

THE EXTRAORDINARY LIFE OF WILLIAM SMITH 1769-1839

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The year 2015 saw the bicentenary of William Smith's great pioneering map '*Delineation of the Strata of England and Wales with Part of Scotland*'. Events to mark the occasion included exhibitions in London (Natural History Museum), Cardiff (National Museum of Wales), Oxford (Museum of Natural History) and York (Yorkshire Museum). There were conferences in London and Freiburg, numerous lectures around the country and many field trips, including one of our own.

William Smith's career began in Somerset and included more than 20 years living and working in the Bath area, where he developed his sensational new ideas concerning stratigraphical and faunal succession and the concepts of geological mapping. During this time he identified and named all the main geological units of Somerset and Wiltshire in their correct sequence and went on to extend his observations across the country, culminating in the production of his 2015 map. For many years his achievements went unacknowledged by the scientific establishment, who 'borrowed' them without compunction, but belatedly (and happily before his death) he was given due credit and properly honoured.

To add to his unhappiness at being snubbed for so long, there were other things in William Smith's life which brought him huge personal and financial difficulties. This timeline attempts to summarize the principal events in the tumultuous life of a remarkable man of decidedly humble origins.

1769 William Smith is born at Churchill, near Chipping Norton. His father, a blacksmith, dies when young William is 8. He was taken in by an uncle who farmed nearby. Leaves school at 11. In his teens learns elements of surveying using books bought by his uncle. Is intrigued by fossils he finds in the fields.

1787 Edward Webb, a surveyor from Stow-on-the-Wold, arrives at Churchill for work to do

with the new Enclosures Acts. Hires Smith as an assistant. WS retained by Webb and moves to Stow.

1791 He is sent to Somerset by Webb for probate valuation surveys of some inherited properties. These include a coal pit near High Littleton (*Mearns*). Smith learns about the Coal Measures strata and their structure and fossils from his own observations in the mine and from the miners. At some point obtains a copy of John Strachey's graphic geological cross-section of the area published by the Royal Society in 1719 (see Fuller, 2004)

1793 He is appointed by John Rennie as Assistant Surveyor (Surveyor from 1795) for the Somersetshire Coal Canal Company (SCCC).

1794 Sent by the SCCC on an extensive fact-finding tour of canals and collieries in the north of England and Shropshire.

1795 SCCC excavations begin. He records and compares the strata and their fossils on the Paulton and Radstock arms of the canal and its continuation down to Dundas. Begins to map the geology of the area and extend his researches further afield.

1796 Admitted to the prestigious Bath and West of England Society. Makes useful contacts among landowners, including the Duke of Bedford, who will later employ him.

1798 While still employed by the SCCC he buys a derelict tucking (fulling) mill (TM) land adjacent and by the new canal between Midford and Monkton Combe, and builds a house there (Figure 1). The SCCC buys a smaller piece of land at TM at the same time. (Smith is pursued for the next 10 years by creditors who have lent money for his purchase. Debt is bought by a friend in 1809, relieving the pressure).

1799 Dictates his '*Order of Strata.....*' dividing the succession from the Coal Measures to the Chalk into 23 named units to the Revs. Richardson and Townsend, at 29 Great Pulteney Street. Produces his geological map (scale 1 1/2 in: 1 mile) of a 5-mile radius around Bath - *the world's first known geological map*.



Figure 1: Tucking Mill, Monkton Combe, the home of William Smith. Photo: Peter Smith

Leaves the employ of the SCCC. Thought to have been dismissed, but if so reason unknown. Sets up as an independent land surveyor/drainage engineer and begins to travel widely.

1801 Completes his initial hand-coloured *General Map of Strata in England and Wales*.

1802/3 Opens offices in Bath and London. Exhibits his fossil collections in both places.

1807 The Geological Society of London (GSL) is formed as a gentlemen's dining club. Smith, a working man, not invited to join despite his scientific work being by then well known. Leases TM to John Sutton who, under the terms of the lease, restores the mill. It briefly becomes a corn mill but Sutton leaves in 1810.

1808 Smith marries. His wife, Mary Ann, is 22 years his junior. She suffers from a series of chronic illnesses and periods of mental instability throughout their married life. There are no children. By now, Smith is living in Norfolk.

1811 Smith finds work again in Bath, engaged to solve a water flow problem at the hot baths (which he does), so returns to TM. Is briefly engaged by the SCCC to look into a canal leakage problem.

The quarries at Combe Down are doing well at this time and he sees a new way of covering his considerable debts and expenses. In May he leases land at Kingham Field (KF) on the hillside above TM from Charles Connolly, the new (since 1808) owner of Midford Castle and its estate, to open a quarry. Work on the quarry begins.

Smith enters an agreement with Connolly and John O'Neal, who operates a quarry nearby (also on land owned by Connolly), for a joint investment in a railway from Combe Down to TM, where WS is to open a water-powered stone mill (completed Nov. 1812). Smith and Connolly each buys about 30 tons of cast-iron rail.

There are serious problems with the initial surface workings at KF and Smith decides to go underground (also Nov. 1812). His debts pile up. In April he conveys the title of TM to Connolly as security against a £1,000 loan.

1814-16 Quarrying continues at KF but conditions remain difficult and the stone of inferior quality. To add to Smiths' woes there is a national recession in the aftermath of the Napoleonic Wars and the building industry suffers badly. Production at KF eventually comes to a halt. In his own words:

*There it was I sought a prize
But there interred my money lies*

TM remains operational but is poorly situated for handling stone from other quarries on Combe Down, which are mostly owned by mason/builders whose main activities are in Bath and who can take the stone straight down to the city on the other side (and have it cut by their own workers). So a combination of poor judgment and bad luck. The economic recovery in the 1820s will come too late. In Oct. 1816 Smith advertises TM to be let as a going concern but there are no takers.

1819 Connolly calls in his loan. Unable to pay, Smith forfeits TM and his share of the railway (later sold for scrap). Is declared bankrupt and spends 10 weeks in debtors' prison in London. Released following disposal of almost all remaining possessions, including collections, books and papers. Relocates to northern England accompanied by a nephew John Phillips (JP) (b.1800, his apprentice since 1815).

1820s Resumes his career and his travels. He and JP gather geological data used in the production of geological maps of Yorkshire, Lancashire, Westmorland and Cumberland. Still denied GSL membership. (Phillips, taught geology by his uncle, goes on to a distinguished career, becoming Professor at Oxford from 1853 until his death in 1874 - see *Torrens, 2003*).



The first geological map of Britain by William Smith, 1815

1828 Now 59, Smith is given employment as land steward, as well as patronage and advocacy, by Sir John Johnstone of Harkness Hall near Scarborough. Johnstone an influential GSL member.

1831 The GSL, under Adam Sedgwick, President since 1829, at last recognises the outstanding role of the outsider Smith in laying the foundations of geology. Smith is the first recipient of what is to become, and remain, GSL's most prestigious award, the Wollaston Medal. At the presentation, Sedgwick calls him "The Father of English Geology".

1832 Smith granted a £100pa pension by the king.

1834 Leaves the employ of Sir John and retires to Scarborough.

1835 Is proposed for an honorary doctorate by the British Association for the Advancement of Science. Degree (LL.D) conferred by Trinity College Dublin, venue for the 1835 British Association for the Advancement of Science (BAAS) conference.

1839 Active to the last, Smith is taken ill on his way to a BAAS meeting in Birmingham and dies. Buried at Northampton.

1844 Memoirs of Smith published by John Phillips and dedicated to Rev. Richardson (see 1799) and Sir J. Johnstone (see 1828).

1977 GSL creates a new *William Smith Medal*, awarded annually for outstanding contributions to applied and economic geology.

William Smith and contemporary philosophy

William Smith studied fossils for their usefulness in his work and

in doing so invented biostratigraphy. But in his lifetime there was, among the intelligentsia (including a fair number of clergymen), great interest in fossils for other reasons. Such people, while invariably accepting religious doctrine of the time, were deeply concerned about what fossils could tell them about the methods and intentions of God. Why did He embed these intricately-designed stone objects, so similar to living creatures and plants, in the rocks on the third day of the Creation, two days before He created the animal kingdom? Or did He for some reason put them there later? Why were there no living things to match many of these objects? Why did God put what looked exactly like sea shells in rocks hundreds of feet above sea level? These were some of the biggest questions anyone could ask. Smith, who introduced the concepts of stratal superposition and faunal succession, and understood very well that the time required for the formation of strata "*would stagger the faith of many*", played no direct part in the debates on these issues.

In his own words "*I have left off puzzling about the origin of Strata and content myself with knowing that it is soThe whys and wherefores....cannot come within the province of a Mineral Surveyor....*". But his surveys in Somerset in the 1790s, self-taught, working alone, and not yet 30, fed directly into nothing less than a complete re-assessment in the 19th Century of the received wisdom about the natural world and its origins. And Darwin was not even born.

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TORRENS H.,2003. An Introduction to the Life and Times of William Smith (1769-1839). *Bath Royal Literary and Scientific Institution*, xxxviii pp (This publication includes, reprinted in full, the 'Memoirs of William Smith Author of the Map of the Strata of England and Wales by his nephew and pupil John Phillips FRS FGS', viii & 224pp, originally published in 1844)

WINCHESTER S., 2001. The Map That Changed The World - The Tale of William Smith and the Birth of a Science. *Viking*, 338pp

and let's not overlook BILL BRYSON's best seller - A Short History of Nearly Everything (*Black Swan*, 2003, 672pp). Bryson devotes a whole page to William Smith, succinctly describing the work of this "obscure Englishman" and its impact on contemporary thinking.