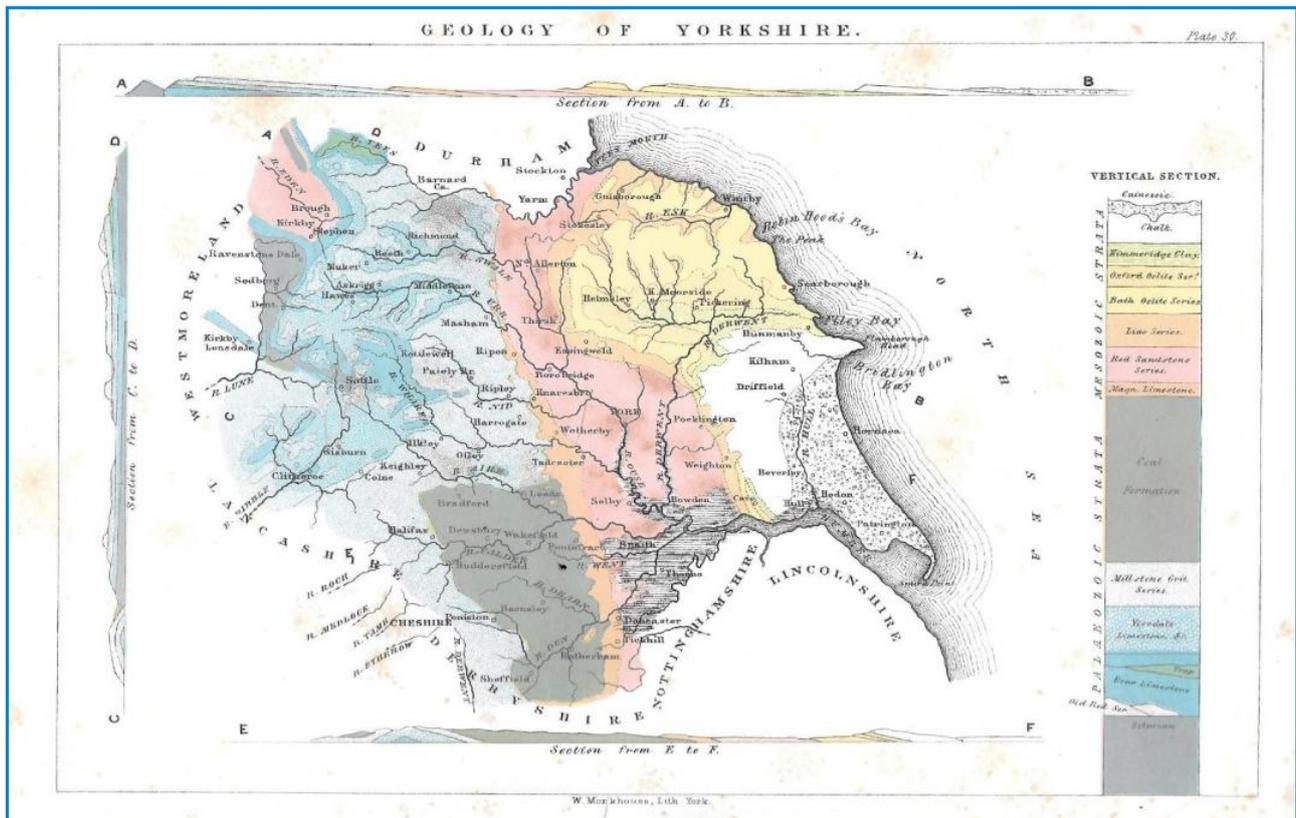


# The Genesis of Geology in York and Beyond



HOGG 25<sup>th</sup> Anniversary Meeting

23<sup>rd</sup>-24<sup>th</sup> October 2019

Marriott Room, York Explore, Library Sq. York YO1 7DS



York Museums Trust



# The genesis of geology in York and beyond

## HOGG 25<sup>th</sup> Anniversary Meeting

23<sup>rd</sup> – 24<sup>th</sup> October 2019

organised in association with the

Yorkshire Philosophical Society and supported by York Museums Trust

Venue: Marriott Room, York Explore, Library Square, York YO1 7DS



### PROGRAMME

#### Wednesday 23<sup>rd</sup> October

- 10.00 Registration and coffee
- 10.30 Start: Welcome and Introduction (house arrangements)
- 10.40 – 11.20 **Keynote talk: *Follow the reptile: Fossil trading on the Yorkshire coast and what it tells us about science and money.***  
Roger Osborne
- 11.20 – 11.40 ***Geological connections in the early Yorkshire Philosophical Society***  
Peter Hogarth
- 11.40- 12.00 ***The Harrogate wells case of 1837 and a gathering of the scientific elite***  
John Mather
- 12.00 – 12.20 ***Scripture and Science: The Dean of York's critique of Buckland and Sedgwick's riposte.***  
Margaret Leonard
- 12.20- 12.40 ***John Phillips and the first chromolithograph geological map in Britain***  
John Henry
- 12.40- 13.00 ***The Yorkshire Boulder Committee – an erratic affair.***  
Duncan Hawley
- 13.00 – 14.00 Lunch
- 14.00 – 14.20 **HOGG AGM**
- 14.20 - 16.40 Afternoon 'viewing tours and discussions' : Yorkshire Museum collections  
4 x 30 minute sessions + 10 minutes swap-over.
- Kirkdale Cave specimens – fossils from Buckland's Reliquiae Diluvianae***  
YMT Assistant Curator Stuart Ogilvy & YPS volunteers
  - Yorkshire Museum's William Smith map of England and Wales***  
YMT Curator Sarah King & Duncan Hawley
  - Mosaic Smith's map of Yorkshire + Calotype of De La Beche***  
Rod & Margaret Leonard, Project Coordinators
  - Yorkshire Jurassic World Exhibition***  
Self-guided tour with specially produced collector/provenance leaflet on exhibits.
- 19.30 **HOGG 25<sup>th</sup> Anniversary Dinner** (Optional – self-pay)  
Ask Italian Restaurant, The Grand Assembly Rooms, Blake St, York YO1 8QG

#### Thursday 24<sup>th</sup> October **Field Day** (Optional) - shared car transport

- AM **Kirkdale Cave, Vale of Pickering** - visit and virtual tour of the site (inside the cave) of Buckland's main source of evidence for 'Reliquiae Diluvianae'
- PM **Rosedale - The Magnetic Ironstone Conundrum** – visit to sites of ironstone discovery, exploring different geological interpretations of ironstone deposits by 'practical men'.

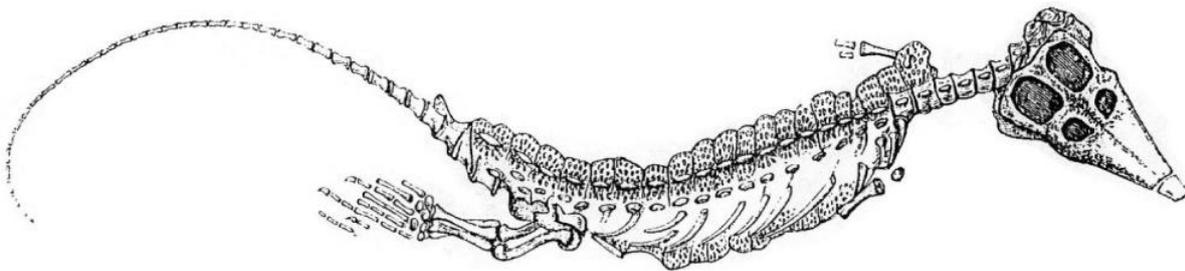
## Gentlemen and players: early fossil trading on the Yorkshire coast

*Roger Osborne, High Tide Publishing, 70 High Street,  
Snainton, Scarborough YO13 9AJ*

In the late eighteenth and early nineteenth centuries the status of fossils underwent a radical change. This change not only reflected humanity's shifting attitudes to the natural world, it sparked a 'goldrush' in fossil trading on the Yorkshire coast.

In 1758 two Whitby residents found a large fossil reptile and, in a significant development, reported the find to the Royal Society via the Philosophical Transactions. More fossil reptiles emerged from the alum workings, attracting attention from local naturalists. Once naturalists came together to found museums in Yorkshire and throughout Britain locals were keen to find fossils to sell to these burgeoning institutions. In 1824 a fossil teleosaur cost Whitby Museum £7, by 1841 Adam Sedgwick had to pay 200 guineas to a Whitby dealer for a plesiosaur. Other Whitby fossils ended up in York, Dublin, Harvard, Houston and Manchester.

From beautiful curiosities, fossils became objects of scientific interest and huge commercial value. The story of early fossil trading has much to tell us about how 'pure' science is often rooted in money, rivalry, ambition and status.



*Teleosaurus chapmani*



*Roger Osborne studied geology at Manchester University before pursuing a career in printing and publishing. He was commissioning editor for academic and educational books at Macmillan then editor of popular science and medicine at Faber & Faber. Since moving to the Yorkshire coast in 1990 he has been a writer and publisher. His historical works have ranged from a history of democracy to an account of a scientific fraud, and include elements of the history of geology. He has continually sought new ways of representing the past. His books have been published around the world and translated into 10 languages.*

*He runs High Tide Publishing, which publishes guidebooks to the landscape, geology and fossils of the Yorkshire coast and moors.*

## Geological connections in the early Yorkshire Philosophical Society

*Peter Hogarth, YPS*

Two sequences of events converged to produce the Yorkshire Philosophical Society, the important geological collections of the Yorkshire Museum, and to stimulate interest in the geology of Yorkshire.

The chance discovery in 1821, in the Kirkdale Cave, of a cache of fossil bones of hyenas and hippopotamuses was rapidly followed by an influx of learned gentlemen to the cave, and consequent dispersal of specimens into private collections. Many felt that such interesting specimens should be reassembled into a museum for public – or, at least, learned – perusal. Before the end of the year, four gentlemen of York (who, between them, possessed several hundred of the Kirkdale fossils) met and founded the Yorkshire Philosophical Society:



followed shortly by the creation of the Yorkshire Museum.

The second sequence of events started with the presence in Kirkby Lonsdale of William 'Strata' Smith creator of the celebrated geological map. Smith was invited to York to give a series of geological lectures to the nascent Philosophical Society. The lectures were a success, in part because of Smith's nephew and assistant, John Phillips. Phillips was promptly recruited as Keeper of the Yorkshire Museum; he became a dominant figure in the Society and, indeed, in geology. As he put it many years later, 'educated in no College, I professed Geology in three Universities'.

The combination of the Yorkshire Museum, John Phillips, the Yorkshire Philosophical Society and connections forged with the likes of Sedgwick, Murchison, Buckland, and de la Beche, combined to put the Society at the forefront of geological studies in England.



*I came to the Biology Department of the then new University of York as a graduate student, and somehow stayed on, eventually retiring as Senior Lecturer in Biology. My main area of research was tropical marine biology, particularly the ecology of mangroves.*

*Since retirement I have been able to pursue other interests, including historical research. My involvement with the Yorkshire Philosophical Society presented the opportunity to research and write a history of the York Museum Gardens (created by the Society), and I am currently working on a number of other projects related to the Gardens, and the early history of the YPS, in preparation for our forthcoming bicentenary celebrations.*

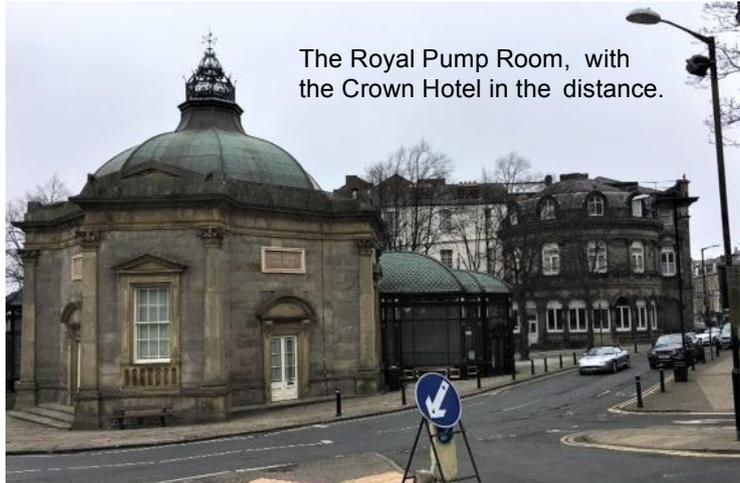
## The Harrogate wells case of 1837 and a gathering of the scientific elite

*John D Mather, Department of Earth Sciences, Royal Holloway University of London, Egham Surrey, TW20 0EX*

On Thursday 14<sup>th</sup> March 1837, the proprietor of the Crown Hotel in Harrogate appeared before Yorkshire Spring Assizes indicted for a misdemeanour in digging a well in the immediate vicinity of the Old Sulphur Wells at Harrogate and supposedly affecting the flow to the well. The defendant pleaded not guilty. Both sides subpoenaed a distinguished group of scientific experts to support their case. Amongst these were William Smith, John Phillips and John Dalton for the prosecution and Thomas Sopwith, John Johnstone and Reid Clanny for the defence.

Unfortunately, for the interested persons who attended, anticipating an intellectual treat, the two sides rapidly reached an accord, without hearing any of the experts. Following the hearing, the witnesses on both sides dined together that evening, at what Sopwith later described as one of the most pleasant dinners he had ever attended. Both Smith and Dalton gave addresses which gave their uninhibited views on the progress of the sciences of geology and chemistry respectively.

The statements of the scientific experts were latter collected and published by the Harrogate antiquarian William Grainge and provide a snapshot of contemporary views on the geology and origin of the Harrogate mineral waters.



The Royal Pump Room, with the Crown Hotel in the distance.



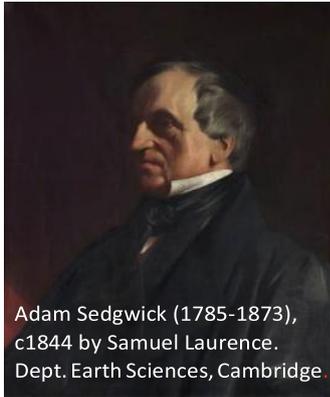
*A graduate of Liverpool University, where his Ph.D. was on Scottish metamorphic rocks, John joined what is now the British Geological Survey (BGS) in 1966. He was assigned to the Hydrogeology Unit where he was soon rewarded with a 2 year posting to the Caribbean. Research on groundwater pollution and waste disposal followed, before he was seconded to NERC headquarters for three years. He became Chief Hydrogeologist in 1986 and an Assistant Director the following year. Moving to Royal Holloway University of London in 1990, as Lyell Professor, he continued his research on groundwater and began to work on the history of hydrogeology, which he recognised as sadly neglected. A*

*particular interest has been the pre-1900 development of ideas on the origin, prospecting for and development of groundwater supplies. Now living in Devon, he continues to write and throws functional stoneware pots in a shed in his back garden.*

## Scripture and Science: The Dean of York's critique of Buckland and Sedgwick's riposte

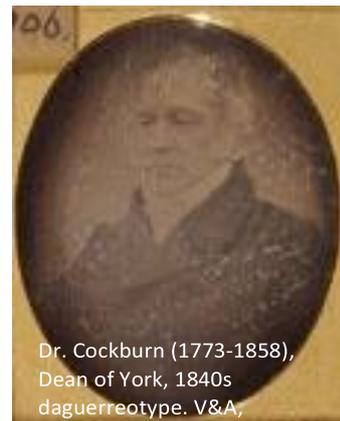
Margaret Leonard, YPS

In 1844, the British Association for the Advancement of Science held its annual meeting in York for the first time since it was founded here in 1831. Now a very large gathering, the various sections held their meetings in a number of different buildings around the city. The Geological section, whose organising committee reads like a roll-call of the great and the good in 1844 Geology, met in the Hospitium, in the grounds of the Yorkshire Museum. Murchison, Sedgwick, Phillips, De la Beche were all involved, though sadly Buckland was unable to attend as his daughter had recently died.



Papers were presented on many of the hot topics of the time. Murchison spoke on the Silurian Rocks of Scandinavia and Russia, De la Beche on the progress of the Ordnance Geological Map of England, soon to acquire its independent status as the British Geological Survey. Papers were presented relating to the search for the North West passage and the proposed Panama Canal, and many palaeontological discoveries were reported.

The conference report, compiled by Phillips, gives at least an outline of each of the above. The paper which caused the most interest, however, is represented only by its title 'The Very Rev. the Dean of York's Critical Remarks on certain Passages in Dr Buckland's Bridgewater Treatise'. The newspapers were not so coy, however, so we can learn a little of Dean Cockburn's interesting geological theory, and of Sedgwick's firm rebuttal. Consideration will also be given to the background to this outburst, and an interesting connection will be drawn with a later clash between religion and science.



*After studying at Imperial College, I taught maths in a comprehensive school in Humberside, whilst raising our two children. In 1992, my husband's career took him to the USA, and I joined him there. After trying a number of volunteer roles, I took a post at the Baltimore Museum of Industry, eventually becoming Director of Education.*

*In 2002 we sold our house, bought a sailboat, and spent the next four years cruising the Eastern seaboard of the USA and the Caribbean islands, before sailing back to England in 2006, and settling in York*

*As members of the YPS, we became involved in commissioning the Geological Map mosaic. The research for this introduced us to the history of Geology. My current project, on the photographs taken at the 1844 conference of the British Association, has provided the opportunity to look at a cross-section of the ideas current in geology at that time.*

## John Phillips and Lithography

*John Henry, Nineteenth Century Geological Maps,*  
71a Oxford Gardens, London W10 5UJ [john@geolmaps.com](mailto:john@geolmaps.com)

During the nineteenth century, the process of geological map making progressed from hand-coloured engraved maps to colour lithography, or chromolithography. The remarkable career of John Phillips (1800-1874), nephew of William Smith (1769-1839), encompassed the major part of this period of geological map-making and illustration. While not a major player in the field of printed illustration and mapping, his story is a vignette of the progress in Great Britain of lithography in the 1800s.

Phillips as a teenager experimented with lithographic printing with a view to assisting his uncle and supporting himself during Smith's time in debtors' prison. As his opportunities and experience expanded in Yorkshire, he illustrated his first publication in 1829 with a hand-coloured lithographed map of the county. Decades later he published the first chromolithographed map, in a 'popular' account of the landscape and geology of Yorkshire, the first colour printed geological map in England. Late in life, his book on Mount Vesuvius included a colour lithographed map. During his career his maps illustrating published books and articles hovered between hand colouring and colour printing, and between engraved and lithographed basemaps, depending upon his publishers who did not embrace colour lithography as did publishers and geological surveys in Europe and the new colonies. This interest but ambivalence is reflected in John Phillips' career.



Geological Map of the E. Part of Yorkshire, drawn by J. Phillips, 1829. The base map is lithographically printed. Courtesy of the Geological Society of London.



*John was educated at the University of Waterloo, Ontario and ITC, International Institute for Aerial Survey and Earth Sciences, Enschede, Netherlands.*

*He worked for consulting engineers, ARUP, producing preliminary engineering geological maps from the interpretation of aerial photographs and satellite images to identify potential problems and to organise ground investigations for large construction projects in the UK and abroad for thirty years. Since retiring, he continues to consult especially where historic air photos are key to understanding difficult ground conditions. He has developed an antiquarian business dealing in historical geological maps, sections, illustrations and books. Currently, John is secretary of HOGG.*

## The Yorkshire Boulder Committee – an erratic affair

Duncan Hawley, 73 Marlcliffe Road, Sheffield S6 4AH [duncan.hawley@gmail.com](mailto:duncan.hawley@gmail.com)

John Phillips was the first to report on erratic boulders in Yorkshire at the 1836 British Association meeting. He wrestled with understanding how rock from Cumbria came to rest in the Vale of York. In 1840, when Louis Agassiz first proposed “perched bowlders” as evidence of past ice sheets, interest increased in the distribution of erratic boulders across northern Britain. Following Scotland’s example in 1871, the BA established a Boulder Committee for England, Wales and Ireland in 1873 to record members’ findings. Initial results were patchy, and the BA appealed for more observers. In 1886, the Geology section of the Yorkshire Naturalists’ Union (YNU) initiated a Yorkshire Boulder Committee (YBC). The YNU was a federation of local natural history societies with a combined membership of 2,310. The YNU was a ‘liberal’ union that embraced middle and working classes, gentlemen and ladies, together with professional geologists in pursuit of natural history as science. The YBC gave local groups and individuals interested in geology a route to record their pursuits and gain a respected reputation. The professional geologists identified erratics and advised on their provenance and did their own field work.



Geologists at Louth, May 1896

In 1906 the YBC was re-named “The Glacial Committee” to reflect the wider interests of its members; but, from then on the search for erratics all but ceased, save for the work of the East Riding Boulder Committee which now reported as the Hull Geological Society. Reports diminished to a paragraph, the last appearing in 1936. The BA Boulder Committee ceased with the outbreak of WW1.

In 1908, J.H.Howarth, Secretary of the YBC for many years, claimed “... the whole county has been examined, and much of it again and again. ... there is hardly an acre of ground, certainly not a square mile, which has not been searched for traces of glacial phenomena, by members of the Committee ... . The open moors and fells, the secluded glens and wild mountain gorges, have all been hunted. Railway cuttings, trenches for waterworks, deep borings, drainage operations, brick-works, building foundations — in short, sections of all kinds (many made for the purpose) have been noted and watched with patient and persistent care.”

In 1908, J.H.Howarth, Secretary of the YBC for many years, claimed “... the whole

The results of these searches were plotted in 1888 and 1892 on maps which have been lost. However, Howarth’s 1908 paper ‘The Ice-Borne Boulders of Yorkshire’ in *The Naturalist*, included a map and detailed accounts of YBC records, classified by provenance and by petrographic type. Little used until 2005, the U. of Sheffield’s BritIce glacial mapping project incorporated the YBC’s records to compile regional ice streams.

The YBC was the prime example of devolved local activity contributing to geological science as envisioned by the BA when it appealed for local observers of erratics. The sheer volume of YBC records demonstrated the fruitfulness of aligning with field naturalists at a time when enthusiasm for natural history in the field was perhaps at its height. The result was a truly Yorkshire erratic affair.



*Duncan was first exposed to the ‘greats’ of the heroic age of geology at school, then UCL where he was President of the student Greenough Club in his final year. He has enjoyed a career in education, teaching at state and independent schools, at a field centre in the Forest of Dean and at university in Swansea. He has received the Geographical Association’s Awards for Excellence (2012) and for Excellence in Leading Geography (2018). He is past Chair of the Earth Science Teachers Association and current Chairperson of HOGG. Duncan works on the geology of the Old Red Sandstone and has contributed to the BGS maps for Brecon, Talgarth and Hay-on-Wye. He is involved in geo-conservation through the Sheffield Area Geology Trust. He has a particular interest in the development of early geological maps.*



AFTERNOON SESSIONS  
at  
Yorkshire Museum

## Kirkdale Cave Specimens – fossils from Buckland's *Reliquiae Diluvianae*

*Stuart Ogilvy, Assistant Curator, York Museum Trust & YPS volunteers*

Kirkdale Cave has a special place in British palaeontology as William Buckland's first, and classic, fossil hyena den. In 1821 bone and teeth remains were noticed being used for road repairs. They were traced back to a cave in Kirkdale, near Kirkbymoorside. The cave was excavated the following year, and the specimens became the basis of the collections of the recently formed Yorkshire Philosophical Society.

The remains came to the attention of Rev. William Buckland of Oxford University. He realized that they had come from a hyena den. He also stated that they had been there for a very long time, possibly for thousands of years. This was a radical view at the time and went against conventional clerical thinking. These controversial views were published in his book, *Reliquiae Diluvianae*. This gave rise to a debate between early geologists and the church. The argument was eventually resolved by Adam Sedgwick at a meeting held in the Hospitium in the Museum Gardens in which the Yorkshire Museum sits.

Kirkdale Cave is now recognized as one of the most important Ipswichian Interglacial sites in Britain. The fauna indicates a warm and relatively damp climate, and contains hyena, straight-tusked elephant and hippopotamus. Many of the bones are characteristically pitted giving them a "peppered" appearance. This has been caused by the bones being gnawed by the hyenas.



MS figure to accompany Buckland (1822). Account of an assemblage of fossil teeth and bones of elephant, rhinoceros, hippopotamus, bear, tiger, and hyaena, and sixteen other animals; discovered in a cave at Kirkdale, Yorkshire, in the year 1821: with a view of similar caverns in various parts of England and others on the continent, *Philosophical Transactions*. Drawn by Mary Morland.

Courtesy of Royal Society archive, PT/73/9/18.

*The geological collections of the Yorkshire Museum Trust are internationally famous, with over one thousand type and figured specimens. There are over 100,000 fossil specimens with a comprehensive Yorkshire coverage with particular strength in the Carboniferous period, and the Mesozoic and Tertiary eras. The mineral collections number over 5,000 specimens and there are more than 7,500 rock specimens. The temper Anderson photographic collection is internationally important, particularly for its vulcanological content.*

## The Yorkshire Philosophical Society William Smith Map

*Duncan Hawley and Dr Sarah King, Yorkshire Museum.*

“On one occasion, early in 1824 ... Dr. Matthew Allen of York ... was introduced to Mr. Smith, and ... mentioned the circumstance to some members of the Yorkshire Philosophical Society, then lately formed ... The consequence was an application from the President of the Society (the Rev. Wm Vernon Harcourt) to Mr. Smith to deliver a course of lectures on geology in York ... New maps were coloured, and sections drawn ... “. (John Phillips ,1844, *Memoirs of William Smith LLD.*, p. 107).

The William Smith map ‘*A Delineation of Strata of England, Wales and parts of Scotland*’ that now hangs in the Yorkshire Museum was one of the ‘new maps’. Several colour features on the YPS map make it an interesting variant of Smith’s ‘big’ map. The YPS map was not assigned a ‘number’ and does not bear his signature under the cross section. Maps up to March 1816 were numbered and signed and four distinct series can be recognized (I to IV); maps after this date were all unnumbered and unsigned and classified as Series V. However, the YPS map differs from other known Series V maps. It has some features in common with Smith’s reduced scale map issued in March 1820. Some geological boundary detail is very similar to locations on Smith’s County Maps issued 1819-1824, particularly in the North of England. Coral Rag is marked on the YPS map, although in several places the geological boundary and outcrop differ from that shown on his County map of Yorkshire issued in 1821. In the northern counties (Northumberland, Durham, Westmorland), trap and basalt outcrops are featured on the map but with some boundary variations from Smith’s maps for those counties, issued in 1824. However, the Cheviot Granite marked on the Northumberland county map does not feature. The geology of the Isle of Wight on the YPS map is comparable to a Smith version C, which appears on the later Series V maps issued in the 1830s. However, the version C colouring is not known from any other map known to have been issued in the 1820s.

The colour washes used on the map are of interest. In particular, many areas originally coloured green have degraded and appear as a blue shade. The most likely primary cause of this degradation is exposure to sunlight during display. However, it may also indicate a lapse in the quality of the colouring demanded by Smith on his earlier maps, although the later Series V maps are coloured to a very high standard. Lastly, some of the geology and colouring on the sheets making up the YPS map do not match; this suggests the map was not produced as an entity, but that some of the fifteen component sheets, if not all, had already been coloured.

The viewing of the YPS Smith Map at this meeting aims to explore some of these features and explain the significance and importance of this unique Smith map by putting the features of the map in the context of its original acquisition and use.

### References

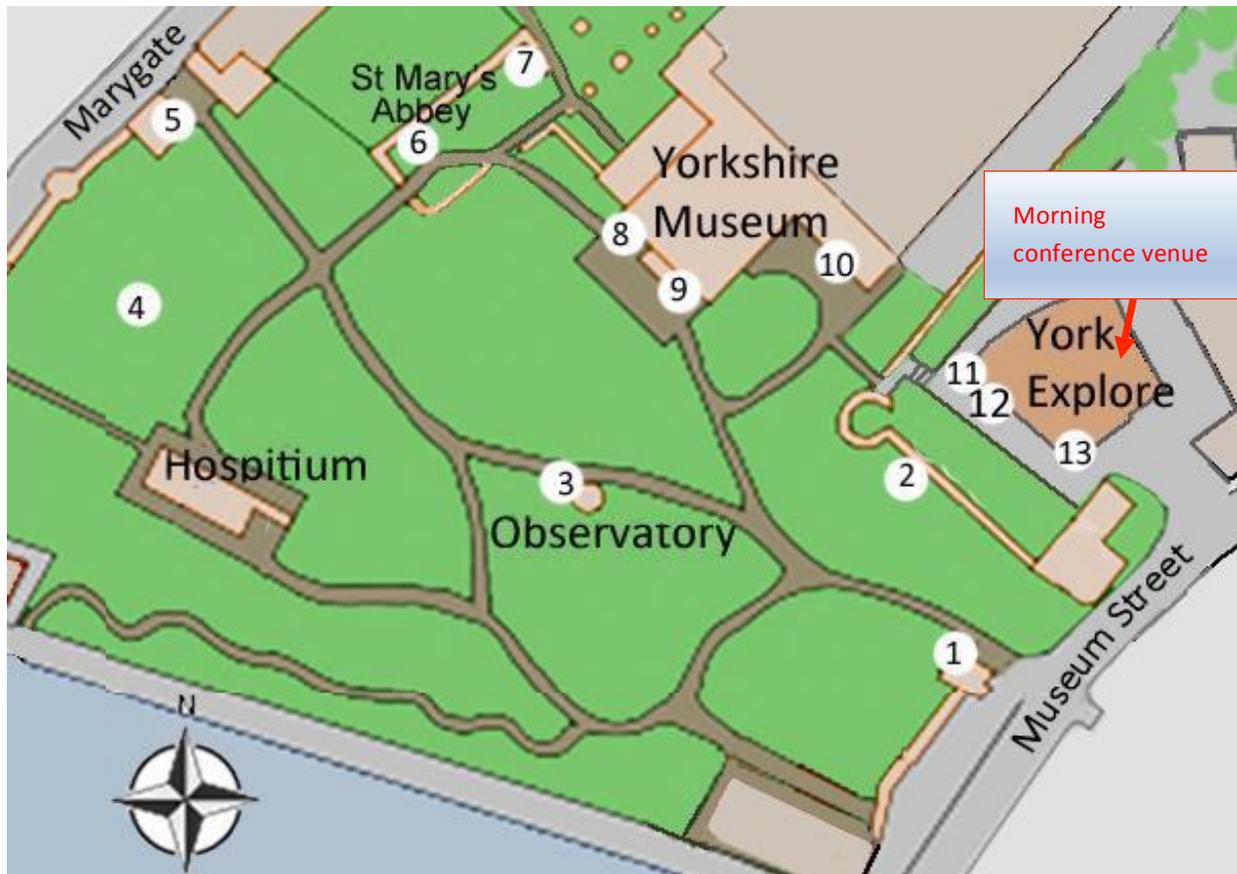
Sharpe, T. (2016). William Smith’s 1815 Map. *A Delineation of the Strata of England and Wales: its production, distribution, variants and survival. Earth Sciences History*, 35 (1), 47-61.

McIntyre, R. (in press). Trap Rocks on William Smith’s Maps. *Earth Sciences History*.

See back cover for an illustration of the YPS’s copy of William Smith’s map, *A Delineation of the Strata of England and Wales with part of Scotland*.

## Calotype locations

Margaret and Rod Leonard, YPS



1. Information board
2. Henry Baines
3. Sir John Herschel
4. Sir Henry Thomas De la Beche
5. Mrs Harcourt
6. William Etty, RA
7. Photographers David Octavius Hill and Robert Adamson
8. Archbishop Edward Harcourt
9. Sir John Johnstone
10. The Baines family
11. William Scoresby
12. Charles William Peach
13. Dr Simpson



Sir Henry De la Beche (1796-1855),  
calotype 1843.

## Geological Map Mosaic Rod Leonard, YPS

This YPS/YMT joint project celebrated the bicentenary of William Smith's famous 1815 geological map, by installing a walk-on mosaic of the Yorkshire part of the map. The stunning artwork created by artist Janette Ireland can be admired in Museum Gardens, behind the ruins of St Mary's Abbey.

We placed boulder-size samples of the rock types identified by Smith in the surrounding flower border. Samples of the two clays, Red Marl and boulder clay, have been fired into ceramics and mounted on concrete plinths. Successive mudstone samples representing Smith's clunch clay stratum have reliably demonstrated the effect of weathering and erosion!



Mosaic strips of the pebbles, used to represent each rock type, have been placed in front of each sample, to make a link between the samples and the main mosaic. Information boards explaining the project are on the nearby pavilion, and explanatory leaflets can be obtained from the YPS. Further information can be downloaded from the YPS website.



The mosaic is now one of the most popular stops for York tourist guides, and has proved an attractive educational tool and an interesting introduction to Yorkshire geology for people of all ages.

The project has also spawned and funded a number of related YPS initiatives including the formation of a YPS Geology Group; the John and Anne Phillips Prize at the University of Hull; a blue plaque for John Phillips; a headstone on John Phillips' grave; and support for HOGG and YGS events in York.

*Although my wife Margaret and I had two children while I was on a student grant, I obtained a London PhD in chemical engineering. I started work as a research scientist in the pigment industry, which led to a varied career- I successively managed plant technical, process development, production, and project engineering departments. I ended up in Baltimore, Maryland as vice-president of R&D for a global chemical company. When young, Margaret & I had made a pact to retire early and do something mad. We bought a 38 ft sailing boat, taught ourselves to sail, and spent 5 years exploring the US East Coast, the Bahamas, and the Caribbean before sailing back to England. We settled in York, and I am currently the Treasurer of the YPS. With my wife, I have organised YPS study tours and worked on several fascinating projects, including the William Smith map mosaic, the Gardens Book, and the Calotype Project.*





The YPS copy of William Smith's map, *A Delineation of the Strata of England and Wales with part of Scotland*. Image courtesy of York Museums Trust : <http://yorkmuseumstrust.org.uk/> : CC BY-SA 4.0 Accession No. YORYM : 2004.25

