

Abstracts for lectures

“The Yorkshire Philosophical Society William Smith Map of 1824”: a unique variant - Duncan Hawley (History of Geology Group)

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 a 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 the Strata of England and Wales with part of Scotland’ that now hangs in the Yorkshire Museum was one of the ‘new maps’. A number of the ‘coloured’ features on the YPS map identify it as a unique variant of William Smith’s ‘big’ map, first published in 1815. Smith, working with his nephew John Phillips (1800-1874), took the opportunity of producing this new map for the YPS to make changes and additions to the strata, and the outcrops within them. This was especially so in County Durham together with the parts of the North Pennines which extend into the four neighbouring counties (including the North Riding of Yorkshire). Smith and Phillips had seen and examined a lot more of England since the map had first appeared in 1815. Interestingly, the YPS map was not assigned a ‘number’ and does not bear William Smith’s signature under the cross section. This talk will highlight the key features of the YPS Smith map, how it fits with the known earlier and later series of William Smith maps and consider what it reveals about Smith’s (and Phillips’) developing geological knowledge in 1824.

“The Miners' Stratigraphy” and the 18th century roots of stratigraphic geology - Ru Smith (Adjunct Professor of Geology at the University of Malaya in Kuala Lumpur)

In colliery visits during 1792, William Smith was inspired by the understanding of stratigraphic succession, correlation, dips and faulting developed by the Somerset mining industry over many prior decades. In Derbyshire, Whitehurst (1778) disclaimed the originality of his observations, “*having principally obtained them from several experienced miners.*” William Turner (1793) was similarly aware of the body of mining knowledge in the northern Pennines and actively encouraged bringing it into the public domain. The first long stratigraphic sections through the Carboniferous (using Pennine mine data) appeared in print during the last decade of the 18th century and the first decade of the 19th century, with Forster (1809) providing the first composite section at the scale of an entire geological system (though not yet named as such). A quantitative comparison between five early sections dating to between 1785 and 1809, enables identification of data sources and discussion on questions of priority. President of the Royal Society Sir Joseph Banks, William Smith’s sponsor, may have been the enigmatic “A Constant Reader” who corresponded on

the topic of these early sections in the Philosophical Magazine and had a copy of Forster's "Section of the Strata" in his library.

Microfossils in Stratigraphy: History and Applications - Duncan McLean (MB Stratigraphy Ltd.)

Microscopic fossils, "microfossils", are generally studied in rock thin-section or as individual specimens released from the rock matrix. The most commonly utilised microfossil groups include calcareous (foraminifera, ostracods, coccoliths), organic (acritarchs, dinoflagellates, fungi, spores and pollen), phosphatic (conodonts), and siliceous (diatoms, radiolaria) forms. They are used in biostratigraphy, palaeoecology and as palaeoclimatic proxies, all enhanced by their abundance in the rock record, rapid evolution, and widespread distribution. Their small size means that they can be recovered intact from borehole material and so they provide the basis for most biostratigraphic studies of the subsurface.

The first microscopical observation of fossil land plant spores was made by J. Witham in 1833 on Carboniferous coal from Lancashire. The general abundance of microfossils in rocks was demonstrated by Christian Gottfried Ehrenberg in 1837. Ehrenberg, like Smith before him, was awarded the Geological Society's Wollaston Medal. This was in 1839, the year of Smith's death. It seems unlikely that either Ehrenberg or Smith would have envisaged the wholesale application of microfossils in stratigraphy that developed in the 20th century. Ehrenberg's seminal work on micropalaeontology, "Mikrogeologie" (1854), was published after Smith's death, and microfossils remained largely as delightful objects of microscopic curiosity until the late 1800s. Work was carried out on the taxonomy and biology of the microfossil groups during this time but it was not until 1886 that the first use of microfossils in biostratigraphy was described by Robert Kidston. He studied land plant megaspores in thin-section to characterise and correlate Carboniferous coal seams in Scotland. The work was furthered by Arthur Raistrick in the 1930s working on spores released by chemical maceration of coal. Other microfossil groups began to be applied in stratigraphy in the early 1900s with Joseph Cushman using foraminifera to correlate artesian wells. Credit for popularising this technique is generally given to Esther Richards Applin and co-workers who presented borehole correlations using foraminifera in 1925. Biostratigraphy using conodonts began in the 1920s and developed rapidly to become one of the standard tools in establishing pre-Jurassic global standard stratotypes, while the stratigraphical use of calcareous nannofossils did not develop until the 1950s. Micropalaeontology developed through the 20th century to become the dominant biostratigraphic methodology. This largely reflected demand in subsurface hydrocarbon exploration and in studying oceanic sediments. Although the size of the fossils may have changed, Smith's stratigraphical principles, now viewed through the prism of biozones and geological stages, remain central to biostratigraphy. His Geological Table of British Organized Fossils laid the foundations for the growth in microfossil stratigraphy that was to follow a century later, with all of the economic and scientific benefits that it has delivered.

