonathan Bow was searching the shoreline when he spotted an unusual fossil. This turned out to be part of a rare fossil jaw containing developing teeth. The find has since helped solve a mystery that has puzzled scientists for nearly 200 years. For generations, fossil teeth found in rocks around the Bristol Channel were difficult to identify. Because of their unusual shape, some early scientists even believed they belonged to giant amphibians rather than fish.



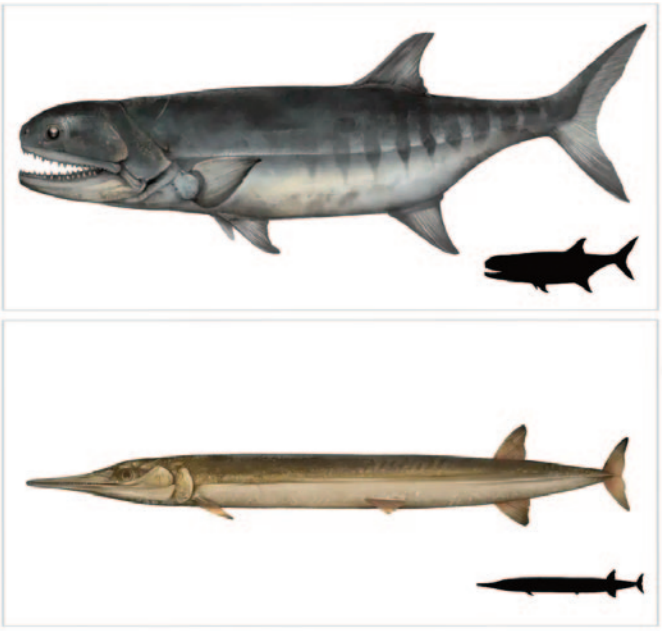
Jonathan Bow and his young son on Lavernock beach where they found the fossil.
(Image: National Museum Wales)

Cindy Howells, Curator of Geology at Amgueddfa Cymru, said: "Many teeth from *Saurichthys* were once mistaken for those of an amphibian, and that misunderstanding continued well into the 20th century. This lovely little jaw caused great confusion when it was first found as it bore no resemblance to any known species."

Researchers from Amgueddfa Cymru, the University of Bristol and the State Museum of Natural History Stuttgart worked together to study the fossil. Their research showed that fossils that had previously been grouped together under one name actually belonged to two different species of fish that lived during the Late Triassic period. After it was discovered, the fossil was sent to the University of Bristol for further study.

Jacob Quinn, lead researcher, said: "These rocks were formed during storms more than 200 million years ago, so it is remarkable that such a delicate fossil survived. Although British Triassic fossils have been studied for over 200 years, this is the first bone from *Saurichthys* ever found in these rocks."

The discovery has led to a scientific paper being published, sharing the team's findings.



It is now believed the teeth come from two different Triassic fishes, the Birgeria (top) and the Saurichthys (bottom).
(Image: National Museum Wales)



This is the fish jaw complete with teeth that was found by Jonathan Bow.
(Image: Jonathan Bow)

Professor Mike Benton, a co-author of the study, said: "This delicate fossilised jaw has now been compared with specimens in museum collections across Britain and Europe to provide clear evidence that fossils originally thought to belong to the same fish actually came from two separate species."

Dr David Whiteside, another co-author, added: "These predators lived

in a shallow tropical sea filled with small limestone islands. *Saurichthys* was probably a fast and agile hunter, while *Birgeria* was larger and more powerful, likely feeding on a wider variety of prey."

Another co-author Dr Sam Cooper added: "These fish have a remarkably complicated history. It's amazing that a single fossil, found by Jonathan Bow during a spring tide, has helped clear up nearly 200 years of confusion."

The discovery also highlights how modern technology and fresh research can help museums learn more from fossils that have been collected and studied for generations. The fossil will go on display at ***National Museum Cardiff*** later this year.

Cindy Howells added: "Being able to share this incredible discovery with the public will capture people's imagination and hopefully inspire the next generation of fossil hunters to explore the amazing finds that can be discovered along Wales' coastline."

Thanks to National Museum Wales for this material. You can find out more in the Journal of Vertebrate Palaeontology (2025).

Never again will East Anglia be a 'geological desert' as new supervolcano is found...

Years ago, a good friend of mine who hailed from Norwich described East Anglia as 'mamba country' which she explained was interpreted as 'miles and miles of b****r all'. Having run several geological trips to North Norfolk to study the superb Quaternary cliffs I can testify that isn't actually the case, but ancient geology it has very little, until now!

Research carried out by scientists from British Geological Survey (BGS) has revealed a remarkable volcanic history that is re-writing part of the history of the UK.

This is from BGS:

The origin of the Kinnekulle tephra, a huge volcanic ash layer spread across Norway, Sweden, the Baltic region, Belarus and Poland, has long been a mystery but new evidence may have uncovered the source of the ash for the first time.

Scientists at the British Geological Survey (BGS) and the University of Oslo have studied tiny crystals, smaller than the diameter of a human hair, extracted from boreholes 65 km apart in Lincolnshire and Norfolk. The analysis uncovered evidence of a 454 million year old supervolcano, now concealed beneath The Wash on the east coast of England.



Tranquil fields at North Creake, Norfolk give away nothing that points to a violent past.
(Image: Tim Pharaoh, BGS/UKRI)

The location of one of the borehole samples studied, was at North Creake in Norfolk. There is no evidence in the present day landscape of the former supervolcano concealed deep below. However 454.45 million years ago several hundred to a thousand cubic kilometres of the Earth's crust were thrown into the stratosphere by eruptions with a force equivalent to several thousand H-bombs, one of the largest eruptions in recorded Earth history.

Volcanic rocks of comparable age comprise the rugged topography of Eryri (Snowdonia) and the Lake District. This belt of arc volcanism extended from the Lake District towards Belgium in late Ordovician

An unusual present idea - limited edition...

'Cream of the Crop 2025 & 2026'

As part of their work for Geo Supplies, your editorial team, Chris Darmon and Colin Schofield go to some very interesting places around the British Isles. Whilst they are in these places they often pick up rock specimens, most of which go to students and institutions both here and even around the world. However there are also some rare or unusual rocks that don't form part of our regular stock and it is these that we've gathered together into a limited edition collection that we are offering as our 'Cream of the Crop 2025'.

The set comprises 14 carefully chosen specimens from the British Isles: with: graptolitic shale (Llandrindod Wells), Stanner Rock metaigneous (the oldest in Wales), Old Red Sandstone (Goodrington), Hematite (Cumbria), Folly Sandstone (Silurian), Phyllite (Arran), Newmead Sandstone (Builth Wells), Man-o-War Gneiss (Cornwall), Quartz Porphyry (Cornwall), Honister Slate (Cumbria), Hybrid Rock (Arran), Tonalite (Ardnamurchan), Pitchstone (Arran), Felsite (Loch Ba, Mull).

STOP PRESS! We are now working on a similar set for 2026, with another unique collection of specimens. Each set comes boxed with notes and costs £54.95 including postage. The 2025 set is available NOW for immediate dispatch and the 2026 set will be ready to send out in good time for Christmas!

Purchase online at: *geosupplies.co.uk* *or ring us on: 0114 245 5746.*

times, when England was separated from Scandinavia by an oceanic basin. The geography was probably comparable to the West Pacific region (Korea–Japan–Indonesia) today.

Using cutting-edge analytical techniques at BGS's laboratories, scientists have been able to examine zircon crystals, which form within molten magma before a volcano erupts. Over time, uranium within the zircon slowly decays into lead isotopes, analysis of which enables the age of eruption to be precisely determined. The research reveals that the zircon crystals at both sites were formed at approximately the same time, about 454.4 million years ago. Researchers at the University of Oslo had previously obtained an almost identical age for the Kinnekulle tephra in the Oslo region.

In an embankment of the railway line north of Oslo, close to Sinsen station, dipping strata of the Arnestad Formation (Sandbian Stage, Late Ordovician), can be seen. It comprise light grey coloured shales containing thin beds of grey-green altered volcanic ash (tephra) likely erupted from the 'Wash Supervolcano'. The Kinnekulle tephra, here about 130 cm thick, lying close to the smaller snow patch, represents the 'fall-out' from an Ultra-plinian volcanic eruption in eastern England 454.45 million years ago.



Ordovician ash from the East Anglian supervolcano at the side of the railway near Oslo. (Image: Tim Pharaoh, BGS/UKRI)

The scientists believe that the near-identical ages suggest that ash from the eruption plume in what is now eastern England was blown across the Tornquist Sea, which separated England and Scandinavia, and settled on the sea floor of ancient Scandinavia. Further support for this hypothesis is provided by chemical analysis of apatite crystals in both the proposed source and the tephra. During the highly explosive 'super-Plinian'-type eruption, hundreds of cubic kilometres of rock were launched into the stratosphere by the force of the blast. One of the samples also contained younger zircon grains, dated to 453.70 million years, reflecting a further eruption associated with the collapse of the volcanic caldera.

Tim Pharaoh, BGS, principal author of the paper said: "More than 454 million years ago, a supervolcano now hidden beneath some of England's flattest landscapes, produced some of the biggest eruptions in recorded Earth's history. We believe that, thanks to cutting edge analysis, we have been able to provide evidence that the source of the ash layer in Scandinavia originated from this supervolcano, reshaping our understanding of England's deep geological past."

The research paper, is now available to read in full.

Go to: https://nora.nerc.ac.uk/id/eprint/54157

Former mountaineer turned fossil hunter makes a once in a lifetime discovery...

Matthew Myerscough is a former mountaineer, who in 2014 suffered a major accident that nearly cost him his life. After the accident on the slopes of Yr Wyddfa, also known as Snowdon, Matthew was left with post traumatic stress disorder. At this point rather than give up he turned to fossil hunting and he has now been rewarded with a major fossil find and he has also published a book.



Matthew proudly holds up his prize fossil. (Image: Ceri Oakes)

Matthew began his fossil hunting on beaches in laces like Lavernock Point in the Vale of Glamorgan and also on the Somerset Coast. He ended up bagging an early Jurassic plesiosaur jawbone something not found at Lavernock before.

Matthew, who is a civil engineer is so into his fossil collecting that he's produced a book entitled ***In Search of Dragons a fossil hunter's odyssey*** - see our book review section for further details.

New viewing platform at Leicestershire working quarry...



The viewing platform off Kinchley Lane Mountsorrel (Image: Charnwood Forest Geopark)

Everybody loves to look into a working quarry, especially when it's as large as the one at Mountsorrel in Leicestershire. The quarry operated by Tarmac has been operational on the site since 1895 and has employed generations of local people.

The Midland Mainline railway between London and Sheffield passes close to the site and the crushed granodiorite stone is transported to the capital every day. The geopark's geoheritage officer, Dr Jack Matthews, said the quarry was one of the forest's "geological wonders".

Shap Quarry - how a village celebrated its history...

The Cumbrian village of Shap has several claims to fame. There's the Shap incline and summit that provided more than a little interest when our railways still had steam engines; there's the cement works that stands out in the bleak landscape and there's the Shap pink quarry. The latter is home to one of the most distinctive granites in the country.

Shap granite adorns many a building and has been used n numerous monuments and gravestones. Founded in 1865 and employing 80 people in 1869 the granite quarry has been celebrated n a month long exhibition at the Old Courthouse in the town.

The exhibition was a celebration of the quarry and what it has brought to the locality by way of employment and fame across the world.



Shap pink quarry a few years ago under different ownership. (Image: Agg-Net)

The last big piece to be worked is the millennium stone at Eamont Bridge. The pink granite quarry closed for a number of years until 2014 when Armstrong Group began to operate it and now stone is once again being extracted.

Shap Pink granite is still a prestigious material in the dimensional stone industry and is widely used in different applications of building; from door surrounds to copings, setts and kerbs to walling.

Armstrongs can manufacture any bespoke product in the bespoke dimensional saw shed based in their Brinscall Quarry in Lancashire. Armstrong's are a keen and active supporter of the local village and surrounding areas employing several local residents in Shap Pink Quarry, if you have an interest in quarrying with machine operating experience, why not give us a ring on 01204 668021 and secure your future with a career with Armstrongs.

Tungsten West will be ready to roll at Hemerdon in the first quarter of 2027...

Mining company Tungsten West are getting ready to start full production at their opencast site at Hemerdon, just outside Plymouth, hopefully in the first quarter of 2027.

This vast site has had a long and chequered history under several previous owners and operators. Land title has long been a problem, but the current team from Tungsten West seem to have secured this, clearing the way for full production to begin.

Speaking after HM Government invested £71 million from the Sovereign Wealth Fund, Chief Executive Jeff Court said: "We started



The vast opencast pit at Hemerdon, is set to become a major tungsten mine. (Image: Tungsten West)

very, very quickly on the back of the announcement... The timing is prefect for us in terms of getting that extra boost for funding... We have done everything we can do to make the project much more robust [after going on hold in 2022]."

Tungsten is classed as a critical mineral and this deposit is one of the largest in the world. Its extraction is seen as vital for the future of the UK's defence industry which is a prime customer for the tungsten it will produce.



Senior Tungsten West staff pose in front of the newly constructed plant at Hemerdon. (Image: Tungsten West)

Luke Pollard, Minister for Defence Readiness and Industry, and a local Plymouth MP added: "It's because of that (importance) and because the world is getting more dangerous and critical minerals like tungsten are more valuable and in demand that the government has stepped in to make an investment in Tungsten West. It will allow the UK to be more resilient in challenging times. If the world is to be more dangerous, and we know that it is, we, as a country, need to be able to secure our own supply of these minerals," he said.

Plans for 2027 in quarter one see the full plant undergo capacity commissioning which will target full production operations and it will employ around 350 direct jobs.

In the second half of 2027 the company aims to achieve a steady-state production and a full ramp up. Tungsten extracted from the Hemerdon Mine in Devon will undergo initial processing on-site before entering supply chains in both the US and the UK.

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

Celebrating James Hutton's tercentenary!

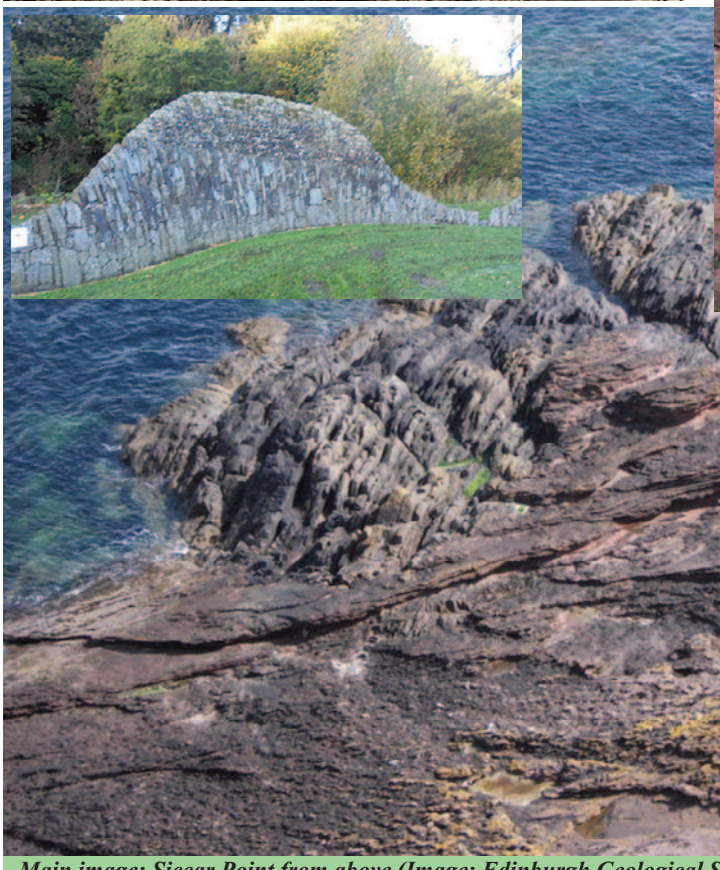
With 2026 marking the tercentenary of the birth of James Hutton we thought it appropriate to include images of some of his iconic locations across Scotland.

Thanks to the hard work of volunteers across the country we've been able to enjoy these locations, some of them having been enhanced - enjoy!









Main image: Siccar Point from above (Image: Edinburgh Geological Society)
Top left: Handbell ringers celebrate Hutton's tercentenary at Siccar Point
Top right: Hutton's unconformity at Lochranza on the Isle of Arran (Image: Callan Bentley)
Below right: Hutton's section at Arthur's Seat, Edinburgh (Image: Edinburgh Geological Society)
Inset: Modern sculpture in celebration of Hutton's unconformity at Jedburgh (Image: Chris Darmon)

your feedback

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

Hi Chris

Anglesey (DtoE 136)

Thanks for an, as always, interesting ***DtoE***. The Anglesey bit reminded me of Greenly's memoir so I popped into the BGS recently to find the dedication.

I remembered he wasn't allowed to dedicate it to his wife so he put in the attached part of the foreword - he goes on to fulsomely thank all the landowners, geologists and others who helped him. The memoir also describes the numerous attempts to win coal from under the Malltraeth Marsh. I know you like trains so have pointed out Holland Arms station on the now closed line to Amlwch. No visit to Anglesey is complete without walking down into the bottom of the Parys Mountain open pit and viewing the pyrite veins through the basic rock - a fossil 'black smoker'!



Kind regards

Tim Colman

Dear Editor

BGS Report on groundwater

The report on groundwater conditions is comforting, but highlights the regrettable level of knowledge in the public at large. This unfortunately extends to the press and media who clearly do not understand how the hydrosphere works.

I was amazed by the ignorance of our gardener at Laxfield House when I spoke to him two weeks ago. He clearly had no idea about the significant role of groundwater in East Anglia. He is a man of at leat 60 years, so not a product of our current so-called education system.

James Dent

The Editor comments: Thanks for this James. Whilst I don't regularly read any of our daily newspapers, I do watch BBC News and I have to say that the standards of journalism are slipping. I always say that if I know something isn't right, how many other things that I don't know are wrong!

Dear Chris

Another angle on James Hutton

My wife Val, borrowed a book from a friend named "The Great Tapestry of Scotland" by Susan Mansfield and Alistair Moffat.

Not perhaps surprisngly, Siccar Point was depicted along with some other related geological aspects. Here below is an interesting example of how Hutton modernised geological ideas.

Richard Mann, Norfolk



Hello Chris

Fossils on stamps

I've just found an interesting article which I thought might be worth a mention.

The July 26 edition of ***'Stamp Collector'*** contains an article entitled ***'History of Palaeontology'*** by Michael Kogan.

The subject is traced from the Ancient Greeks to the present and is illustrated with appropriate postage stamps.

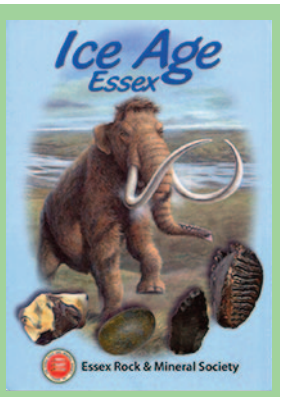
His website ***'palaeophilatelie.eu'*** is the most comprehensive available.

Pat Collins

The Editor comments:

Reviewer: Chris Darmon

Book Choice



Title:	Ice Age Essex
Authors:	ERMS Members
Publisher:	Essex Rock & Mineral Society
ISBN:	978 0 9534832 7 3
Format:	Folded pamphlet
Cost:	£2.50
Level:	Adult & general interest
My rating:	*****

Over the past few years Essex Rock & Mineral Society (ERMS), under the leadership of Ros and Ian Mercer, has done much to stimulate interest in geology across the county of Essex and even beyond. With Ian and Ros having recently retired from their involvement, they have passed the future of ERMS into the hands of new volunteers who will inherit a respected society in good shape.

In an age that's dominated by online media and things being accessed via the internet, it's good to see that in their latest publication ERMS has once again returned to a tried and tested method of communication - the printed word.

Ice Age Essex is the fourth in a series of publications that all use the same format, and its not one that transfers easily to an electronic environment. It's a full colour, edge to edge printed pamphlet folded down to A5 from a full A2 original. The other publications in the series are: Fossils in Essex, Essex Rocks and Pebbles in Essex.

Essex never saw glaciers in the way that Snowdonia, the Lake District or the Scottish Highlands did, but there's lots of Ice Age wonders to see as this pamphlet shows.

To start with there's lots of fossil evidence to support the idea that Essex experiences climatic extremes during some of the last two million years, from the finding of the teeth of a giant Steppe Mammoth to the discovery of numerous hand axes fashioned from local flints.

Once unfolded, one side of the pamphlet is used to present a 'picture gallery' of all of the fossils and artefacts that have been discovered across Essex. Each one is illustrated and where in the county it was found.

On the other side, panels are used to present climatic information, both hot and cold; Ice Age mammals, people in the landscape, ice reaches in Essex, Ice Age landscapes, flint tool making and living in the Ice Age. In short, there's a lot of information here and it doesn't seem to be crammed in. To sum up, this is a great addition to our library of accessible information - well done ERMS!

Geo Supplies stocks hundreds of geological books and booklets, as well as holding a full range of BGS maps and other publications. If we haven't got it in stock, we can usually get a current title for you within a short period of time.

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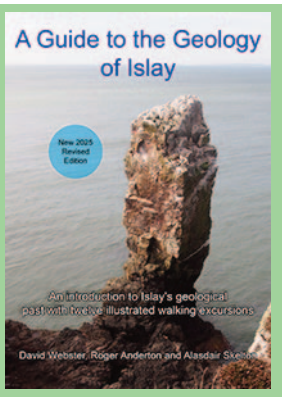
Title:	In search of Sea Dragons
Author:	Matthew Myerscough
Publisher:	Seren Books
ISBN:	978 1 781727 96 6
Format:	Paperback
Cost:	£14.99
Level:	General interest
My rating:	****

In the Backyard Geology section of this issue, you'll find details of the personal journey that is the background to this book. Ahead of receiving a review copy, this comes from publisher Seren Books.

After surviving a terrifying avalanche on Yr Wyddfa (Snowdon) as a young man, keen mountaineer Matthew Myerscough was forced to reevaluate his life. He returned to his childhood pastime, fossil hunting. Searching for spectacular marine reptile fossils on the beaches near his home developed into a new passion. He now has an impressive reputation amongst the fossil-hunting community and palaeontologists more widely.

Recounting his journey from novice to expert, ***In Search of Sea Dragons*** follows Matthew's adventures at lesser-known sites in South Wales, Somerset and North Yorkshire, where he makes jaw-dropping discoveries and searches for his dream find – a complete ichthyosaur. His story is one of personal growth and maturing into adulthood, as well as a love letter to the Jurassic oceans. As his months-long search for the missing half of the ichthyosaur draws to a close, Matthew considers what's more rewarding? The discovery or the things you find along the way. Lots of research is going on and new discoveries are being made, almost on a daily basis.

Book Choice



Title:	A guide to the Geology of Islay
Authors:	David Webster, Roger Anderton & Alasdair Skelton
Publisher:	Ringwood Publishing
ISBN:	978 1 9015014 16 2
Format:	Softback
Cost:	£14.99
Level:	General interest
My rating:	*****

This is a new and revised edition of an excellent guide that was first published in 2015. This, the 4th edition, features a number of additions and improvements.

Compared to the last edition, this guide only contains excursions on Islay, with Jura having a separate volume. It also benefits from more than 10 years of the authors leading trips to the island.

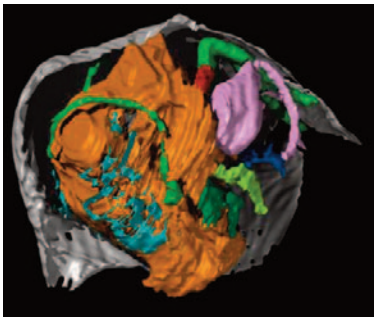
The 12 excursions are well described with clear route directions along with colour photographs and great maps and diagrams. Superb!

brainteaser

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

Who, What & Where?





I don't know what it is, but whenever we use more recent events or people, we get less feedback. That said, a correct unravelling of this brainteaser required knowledge that the heraldic device related to the University of Leicester. Failure to recognise this led to a dilemma - as we shall see!

Who? ***David Siveter (Emeritus Professor)***

What? ***Famous palaeontologist with brother Derek***

Where? ***David is most associated with the University of Leicester***

The problem with this brain teaser is that both of the Siveter brothers were involved with the same research at a lagerstatten that they discovered in Herefordshire. We were looking for David Siveter, hence we provided you with the heraldic device for the University of Leicester.

We had only two contributions, from Paul Thornley, and Richard Mann.

Here's part of what Paul had to say:
"Twin Brothers Derek and David Siveter. (1946 -)
Both are distinguished Palaeozoic palaeontologists, David with bivalved crustaceans and Derek with arthropods.

They were born in Wolverhampton and studied Geology at the University of Leicester. David then remained at Leicester for the rest of his career. He was awarded the Brady Medal, the senior medal in *The Micropalaeontological Society*, in 2014."

Richard went on to explain more of what David did:
"David studied Ostracod micropaleontology - recognition of a new species *Nasumaris flata*, the first 425 mya ostracod revealing the Bellonci Organ, an organ linking the respiratory and circulatory systems protruding from the middle eye within this classified Family of crustaceans. Only 2 other ostracods have been found with any soft body parts - up to now.

Using this new found technology provides a better interpretation of their evolution, past environments such as salinity and water depth as ostracods are ubiquitous. Currently the shell carapace alone has been used for classification purposes yet this now has now identified that using the carapace for classification would have led to this specimen to belong to two other families within the Group classification. The samples were obtained from Hertfordshire, the Silurian Lagerstatte Formation."

The Editor comments: In the 1980s, I remember taking a group to the Department of Geology at the University of Leicester where David took great delight showing us some of his images. What many people may not realise is that these false coloured images were some of the first uses of computer generated images in micropalaeontology.

The fossils were found in lime nodules in a volcanic ash at the (still secret) location in Herefordshire. The only way that the specimens could be studied was to slice them repeatedly and then string the individual images together. In this way the images could be manipulated and studied from any angle. A case of sacrificing your body for scientific research!

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

Once again we're asking you to engage your little grey cells! Who is this person, what are they known for and which place is he/she most associated with? You will realise that we have gone back a long way in time for this one!

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


DE SOLIDO
INTRA SOLIDVM NATVRALITER CONTENTO
DISSERTATIONIS PRODROMVS.
A D
SERENISSIMVM
FERDINANDVM II.
MAGNVM ETRVRIÆ DVCEM.
GRATIA
OBVIA VLTIO
QVÆSITA
FLORENTIÆ
Ex Typographia sub signo STELLÆ MDCLXIX.
SUPERIORUM PERMISSU.





diary of events

lectures/zoom mee

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

November

9 "The longest delay: the slow recovery from the Hangenberg mass extinction" by Lila Blake Organiser: Huddersfield Geology Group
Details: https://www.huddersfieldgeology.org.uk/talks/
10 "The art of making dinosaurs: how science and imagination bring them to life" by Michael Benton (Zoom)
Organiser: Amateur Geol. Soc. Details: https://(amgeosoc.wordpress.com/
10 "A magmatic legacy: how granite has shaped the Cornish landscape" by Sam Hughes (Zoom)
Organiser: West of England GA Details: https://www.wega.org.uk/
10 "Coastal geology" by Diana Perkins
Organiser: East Herts. Geology Club Details: https://ehgc.org.uk/
11 "The influence of geology on prehistoric and Roman societies in the north of England' by Ian Jackson
Organiser: Edinburgh Geol. Soc. Details: https://edinburghgeolsoc.org/
11 "Geology of the Himalayas" by Peter Treloar
Organiser: Shropshire Geol. Soc. Details: https://shropshiregeology.org.uk/
11 "Geology in art and art in geology" by Roger Smith
Organiser: Horsham Geological Field Club Details: www.hgfc.org.uk/
11 "The Cambrian explosion" by Rachel Wood
Organiser: Harrow & Hillingdon Geol. Soc. Details: https://www.hhgs.org.uk/
11 "Critical minerals and their importance for the UK" by Kathryn Goodenough Organiser: Cumberland Geol. Soc.
Details: https://www.cumberland-geol-soc.org.uk/events/
11 "Current mineral extraction in the UK from Cornwall to Tyrone" by Tim Colman Organiser: Leicester Lit. & Phil. Soc.
Details: https://www.leicesterlitandphil.org.uk/Geology-Section-Events
12 "Rare Earth metals" by Taija Torvela
Organiser: Leeds GA. Details: https://leedsga.org.uk/events/category/lectures/
12 "Geology of the vineyards of the Weald? by Mark Eller
Organiser: Mole Valley Geological Society. Details: www.mvgs.org.uk
12 "Past environments of the Isle of Wight" by Eve Horsfall
Organiser: Harrow & Hillingdon Geol. Soc. Details: https://www.hhgs.org.uk/
12 "Critical minerals from geology to circular economy: a matter of national security" by Kathryn Moore (Zoom)
Organiser: Hertfordshire Geol. Soc. Details: https://www.hertsgeolsoc.org.uk/
12 "How geology made the Potteries" by Bernard Besly
Organiser: North Staffs GA Group Details: https://nsgga.org/lectures/
13 "The Great Pyramid of Giza" by Geoff Downer (Zoom)
Organiser: Farnham Geol. Soc. Details: https://www.farnhamgeosoc.org.uk/
14 "From the bog to the sea - the Mull Dyke Swarm" by Joe Cartwright
Organiser: East Midlands Geol. Soc. Details: https://www.emgs.org.uk/
16 "Bringing forward the past: Black Country geology past, present and future" by Graham Worton
Organiser: Black Country Geol. Soc. Details: https://bcgs.info/pub/
16 "Retracing the footprints and notebooks of Charles Lyell in Nova Scotia's geoheritage" by Tim Fedak
Organiser: Edinburgh Geol. Soc. Details: https://edinburghgeolsoc.org/
17 "The whispers of rock - Stories from the Earth" by Anjana Khatwa
Organiser: Dorset GA Group. Details: https://dorsetgeologistsassociation.org/
17 "Basalt or ET basalt" by Alison Ure
Organiser: Kent Geologists' Group Details: www.kgg.org.uk/
17 "Kefalonia - new plate boundary and perhaps the site of Homer's Ithaca" by Peter Styles
Organiser: Liverpool Geol. Soc. Details: https://liverpoolgeologicalsociety.org/
18 "Some impacts of large igneous provinces" by Richard Wrigley
Organiser: Westmorland Geol. Soc. Details: https://westmorlandgeolsoc.org.uk
19 "Coast to coast across Northern England" by Anne & Denis Kell
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Stanway)
19 "The sub-ice surface in Antarctica" by Guy Paxman & "Yorkshire, land of ice & water" by Mark Bateman
Organiser: Manchester GA. Details: https://manchestergeology.org.uk/
19 "The geologist nd his museum" by Mick Oates
Organiser: Hull Geol. Soc. Details: https://hullgeolsoc.co.uk/hgmeet.htm
19 "Geology of Stonehenge & the bluestone controversy" by Peter Worsley
Organiser: Warwickshire Geol. Cons Group Details: https://www.wgcg.co.uk/
20 "The groundwater resources of Namibia" by Nigel Hoad (Zoom)
Organiser: West Sussex Geol. Soc. Details: https://wsgs.org.uk/
21 "Underground gas storage and the Portland landslide complex" by Kevin Privett
Organiser: South Wales GA Group Details: http://swga.org.uk/
23 "What are the real risks from landfill" by Robert Gregory
Organiser: Teme Valley Geol. Soc. Details: enquire@teme-village.org
24 "Carboniferous fossils"
Organiser: Sidcup Lap. & Min. Soc.
Details: http://www.sidcuplapminsoc.org.uk/
25 Short talks by early career researchers
Organiser: Edinburgh Geol. Soc. Details: https://edinburghgeolsoc.org/

December

1 "Geohazards in the Peak District" by Vanessa Banks
Organiser: Liverpool Geol. Soc. Details: https://liverpoolgeologicalsociety.org/
1 Christmas Gathering
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Shenfield)
2 "Floods in the Indian Himalaya: growing challenges and emerging solutions" by Richard Johnson Organiser: Cumberland Geol. Soc.
Details: https://www.cumberland-geol-soc.org.uk/events/
3 "Carreck archive - photo archive & geoconservation" by Jonathan Larwood
Organiser: Bath Geol. Soc. Details: https://bathgeolsoc.org.uk/lectures/
3 AGM & Conversazione
Organiser: Leeds GA. Details: https://leedsga.org.uk/events/category/lectures/
4 "Critical conundrums: a UK perspective on critical minerals" by Holly Elliott
Organiser: Geol. Assoc. Details: https://geologistsassociation.org.uk/lectures/
7 "Adventures in Volcanoland" by Tamsin Mather
Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com
8 "Deep time, Somerset geology and Ham Hill" by Geoff Rowland
Organiser: Dorset GA Group. Details: https://dorsetgeologistsassociation.org/
8 "The history of building stone use in Cambridge" by Nigel Woodcock
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
9 "Quaternary geology of Shropshire" by Mike Streetly
Organiser: Shropshire Geol. Soc. Details: https://shropshiregeology.org.uk/
9 "The influence of geology on London's Underground Railways" by Jonathan Gammon
Organiser: Harrow & Hillingdon Geol. Soc. Details: https://www.hhgs.org.uk/
9 "Troodos ophiolite of Cyprus" by Alastair Robertson
Organiser: Leicester Lit. & Phil. Soc.
Details: https://www.leicesterlitandphil.org.uk/Geology-Section-Events
9 "The geology of the North Caucasus" by John Connor (Zoom)
Organiser: Hull Geol. Soc. Details: https://hullgeolsoc.co.uk/hgmeet.htm
10 "Igneous petrology and early rifting" by Rebecca Richardson
Organiser: Geol. Soc. of Glasgow Details: https://geologyglasgow.org.uk/
10 "The history of geological thought and exploration of the geology of the Himalaya" by Danny Clarke-Lowes
Organiser: Hertfordshire Geol. Soc. Details: https://www.hertsgeolsoc.org.uk/
10 Christmas soiree & members' contributions
Organiser: Mole Valley Geological Society. Details: www.mvgs.org.uk
10 "Reconstructing the Cretaceous Greenhouse" by Andy Gale (Zoom)
Organiser: West Sussex Geol. Soc. Details: https://wsgs.org.uk/
10 "Campi Fegrei - living on a restless volcano" by Christopher Kilburn
Organiser: Harrow & Hillingdon Geol. Soc. Details: https://www.hhgs.org.uk/
12 "Future prospects for hydrocarbons in UK waters" by Jonathan Redfern & "Fossil footprints of the North Yorkshire coast" by John Hodgson
Organiser: Manchester GA. Details: https://manchestergeology.org.uk/
12 Talk by Karen Hanghoj BGS Director - subject tbc
Organiser: East Midlands Geol. Soc. Details: https://www.emgs.org.uk/
15 Christmas celebration & members' contributions
Organiser: Kent Geologists' Group Details: www.kgg.org.uk/
15 Christmas 'do' on Zoom
Organiser: East Herts. Geology Club Details: https://ehgc.org.uk/
17 Christmas gathering
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/ (Stanway)

January
6 "Devonian geology of the Midland Valley of Scotland" by Danny Long
Organiser: Brighton & Hove. Geol. Soc. Details: https://www.bhgs.org/
7 "Yorkshire coelacanths and their habitats" by Ru Smith (Zoom)
Organiser: Hull Geol. Soc. Details: https://hullgeolsoc.co.uk/hgmeet.htm
9 Talk by Tony Waltham - subject tbc
Organiser: East Midlands Geol. Soc. Details: https://www.emgs.org.uk/
10 "Searching for traces of life on Mars" by Keyron Hickman-Lewis
Organiser: Amateur Geol. Soc. Details: https://amgeosoc.wordpress.com/
11 "Fossil viruses and the roles of viruses in earth sciences" (Zoom)
by Maurice Tucker Organiser: Huddersfield Geology Group
Details: https://www.huddersfieldgeology.org.uk/talks/
12 "Aspects of the geology of Scotland" by Angus Miller (Zoom)
Organiser: West of England GA Details: https://www.wega.org.uk/
13 "Searching for (and not always finding) fossil life on Earth: lessons for Mars" by Alex Brasier
Organiser: Edinburgh Geol. Soc. Details: https://edinburghgeolsoc.org/
13 "Volcanic slope failure in Iceland" by Dave McGarvey
Organiser: Leicester Lit. & Phil. Soc.
Details: https://www.leicesterlitandphil.org.uk/Geology-Section-Events
14 "New research in stegosaurs" by Susannah Maidment
Organiser: Geol. Soc. of Glasgow Details: https://geologyglasgow.org.uk/
15 "Out of the frying pan into the freezer - extreme environments from around the world" by Ian Carr
Organiser: West Sussex Geol. Soc. Details: https://wsgs.org.uk/
16 "The UK & Ireland geophysical array project" by Dave Healy & a further talk by Rick Battarbee tbc
Organiser: Manchester GA. Details: https://manchestergeology.org.uk/
19 "The story of Meteor Crater" by Colin Morley
Organiser: Dorset GA Group. Details: https://dorsetgeologistsassociation.org/
19 "Fossilized footprints" by Peter Folkingham
Organiser: Liverpool Geol. Soc. Details: https://liverpoolgeologicalsociety.org/
20 "Shap Granite" by Andrew Miles Organiser: Cumberland Geol. Soc.
Details: https://www.cumberland-geol-soc.org.uk/events/
20 "Anthropogenic sediment deposits in Cumbria"
by Amanda Owen & John MacDonald
Organiser: Westmorland Geol. Soc. Details: https://westmorlandgeolsoc.org.uk
27 "A suitable stone: how geology has shaped British Stones used for letter cutting and fine carving" by Steve Garrett
Organiser: Edinburgh Geol. Soc. Details: https://edinburghgeolsoc.org/

February
1 "Mull dyke swarm" by Joe Cartwright
Organiser: Reading Geol. Soc. Details: rgs.secretary@btinternet.com
2. ":Radon - the UK's big hazard" by Peter Williams
Organiser: Liverpool Geol. Soc. Details: https://liverpoolgeologicalsociety.org/
3 "The sunken lanes of Southern England" by John Boardman
Organiser: Brighton & Hove. Geol. Soc. Details: https://www.bhgs.org/
4 "James: the man, his family and the mythology" by Beverly Bergman
Organiser: Bath Geol. Soc. Details: https://bathgeolsoc.org.uk/lectures/
8 Talk on the mineral trade by Emily Coulter & Frank Wrigley (Zoom)
Organiser: Huddersfield Geology Group
Details: https://www.huddersfieldgeology.org.uk/talks/
9 "Darwin's & BGS geological collections" by Mike Howe (Zoom)
Organiser: West of England GA Details: https://www.wega.org.uk/
9 "Palaeoecologicl analysis in the Pacific Northwest of North America"
by Joanne Egan
Organiser: Liverpool Geol. Soc. Details: https://liverpoolgeologicalsociety.org/
10 "Darwin's rock collection" by Mike Howe
Organiser: Shropshire Geol. Soc. Details: https://shropshiregeology.org.uk/
10 "Sulphide trace element signatures of mineralization styles in County Tyrone, N. Ireland" by Phillippe Mongeau
Organiser: Edinburgh Geol. Soc. Details: https://edinburghgeolsoc.org/
13 "Lincoln Cathedral and its buildings stones" by Mike Ashton
Organiser: East Midlands Geol. Soc. Details: https://www.emgs.org.uk/
17 "Whence the Rudston Monolith... again" by John Connor & Martin Clarke
Organiser: Hull Geol. Soc. Details: https://hullgeolsoc.co.uk/hgmeet.htm
17 "Structural inheritance controls present day fluid flow in the subsurface"
by Ken McCaffrey Organiser: Cumberland Geol. Soc.
Details: https://www.cumberland-geol-soc.org.uk/events/
17 "On mudstones" by Kevin Taylor
Organiser: Westmorland Geol. Soc. Details: https://westmorlandgeolsoc.org.uk

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
10 Church walls with John Walmsley
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/
14 Visit to Bradford on Avon Folk Museum and walk with Graham Hickman
Organiser: Bath Geol. Soc. Details: https://bathgeolsoc.org.uk/lectures/
14 Field visit to Bowleaze with John Scott
Organiser: Dorset GA Group. Details: https://dorsetgeologistsassociation.org/
18 Geoconservation at Wren's Best
Organiser: Black Country Geol. Soc. Details: https://bcgs.info/pub/
21/22 Geological conservation work on Gibbett Hill with Jane Allum
Organiser: Warwickshire Geol. Cons Group Details: https://www.wgcg.co.uk/

December
8 Visit to the NHM Mineral Department with Jonathan Spence & Aimee Smith
Organiser: Essex Rock & Min. Soc. Details: http://www.erms.org/

January
16 Geoconservation work at Shire Oak Nature Reserve, Walsall
Organiser: Black Country Geol. Soc. Details: https://bcgs.info/pub/

residential field trips

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

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

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

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

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

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

2028
April
5-13 The Northwest Highlands of Scotland with Chris Darmon & Colin Schofield Organiser: Down to Earth Details: downtoearth@geosupplies.co.uk

fairs, shows & special events

November
7/8 GA Festival of Geology, Burlington House, London
Organiser: Geol. Assoc. Details: https://geologistsassociation.org.uk/
14 Sussex Mineral & Fossil Show, at Haywards Heath College
Organiser: Sussex Min. & Lap. Soc. Details: https://www.smls.online/show
29 Oxford mineral & fossil show, Exeter Hall, Kidlington
Details: https://mineralshows.com/event/

pygidium

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

Look what happened when this hammer, went 'under the hammer'...

We are grateful to DtoE readers Ray & Sally Newton for this little piece of information.

The October edition of ***Sky at Night*** magazine carried an advert for an auction site, which gave an example (see attached) of the sale price reached for a geological hammer - alright it was rather special; but blimey. After that I don't think anyone can complain about your prices.



This is what Heritage Auctions had to say after the sale:

The auction's undisputed centrepiece was Alan Bean's Apollo 12 Lunar Module Flown and Surface-Used Geological Hammer, which realized $812,500. More than a geological tool, the hammer became part of Apollo history on Nov. 19, 1969, when Bean famously used it to free the stubborn Radioisotope Thermoelectric Generator fuel cask during deployment of the Apollo Lunar Surface Experiments Package on the Ocean of Storms. Bean later declared, "That hammer's a universal tool," and before leaving the Moon offered future explorers memorable advice: "Don't ever come to the Moon without a hammer." The artifact later entered a remarkable second chapter when Bean incorporated it into the creation of his celebrated lunar-inspired artwork.

"The incredible result for this hammer is a clear reflection of the interest in items from lunar missions, but the demand for items that actually made it to the surface of the Moon is exponentially greater," says Brad Palmer, Director of Space Exploration at Heritage Auctions. "Alan Bean's comments about it spotlight the fact that it wasn't just an artifact on the mission. It was a critically important tool for him."

The Editor comments: For what it's worth (and that's not a lot) I still have my original Whitehouse 1lb weight hickory shafted hammer from 1971 here at our office in Sheffield. Do I have any bids!?

Staying in Sheffield, I think there's a 'big hole' problem for Supertram...

This is the situation just below the tracks of ***Sheffield Supertram*** that emerged during August. It has been variously described as a well and a mineshaft, but either way it looks to be a big and expensive hole to fix.



Ironically the lining of the hole looks pretty secure, but how to fill the void is the problem! (Image: SYMCA)

The hole appeared without warning on Birley Lane to the southeast of the city centre on the line to Halfway. So far, surveys, technical studies and even a borehole have been undertaken. Investigations are continuing into groundwater conditions and any historic mine workings in the immediate area.

A spokesperson for South Yorkshire Mayoral Combined Authority (SYMCA) apologised for the disruption and said: "We'll provide an update on reopening timescales as soon as we can once the solution has been identified." Meanwhile no trams are running through the area.

Minerals in 1000 pieces...

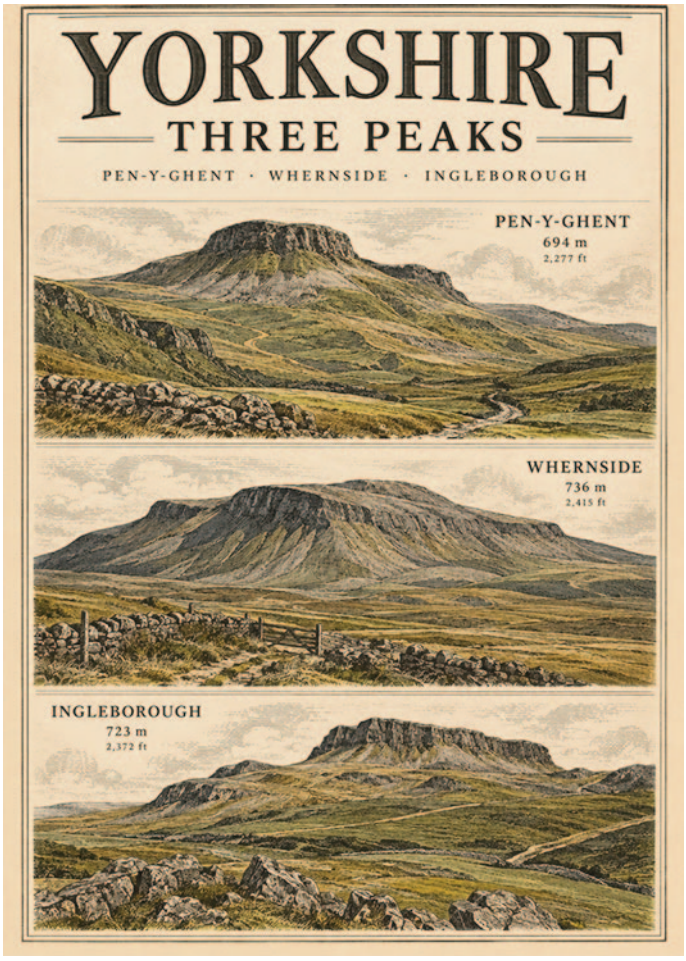
Down to Earth reader Pat Ford contacted to tell us that she purchased a 1,000 piece mineralogy jigsaw puzzle. She's offered to send it over for us to put out at next year's Summer School - what a splendid challenge - Thanks Pat!



Three of Yorkshire's finest...

At our stationery shop here in Chapeltown, we get lots of local customers who bring in documents to photocopy.

Occasionally we get historic items such as this vintage view of Yorkshire's three peaks, Penyghent, Whernside and Ingleborough. Quality like this speaks for itself!



Top this says Mel Fischer...

Old fashioned post boxes are getting almost as rare as their cousins red telephone booths, but those that do still hang around risk getting decorated like this fine example on the isle of Mull. Rather than a tribute to the recently revived Balamory, this post box pays homage to the basalt columns of the nearby Isle of Staffa.



Anyone for a walk 'on the moon'?

The rock anorthosite isn't common on the surfce of the Earth, but it is much more common on the surface of the Moon.

During a recent visit to Norway I was invited to walk on anorthosite to the lighthouse at Eigeroy, near Egersund in the ***Magma UNESCO Global Geopark***.



In May of next year a number of ***Down to Earth*** readers will be invited to join us on the self same walk. I, for one, can't wait to return!

Towering over the dolerite landscape...

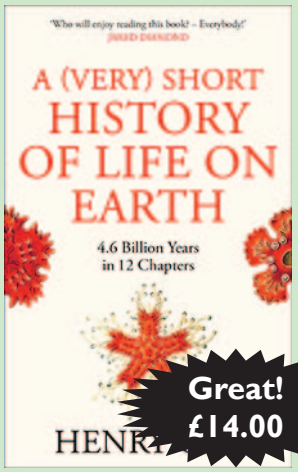
We end this collection of weird and wonderful stories with one from the Scottish Borders. A recent visit enabled us to see a great variety of different places and landscapes from the undulating Southern Uplands with their folded greywacke sandstones to the hills formed from volcanic plugs and necks.



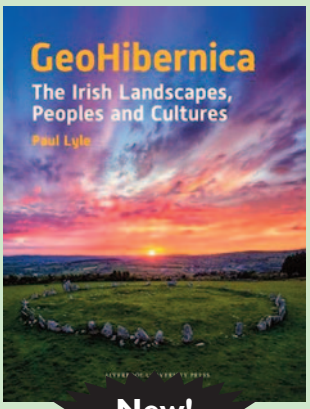
This is Smailholm Tower near Kelso, it is built from locally quarried dolerite and red Devonian sandstone.

GEO Featured books November to January

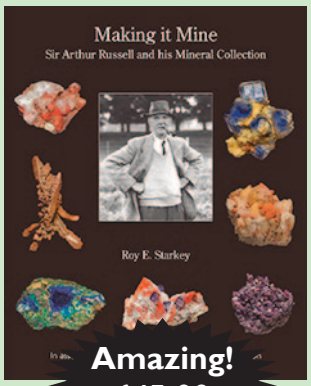
In each issue we are pleased to be able to introduce you to a range of featured books. Where they are being offered at reduced prices, these will be current to the end of January 2027 provided that stocks are available. Please note, all prices include UK postage. Many of these would make great presents!



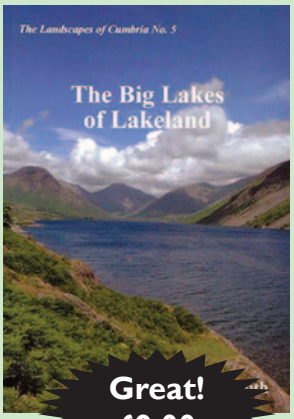
Great! £14.00



New! £50.00



Amazing! £45.00



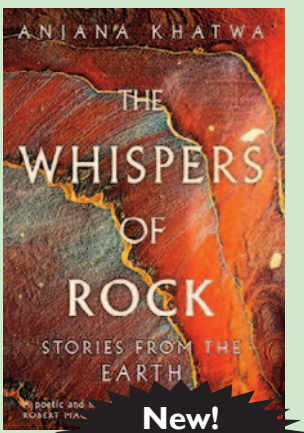
Great! £9.00



New! £22.00



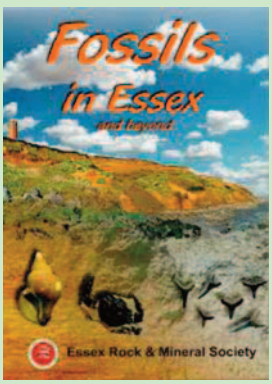
New! £7.00

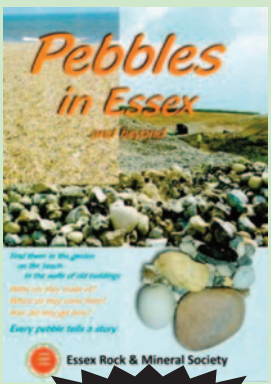


New! £25.00



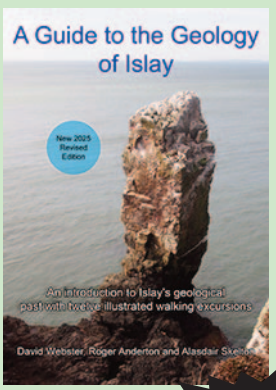
New! £14.00

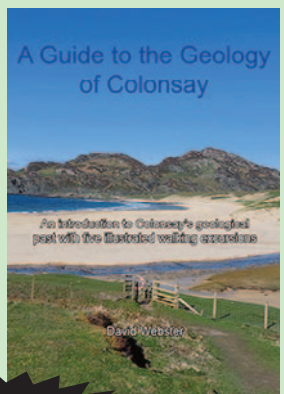






All three titles £8.00





Both titles £26.00

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