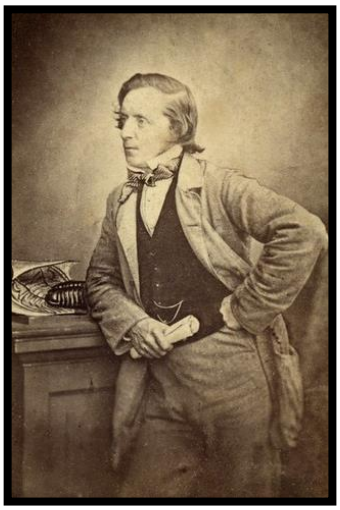
John William Salter ALS FGS (1820-1869)

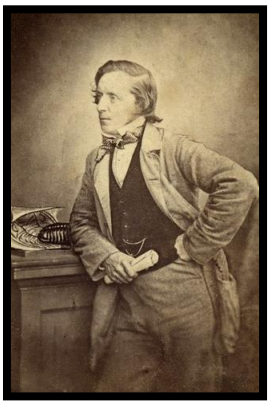


Born: St Pancras 15 December 1820
Died: River Thames 2 August 1869

John William Salter ALS FGS (1820-1869)

1. Introduction

John William Salter has been championed as an 'eminent palaeontologist' of the Victorian era who worked with many of the luminaries of the mid nineteenth century – Sowerby, Sedgwick, Edward Forbes, Murchison etc. In his short life he published many papers describing fossils from the United Kingdom and from abroad. He is also accredited with the discovery of the first Precambrian fossil, a discovery linked to members of the Ludlow Natural History Society.



Salter was born on the 15th December 1820 in St Pancras, London to John and Mary Ann Salter nee Mortyn. He was educated at a private boarding school and, in April 1835, he took up an apprenticeship as a draughtsman and engraver to James de Carle Sowerby (the son of James Sowerby, naturalist and author of the '*English Botany'* and '*The Mineral Conchology of Great Britain'*) - this under the auspices of the Haberdashers Company. His initial desire was to study natural history and in particular entomology. During this period he assisted in the preparation of plates for Sowerby's '*Mineral Conchology'* and also published his first paper *'On the Habits of Insects'* read at the Camden Literary Society. He also prepared plates for Murchison's *'Silurian System*'.

2. Professional Career

On completion of his apprenticeship in 1842 Salter went to Cambridge to help Sedgwick arrange fossils in the Woodwardian Museum. He then joined 'the Master', as he referred to Sedgwick, on summer field trips to North Wales in 1842 and 1843. Sedgwick wished Salter to stay in Cambridge to produce a catalogue of the Palaeozoic fossils, Salter also had an offer from Murchison to join him on a summer visit to the Baltic.

In the event Salter took up an offer in 1846 to join the British Geological Survey in London. By this time Salter had married Sowerby's daughter Sally and had been elected an Associate of the Linnean Society and a Fellow of the Geological Society. Salter initially worked as the chief assistant to Edward Forbes undertaking the arrangement, description and cataloguing of the public fossil collections while at the same time participating in the Survey's field work. He also continued to work on Murchison's *Silurian System*. On his retirement in 1854, Forbes' job was split in two - Huxley was appointed to the Lectureship in Natural History while Salter took charge in the Office of the Palaeontologist. Salter was not an administrator and further changes were made in 1856 which allowed Salter to concentrate on his preferred field, the fossils of the Palaeozoic.

Salter's work in the Office of the Palaeontologist involved much routine work in the naming and listing of fossils as well as the preparation of demonstrations for students of the School of Mines. This work led to the publication of many papers in the Journal of the Geological Society etc. as well as the preparation of a series of 'Memoirs' and a monograph on British Trilobites. Ninety two separate papers plus twelve of joint authorship on palaeontology and geology appear in the Royal Society's *Catalogue of Scientific Papers*.

Unfortunately, Salter suffered from poor health and unsettled relationships with his peers. He retired from the Geological Survey in 1863, several years before his pensionable age, and found himself in straightened circumstances. He was awarded the Woolaston Donation Fund in 1865 and found intermittent employment in the arranging and naming of Palaeozoic invertebrates at various museums; Manchester, Leeds, Worcester, Cambridge etc. The updating of the catalogue of the collection of Cambrian and Silurian fossils in the Woodwardian Museum for Sedgwick was one of the last tasks undertaken. He also undertook two lecture tours '*On the Order of Creation'* in 1863. Income from this work did not provide sufficient funds to support his wife and seven children. In a letter

dated 31st December 1866 Salter asked Darwin for both financial help and employment mentioning a debt of £200. A second letter dated 14 May 1867 was of similar tenor:

> *Dear Mr Darwin*
>
> *You bade me apply to you if I wanted help. And this generosity has prevented me till I have tried every other means. Those who should have aided me for kin's sake would do nothing when I left the Survey except old Mr Sowerby and he could not. I can borrow no money - I cannot sell my English Botany nor carry it on & serious & frequent illness prevents me doing half that I ought, even in my precarious occupation. And not one of my monied friends but are themselves in difficulties four men who would gladly aid me and who had thousands, are now borrowing money. And now I have my family engaged in schoolkeeping - my house partly let & retrenchment in every sort - I am still heavily in debt & have no means of getting out of it.*
> *I know not what I can do for you in return for any aid, unless your library wants the English Botany – it is the only thing in my power. Pray let me send it you if you have it not……*
> *Aid me, if you can, and command me in any way in return*

Darwin Correspondence Project "Letter no. 5535".

Seemingly Darwin did help, as did Sedgwick, but to no avail - in August 1869, while he was travelling on the Thames steamer *Eagle* with his son William, Salter gave to his son a gold watch presented to him by Sedgewick and then jumped overboard. His body was retrieved and he was buried in the Highgate Cemetery.

> *Many persons in Malvern knew Mr J W Salter, the eminent geologist. He was residing here during the winter, and commenced taking steps for organising classes on natural history. On Tuesday last he put an end to himself in the following manner, which we copy from the Times:- On that day the Steam Navigation Company's boat, the Eagle, took up among her passengers from the metropolis to the Isle of Thanet a gentleman of about 50 years of age, with his son, a youth of about 18 years. When the boat got to the Lower Hope, below Gravesend, the gentleman was seen by the mate suddenly to jump from the sponsons into the river. An alarm was at once given, the steamer was stopped, and a boat was lowered to recover the unhappy man, but without success, and after remaining half an hour searching for him the steamer proceeded on her journey, carrying with her the bereaved son. It transpires that the unfortunate gentleman was named John William Salter, and that he resided at St George's-road, Kilburn. He was a geologist by profession. The reason that induced him to commit the rash act has not been made public, but the son states that his father handed over to him his watch and guard just previously for him to take care of in case any harm came to him.*

Worcestershire Chronicle 11 August 1869

3. Salter's Oeuvre and his contacts with Ludlow Natural History Society

Salter's gift to the world of the geology and natural history is enormous. It is primarily in the form of the many published papers identifying and naming species. The scale of this offering is shown in some detail in Huxley's obituary (Proceedings of the Geological Society 1870). Salter's main expertise was with regard to trilobites, reference the unfinished monograph on trilobites. What is not mentioned in the obituary are two discoveries made well in advance of others. The first is pertinent to the Ludlow Natural History Society with regard to Pre-Cambrian fossils (see below). The second was in the recognition of the connection between stratigraphical and fossil evidence from Canada and that from the western isles of Scotland - evidence of the closure of the Atlantic Ocean which led to the theory of continental drift. In both Salter was at least 100 years ahead of his contemporaries (Brasier et al 2011).

According to a preface to the revised catalogue of the Society's fossils prepared by Thomas Digges la Touche in 1928, Salter determined the names of the Society's fossils 'some time between 1863 and 1868'. Ludlow may therefore have been one of the museums included in his 'tour' of the country's museums during the last few years of his life. According to the Society's accounts for the year Salter did give lectures on the 'Order of Creation' to the Ludlow Natural History Society in 1863, the year of his resignation from the Geological Survey (he was paid £6.0.0 for the lectures). He may therefore have worked on the first catalogue at that time when it was certainly in preparation.

But, more interestingly, at the Committee Meeting of the 30th November 1855, George Cocking reported that:

> *' ….. on a late visit to this neighbourhood Mr Salter accompanied himself and Mr Lightbody to the Museum and after carefully examining the Collection gave considerable assistance in naming and arranging the Silurian fossils and that he was convinced of the value of Mr Salter's aid that he proposed "That the thanks of the Committee be given to Mr Salter for the time and attention he bestowed in his late visit to Ludlow in naming and arranging the Silurian fossils in the Society's Museum".*

This proposal was unanimously agreed.

Salter revisited the Society in 1862/63 to give two lectures on the 'Order of Creation' one of a series of lectures given after his retirement from the Survey. The 1863 Accounts note the follwing:

Expenses of Mr Salter's Lectures on the Order of Creation

His fee	6 0 0
Printing of circulating notices	1 5 0
Gas, candles & sundries	4 11
??	10 6
Total	£8 0 5

The 1855 record is of particular interest as it was in this year that John William Salter visited the Long Mynd and found examples of a fossil of pre-Cambrian origin *Arenicolites didymus* (Salter).

> *…….. Untutored but remarkably gifted, Salter had two great assets of the kind much needed in this field – a knack for finding great things, and an artistic flair. Keen to test the existence of truly Cambrian biota, Salter set off with geological hammer in hand to begin a three week search, from Wenlock to Wentnor in the Welsh Borderlands. Revelation took pace within a deep valley in the Longmyndian hills of Shropshire. These rocks had been notionally accepted as both azoic (without life) and 'Cambrian' by Sedgwick as well as by Murchison. But it was here that Salter found what he took to be the remains of wormy activity on the seafloor as they went about their daily business. These were pairs of pits which reminded him (wrongly as it happened) of the openings of U-tubes like those made by the modern lugworm Arenicola – so he called them Arenicolites. He also found what he mistakenly took to be a trilobite which he called Palaeopyge. 'The Cambrians are not barren of organic life' he excitedly wrote to Murchison. But what Salter had actually stumbled upon was not worm tracks at all. Nor were they even Cambrian. They were the first genuine Precambrian fossils ever to be named and described. The year was 1855* (Brasier et al 2011).

The syntype specimen of *Arenicolites didymus* is held by the Geological Survey. It is also of note that Salter donated an example of *Arenicolites didymus* to the Woodwardian Museum - as did Robert Lightbody.

Salter's find did not send resonances through the fossil world and the discovery was largely forgotten until recent years when the literature on pre-Cambrian, or Edicaran, fossils has blossomed - and debate still occurs as to the exact nature of Salter's find. Darwin was aware of the find and makes note of the find in *On the Origin of Species*, but without mentioning Salter's name. Salter recorded the find in two papers of 1856 and 1857.

Arenicolites didymus (Salter)
BGS GSM 49160 Syntype Carding Mill Valley

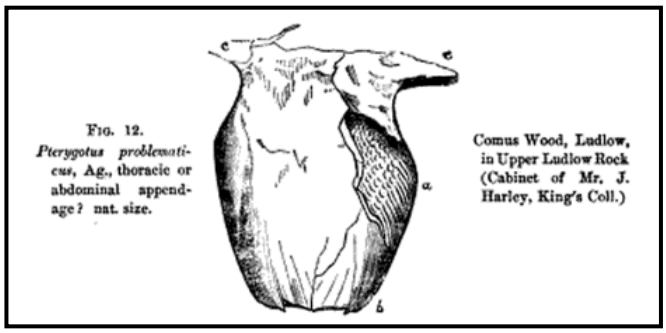
> *There is no doubt that the find was of major importance: John W. Salter's papers of 1856 and 1857 reported trace and body fossils from the rocks of the Longmyndian Supergroup, Shropshire, that conventional wisdom has deemed literally "Azoic". The significance of this work is reflected by its mention in* On the Origin of Species, *where it is cited as evidence for the existence of life prior to the Cambrian radiation. This study of Salter's historic specimens combined with recent field studies confirms that these structures likely represent microbial rather than metazoan markings. Nevertheless, the review confirms Salter as the unheralded founder of Precambrian palaeontology, many years before the existence of a Precambrian fossil record was widely known. This study gives credit to a highly skilled palaeontologist, who appears to have struggled with psychological problems throughout his life. ….* Brasier et al (2011).

Salter's 1855 paper briefly introduces *Arenicolites didymus*. He revisited the Longmynd in 1856 adding a second example of a Precambrian fossil *Arenicolites sparsus*. But of more import is a mention in the paper:

> *In a journey across the eastern portion of the Longmynd, in company with my friends, Messrs Lightbody and Cocking, of Ludlow, we found them (the annelids) at intervals all the way, until they ended with the sandstones of the Portway itself.*

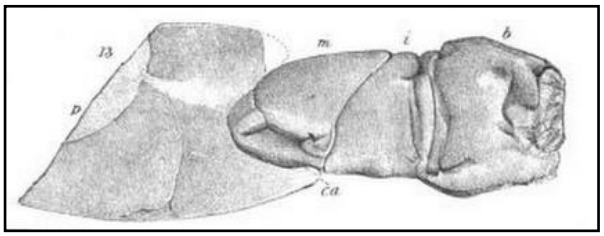
Thus Cocking and Lightbody, and the Ludlow Natural History Society, were directly involved in Salter's finding of a Precambrian fossil.

Salter examined the private collections of the Ludlow fossil hunters at this time as confirmed by multiple references to the cabinets of Messrs Salwey, Cocking, Lightbody, H. Pardoe, Marston, Harley and Colvin - see his descriptions of *Pterygotus problematicus* (Agassiz) from the cabinet of John Harley as shown below (Huxley and Salter 1859).



Pterygotus problematicus (Agassiz)
Figure 12. Huxley T H, Salter J W (1859).

There is also mention of a specimen donated to the Museum of Practical Geology by Mr R. Lightbody Jnr.



Pterygotus punctatus swimming foot presented by R. Lightbody Jnr

Huxley T H, Salter J W (1859)
Plate XI, Figure 13.

Further evidence of Salter's July 1856 visit to Ludlow is given in Murchison's brief note of 1857 where Murchison, accompanied by both Salter and Robert Lightbody, visited the site of the discovery of fossil fish by Lightbody in a bed below the paper mill on the Teme at Ludlow, this as described by Egerton 1857.

4. Salter Fossils in the Ludlow Natural History Society Collection

Salter donated fossils to the Ludlow Society from the Longmyndian and the Llandeilo Flags including specimens of both *A. didymus* and *A. sparsus.* The fossils are as listed below as numbered in la Touche's 1928 catalogue:

Longmyndian Fosils

A/1	Rippled surfaces with sun-cracks	Carding Mill
A/3	{Arenicola} Arenicolites didymus Salter	Carding Mill
	Note by Mr Salter: *'The burrows of mudinhabiting worms on the rippled surface of the Longmynd sandstone'.*	
A/4	Plaster cast of Arenicolites didymus	-
A5/A6	Arenicolites sparsus Salter	Carding Mill
A/7	Palaeopyge Ramsayii Salter	-
	Plaster cast of the specimen (supposed to be the pygidium of a Trilobite) described by Salter in QJGS Vol XII p, 949 Pl. IV, fig,3; and figured by Murchison, Siluria, 3rd Edition p.26, fig.2.	

Trilobite and Brachiopod fossils from the Llandeilo Flags:

B/b/4	Olenus micrurus Impression of complete individual Lingula ramsayi (Salter)	?near Dolgelly
B/c/2	Dictyonema flabelliforme (Eichw. Var. sociale Salter)	Malvern

5. The Salter Family

Salter's parents were living in Pratt Place, Camden Town at his birth and in Gee Street, Somers Town, at the time of his baptism at the Old Church, St Pancras on the 10th April 1821. Salter married Sally Sowerby on the 7th July 1846 again at St Pancras. All seven of the Salter children were christened at the Old Church, St Pancras.

Prior to Salter's death, Sally *'gathered up the children and moved out'* to live with her father James de Carle Sowerby in Hampstead. The family remained there until the death of Sally in 1892 running a school from this address. Sally and three of her daughters gave their occupation as 'governess' but by 1901 daughters Lucy and Ellen had labelled themselves as 'Principals of young ladies school'. All the daughters left a will. Of the sons, Mortyn John and William, both married and were employed respectively as an analytical chemist and a sanitary engineer. James Colam was a mathematics teacher at Cheltenham College. Again all the sons left a will, William leaving over £5000 compared to

his father's listing as '*Effects less than £100*' – it is thus suggested that the family recovered from Salter's illness and suicide and lived in reasonable comfort for the remainder of their lives.

Note. Three main sources have been used for the above – Huxleys' obituary in the Quarterly Journal; Brasier et al who focusses on the Longmyndian find and the very interesting paper by Secord on the limited prospects of employment for naturalists in the mid-Victorian era which uses Salter as the exemplar.

Dr J. A. Gosling
July 2018

Selected Publications

Huxley T H, Salter J W (1859) *Memoirs of the Geological Survey of the United Kingdom. Figures and descriptions of British Organic Remains Monograph 1* Longmans, London.

Salter J W (1856) *On Fossil Remains in the Cambrian Rocks of the Longmynd and North Wales* Quarterly Journal of the Geological Society **12** 246-251.

Salter J W (1857) *On Annelide-burrows and Surface-markings from the Cambrian Rocks of the Longmynd and North Wales* Quarterly Journal of the Geological Society **13** 199-206.

Salter J W (1863-1867) *A Monograph of British Trilobites from the Cambrian, Silurian and Devonian Formations* Cambridge University Press, Cambridge.

Salter J W (1873) *A Catalogue of the Collection of Cambrian and Silurian Fossils contained in the Geological Museum of the University of Cambridge* Cambridge University Press.

Sources

Bonney T G (1897) *Salter John William* Dictionary of National Biography.

Callow H T, McIlroy D, Brasier M (2011) *John Salter and the Edicaran Fauna of the Longmyndian Supergroup* Icnos 18 176-187.

Egerton P (1857) *On some fish remains from the neighbourhood of Ludlow* Quarterly Journal of the Geological Society **13** 282-288.

Encyclopaedia Britannica *John William Salter*.

Huxley T H (1870) *John William Salter A.L.S., F.G.S.* Quarterly Journal of the Geological Society **26** xxxvi-xxxix.

McIlroy D, Crimes P T, Pauley J C (2005) *Fossils and matgrounds from the Neoprotozeroic Longmyndian Supergroup* Shropshire Geological Magazine.

Menon L R, McIlroy D, Liu A G, Brasier M (2015) *The dynamic influence of microbial mats on sediments fluid escape and pseudofossil formation in the Edicaran Longmyndian Supergroup UK* Journal of the Geological Society 173-185.

Murchison R (1857) *Notes on the Relative Position of the Strata, near Ludlow, containing the Ichthyolites described by Sir P. Egerton* Quarterly Journal of the Geological Society **13** 290-291.

Secord J A (1985) *The Rise and Fall of a Victorian Palaeontological Career* Archives of Natural History 161-75.

The Darwin Correspondence Project www.darwinproject.ac.uk .

Findmypast findmypast.co.uk

Appendix 1: **The Salter family**

John Salter
1779-1837
m. Mary Ann Mortyn
St Pancras 25.12.1811

James de Carle Sowerby
1787-1871
m. Mary Edwards
20.09.1813

John William Salter
1820-1869
b. 15.12.1820
c. 18.02.1821 *St Pancras*
d. 02.08.1869

m.

Sarah (Sally) Sowerby *St Pancras* 07.07.1846
1819-1892
-
c. 25.08.1819 *Lambeth*

Mortyn John	Mary Esther	Emily Martha	Lucy Charlotte	James Colam
1847-1933	1849-1897	1850-	1852-1933	1854-1936
c. *St Pancras*	c. *St Pancras*	c. *St Pancras*	c. *St Pancras*	c. *St Pancras*
09.01.1848	02.09.1849	05.02.1851	15.10.1852	02.11.1856
d. *Stow*	d. *Hampstead*	-	d. *Chertsey*	d. *Camberwell*
16.04.1933	06.08.1897	-	22.03.1933	02.06.1936
m. Alice Wilding				m. Emily Susana Wilding
1849-				1854-1935
Church Stretton 10.08.1875				*Kensington* 1879

William Sowerby
1856-1923
b. *St Pancras*
d. *Camberwell*
25.12.1923
m. Fanny Weatherhead *Brentford* 1898

Ellen Henrietta Bevan
1859-1938
b. *St Pancras*
d. *N. Surrey*
22.01.1938