



# Down to Earth *extra*

Issue 79 July 2019

## SPOTLIGHT

- 2020 Residential Field Trips - the latest information
- Last places on Autumn 2019 trips
- Join us on a day trip - soon!
- Autumn face-to-face and distance learning courses

*Fabulous Devonian cliffs on the Caithness Coast. This is a deep geo at Dunscahy Head. Shown here are the characteristic Thurso Flags which often contain fossil fish and have been extensively quarried. (Photo: Chris Darmon)*

## From the Editorial team...

If you are one of those people who prefer travelling along our old trunk roads, rather than a motorway, you may have passed by the Shap granite quarry, alongside the A6. But if you haven't seen it for a while, prepare for a shock! After a long period of being closed, the famous pink stone is again being worked by Armstrongs.

Whilst a little is being used for repairs to monuments and even new memorials, most is finding use either as a general aggregate, or as coastal defence blocks. A recent visit found it was still working, even after 5pm. At this rate of extraction the quarry may have to be deepened rather than cut back much further.

So we know where Shap granite is going today, but there's a much more important question about this famous rock and its geological past. There are Shap erratics all around the North of England, with some reaching as far south as the Derbyshire Peak District. Conventional wisdom has it that they have been carried by glaciers and I'm not about to challenge that. However there are some question marks.

Firstly, even erratics close to the granite outcrop are rounded. How can we explain this, when they appear to have only been moved less than 5 miles? Secondly, the pluton is small, less than 5 miles in diameter, and yet there are probably tens of thousands of erratics. Have they all come from the same source, or is there another 'hidden' Shap granite outcrop somewhere?

Has anyone else had similar thoughts, or are we barking up the wrong tree?

*Chris Darmon & Colin Schofield*  
The Down to Earth extra Editorial team

**Help us to fill the final Autumn vacancies - see page 8 for details!**



**University of Edinburgh in appeal to acquire Charles Lyell's notebooks...**



We've been made aware of an appeal to help secure the purchase of Charles Lyell's notebooks. We're delighted to be able to promote this appeal and hope that you, our readers, will consider supporting such a worthy cause.

The University of Edinburgh is making a public plea in its efforts to acquire the notebooks of Sir Charles Lyell. This opportunity has arisen due to an export bar being placed on his collection which are being sold. The importance of Lyell to the history of geology and the earth sciences will be well known to our readers.



*The notebooks include maps, cross sections and diagrams of Lyell's field areas.*

Charles Lyell's 294 notebooks, currently in private hands, were due to be sold abroad. The University of Edinburgh is looking to raise £1,444,000 to save this vital historical collection. "We are supporting the purchase with our own funds but we also need your help. Right now, our challenge is to raise enough funds by 15 July 2019 to secure an extension to 15 October 2019, which is the final deadline to save

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the Lyell notebooks.” They contain not only field notes, but also maps, diagrams and cross sections of his many fieldwork areas.

Here is a link to a brief overview of the notebooks and the plans to save them:

[https://gallery.mailchimp.com/b3ea23a6951bcf5950bddd925/files/46ac9eff-4ece-403e-b304-a1410523c8ae/Making\\_public\\_the\\_notebooks\\_of\\_Charles\\_Lyell.01.docx](https://gallery.mailchimp.com/b3ea23a6951bcf5950bddd925/files/46ac9eff-4ece-403e-b304-a1410523c8ae/Making_public_the_notebooks_of_Charles_Lyell.01.docx)

It seems that the geological world has risen to the challenge and is getting behind the effort to secure these important documents. Given the short timescales (initially 15 July and hopefully 15 October to raise the funds) we need to act fast.

The dedicated website is open for pledges:

[www.ed.ac.uk/giving/save-lyell-notebooks/pledge-to-save](http://www.ed.ac.uk/giving/save-lyell-notebooks/pledge-to-save)

### Was the ‘Cambrian explosion’ driven by plate tectonics...

Around 542 MA something happened that gave rise to a big step in evolution, it was the so-called ‘Cambrian explosion’. At places where

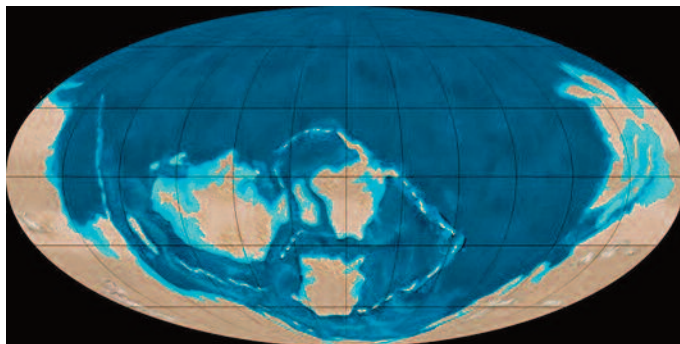


*All calm on the surface, but 542 MA was an exciting time for life as we know it. (Image: CCO common domain)*

there is a continuous sedimentary record, such as in China, the time is marked by a sudden influx of shelly creatures, such as brachiopods. It has been likened to someone turning on a light switch. After that, things were never the same again. If as we know it, had taken off.

My story has surrounded that causes of that event with some people suggesting that it was due to oxygen levels, whilst others have championed environmental factors or a rise in predatory behaviour. Now, a paper in the journal *Nature Communications*, suggests a strong link to tectonics.

Now a team of scientists from the Universities of Exeter and Edinburgh have given a fresh insight into what may have driven the ‘Cambrian explosion’ – a period of rapid expansion of different forms of animal life that occurred over 500 million years ago.



*All mixed up - the plate distribution was very different back then.*

While a number of theories have been put forward to explain this landmark period, the most credible is that it was fuelled by a significant rise in oxygen levels which allowed a wide variety of animals to thrive. The new study suggests that such a rise in oxygen levels was the result of extraordinary changes in global plate tectonics.

During the formation of the supercontinent ‘Gondwana’, there was a major increase in continental arc volcanism – chains of volcanoes often thousands of miles long formed where continental and oceanic tectonic plates collided. This in turn led to increased ‘degassing’ of CO<sub>2</sub> from ancient, subducted sedimentary rocks.



## Show Dates

July 6 & 7  
**Edinburgh Academy**

Rock, Gem ‘n’ Bead Show

July 20 & 21  
**Newcastle Racecourse**

Rock, Gem ‘n’ Bead Show

July 27 & 28  
**Kempton Park Racecourse, Sunbury on Thames**

Rock, Gem ‘n’ Bead Show

August 3 & 4  
**Burgess Hall, St Ives, Cambs.**

Rock, Gem ‘n’ Bead Show

**All shows are indoors with refreshments & ample free parking**

**All shows are open: 10am - 5pm Saturday  
10am - 4pm Sunday**

**Admission (one entrance fee covers the whole weekend):**

**Kempton Park: adults £5.50, seniors £3.00**

**All other shows: adults £4.50, seniors £2.00**

**All shows: children 8-16 £1.00, under 8's free**

**Rock and Gem Ltd., 27 Common Hill, Steeple Ashton,  
BA14 6EE Tel: 01380 871835 • <http://www.rockngem.co.uk>**



*Trilobites were one of the groups that came to dominate the Lower Palaeozoic after the Cambrian explosion.*

This, the team calculated, led to an increase in atmospheric CO<sub>2</sub> and warming of the planet, which in turn amplified the weathering of continental rocks, which supplied the nutrient phosphorus to the ocean to drive photosynthesis and oxygen production.

The study was led by Josh Williams, who began the research as an MSc student at the University of Exeter and is now studying for a PhD at the University of Edinburgh. During his MSc project he used a sophisticated biogeochemical model to make the first quantification of changes in atmospheric oxygen levels just prior to this explosion of life.

Co-author and project supervisor Professor Tim Lenton, from the University of Exeter's Global Systems Institute said: "One of the great dilemmas originally recognised by Darwin is why complex life, in the form of fossil animals, appeared so abruptly in what is now known as the Cambrian explosion."

"Many studies have suggested this was linked to a rise in oxygen levels – but without a clear cause for such a rise, or any attempt to quantify it."

Not only did the model predict a marked rise in oxygen levels due to changes in plate tectonic activity, but that rise in oxygen – to about a quarter of the level in today's atmosphere – crossed the critical levels estimated to be needed by the animals seen in the Cambrian explosion.

Williams added: "What is particularly compelling about this research is that not only does the model predict a rise in oxygen to levels estimated to be necessary to support the large, mobile, predatory animal life of the Cambrian, but the model predictions also show strong agreement with existing geochemical evidence."

"It is remarkable to think that our oldest animal ancestors - and therefore all of us - may owe our existence, in part, to an unusual episode of plate tectonics over half a billion years ago" said Professor Lenton.

Whilst this won't be the final word on the 'Cambrian explosion' it is a breath of fresh air and takes us further along the road to revealing the truth about one of the most important events in Earth's history.

*A tectonically driven Ediacaran oxygenation event by Joshua Williams, Benjamin Mills and Tim Lenton was published in Nature Communications on Wednesday, June 19th 2019*

*Down to Earth extra is grateful to the University of Exeter for much of the text in this item.*

## Rockwatch trips and outings for kids this Summer...

*Rockwatch* is the club for budding geologists, fossil hunters and dinosaur lovers! Based at the Geologists' Association, *Rockwatch* is able to enlist the help and support of expert geologists on its Summer outings.

*Here's the Summer programme - just contact the GA, or book through the website: [www.rockwatch.org.uk](http://www.rockwatch.org.uk)*

### *July 13-14 South Wales Weekend*

Based in Cardiff this weekend will take a close look at some of the geology of South Wales. Lots of rocks and fossils are just waiting to be discovered!

### *July 20 Yorkshire Coast field trip*

A bit of a difference to the normal Jurassic, we'll be spending the day at Skipsea Withlow, exploring the Quaternary, collecting lots of different rocks, thanks to the Ice Ages and there may even be some rare fossils!

### *July 27-31 Field trip to Fife, Scotland with Angus Miller*

Based in the lovely coastal village of Crail, this field trip takes in all that's best about Fife Geology. There are just so many different rocks to be found! Imagine that you're inside a volcano and at the bottom of a muddy sea!

### *July 29 - August 2 The Jurassic Coast of Dorset & East Devon*

Our annual trip to this world famous area. We'll be seeing evidence for past changes in sea level as we collect some great fossils.

### *August 6 Activity day at Ware Museum.*

*For more information go to: [www.rockwatch.org.uk](http://www.rockwatch.org.uk)*

## All fall down, recent bad weather leads to cliff collapses...

Recent storms which have followed spells of dry weather have led to a series of cliff failures around the coast of the UK. Amongst those recorded recently was one in Sussex, where the local authority was forced to close access to a popular beach after part of Seaford Head came down. Chalk cliffs are amongst the most likely to fail, especially if rainwater gets down into joints.

Meanwhile at Sidestrand on the Norfolk Coast, there was a huge cliff

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Mobile 079 309 70579

Further information available via email or website:

<https://www.mott.me.uk>



*An aerial view of the Sidestrand cliff collapse, shows the extent of the fall. (Image: Courtesy of North Norfolk News)*

collapse which has led to the council warning users of the popular coast path to keep at least 5 m back from the cliff edge. Warning signs have been put up for the many walkers still using the path.

"We always urge the public to take care on coastal paths, especially near cliffs, but given the recent weather and rate of erosion we advise everyone to stay at least five metres back at all times," said a Norfolk County Council spokesman.

Mr Damms was on the beach using 3D scans to monitor the changing coastline when the cliff collapsed in front of him.

Meanwhile, another local resident, Mr Cramp, who moved to the area from Leicester three years ago, said he hoped further cliff collapses would not reach his flat in nearby Overstrand. "My wife noticed that a fence post along the path has got much closer to the cliff edge in the few years we've been here," he said.

*Down to Earth readers are advised to scan the internet for some really good video material, with some of the collapses captured as they happened.*

## How to learn the geology of the United Kingdom, one piece at a time...

The BGS have produced a jigsaw of the Bedrock geology of the United Kingdom and Ireland map first published in 2017. Scaled to 50x66cm with a full size folded and cased map included in the box. You'll find it's available in two different box sizes (everything else is the same). The postbox size one, should fit through most letterboxes, so it's the one we'll be sending out.

Not only do you get a picture on the cover of the box, you also get a full size folded copy of the map to aid you in your quest to put it all together, if you so wish!

This 'poster map' featured in an earlier edition of 'Down to Earth' is aimed to provide an overview of the geology of the UK and Ireland at a relatively coarse scale using current BGS and GSI data. The map shows the bedrock (solid) geology of Britain and Ireland excluding the Channel Islands, generalised from larger-scale maps and overlaid on shaded relief. The map is intended as a teaching resource, suitable for a wide range of educational purposes and was designed in collaboration with the Earth Science Teachers Association and the



Geographical Association.

*The jigsaw map is available priced at £19.95 from Geosupplies and the British Geological Survey shops and online.*

*It's post free from:*

[www.geosupplies.co.uk](http://www.geosupplies.co.uk) when you enter the online shop.

## Have you heard the one about the paramoudra?

Down to Earth reader Derek Brumhead wrote to tell us about an excellent leaflet by Martin Warren former curator of the Cromer Museum about paramoudra flints. These are the ones that look a bit like oversized Polo mints! We were lucky to find one on the beach exactly as he describes.

*The Editor comments:* Thanks Derek, the resemblance is quite uncanny. I concur with you that Cromer Museum is well worth a visit.



## Summer Day Trips are here...

*Come and join us, we've saved a place for you! The standard price is £15.00 per person, with some trips at the lower rate of £10.00 per person. All trips offer a £3.00 discount for holders of Club Class, students under 19 and groups of 5 or more people booked together.*

*To book for any Day Trip go to: [www.geosupplies.co.uk](http://www.geosupplies.co.uk) and enter the online shop.*

*Alternatively, ring us on: 0114 245 5746*

### Sunday, June 30

#### Moffatdale & Dobs Linn, Southern Uplands

Charles Lapworth spent several years as a young teacher studying the rocks of a small stream section in lonely Moffatdale. He was to determine the rocks succession using graptolites and to change radically our view of the structure of the Southern Uplands, no longer a thick successions but a thinner one repeatedly folded. We'll also see some amazing structures and Scotland's highest waterfall.

*Meeting: Grey Mare's Tale car park (NT) at 11.00, standard prices*

### Thursday, July 4

#### Ballantrae & Downan Point, Ayrshire

There's superb variety on this day trip with basaltic pillow lavas, serpentine, jasper and even some Permian sandstone. Add in some amazing folds and this will be a day to remember.

*Meeting: Ballantrae Harbour at 10.30, standard prices*

### Tuesday, July 23

#### Creswell Crags & Permian rocks of Nottinghamshire

Creswell Crags is a World Heritage Site for its Quaternary bone caves. It's also an excellent place to kick off a day of Permian rock sites in the area. Come and see some mysterious rocks!

*Meeting: Creswell Crags car park at 10.30, standard prices*

### Thursday, July 25

#### National Stone Centre, Wirksworth

Come and explore this small area, where the Dark Peak meets the White Peak, where both fossils and minerals can be found. There's easy walking and rocks a-plenty all within a couple of miles of the National Stone Centre.

*Meeting: National Stone Centre car park at 10.30, standard prices*

### Wednesday, July 31

#### Mundays Hills Quarry, Leighton Buzzard, Bedfordshire

Exposures in the soft Woburn Sands are rare, but this quarry has excellent faces that show really good sedimentary structures. There are also some fossils to be seen. As this is a working quarry, boots and safety helmets are required.

*Meeting: To be confirmed at 11.30, standard prices*

### Wednesday, August 14

#### Geology & landscape of the Burbage area of South Yorkshire & Derbyshire

Despite being based in Sheffield, it's a very long time since we arranged a visit to this area on the SW edge of the city and into Derbyshire. It's a big landscape with thick sandstone units, dipping strata and faults. We'll be taking in Higger Tor and Carl Wark along the way in what is quite a small area with superb landscape.

*Meeting: Upper Burbage Bridge car park (GR 262 830) at 10.30*

### Saturday, September 7

#### Geology & minerals of Kit Hill & Callington area

This is a story of granite outcrops and their associated minerals. We begin our day with a look at the overall landscape of this part of Eastern Cornwall, before homing in on the settlements of Callington and Kelly Bray which were formerly mining centres for a variety of different minerals.

*Meeting: Car park at the top of Kit Hill at 10.30 standard prices*

### Tuesday, September 10

#### Rocks and landscape of Roche Rock area

This is a day that's all about granite and its related rock. We'll see unaltered granite as well as various stages in its breakdown. At Roche Rock there's tourmaline and then we see its reduction to kaolin at the china clay museum at Wheal Martyn.

*Meeting: Roche Rock at 10.30, standard prices, Wheal Martyn Museum admission is extra.*

*If you'd like to join us on any other days during our SE Cornwall trip between September 5-12, please contact us.*

### Wednesday, September 18

#### Geological sites in Walsall & the Black Country

It's a while since we visited the geology trail at the Dingle and Cuckoo Nook in Walsall. This is just 4 km east of Walsall town centre and is an area that was formerly quarried for limestone. The Silurian rock is of similar age to that at Wren's Nest so fossils are a distinct possibility! Afterwards we'll visit another local site.

*Meeting: On B4151 Sutton Road near The Three Crowns PH at 11.00 standard prices*

## Autumn distance learning courses...

*This Autumn we'll be running the following distance learning courses. Each course has a minimum of 10 Units but you can use our learning site for up to 6-months. For each course you can also receive the materials by post in paper form or electronically by email or Moodle. All courses run from mid-September 2019. They cost £75.00 by email/Moodle and £100.00 for printed materials by post.*

### Here's what's on offer:

*"How the Earth works - new views of an old planet"* This 11-Unit extensively revised and rewritten course, looks at the theory of plate tectonics. You'll learn how the theory developed over a period of nearly 100 years and how it's still evolving today. The course starts with basic Earth chemistry and physics and takes it from there.

*"Yorkshire Geology"* This is a 10-Unit course that examines the geology of the county, step by step. Naturally it starts with the oldest rocks in the Ingleton area and ends with the Devensian glaciation that shaped the coast of Holderness.

*"Time Travellers Britain 2"* A further 10 Units that take in some of our finest geology. Don't worry, there's no requirement for having done the first 10 Units. This batch includes: London's true underground, East Anglia, Orkney & Shetland, the work of Gideon Mantell and George Barrow to name but a few of the Units.

*"Steps toward the rock face"* This introductory, 11- Unit course, can be started at any time. You just push the button whenever you wish!

*For more information on any of the courses Email: [downtoearth@geosupplies.co.uk](mailto:downtoearth@geosupplies.co.uk)*



## Our Residential Field Trip Programme for 2020



The majestic Black Cullins of the Isle of Skye  
(Photo: Chris Darmon)

We're so excited by our 2020 Residential Field Trip Programme that we've decided to release details of all the trips at the same time. This will allow you to plan your year, well in advance. We look forward to seeing you somewhere in 2020!

We've got a mix of new and old locations with, what we hope, is something for everyone. We have our first visit to a fabulous geopark in Portugal, along with a repeat of our 2019 sell-out Norwegian trip. We've a long awaited Shetland Isles trip, as well as our first ever trips to the Yorkshire Dales and the Forest of Dean.

At this stage, we are only awaiting final details for the Summer School and the Forest of Dean trips, all of the others have brochures and are open to book.

For further details, visit the website or  
Tel: 0114 2455746  
Email: [downtoearth@geosupplies.co.uk](mailto:downtoearth@geosupplies.co.uk)

### The complete 2020 field trip programme...

- Terras de Cavaleiros, Portugal - March 13-20\*
- Norway revisited - March 27 - April 5\*
- Raasay & Skye - April 25 - May 2\*
- Eigg & Rum - May 3-12\*
- Dingle Peninsula - May 31 - June 7\*
- Shetland Isles - June 20-27\*
- Western Lake District - July 4-11\*
- Summer School - July 25 - August 1
- Pembrokeshire - September 1-8\*
- Isle of Arran - September 14-21\*
- Forest of Dean - September 27 - October 1
- The Yorkshire Dales - October 6-11\*
- The Malvern Hills - October 23-28\*

Trips marked \* have brochures that can be viewed on our website: [www.geosupplies.co.uk](http://www.geosupplies.co.uk)  
We look forward to hearing from you!



# Come & join us on an Autumn 2019 Residential Field Trip



Beds of Lower Cretaceous Hastings Beds, Cliff End, Fairlight Cove. (Photo: Wild Hastings Wordpress.com)

We've still got some vacancies on our exciting Autumn 2019 residential field trips. So it's still not too late to make your booking. We welcome all, who are interested in rocks and the landscape to join us. Our trips are informal, friendly and informative. We look forward to hearing from YOU!

If you are looking for a single room, these are very limited and may not be available at all on some of the trips.

Brochures for all of the trips can be viewed on our website: [www.geosupplies.co.uk](http://www.geosupplies.co.uk)

To enquire, or get a booking form, you can contact us as follows:

Tel: 0114 2455746

Email: [downtoearth@geosupplies.co.uk](mailto:downtoearth@geosupplies.co.uk)

## Autumn 2019 field trip programme...

It's not too late to join us - but book soon!

- South Cornwall - September 5-12  
N.B. New dates
- Northumberland Coast - September 22-27
- Llyn Peninsula - October 12-17
- Hastings Coast, Sussex - October 22-27

You can view brochures for all of these trips at our website: [www.geosupplies.co.uk](http://www.geosupplies.co.uk)

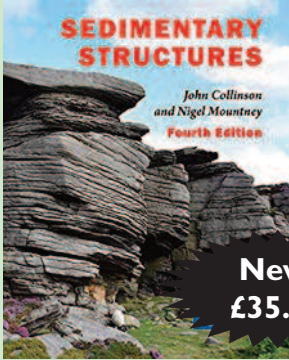
We look forward to hearing from you!



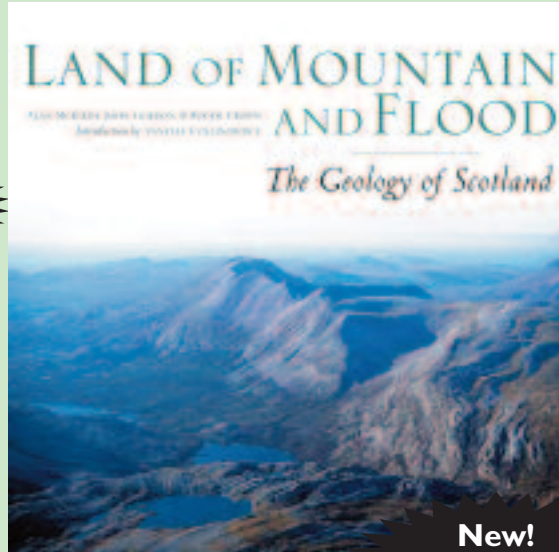


# Featured books May - July

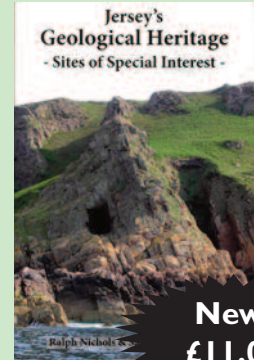
In each issue we are pleased to be able to introduce you to a range of featured books. Where they are being offered at reduced prices, these will be current to the end of the month shown above, provided that stocks are available. Please note, all prices include UK postage.



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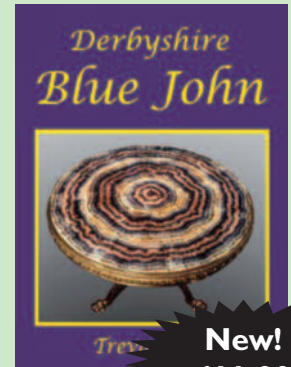
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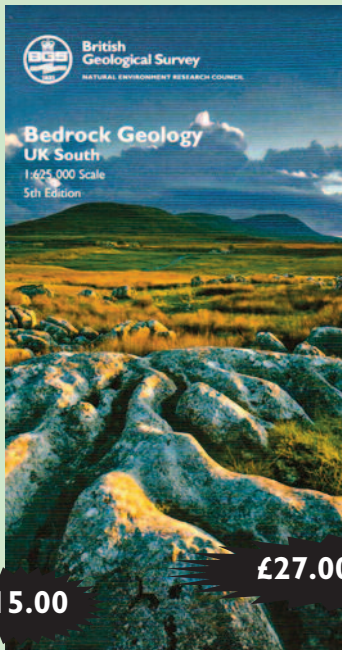
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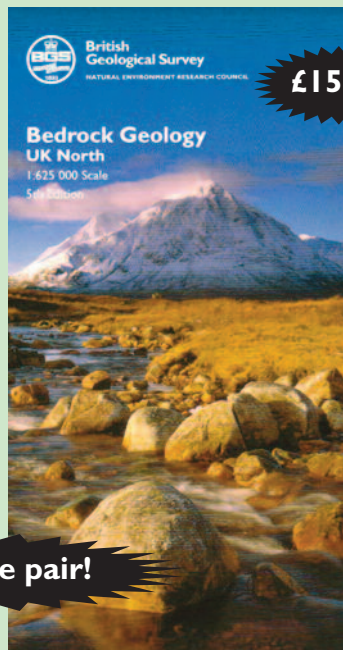
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