

MERCIAN

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Front cover: Extracting Mercian Mudstone for the
Dorket Head brickworks. Photo: Keith Ambrose.

Back cover: Underground scenes in mines home
and away, relating to the Members' Evening talk
by Geoff Warrington and his report on pages 256.

Contents

Geobrowser	198
From the Archives	200
The Record	201
Peter Worsley	202
Late Pleistocene geology of the Chelford area of Cheshire	
John Hunter	213
Old mines and new sinkholes along the Hucklow Edge vein, Derbyshire	
Allan Straw	227
The Quaternary sediments at Welton-le-Wold, Lincolnshire	
Jeremy Lockwood, Colin Bagshaw and Stuart Pond	234
Vertebrate tracks from the Triassic Helsby Sandstone Formation at Burton upon Trent, Staffordshire	
Peter Worsley	243
The 2014-15 volcanic eruption on Fogo, Cape Verde Islands	
Reports	
British Triassic palaeontology 35: Geoffrey Warrington	252
Members' Evening 2015	
Ironstone workings in Norfolk: Richard Hamblin	253
Lost (Under)Worlds: Geoff Warrington	256
Wad deposits in the White Peak: Vanessa Banks	258
Excursion - Permo-Triassic rocks of Nottingham	260
Keith Ambrose and Oliver Wakefield	
Excursion - Dorket Head Brickworks	264
Keith Ambrose and Greg Kington	
Trinidad Asphalt Lake: Tony Waltham	266
Derbyshire Archaeology Day: Peter Jones	267
Book reviews	268

Ghostly happenings at Death Valley

A mystery surrounding the Racetrack Playa in Death Valley National Park has now been solved. Its dried-out surface is littered with large isolated stones that can weigh more than 100 kg, but which have clearly moved very recently, under their own volition and with a sliding motion, creating shallow gouge-marks on the mud substrate (*Hobart King: Geology.com*). They are found within a perfectly flat lake basin, a playa, about 4 km long by 2 km wide, which fills only infrequently after heavy rainstorms in the mountainous hinterland. It is thought that these storms could loosen rocks high on the steep slopes bordering the playa. If the rocks then reached the lake basin they could then begin to slide, but no-one had witnessed this phenomenon, so how could it happen? The absence of any other imprints shows that the stones have not been moved by animals or people, but it did seem that the prevailing southwesterly winds were somehow involved, since most of the gouge marks are parallel to that direction. The circumstances surrounding such movements have long been debated, however, since it would clearly take a significant input of wind energy to get a stone to slide, even on a very low-friction mud surface.

The mystery was finally resolved over the winter of 2013/14, when a lake up to 8 cm deep covered the playa and then froze. Researchers then observed many ice-embedded rocks moving slowly across the playa on several dates in December 2013 and January 2014, and the Scripps Institution of Oceanography even have a video clip of the phenomenon. By February 2014 the lake had dried up, and new trails left by the recently-moved rocks could be seen in the playa sediment surface. Further confirmation came from rocks that had been fitted with small GPS recorders, which showed around 100 m of travel during at least four episodes of movement. The researchers concluded that the stones were able to travel because the ice sheet in which they were embedded floated on a thin layer of water, and was thus easily susceptible to movement through wind force alone. This mechanism recalls the action of erratics which, embedded in moving glaciers, grind out striae on the underlying bedrock surface.



Did a volcano help decide European history?

This year sees the bicentennial of two major events; although one is historical and the other geological, the two may have been closely linked. On the 18th of June, 1815, Napoleon's army was defeated at Waterloo - but only just, as the Duke of Wellington acknowledged: "...the nearest run thing you ever saw". In addition to valour and strategy, one factor that swayed the issue was the unprecedented rainfalls of that morning, and throughout the day before. This extraordinary weather is depicted by paintings such as that of Andrieux (1852), which show an apocalyptic sky, and it was remarked upon by many, including an English officer, Captain Mercer, who noted that: "...Large isolated masses of thundercloud, of the deepest, almost inky black, their lower edges hard and strongly defined, lagged down, as if momentarily about to burst,..... involving our position.....(in) deep and gloomy obscurity" (www.napoleonsociety.com). The clayey substrate of the battlefield became saturated, forcing Napoleon to delay his attack and, crucially, closing the time-gap to only three and a half hours before the relieving Prussian army arrived (<https://reginajeffers.wordpress.com>).

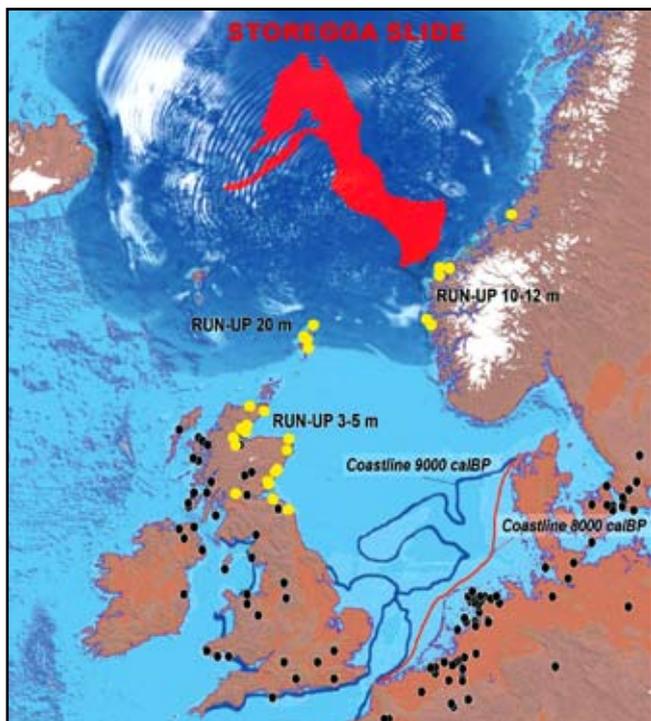


Such weather was clearly atypical, even for a northwest European summer during the later stages of the Little Ice-Age, but may be explained by an event that had happened far away in the East Indies. Nine weeks before Waterloo, between April 5th and 10th, the most violent eruption for some 2000 years occurred on the Indonesian island of Sumbawa, when the dormant Tambora volcano exploded. According to estimates (W & N Klingaman, *The Year without Summer*, 2013), many millions of tonnes of ash and 55 million tonnes of sulfur dioxide gas were ejected more than 30 km upwards. The sulfur dioxide then combined with water vapour to produce more than 100 million tons of sulfuric acid. All this material was vented into the stratosphere, where there are no clouds or rain to wash it away; hence the pollutants remained suspended in the air. The effects were global: estimates suggest it took only two weeks for the equatorial region to be encircled, and after some two months the aerosol cloud had reached the North and South Poles. By the winter of 1815–16 the entire globe was veiled in ash, wreaking havoc on weather patterns and causing those famous red sunsets that influenced Turner's great paintings'.

The Storegga tsunami: a prehistoric tragedy

The Asian tsunami of Boxing Day 2004 (Mercian 2005, p.99) proved just how vulnerable humanity is to the forces of nature. And with hindsight it was almost predictable, given the location of the stricken area along a major subduction zone. The Storegga tsunami, however, happened far away from any active seismic area, worryingly on our own doorstep, and was triggered by one of the largest submarine slides ever documented on Earth. Radiometric dates from a suite of 89 submarine cores within the slide region suggest that the main, retrogressive event took place at 8100 ± 250 cal. years BP (Marine @ Petroleum Geology, 22, 2005, 123-136), closely overlapping with the 8110 ± 100 cal. years BP age for tsunami sands identified from various Mesolithic coastal settlements bordering the North Sea (Documenta Praehistorica, XXXV, 2008, 1-24).

The human cost of this has recently been assessed by a study (Geology 2014; doi:10.1130/G36278.1.) which suggested that exposure to the disaster would have been greatest in late autumn, when the Mesolithic hunter tribes returned to over-winter at the coast. Unfortunately, it appears that the catastrophe occurred at just that time of year; a conclusion based on those tsunami deposits with entombed stem samples of the moss *Hylocomium splendens*. These plant fragments have retained their green colour and chlorophyll, showing a level of maturity typical of growth occurring from October through to December. So the Storegga tsunami must have affected a large proportion of peoples just returned to their coastal homes in western Norway and northeast Scotland. Even the survivors would have faced a very difficult winter of destroyed dwellings, boats, equipment, and supplies.



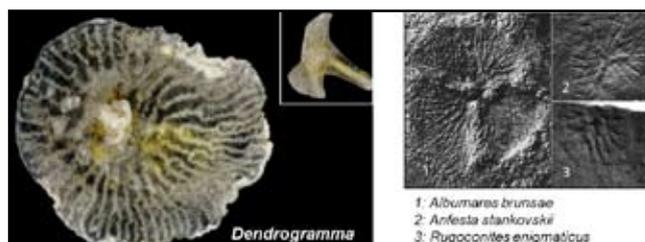
The European continental shelf, the Storegga slide, and sites with dated tsunami deposits shown by the yellow dots.

As a postscript, we note that a major flood figures prominently in the creation myths of the Celtic and Norse peoples that inhabited the North Sea and Atlantic coastlines. The Storegga tsunami occurred a few thousand years before the Celtic and Norse cultures developed, but given the capacity for humans to embellish stories handed down by oral tradition through the generations, and perhaps from culture to culture, could this mythology have had some basis in fact?

Ediacarans alive: a new coelacanth moment?

When formulating his theories on evolution, Charles Darwin relied heavily on the fossil record, but the famous coelacanth discovery shows just how incomplete this can often be. The coelacanth is perhaps the best known example of a 'Lazarus taxon': it represents an evolutionary line thought to have died out some 66 million years ago, only to reappear in 1938 when one was fished up off the east coast of South Africa. An even longer 'discovery gap' may have emerged last year, however, when Jean Just, a zoologist at the Natural History Museum of Denmark, found 18 odd-looking invertebrates while sorting through specimens dredged up from between 400 and 1000 m depth in the Tasman Sea. Just's study (in the September 2014 issue of *PLOS ONE*, doi:10.1371) describes 14 mushroom-shaped animals, up to about 1 cm in length, which are clearly multicellular and asymmetrical, with a gelatinous layer between the inner and the outer body. They have been classified under a new genus; *Dendrogramma*, and although they have no obvious affinities to modern phyla, microscopic investigations suggest similarities to jellyfish (Cnidaria) and comb jellies (Ctenophora): DNA analysis may follow if suitable material has been preserved, or if new specimens can be found.

Particularly intriguing to the researchers, however, are the similarities between the living *Dendrogramma* and the fossils *Albumares*, *Anfesta* and *Rugoconites*. The latter are known only from Ediacaran assemblages and are currently lumped into the extinct kingdom 'Vendozoa', which disappeared from the record at the end of the Precambrian, around 542 million years ago. This may simply be an example of morphological convergence, where apparently similar structures have evolved in organisms from different lines of descent. The evidence for a direct comparison is nonetheless compelling and, if confirmed by further studies, this would prove to be a major discovery, enabling the three Ediacaran forms to be reclassified as the half-a-billion-year-old ancestors to either the Ctenophora or Cnidaria, depending on where *Dendrogramma* is finally placed.



FROM THE ARCHIVES

Andrew Templeman and Strata Smith

On the afternoon of Sunday 20 December 1945, Andrew Templeman, Inspector of Borings and Shafts with the Geological Survey, was descending a 50-foot trial shaft for coal at High Seaton, near Workington, when he was overcome by carbon dioxide poisoning and fell to his death. Another man, John James McCabe, went to his rescue and suffered the same fate. About two and a half years later, Templeman's collection of rare books and manuscripts was auctioned by Hodgson & Co. of Chancery Lane, London, and it became clear that this rather reserved and seemingly un-ambitious man had in life been a most extraordinary bibliophile.

Templeman was born 22 April 1887 in Aberdeen. Following his discharge from the Army at the end of the First World War he applied for the position of

Fossil Collector with the Geological Survey, to which he was appointed 2 February 1920. After the passing of the Mining Industry Act of 1926 he was assigned the position of bore inspector England and Wales to examine cores of borings and shafts notified under this Act, both at the surface and underground. His knowledge of stratigraphy thus became extensive, and his particular admiration of the work of William 'Strata' Smith led him to assemble an unrivalled personal collection of the works of Smith and other geological pioneers.

Although married, there were no children, which presumably enabled Templeman, who never rose above the rank of Assistant, to expend a sufficient portion of his modest earnings on the acquisition of rare books, manuscripts and drawings. He was thus able to acquire every one of Smith's published works, including very rare prospectuses and lithographed sections.

David G Bate & Andrew L Morrison



Geological Survey staff at the British Gazette, appointed as cleaners during the General Strike in 1926. Left to right: J Pringle, S W Hester, A Templeman, C P Chatwin (BGS photo P827761).

And the report of Templeman's death in the Daily Telegraph in December 1945.

Two die in shaft
RESCUER
KILLED
 From Our Own Correspondent
 WORKINGTON, Sunday.
MR. ANDREW TEMPLEMAN, an assistant geologist of the Geological Survey and Museum, Exhibitoin Road, S.W., and Mr. John McCabe, of Seaton, near Workington, were killed this afternoon in a new shaft being sunk under the direction of a department of the Ministry of Mines dealing with open-cast coal production.
 While descending a ladder Mr. Templeman fell 50 yards to the bottom of the shaft. Mr. McCabe, who volunteered to go to his rescue, failed to return.
 A third man, Mr. Conway, after three attempts, brought the body of Mr. McCabe to the surface.
 In the evening a rescue party recovered the body of Mr. Templeman.



Not an archive item, but just the gratuitous inclusion of a rather fine photograph by a Society member, Alan Filmer, of very spectacular folding in a limestone on the island of Crete.

THE RECORD

Our individual membership now stands at 165 together with 59 joint members and 30 institutional members and we welcome the new members who have joined the Society during the year.

Indoor Meetings

Our annual lecture programme took us to Sinking Cities with Tony Waltham, explored other worlds in The Geology of Mars with Susanne Schwenzer, and visited underworlds on the Members' Evening with Vanessa Banks, Richard Hamblin and Geoff Warrington. We then heard about the effects of Geotourism in Britain from Kirstin Lemon, and the exciting new fossil finds in Charnwood Forest from Phil Wilby.

We celebrated the Bicentenary of William Smith with a lecture by Hugh Torrens, when we had the opportunity to compare two original copies of William Smith's map kindly lent to us by BGS and Nottingham University for the occasion.

Field Excursions

An excursion to Dudley Canal and the Wren's Nest Hill quarries was a return visit to the site of the Society's very first field trip in 1964. Other one-day and evening visits were to the Nottingham caves, Dorket Head, the Bonsall area and the Permo-Triassic rocks around Nottingham. The long-awaited visit to see the 'volcano' at Nottingham University, courtesy of Prof Barry Azzopardi, also came to fruition.

Council

Council met on six occasions during the year to discuss matters for the Society's benefit and where possible to contribute to wider geological issues. The latter included support for retention of the Connesby rock store. Most discussions revolved around the marking of the Society's 50th anniversary, but were also looking to the future. Albert Benghiat, on behalf of the Society, has begun to investigate what would be involved in the making of a Peak District Geopark.

Janet Slatter, Secretary

Awards to Society members

The Society congratulates two of its leading members who have recently been recognised by academia for their significant contributions to geological science.

One of the Society's founder members, Dr Trevor Ford, has been awarded an Honorary Doctorate by the University of Derby, in recognition of his long and outstanding contributions to the geology of Derbyshire. He will receive his award at the University's meeting in Buxton in November of this year. Though only one part of Trevor's wide-ranging geological expertise, his work in the Derbyshire Peak District, on its geology, mineralogy, mining and karst geomorphology, has established a bank of data that is now, and long will be, a standard source and background for geological studies within the region.

The Society's honorary editor, Dr Tony Waltham, was presented with the Yorkshire Geological Society's W.S. Bisat Medal at a Society meeting at Keyworth

in March of this year. The medal is awarded as acknowledgement of distinguished contributions to applied geology in northern England, and the President, Dr John Knight, drew attention to Tony's contributions in both engineering geology and karst geomorphology, and also to his output of text books, guides and photographs that have disseminated geology far beyond the professional community.

The editor has also been awarded the 2015 Glossop Medal by the Engineering Group of the Geological Society. This is the most prestigious award in the engineering geology calendar, and comes with an invitation to deliver the Glossop Lecture in London in the coming November. Tony's lecture will be titled "Control the drainage: the gospel accorded to sinkholes", reflecting his contributions to engineering geology through his researches in karst subsidence and through his lectures and publications that are widely recognised within the profession.

Alan Filmer