



Down to Earth *extra*

Issue 88 April 2020

NEWS FLASH!

- All residential and day trips cancelled until further notice
- Expansion of online courses with price reductions!
- Our online shop is still open for business, as usual!
- 2021 Residential Field Trips are open for bookings!

The famous 'Three Chimneys' of Marloes Bay, Pembrokeshire. The pillars are composed of vertically bedded Silurian ferruginous sandstones.

This is just one of the locations we planned to visit on our September field trip. As yet, no decision has been taken as to whether this trip is still on. (Photo: Chris Darmon)

From the Editorial team...

For all of us, these are extraordinary times. You have to talk to elderly people who can remember the Second World War to find similarities, in the way Government is acting. Like a war, Covid 19 is a killer that may take some of our loved ones, before their time. There are also parallels with some of the plagues of history. Not far from here lies the village of Eyam in Derbyshire which was hit by bubonic plague in 1666. The villagers, led by their priest, placed themselves in quarantine. Over 200 of the inhabitants perished, but they prevented a much larger loss of life in the surrounding area.

Let us hope that nothing as drastic of this will befall us here in the UK during the current emergency, but now is definitely not the time to be going out into the field, not even by yourself, and certainly not in a group. We're joining with the rest of the geological community across the UK in cancelling all of our planned events until further notice. At the moment, this includes everything up until the Summer period. We'll be reviewing the Autumn programme at a later date. In the meantime, we're planning a bumper programme for next year, that will include some of the locations we've lost from this year.

So what can geologists do during these weeks of self isolation? Already some of you are buying jigsaws - geological ones of course! We are also making available our entire range of distance learning courses, many at reduced prices, so that you can keep those grey cells active. Details can be found elsewhere in this issue. There's lots of free stuff also available online including thousands of youtube videos. Now is also the time to take a look at your specimen collection, or your field notes. There's always something that you can do to keep you occupied.

But most of all at this time, stay safe. We don't want to lose a single one of you during this emergency.

Chris Darmon & Colin Schofield

The Down to Earth extra Editorial team

See page 8 for the full list of our distance learning courses - available now!



news update

World's smallest dinosaur found trapped in amber...

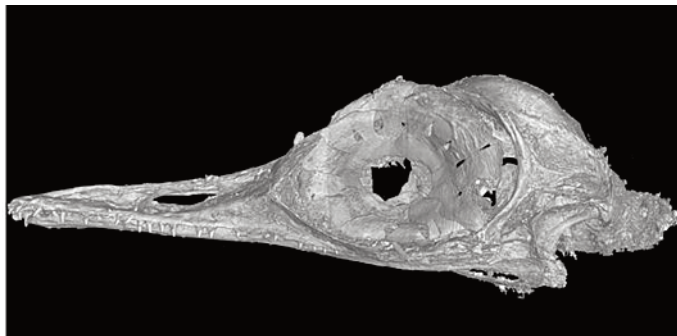
Over the past few years we've become accustomed to weird and wonderful dinosaur stories, but the latest, from Myanmar takes some beating!



The fossil in its amber tomb. (Image: Lida King)

It's the remains of a bird-like skull from around 100 million years ago, in the Cretaceous. The research, which has been led by Professor Jingmai O'Connor from the Chinese Academy of Sciences in Beijing describes a specimen that's about the size of the bee hummingbird.

Prof. O'Connor describes it as: "The weirdest fossil I've ever been lucky enough to study. I just love how natural selection ends up producing such bizarre forms. We are also lucky that this fossil survived to be discovered."



This is the actual skull of Oculudentavis khaungraae, but it weighs only about 2 grams. (Image: Gang Li)

The fossil that's been named *Oculudentavis khaungraae*, has been superbly preserved in its amber tomb. Scientists have even been able to determine fine details of its eyes and teeth, sufficient to believe that, despite its tiny size, it was a confident predator, which ate insects.

Amazingly, scientists have even been able to examine the animal's tongue. This may shed more light on its biology. For the first time we have an insight into the small animals that were around in a Cretaceous tropical forest, at the same time as the dinosaurs.

Down to Earth extra is designed & published by Geo Supplies Ltd.,
49 Station Road, Chapeltown, Sheffield S35 2XE

Editor: Chris Darmon
Assistant Editor: Colin Schofield

Tel: 0114 245 5746 • FAX: 0114 240 3405
Subscribe for FREE: downtoearth@geosupplies.co.uk

Material is © Geo Supplies Ltd. 2020
You are welcome to share DtoE extra with others in your group and reproduce items contained here, provided you acknowledge the source.



A reconstruction of the animal, with its prominent beak and eyes. It's thought that it had excellent sight. (Image: Zhixin Han)

Miniaturisation, such as this, is often associated with isolation and Myanmar, at this time in the Cretaceous is thought to have been the site of an ancient island arc.

*You can read the full story at:
www.livescience.com/smallest-dinosaur-of-mesozoic.html*

Sirius Minerals: takeover by mining giant Anglo American, has now been agreed...

The long term future of the North Yorkshire polyhalite mine project has been assured following agreement at a special meeting of the shareholders of Sirius Minerals.

This was despite objections from many small investors who lost out heavily on the cost price of their shares. They got only 5.5 pence per share.

It is now expected that work at the mine site, near Whitby will move more rapidly towards completion, so that mining can commence.

Salt Lake City, Utah hit by a 5.7 magnitude earthquake...

On March 18, 2020, a magnitude 5.7 earthquake struck the outskirts of Salt Lake City, Utah. Seismic instruments indicate the earthquake originated at a depth of 6.6 miles (10.6 km).



Downtown Salt Lake City with a backdrop of snow covered mountains.

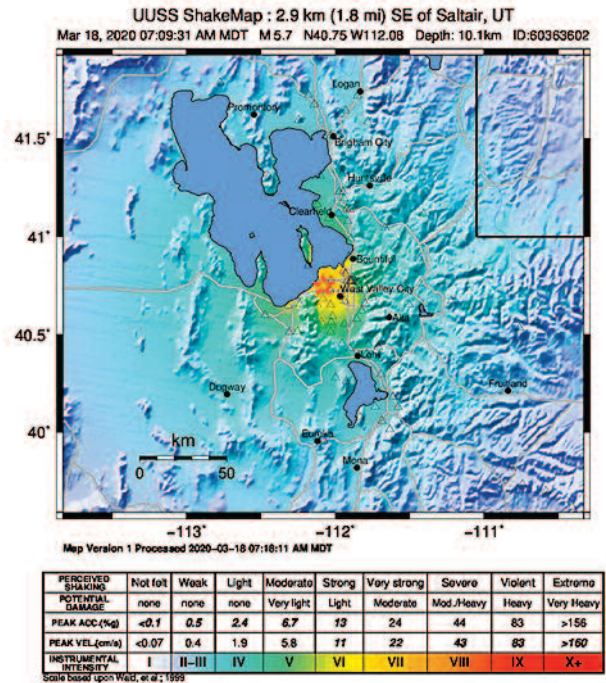
The USGS has updated the aftershock forecast. Over the following week there was a less than 1 percent chance of one or more aftershocks that are larger than magnitude 5.7. It is likely that there will be many smaller earthquakes over the next few weeks, with 0 to

240 magnitude 3 or higher aftershocks.

Here are the details of the main shock as reported by USGS:

“At 7:09 a.m. MTC on March 18 a large earthquake struck about 15 miles west of Salt Lake City, UT. Perceived shaking for the quake was severe. The event was widely felt, with over 35,000 "Did You Feel It?" reports thus far submitted. The earthquake caused damage to some structures and local power outages.

Our automated estimate of ground failure suggests only modest amounts of landsliding and liquefaction, with limited population impacted.advertising jobs!”



USGS image for the Salt Lake City earthquake event on March 18.

There was some damage to property, but no reports of serious injury or deaths amongst the population. Events like this are rare in Salt Lake City, especially an earthquake of this magnitude.

Top award for Ian & Ros Mercer...

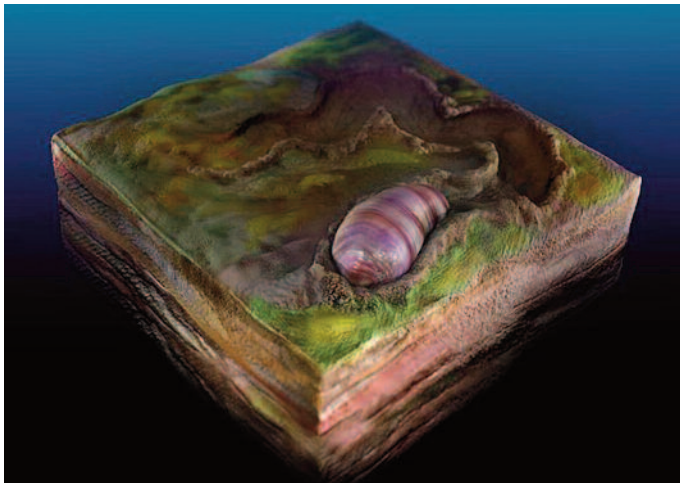
Even in the midst of this national emergency, we will always find the time and the space to bring you some good news. If it concerns volunteers, so much the better! On the national stage, there's no finer organisation than the U3A which single handedly teaches more Earth science than anyone else with groups the length and breadth of the country.

In the last couple of years, the 'dynamic duo' of Ros and Ian Mercer have been spearheading the work of U3A nationally in this area. We're delighted to be able to tell you that they have been honoured by the award of the Halstead Medal from the Geologists' Association for their work. Congratulations to you both, it is richly deserved!

Elsewhere in this issue of *DtoE extra*, you'll find reference to the latest publication from the Essex Rock and Mineral Society. It's all about the fossil of the local area and, you've guessed it, this also has the telltale mark of the Mercer's upon it! Two very talented people.

555 million year old fossil could be the 'holy grail' of many modern animals...

A strange worm-like organism that's been found in the outback of Australia may prove to be the ancestor of many of our familiar forms of animal life. A team from the University of California at Riverside have discovered a 'blob' about the size of a grain of rice that's been named *Ikaria wariootia*. The significance is the Ediacaran form, dated at 555 Ma, is the earliest so far to show bilateralism, i.e. animals with bilaterally symmetrical bodies (mirrored left and right sides) and a front side and back side, usually sporting a mouth and an anus.



A reconstruction of what Ikaria wariootia may have looked like.
(Image: Sohail Wasif, University of California Riverside)

"This is what evolutionary biologists predicted," says geologist Mary Droser from UC Riverside. "It's really exciting that what we have found lines up so neatly with their prediction."

Scientists have long realised that the fauna of the Ediacaran, including that from our own rocks in Charnwood Forest, reflect a great diversity, with a number of 'experimental' forms. But where did we and all the other bilaterians originate from?

Science Alert takes up the story:

For many years, a set of fossilised burrowing marks imprinted in stone deposits in Nilpena, South Australia, have intrigued researchers. These trace fossils, called Helminthoidichnites, date to the Ediacaran Period (specifically about 551 to 560 million years ago), and were



Ikaria wariootia impressions in stone.
(Image: Droser Lab, University of California Riverside)

speculated to be the legacy of an ancient bilaterian life-form. Thanks to new research, made possible by laser scanning of the stone deposits, that speculation looks to be confirmed.

"We thought these animals should have existed during this interval, but always understood they would be difficult to recognise," says palaeontologist Scott Evans, now with the Smithsonian Institution's National Museum of Natural History.

"Once we had the 3D scans, we knew that we had made an important discovery."

The scans reveal impressions made by over a hundred of the ancient animals, ranging in between 2-7 millimetres long and about 1-2.5 millimetres wide.

This creature, dubbed *Ikaria wariootia*, takes its name from the Adnyamathanha language used by the indigenous custodians of the Flinders Ranges region, with 'Ikara' meaning 'meeting place', and 'warioota' being named for Warioota Creek, which runs in the area.

The findings have been published in the journal PNAS.

Read the full story at:

<https://www.sciencealert.com/strange-worm-like-blob-may-be-earliest-known-ancestor-of-all-animals-like-you-and-me>



THE RUSSELL SOCIETY

Interested in British minerals?
Why not join us?
www.russellsoc.org

to find out about our:

- Field Trips
- Journal
- Newsletter
- Social Events

Please mention Down to Earth when contacting us



Calcite with chalcopryite
Cloud Hill Quarry
Leicestershire

YORKSHIRE MINERAL & FOSSIL FAIR

18th April 2020

Show postponed due to
Coronavirus - watch for new date

The Market House, Hawes, North Yorkshire DL8 3QN



Fluorite on Quartz
West Pastures Mine
Stanhope, Durham

For further information
contact Don Edwards -
don.edwards@talktalk.net
+44-(0)1433 620304
www.petrifactioneer.com/TMFF

A REAL COLLECTOR'S FAIR!

Ancient continental fragment off Canada shines a light on early tectonic processes, and it's 10% larger than previously thought!

A pattern is beginning to emerge of ancient continental fragments being found, either deeply embedded in the mantle, or in otherwise 'odd' places. Terms such as 'underplating' are becoming ever more common as we probe deeper into the interior of our planet. Along the way we are having to revise the details of how plate tectonics actually works.

Here is the latest story to catch our eye, courtesy of Science Alert:

Scientists have uncovered a splintered remnant of Earth's continental crust from millions of years ago, embedded in the isolated wilderness of northern Canada. Baffin Island, located in between the Canadian mainland and Greenland, is a vast Arctic expanse covering over 500,000 square kilometres (almost 200,000 square miles), making it the fifth largest island in the world.

While the island comprises part of the newest recognised territory in Canada – Nunavut, formally established in 1999 – a new discovery shows this ancient landmass has undisclosed ties that stretch backwards in time so far, they actually emanate from a distant geological eon.



Diamond embedded in a piece of kimberlite.
(Image: St. John / Flickr)

While analysing igneous rock samples recovered from diamond exploration drilling in the Chidliak Kimberlite Province at the southern stretches of Baffin Island, researchers identified a mineral signature in the rock they had never expected to find.

"Kimberlites are subterranean rockets that pick up passengers on their way to the surface," explains geologist Maya Kopylova from the University of British Columbia. "The passengers are solid chunks of wall rocks that carry a wealth of details on conditions far beneath the surface of our planet over time."

In this case, those passengers had completed a very long journey. The team says kimberlite rocks like this, formed at depths below 150 kilometres, are driven to the surface by both geological and chemical forces.

In terms of the geological component, their emergence underneath modern-day Baffin Island represents the end of a colossal dispersal that occurred approximately 150 million years ago, during rifting of the continental plate of the North Atlantic Craton (NAC).

This NAC refers to chunks of lithospheric rock that date back billions of years ago to the Archean Eon, representing some of the best exposures of Earth's earliest continental crust.

Rifted into fragments millions of years ago, NAC has been exposed in Scotland, Labrador, and Greenland, but researchers weren't expecting to find it in Baffin Island's Hall Peninsula.

"The mineral composition of other portions of the North Atlantic Craton is so unique there was no mistaking it," says Kopylova. "It was easy to tie the pieces together. Adjacent ancient cratons in Northern Canada – in Northern Quebec, Northern Ontario and in Nunavut – have completely different mineralogies."

To reach their findings, the team used a number of analytical techniques – including petrography, mineralogy, and thermobarometry – to study 120 rock samples, called xenoliths, taken from the kimberlite province. The results showed the Chidliak mantle "strikingly resembles" the NAC rocks from West Greenland in terms of their bulk composition and mineral chemistry, while showing numerous contrasts with markers from other cratons.



Earth's ancient continental crust, found in outcrops along the eastern shores of the Hudson Bay, was formed from re-melted oceanic-type rocks forged more than 4.2 billion years ago.
(Image: Jonathan O'Neil/Carnegie Science)

"We conclude that the Chidliak mantle demonstrates an affinity with only one adjacent block of cratonic mantle, the NAC," the authors explain in their paper. "We interpret this similarity as indicating the former structural coherence of the cratonic lithosphere of the Hall Peninsula Block and the NAC craton prior to subsequent rifting into separate continental fragments."

The new findings mean we've discovered about 10 percent more of the known expanse of the NAC – a pretty sizeable chunk of this incredibly ancient crust. And thanks to newer mantle modelling techniques, we can also envisage the shape of some of Earth's earliest known rock formations at much greater depths than ever before.

"With these samples we're able to reconstruct the shapes of ancient continents based on deeper, mantle rocks," says Kopylova. "We can now understand and map not only the uppermost skinny layer of Earth that makes up one percent of the planet's volume, but our knowledge is literally and symbolically deeper."

These findings are reported in Journal of Petrology.

Looking beyond the Coronavirus pandemic...

Our Residential Field Trip Programme for 2021



Why not hop aboard our 'geobus' and go wherever it takes you?
 (Photo: Chris Darmon)

As you will appreciate, at the current time a lot of things are up in the air as we, along with everyone else, try and plan amidst the Covid 19 pandemic. At the moment, we are hoping to run a 'best of 2020/2021' programme with some trips from this year re-scheduled for next year. In addition, it may be possible to run a couple of the Autumn 2020 trips.

We already have around 20 bookings for 2021, so we would encourage you to contact us should you wish to join us. Remember all monies paid are protected in our client account, so you take no risks in booking.

If you'd like to see a brochure for any of these trips, contact us. You can only get booking forms for your chosen trips from us at:
downtoearth@geosupplies.co.uk

If you'd like to discuss anything, or would like a printed copy of any of the brochures, please ring us on: 0114 245 5746

Revised residential field trips for 2021...

- Fuerteventura - February 22 - March 1
- Southern Norway - March 18-28
- South Devon, English Riviera - April 7-14
- Isles of Raasay & Skye - April 20-27 *
- Northwest Highlands of Scotland - May 5-13
- The Shetland Isles - May 20-27
- Islay, Jura, Gigha - June 5-13
- Dingle Peninsula - June 19-26 *
- Heart of Wales - June 30 - July 7
- Summer School, Worcester - August 14-21 *
- The Outer Hebrides - September 1-9
- Minehead - September 14-19
- Bridgnorth, Shropshire - September 24-29
- Anglesey - October 5-10
- North Norfolk Coast - October 22-27

*Trips marked with an * are currently provisional dates, subject to confirmation.*

Brochures for all trips, are available from us. We look forward to hearing from you!

Important changes to our services during the Coronavirus emergency...

During the national emergency caused by the Coronavirus outbreak we have had to close our shop to personal callers. However, we are endeavouring to continue our online sales, albeit there may be a little delay in the dispatch of items with changes to Royal Mail schedules.

For all your requirements go to: www.geosupplies.co.uk

Time for a Wiltshire geology bundle...

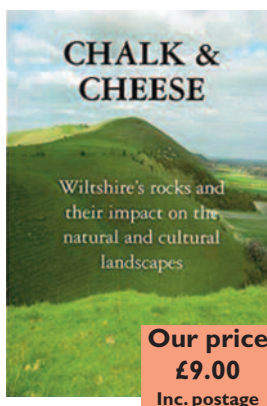
In the last issue of *DtoE extra* we told you about four Wiltshire geological guides. We're pleased to remind you that we still have copies available, but they are selling well, so numbers are limited.

The guides cover: *The Vale of Pewsey, Bradford-on-Avon, The Vale of Wardour and Salisbury Cathedral Close.*

The set of four cost £9.50 including UK postage.

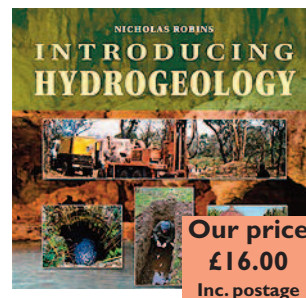
New books for this issue...

Title: Chalk & Cheese
Author: Steve Hannath
Publisher: Ex Libris Books
ISBN: 978 1906641 65 8
Format: Softback
Cost: £8.00
Level: Adult & general interest
My rating: *****



Recommended

Title: Introducing Hydrogeology
Author: Nicholas Robins
Publisher: Dunedin Press
ISBN: 978 1 78046 078 9
Format: Softback
Cost: £14.99
Level: Student & general interest
My rating: *****



Title: Rocks of Wales - their story
Author: Dyfed Ellis-Gruffydd
Publisher: Gwasg Carreg Gwalch
ISBN: 978 1 84524 295 4
Format: Softback
Cost: £8.00
Level: Student & general interest
My rating: *****



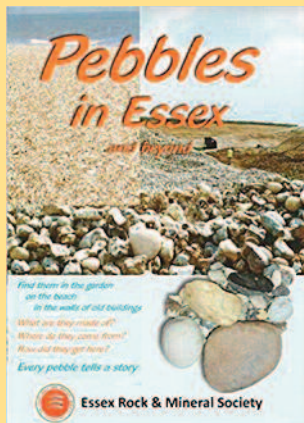
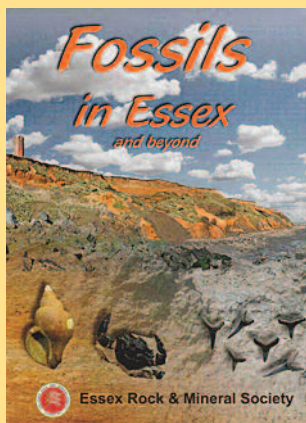
From the back catalogue...

Title: Derbyshire Blue John
Author: Trevor Ford
Publisher: East Midlands Geological Society
ISBN: 978 0 9519717 9 6
Format: Softback
Cost: £9.99
Level: Adult general interest
My rating: *****



All of the featured publications are available from Geo Supplies Ltd.

Pebbles in Essex have been joined by Fossils...



The lovely people at Essex Rock & Mineral Society have now published another excellent fold out poster, This time it covers Essex Fossils. *Buy one of each for £5.00 including postage.*

Available from Geo Supplies Ltd. www.geosupplies.co.uk

Down to Earth readers welcome!

Just 5 minutes off M1 Jn 35 N. Sheffield



GEO SUPPLIES LTD.

49 Station Road, Chapeltown S35 2XE
Tel: 0114 245 5746 • www.geosupplies.co.uk
Open: Mon-Fri 8.30-5.00, Sat. 9.00-2.00

Our shop is currently closed due to Coronavirus
Order online at: www.geosupplies.co.uk

First, the bad news, all field trips are cancelled until further notice...

Due to the current Coronavirus emergency, all day schools and field trips have been cancelled until further notice. We are sad to have to take this decision, but such activities are clearly out of the question at this time.

Day Schools & Day Trips - Refunds/Transfers

If you have paid for a day school or day trip that has been cancelled you may contact us for a refund which will be credited back to your debit or credit card. Alternatively, we are happy to hold on to your payment and then to transfer it to a trip of your choice once we are able to start them up again.

Residential Field Trips - Refunds /Transfers

All of the money that you have paid for trips that we cancel is safe in a client trust account and can be refunded to you. We are assuming that trips due to run in the Spring and Summer will not take place. Even trips planned for the Autumn may not run, but we are constantly monitoring Government advice and instructions, so the situation is subject to change.

We are currently working on a revised and expanded 2021 programme that will incorporate some of the cancelled 2020 trips. Some of those details are not yet finalised, but an up to date list can be found on page 6 of this issue of *DtoE extra*.

If you have booked for a cancelled 2020 field trip you have priority to book places for any of the 2021 trips. You may transfer any monies paid for 2020 trips to 2021.

If you wish to have a refund for any residential field trip, please contact us by email or phone. We would prefer to make payments by cheque to you. You can contact us by email at: sales@geosupplies.co.uk or on: 0114 245 5746 in the current emergency please allow 7 days for a reply.

Now for the good news, we have lots of distance learning courses for you...

Due to the current Coronavirus emergency, why not exercise your brain with one of our distance learning courses? They are primarily designed for adults wanting to learn more about aspects of geology in a relaxed and informal style.

Most of the courses comprise 10-units which can be undertaken over a time scale to suit you. If you choose to access the units via our free to use Moodle platform, you have 6 months of Moodle time. You can also get the units by email or as printed sheets. We provide you with lots of tasks to do, but there's no homework and nothing to send us - we give the answers with the following unit.

To make things easier for you at this time, we've reduced the prices of many of the courses and also provided several 'bargain bundles'! We look forward to you joining us on one of the courses in the near future.

For further information, email: downtoearth@geosupplies.co.uk

Here's the full list of courses on offer...

Yorkshire Geology £60 This 10-unit course examines the geology of 'God's own county' beginning with the oldest rocks from the Silurian and ending with the effects of the Quaternary Ice Age.

Hot Rocks £60 This 10-unit course provides a comprehensive introduction to igneous rocks and processes. By the end of it you'll know about far more than just granite and basalt!

Sedimentary Rocks £60 This 11-part course provides an overview of sedimentary rocks and the processes that made them. We also include sedimentary structures and how to interpret them.

Rocks from the Pressure Cooker £60 This 10-unit course takes a close look at metamorphic rocks and processes that make them. For many people this is something of a 'closed book', but with our course, your eyes will be opened!

Bargain bundle - get all three Rock Courses for £150

Fossils for All Part 1 £60 This 10-unit course is for anyone with an interest in fossils and even those without! Part 1 examines how fossils are preserved, their use and fossils through time. It goes on to look at graptolites, brachiopods, bivalves, echinoderms, corals, and trilobites.

Fossils for All Part 2 £60 This 10-unit course carries on from Part 1 and examines microfossils, dinosaurs and ichnofossils. It goes on the look at the record of life through time and takes a close look at extinction events such as the K/T boundary and human ancestry.

Bargain bundle - get both fossil courses for £100

World Geology £60 This 10-unit course puts the spotlight on places around the world with exceptional geological stories. Examples include Iceland, New Zealand, China and the Grand Canyon. As you might expect there are some great stories to be told!

Time Traveller's Britain Part 1 £60 In this 10-unit course, we examine some of the places that make Britain the landscape and place that it is. In this part we include William Smith, Mary Anning, Roderick Murchison and places such as Raasay, the Northwest Highlands, Anglesey and County Antrim.

Time Traveller's Britain Part 2 £60 In this 10-unit course we continue the story with a look at London, Yorkshire, Rum, Charles Lapworth, Gideon Mantell and George Barrow to name but a few.

Time Traveller's Britain Part 3 £60 In this 10-unit course with story with Arran, the Malvern Hills, the Dorset Coast and take a look at Charles Darwin and Henry de la Beche to name but a few.
Bargain bundle - get all three parts of the above for £150.

How the Earth Works £60 In this 10-unit course we take a look at how the theory of plate tectonics developed from the earliest times, to the most recent discoveries. See how observations and scientific advances across many fields, played their part.

Backyard Geology £60 Learn about how to study the geology of your local area in this 8-unit course. It includes help on how to read BGS maps. The cost includes a free BGS map of your choice.

Steps Towards the Rock Face £60 (£50 for under-19's) Our acclaimed introductory course ideal for students aged 14+ as well as adults who are looking for a comprehensive look at the Earth sciences.



Down to Earth

'Earth science learning for all'

The learning zone

**Put some colour into your world
with one of our distance
learning courses...**

**Backyard
Geology**

**Steps Towards
the
Rock Face**

**Time Traveller's
Britain
Parts 1, 2 & 3**

**British Isles
Geology**

**Yorkshire
Geology**

Hot Rocks

**Sedimentary
Rocks**

**Rocks from the-
Pressure
Cooker**

**Fossils for All
Parts 1 & 2**

**How the Earth
Works**

**Enrol online at www.geosupplies.co.uk or ring us on 0114 245 5746
Geo Supplies Ltd 49 Station Road, Chapeltown, Sheffield S35 2XE**

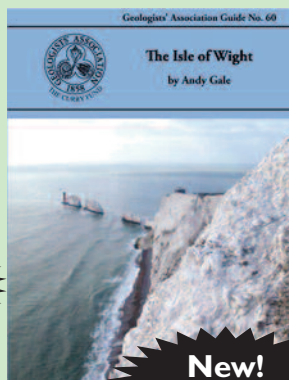


Featured books February - April

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.

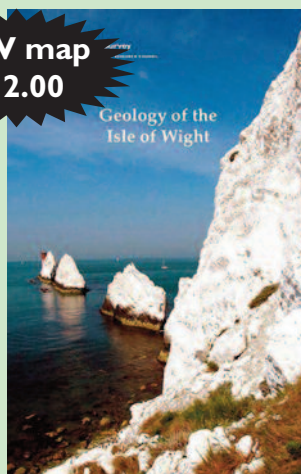


New!
£18.95

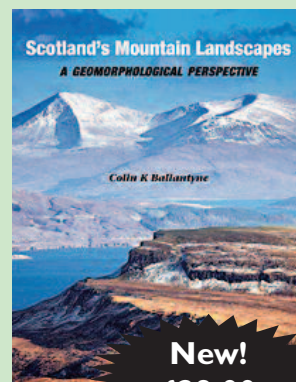


New!
£14.00

LOW map
£12.00



**Buy the book and
map for £23.00!**

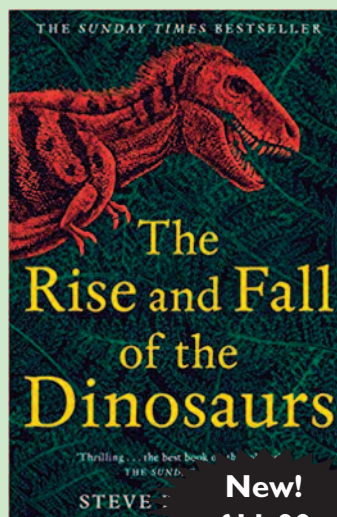


New!
£28.00

**William Smith 1815 map of England & Wales
1,000 piece jigsaw - includes a folded copy of the
map!**



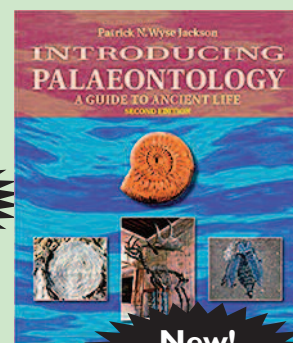
New!
£22.95



New!
£11.00



New!
£15.00



New!
£11.00

**Order online at www.geosupplies.co.uk or ring us on 0114 245 5746
Geo Supplies Ltd 49 Station Road, Chapeltown, Sheffield S35 2XE**