

# MERCIAN

## Geologist

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**Front cover:** The Breedon Hill limestone quarry seen  
from the north (see page 139). Photo P542174 from  
British Geological Survey.

**Back cover:** Coast erosion at Holderness, east of  
Hull, where cliffs of glacial till recede by successive  
rotational landslides, though armour stone and sea-  
walls protect hard points and cause increased erosion  
down-drift. Photos and map by Tony Waltham.

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### They're getting younger all the time...

The story of how two 14-year-old schoolboys, Richard Blachford and Roger Mason, found the Precambrian fossils *Charnia* and *Charniodiscus* in Charnwood Forest (see *Mercian*, 2011, p226) bears out a somewhat anecdotal suggestion that many important geological discoveries have not actually been made by geologists. But the possibility that those in the forefront of field-discovery are becoming even younger was confirmed in 2009, when a five-year-old girl noticed fossilized bones along the sea shore on the Isle of Wight. Her find was made in a landslip area on the Atherfield Clay Formation, and was brought to the attention of palaeontologists at the University of Southampton. The partial pelvis and associated sacral and dorsal vertebrae were subsequently confirmed as belonging to a new species of pterosaur, and are described in the online publication PLOS ONE of March 2013 (doi:10.1371/journal.pone.0058451). The species, which is from the Lower Cretaceous about 115 million years ago, was named *Vectidraco daisymorrisae*, which honours both the name of its young discoverer and also the location - *Vectidraco* meaning "dragon from the Isle of Wight".



### Another predatory dinosaur

Yet another newly discovered species of flying dinosaur, this time from the late Jurassic strata in Kimmeridge Bay, Dorset, has been given an unusual name which is, for this year, particularly topical. The specimen has been called *Cuspicephalus scarfi* after the satirical political cartoonist Gerald Scarfe, who was chosen because his caricatures of the late Margaret Thatcher once famously depicted her as a pointy-nosed *Torydactyl*. Found by fossil collector Steve Etches, and identified by University of Portsmouth palaeontologist Dr David Martill, it is believed to be the most substantial pterosaur skull to be found in Britain for nearly 200 years (*Acta Palaeontologica Polonica*, doi:10.4202/app.2011.0071). The specimen, 33 cm long, is now in Dorset's Museum



of Jurassic Marine Life, and according to Dr. Martill is unique because of its complete skull, which is extraordinarily slender, hence its 'pointed head' name. Gerald Scarfe said he was "... thrilled and flattered - I never thought Mrs Thatcher would do anything for me - even if it is to be immortalised as a 155-million-year-old fossil. I have spent many holidays in Kimmeridge and to think my namesake was buried beneath my feet is wonderfully bizarre."

### Evolution, creationism and flying spaghetti

The Church of the Flying Spaghetti Monsters is a spoof rival to the creationist school of thought, and is generally held to be a light-hearted parody religion whose devotees are called 'Pastafarians'. The church's name was first coined in a satirical open letter written by Bobby Henderson in 2005 to protest the Kansas State Board of Education's decision to permit teaching intelligent design as an alternative to 'Darwinian' evolution in public school science classes. Perhaps because of the mirth that it engenders, but also because of its more serious undertones with regard to the teaching of science in schools, the Flying Spaghetti Monster has had widespread exposure on the internet. Its underlying tenet relates to an argument (*Russell's teapot*) put forward by Bertrand Russell, which refutes the notion that the burden of proof lies upon the skeptic to disprove the claims of religions, and concludes instead that the philosophical burden of proof lies upon those who make unfalsifiable claims (for example supporting a literal interpretation of the Book of Genesis), and not on those who reject them.

In his letter, Henderson satirized creationist ideas by suggesting that whenever a scientist carbon dates an object, a supernatural creator that closely resembles spaghetti and meatballs is there "changing the results". Arguing the equal validity of his beliefs, Henderson called for Flying Spaghetti Monsterism to be allotted equal time in science classrooms alongside intelligent design and evolution. The theme was elaborated further in Henderson's book, *The Gospel of the Flying Spaghetti Monster*, which preaches that an invisible and undetectable Flying Spaghetti Monster created the

universe. Pirates are revered as the original Pastafarians, and their important role in causing global warming is demonstrated by a graph showing a steady decline in numbers of pirates plotted against rising global temperature. This argument was put forward to show that correlation does not always imply causation, and is a counter to the suggestion from some religious groups that the high numbers of disasters, famines, and wars in the world is due to the increasing lack of respect and worship shown towards their deity.

Creationism can be identified with a variant of Christian fundamentalism that has persisted down the centuries, often resulting in the persecution of scientists and philosophers. However, in a 2012 paper entitled *The Evolution of Creationism (GSA Today, v22, n11, p4-9)* David Montgomery argues that the modern creationist school finds its roots in the teachings of George McCready Price (1870–1963). A Canadian Seventh-day Adventist, Price was an amateur geologist with no formal training who in 1923 published a book with the rather misleading title *The New Geology: A Textbook for Colleges, Normal Schools, and Training Schools; and For the General Reader*. Here he asserted that there was no order to the fossil record, and that the apparently logical progression of species-types favoured by geologists was really just a mixed-up sampling of communities that lived in different parts of the ancient world. He considered the fossil record too incomplete to confidently reconstruct the past, citing the occasional discovery of animals previously thought to be extinct and known only from fossils.

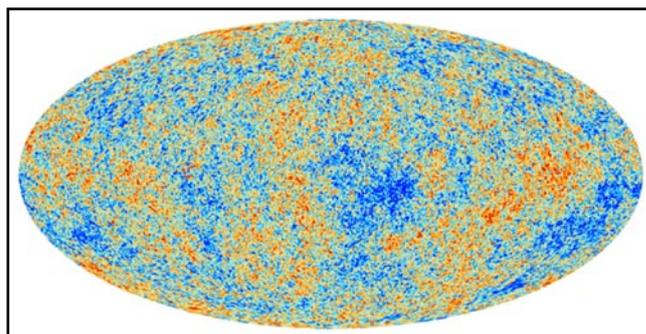
### Trouble in Paradise?

While geological thought has evolved over the past several centuries, so too has Christianity, and Montgomery notes that the creationist school is currently being torn apart by bitter arguments. *Young-Earth creationists* believe the world is no older than about 10,000 years, and that Noah's Flood formed its present-day topography during a single event a few thousand years ago. *Old-Earth creationists* accept much geological evidence but endorse ideas such as progressive creationism (also known as theistic evolution), which argues that God guided evolution in creating the diversity of life. In a later step, creationism was repackaged as *intelligent design*, which embodies the inherently untestable assertion that God designed the world with a particular purpose or goal in mind. Interestingly, the name *God-particle* has strayed into the realms of astrophysics, although it is a populist term disliked by many scientists and clergy alike and, in any case, it has recently been supplanted by the discovery of the Higgs-boson. Montgomery concludes that after losing repeated court battles over efforts to teach creationist views in science classrooms, the creationist strategy appears to have shifted to questioning evolution, particularly in the wake of the Charles Darwin bicentenary celebrations (see *Geobrowser* 2009). He notes that "Geologists assess theories by how well they

fit the data, and creationists evaluate facts by how well they fit their theories", which are philosophies that cannot be reconciled. By discussing the development of creationism in classrooms alongside the teaching of evidence-based Natural Sciences, students could be given useful insights into the science vs spirituality debate, and how the two approaches can be evaluated evidentially in the context of the planet's geological evolution.

### ...and there was light

Thanks to the European Space Agency's Planck telescope, we are now within a chronological hairsbreadth of observing the very act of Creation. The latest images of the cosmic microwave background constitute the most detailed map yet of the situation that prevailed only 380,000 years after the Big Bang. They show variations in the heat-radiation left over from that event, with red and blue regions representing areas that are slightly warmer and colder, respectively. It is these small fluctuations in the early universe that developed into the stars and galaxies we see today. This map of the remnant glow largely affirms scientists' theories about the universe's early history (The Guardian, 21 March, 2013).



For example, the data support the theory of simple inflation in which, around 10-30 seconds after the Big Bang, the universe briefly expanded faster than the speed of light. It also broadly confirms previous calculations of universe age, but with the proviso that it commenced 13.81 billion years ago, some 80 million years earlier than previously thought. As with all major scientific advances, there are also some new problems to solve. The universe now seems to contain more matter, of both visible and invisible types, and less of the mysterious entity called dark energy than earlier observations suggested. The Planck data also delivered an unexpectedly low rate of expansion for the universe, a figure called the Hubble constant that describes how dark energy is increasingly stretching the fabric of space. "This is one of the most exciting parts of the data," says Martin White, a Planck scientist at the University of California, Berkeley, "the hope would be that this is actually pointing to extra physics we're not aware of." This should move us closer to answering the two outstanding questions about our existence – what happened at the Big Bang, and what came before it?

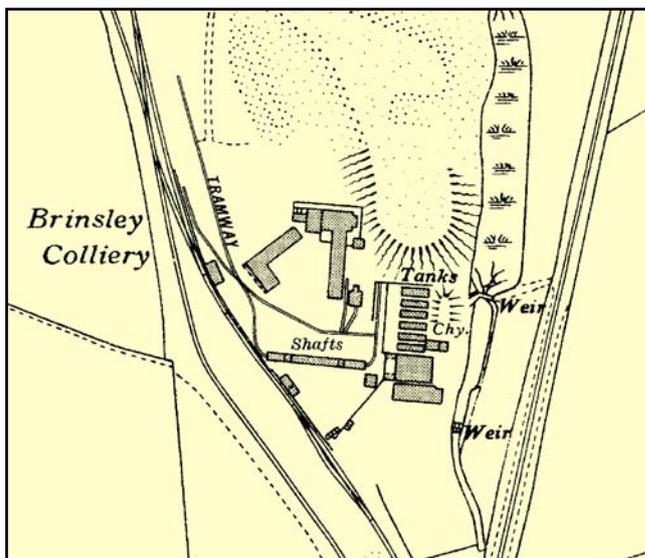
## FROM THE ARCHIVES

### Headstocks at Brinsley Colliery

The opening scene of the 1960 film of D. H. Lawrence's *Sons and Lovers* presents an idyllic view of sheep grazing contentedly on a hilltop in the shade of an overhanging tree. As the camera slowly pans right we see a pleasant rural valley revealed, which then unexpectedly gives way to a scene of stark industrial activity, at the centre of which stand the iconic tandem headstocks of Brinsley Colliery.

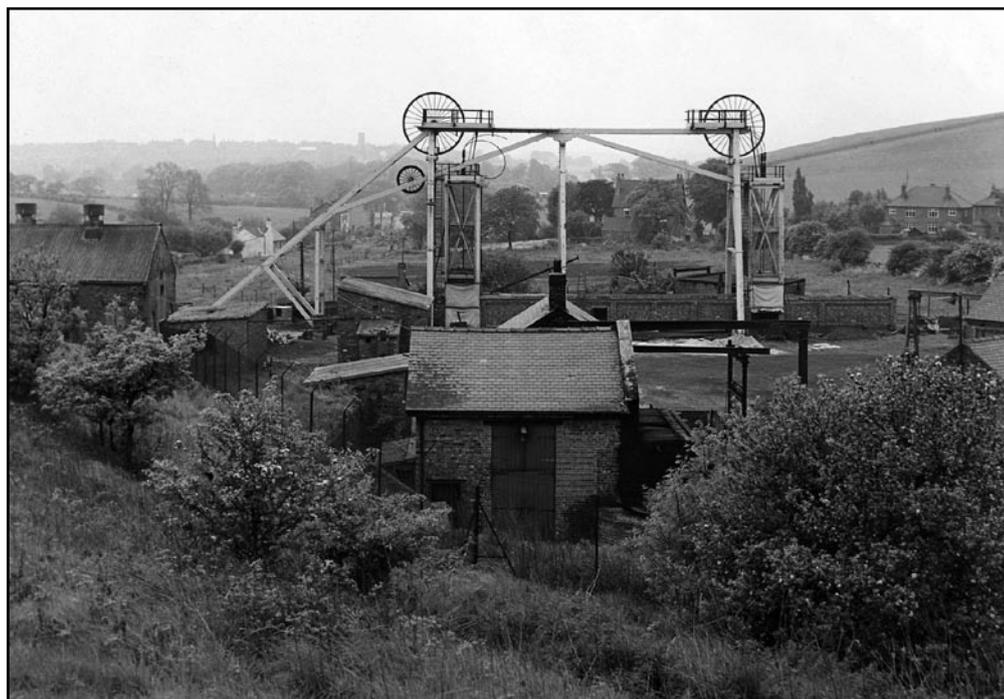
Situated some 2.5 km north of Eastwood, in Nottinghamshire near the Derbyshire border, Brinsley and the surrounding area had been at the heart of coal mining activity for over 700 years. The last Brinsley Colliery (there has been more than one) was established sometime after 1842 by Barber Walker and Co.. A company report dated April 1855 records that Brinsley Colliery had been deepened to the level of the Deep Soft Coal, having previously worked the Top Hard Coal. In 1872 working was extended to the Deep Hard Coal at a depth of 780 ft, and a second shaft, adjacent to the first, was newly sunk. The Coal Mines Regulation Act of 1872 commanded that no person should be employed in a mine unless there are at least two shafts in communication with each seam being worked. The tandem headstocks date from that time.

D. H. Lawrence's father worked at Brinsley Colliery, which in *Sons and Lovers* is called 'Beggartree' (there had formerly been a mine of this name located near Moorgreen Colliery), and later 'Bretty'. The novel, which is largely autobiographical, was published in May 1913. Brinsley Colliery also features, under its proper name, in an earlier short story by Lawrence entitled *Odour of Chrysanthemums*, which he wrote in



Surface plan of Brinsley Colliery (modified from Ordnance Survey map of 1938).

1909. The story opens with a description of the colliery as seen from the cabin of a coal train approaching from the north: 'The fields were dreary and forsaken, and in the marshy strip that led to the whimsey, a reedy pit-pond, the fowls had already abandoned their run among the alders, to roost in the tarred fowl-house. The pit-bank loomed up beyond the pond, flames like red sores licking its ashy sides in the afternoon's stagnant light. Just beyond rose the tapering chimneys and the clumsy black headstocks of Brinsley Colliery. The two wheels were spinning fast up against the sky, and the winding engine rapped out its little spasms. The miners were being turned up.' In Lawrence's day the timber framing above the shafts, which supported the cages, was partly clad and thus appeared more 'clumsy' than the elegant structure that can be seen today.



Brinsley Colliery looking to the south. This picture, by an unknown photographer, was probably taken shortly before the headstocks were dismantled in the first week of June 1970. The building on the far left contained the winding engine. During the making of the film *Sons and Lovers* (1959–60) the headstocks were painted a light blue colour to make them stand out. Eastwood church is just visible on the skyline (photo: British Geological Survey archives, P711164).

## THE RECORD

Our membership now stands at 334, including individual, joint and institutional members, and we welcome the new members who have joined the Society during the year.

### Indoor Meetings

Following the Annual General Meeting in March Ian Sutton discussed New Zealand's major historic earthquakes in the country's tectonic context.

A Members' Evening in April had three presentations: by Don Cameron on the BGS Mines and Quarries Database (BRITPITS) from 1845 to the present day; by Geoff Warrington on the legacy of mining at Alderley Edge in Cheshire; and by Richard Hamblin on the Upper Greensand of the Haldon Hills in Devon.

The winter season of lectures started in October when Keith Ambrose brought us up to date with a revised lithostratigraphy for the Triassic Sherwood Sandstone Group of England and Scotland.

To mark its centenary in November, the story of the infamous Piltdown forgery was unfolded by David Bate.

In December, Colin Small described 56 years of flying aircraft into ash clouds, before everyone retreated to enjoy the Christmas Buffet.

January 2013 had Mike Searle's lecture on the thermal and structural evolution of the Himalayan and Karakoram continental crust.

At February's meeting David Tappin described his research into recent devastating tsunamis, and this was followed by the Society's Annual Dinner.

### Field Excursions

A combination of circumstances left the Society with an atypically short programme of just three field trips in the summer season.

May saw a day-visit to the Wren's Nest at Dudley and the Saltwells Local Nature Reserve, led by Graham Worton, and also an evening walk led by Albert Benghiat to the limestone reefs of the Manifold Valley.

Tim Colman and Neil Turner led an evening walk around Nottingham Rock Cemetery in June.

### Council

With the large increase in postage, this year's copy of *Mercian Geologist* was available for collection at the first indoor meetings in an effort to reduce costs. This proved very successful with 50% received by members post-free. Our thanks go to those members who delivered *Mercians* to others.

As a result of a generous bequest from the estate of the late Beryl Whittaker, the Society proposes to offer a Regional Geology Student prize of £250 in her name. Rock boxes continue to be distributed to schools and community groups in the region. More than fifty have been given away so far.

After 1918 Brinsley was connected underground to neighbouring collieries at Underwood (Selston) and Moorgreen. Activity became focused at Moorgreen, with the result that Brinsley was abandoned for coal winding, but the shafts were kept open to provide access and ventilation to adjoining collieries. In 1930 its winding engines were converted from steam to compressed air for hoisting men and materials only. The colliery finally closed in 1970. The headstocks were dismantled and moved to the National Mining Museum at Lound Hall in the north of the county. When the museum closed in 1989, British Coal acceded to a request from Nottinghamshire County Council to reassemble the headstocks at their original location, now landscaped, where they would become the focal point of a park and serve as a reminder of the county's industrial heritage. By this time much of the original timber was rotten and had to be replaced or conserved. The restored headstocks were reassembled on their original site (more or less) on 30 July 1992 at a cost to British Coal of more than £70,000.

Since 2008 a group called The Friends of Brinsley Headstocks has been working to develop the area as a heritage and nature reserve with the support of Nottinghamshire County Council and Broxtowe Borough Council.

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Whitelock, G. C. H., 1957. *250 years in coal: the history of Barber Walker and Company Limited, colliery proprietors in Nottinghamshire & Yorkshire, 1680–1946*. Derby & London: Bemrose, 256 pp.

Newspaper articles: *Nottingham Evening News*, 31 Jan 1908 (description of Brinsley Colliery); *Nottingham Evening Post*, 3 June 1970 (dismantling of headstocks); *Nottingham Evening Post*, 30 July, *Eastwood & Kimberley Advertiser*, 14 Aug 1992 (Brinsley headstocks reinstated).

*David G. Bate, British Geological Survey*



*The reassembled headstocks at Brinsley, now within a picnic area and nature reserve.*

## **Carboniferous stratigraphy**

Recently available is the definitive report on the correlation and stratigraphy of the Carboniferous of the British Isles (Waters *et al.*, 2011). Its significance is that it will be a key handbook essential for any future work on the geology of the Pennines and of the adjacent basins where these rocks underlie large parts of the East Midlands and elsewhere.

This report revises and expands upon the publications for the Dinantian (George *et al.*, 1976) and Silesian (Ramsbottom *et al.*, 1978), accepting the demise of these two terms to combine them into a single account of the Carboniferous of the British Isles.

In 25 chapters it describes the considerable advances in Carboniferous chronostratigraphy, biostratigraphy and international correlation since publication of the previous editions. The main content is a series of regional descriptions, including ones of local interest for the southern Pennine Basin margin and Peak District and north Staffordshire. Each regional chapter includes a summary geological map and correlation panel, with Coal Measures areas also having a more detailed correlation of coals and marine bands.

For onshore chapters in England, Scotland and Wales the report uses the lithostratigraphy previously described (in Waters *et al.*, 2009 and Dean *et al.*, 2011), with the text concentrating upon description of the key biostratigraphical evidence for constraining the ages of the successions presented in the correlation panels. The report reflects the great contribution that the search for hydrocarbons, mainly post-dating publication of the previous reports, has had to the understanding of the offshore Carboniferous successions. The report also has a more thorough description of successions in Ireland.

Dean, M.T., Browne, M.A.E. & Waters, C.N., 2011. A lithostratigraphical framework for the Carboniferous successions of northern Great Britain (onshore). *British Geological Survey Research Report*, RR/10/07, free download at [www.bgs.co.uk](http://www.bgs.co.uk).

George, T.N. and 6 others, 1976. A correlation of Dinantian rocks in the British Isles. *Geological Society Special Report*, 7, 87pp.

Ramsbottom, W.H.C. and 6 others, 1978. A correlation of Silesian rocks in the British Isles. *Geological Society Special Report*, 10, 81pp.

Waters, C.N., Waters, R.A., Barclay, W.J. & Davies, J.R., 2009. Lithostratigraphical framework for Carboniferous successions of Southern Great Britain (Onshore). *British Geological Survey Research Report*, RR/09/01.

Waters, C.N. and 18 others, 2011. A Revised Correlation of Carboniferous Rocks in the British Isles. *Geological Society Special Report*, 26, 186 pp, ISBN: 978-1-86239-333-2.

## **The Ford Fiesta**

The Geology Section of the Leicester Literary and Philosophical Society has a long and distinguished record that includes annual seminars on particular geological themes. The theme for 2013 was to honour Trevor Ford, who has a long association with the Society. A large number of Trevor's friends, colleagues and ex-students gathered at Leicester University to hear six distinguished speakers give presentations covering aspects of Trevor's work and the research that has followed in his footsteps.

The steeply raked lecture theatre with its rear entrance meant that Trevor sat at the very back. But his distinctive resonant tones boomed out from time to time in response to questions or queries from speakers or the audience. The speakers were: Dr Richard Shaw on the life of a modern day caveman; Dr Tony Waltham on Trevor's work in the Grand Canyon; Dr Bill Finches on the geology of the Isle of Man; Dr Noel Worley on Peak District mineralisation in Fordian style; Dr Dave Quirk on the origin of the South Pennine Orefield; Prof John Gunn on the hydrology of the Castleton karst; and Prof Martin Brasier on the iconic Precambrian fossil with a full name that reads as *Charnia masoni* Ford 1958.

These talks showed the wide range of Trevor's research interests and enabled the speakers to reminisce, often very humorously, over their association with him and to illustrate where his pioneering work had led. The day was smoothly organised by Joanne Norris and Andrew Swift, and was a fitting tribute to Trevor's geological career.

## **Excavations at the Broad Marsh caves**

Excavation, clearance and documentation of the sandstone caves under Nottingham has been a long-standing project for a small band of dedicated archaeologists in the Nottingham Historical and Archaeological Society. For the last fifteen years they have been working in the caves just west of the show cave beneath the Broad Marsh Centre, clearing debris from caves that should one day be part of an extended tourist site. They recently cleared down to a lower level, and had to build a timber bridge to maintain access to the spectacular Willoughby House caves. The East Midlands Geological Society contributed to the work by funding purchase of the materials for the bridge, with a grant to the NHAS; this was sourced from the bequest from Beryl Whittacker's estate, and she would be delighted to know that she has supported this work in her home town.

## **Geological map of Chesterfield**

A new version of the geological map of Chesterfield has been published by BGS, as sheet 112 in the 1:50,000 series. Its coverage of the Matlock area gives it local interest for Society members, and it is a step forward from the old One-inch map with a wealth of detail and useful material in the style of the newer BGS maps.