

# Samuel Johnson and the English Industrial Revolution

When we imagine the Industrial revolution we normally think of steam locomotives, massive factories spurting black smoke into the atmosphere and children at weaving machines or young boys being employed as chimney sweeps. But all this is some 80 or more years after Johnson's death in 1784. When Johnson died, Stephenson's rocket was some fifty years away.

Can we, however, make connections between a literary man of the eighteenth century and a scientific, technological and economic revolution of the nineteenth century?

Although I will refer to his dictionary, we cannot expect much direct help from it. It was completed by 1755 and generally reflected the historical meanings of words – the ways words had been used in the past – although there were long encyclopaedic entries on things that were then of current interest such as camels – with a separate entry for dromedary.

However, even in his preface, there is evidence that changes are taking place. This evidence comes from what he said he would NOT do: he said that it was 'unavoidable' that many terms of 'art and manufacture' had to be omitted:

*I could not visit cavern's to learn the miner's language, nor take a voyage to perfect my skill in the dialect of navigation, nor visit the warehouses of merchants, and shops of artificers, to gain the names of commodities, utensils, tools and operations of which no mention is found in books. (Oxford authors p 323)*

Here then is evidence of changes taking place which had not yet entered the literary record.

Earlier Johnson Society papers have covered some aspects of science and medicine during Johnson's time, but the only paper to focus solely on the Industrial Revolution I have been able to find was that by Greg Veitch, published in Volume 3 of the Johnson Society Papers 16 years ago in 1999 – and as far as I know the only publically available copy of this is in the rare books section of the Baillieu Library. I found it a valuable source, but its concentration was on technology, and what I am going to attempt is to bring in some contemporary historical thinking on the Industrial Revolution, and approach it from a different angle.

There were significant changes taking place in society and in the economy during the seventeenth century and we can get glimpses of these in both the writings of



*The first Iron bridge over the River Severn (1779).  
Twenty years earlier Johnson had argued that  
Blackfriars Bridge in London should be of iron, but  
masonry was used instead.*

Boswell and Johnson and of their contemporaries. One of the significant features of the eighteenth century was improvements in agriculture. One way in which agricultural production was improved was by selective breeding for an increase in meat or wool. Boswell mentions (16 September 1770) a visit to the farm of Dr John Taylor (who also managed to be a clergyman) where Boswell was shown 'one cow which he had sold for a hundred and twenty guineas and another for which he had been offered one hundred and thirty'

I have chosen to focus on three particular factors present in the eighteenth century and hope to show Johnson's awareness of them, their relationship to each other and to the industrial revolution. These are Consumers, Coal and Canals – and I will look at them in that order.

## Consumers

Kate Burridge, in her 2013 Fleeman lecture discussed the role of advertising and Johnson's reflections on it, and this in fact was an important inspiration for the approach I have adopted.

Advertising – trying to persuade people to buy goods they do not really want by creating a 'need' – is itself an indicator of a consumer society, of one in which people are living beyond subsistence level and looking for additional things to buy.

In the *Adventurer* No 67 (26 June, 1753) Johnson describes how it had become difficult to attain happiness in his society:

... the happiness of man may still remain imperfect, as wants in this place are easily supplied, new wants likewise are easily created: every man, in surveying the shops of London, sees numberless instruments and conveniences, of which, while he did not know them, he never felt the need; and yet, when use has made them familiar, wonders how life could be supported without them. Thus it comes to pass, that our desires always increase with our possession; the knowledge that something remains yet unenjoyed, impairs our enjoyment of the good before us. (Yale p 387)

Where did all these goods, and the money to purchase them, come from? We need to go back another hundred or so years.

The East India Company had been established by Royal Charter from Queen Elizabeth I on 31 December 1600 and the trade initiated by this led to the development of a "Middle Class" whose wealth came from this trade and whose standing in society was measured by how much money they possessed rather than their ownership of land.

Daniel Defoe's *Tour through Great Britain* was published when Johnson was in his teens and Defoe describes the changes that were taking place at the time:

In the last 'twenty or thirty years' the Village of Stratford has:

*more than doubled in that time; every vacancy filled up with new houses ... generally speaking, of handsome, large houses, from 20 pounds a year to 60 pounds, very few under 20 pounds a year; being chiefly for the habitations of the richest citizens ...*

Fifty years later, in 1778, Boswell asked Johnson why things had gone so 'topsy-turvey'. Johnson replied:

*Why there are many causes, the chief of which is, I think the great increase of money. No man now depends on the Lord of a Manour, when he can send to another country, and fetch provisions. The shoe-black at the entry of my court does not depend on me. I can deprive him of but a penny a day, which he hopes someone else will bring him; and that penny I must carry to another shoe-black, so the trade suffers nothing. I have explained, in my Journey to the Hebrides, how gold and silver destroy feudal subordination.(665)*

Earlier generations could only afford the necessities. This new generation were consumers. Defoe describes a fair in Cambridge where there are:

*all sorts of wrought-iron and brass-ware from Birmingham; edged tools, knives, etc., from Sheffield; glass wares and stockings from Nottingham and Leicester; and an infinite throng of other things of smaller value every morning.*

*To attend this fair ... there are sometimes no less than fifty hackney coaches which come from London, and ply night and morning*

Towards the end of the Fair local gentry come and spend money on:

*toy-shops, goldsmiths, braziers, ironmongers, turners, milliners, mercers, etc., and some loose coins they reserve for the puppet shows, drolls, rope-dancers, and such like.*

"Toys" at that time referred to any small consumer item such as cutlery, buckles, fancy buttons, snuff boxes and the like. By Johnson's time, fancy buttons had become one of those 'small luxuries' that large numbers of people could afford. Such items only needed elementary machinery to mass produce, but it was from this machinery that more sophisticated machines developed.

Two entries from Johnson's dictionary reveal Johnson's attitude to these. The first entry is for "Toys":

*Toy [toyen, tooghen, to dress with many ornaments. Dutch  
A petty commodity; a trifle; a thing of no value.  
'They exchange for knives, glasses and such toys great abundance of gold and pearl.'" Abbot*

The second entry is that for Buttons:

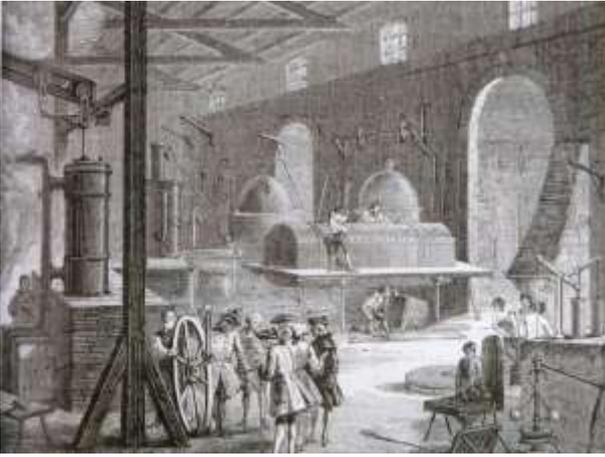
*Button  
A catch or small ball, by which the dress of man is fastened.  
'Pray, undo this button.'  
Shakesp. King Lear  
'I mention these ornaments, because, of the simplicity in the shape, want of ornaments, buttons, loops, gold and silver lace, they must have been cheaper than ours'.  
Arbuthnot on Coins*

In both these extracts there is the attitude that contemporary society is placing too much value on what should be basic items.

When Johnson was living in Birmingham in 1733 (age 24) one of his 'valuable acquaintances' there was John Taylor (1711-1725) who began his career by making buttons. Boswell says Taylor was a person who: 'by his ingenuity in mechanical inventions, and his success in trade, acquired an immense fortune' (bl 51), Taylor went on to fund the first bank in Birmingham which was eventually to develop into Lloyds of London.

Many of these items were being made in Matthew Boulton's works in Birmingham. Johnson visited the works in September 1776 year as recorded in his diary:

*We then went to Boltons, who with great civility led us through his shops. I could not distinctly see his enginery. Twelve dozen of Buttons for three shillings. Spoons struck at once.*



*Boulton's factory in Birmingham*

Earlier in March of that year, Boswell had visited the same works:

*Mr Hector (Edmund Hector) was so good as to accompany me to see the great works of Mr Bolton [Boulton], at a place he has called Soho, about two miles from Birmingham, which the very ingenious proprietor shewed me himself to the best advantage. I wish Johnson had been with us: for it was a scene which I should have been glad to contemplate by his light, the vastness and contrivance of some of the machinery would have 'matched his mighty mind'. I shall never forget Mr Bolton's expression to me; "I sell here, Sir, what all the world desires to have – POWER (p 510)*

The Boultons had originally lived in Lichfield but in the early 1700s Matthew Boulton's father had moved from Lichfield to take up an apprenticeship in Birmingham and then set up a business of his own, which his son took over and developed. Because transport of goods by road was so difficult, it was more worthwhile to concentrate on small consumer items – buttons and cutlery – as mentioned by Johnson – and also buckles and snuff boxes.

There is an indirect reference to other consumer items – iron pots and saucepans – in a discussion Boswell had with Johnson on whether fornication was a heinous sin:

*JOHNSON: "Why, Sir, observe the word whoremonger. Every sin, if persisted in, will become heinous. Whoremonger is a dealer in whores, as ironmonger is a dealer in iron. But as you don't call a man an ironmonger for buying and selling a penknife, so you don't call a man a whoremonger for getting one wench with child. (352)*

There had been iron works in places like Coalbrookdale in Shropshire from the seventeenth century, and it was in 1709, the year of Johnson's birth, that Abraham Darby rebuilt the furnaces, using coke instead of charcoal, to produce cast iron. This was to meet the demand for iron pots and saucepans. In 1781, three years before Johnson's death the first Iron Bridge was

built across the Severn River.

The following year (19 September, 1777) Boswell reports a visit they both made to Derby:

*I admired the ingenuity and delicate art with which a man fashioned clay into a cup, a saucer or a teapot, while a boy turned round a wheel to give the mass rotundity.*

Johnson however had his reservations:

*The china was beautiful, but Dr Johnson justly observed it was too dear; for that he could have vessels of silver, of the same size, as cheap as what were here made of porcelain. {610}*

Some forty miles to the west, Josiah Wedgwood (1730-1795) was firmly established at Etruria supplying fine porcelain to Queen Charlotte wife of George III and Catherine the Great of Russia.

While advertising was important in selling goods so was the way in which goods were displayed. They had to be arranged in a way that would entice the customer to purchase things they had not gone out looking for; or as Johnson said 'create new wants'.

The ability to display goods was greatly enhanced by the advances made in France in 1688 with the discovery of methods of making large sheets of glass, called Plate Glass. The English achieved this in 1173 at Ravenhead in Merseyside.

Defoe was strongly opposed to what he thought was the waste involved in setting up shops:

*It is a modern custom, and wholly unknown to our ancestors ... to have tradesmen lay out two thirds of their fortune in fitting up their shops. By fitting up, I do not mean furnishing their shops with wares and goods to sell ... but in painting and gilding, fine shelves, shutters, boxes, glass doors, sashes and the like, in which they tell us now, tis a small matter to lay out three hundred pounds, nay five hundred pounds, to fit up a pastry cook's, or a toy shop (England in transition p 33-4)*

He goes on to say that:

*It will hardly be believed in ages to come, when our posterity shall be grown wiser by our loss ... Anno Domini, 1710. Let the year be recorded.*

Defoe would be disappointed to know that 300 years we are none the wiser!

Sophie Roche, a German novelist born in 1731, describes the shops in London

*It is almost impossible to express how well everything is organised in London, every article is made more attractive to the eye than in Paris or in another town ... We especially noted a cunning device for showing women's materials. Whether they are silks, chintzes or muslins, they hang down in folds behind the fine high windows, so that the effect*



*Showroom of Wedgwood and Byerly  
Potteries, St James Square London*

*of this or that material, as it would be seen in the ordinary folds of a women's dress can be studied ... Behind great glass windows absolutely everything one can think of is neatly and attractively displayed and in such abundance of choice as almost to make one greedy.*

## Coal

The exploitation of coal is usually seen as a *result* of the Industrial Revolution – as being required to feed the steam engines and iron furnaces. However in many ways the reverse is true: it was the greatly increased demand for coal from the start of the eighteenth century that led to some precursors of the Industrial Revolution.

Johnson's dictionary gives two meanings for coal:

*The common fossil fewel.*

*Coal is a black, sulphurous, inflammatory matter, dug out of the earth, serving for fewel. It is ranked among the minerals and common in Europe, though the English coal is of most repute...*

In the second meaning he quotes a passage from Francis Bacon:

*The cinder of burnt wood, charcoal*

*Whatsoever doth so alter a body, as it returneth not again to that it was, may be called alteratio major; as when cheese is made of curds, or coals of wood, or bricks of earth*

We can see from Johnson's entry that charcoal could also be called 'coal'

The production of pottery required wood to heat the kilns, while iron required carbon to remove the oxygen from the ore, to convert Iron Oxide to its elemental iron. From the Middle Ages on it was charcoal – made from

heating wood in the absence of oxygen – that was used in this reduction process.

But by the end of the seventeenth century, wood was in short supply and becoming very expensive. Its use in ship building for both merchant and naval ships, the construction of houses, which Defoe referred to, and warehouses and wood's use for general heating were making wood so expensive, that coal could be shipped along the east coast from Newcastle to London and sold far more cheaply than timber for firewood.

We can see how expensive wood was becoming when in Boswell visited a large estate in Derby:

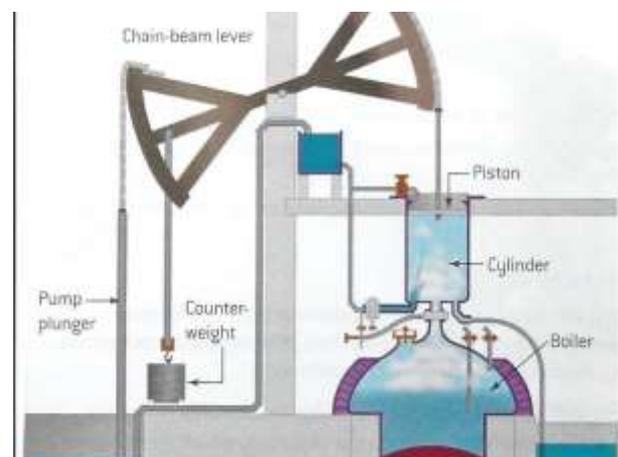
The number of old oaks, of an immense size, filled me with a sort of respectful imagination: for one of them sixty pounds was offered. P. 609

When coal replaced wood for heating, chimney design had to be improved in order to ensure that the noxious gases were removed from the room – but, of course, they gathered in the atmosphere above the houses.

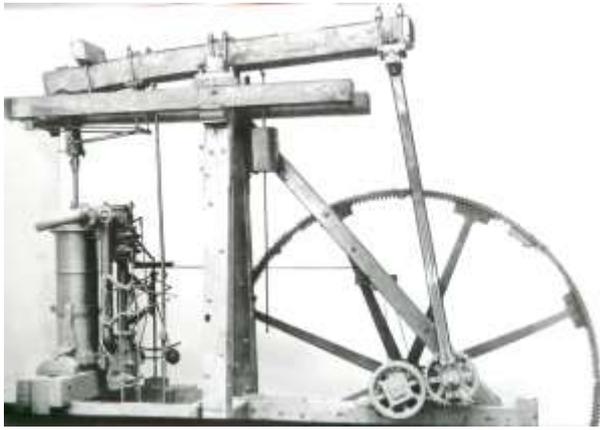
To meet this increased demand for coal two challenges had to be met – (1) obtaining coal from deeper mines and (2) efficiently transporting coal overland.

As the mines went deeper to extract more coal, mining moved below the water table and the water had to be removed. At first this was done with buckets raised by horses but in 1712, when Johnson was three years old, the Newcomen Steam Pump was used to pump water out of mines, and was widely used through England during the eighteenth century.

This was very inefficient as steam had to be created to push air out of the chamber, and then cooled down to create a vacuum. Because they were used on coal fields, this excessive use of coal was not a problem. It was also designed for up and down motion, so could not be used for locomotion. Engines based on these were used in Boulton's factory which Johnson and Boswell visited in 1776.



*Diagram of Newcomen Steam Pump*



Watt's modifications to the steam pump

Thirteen years before Johnson visited Boulton's Birmingham factory, James Watt was asked to repair a Newcomen Engine at the University of Glasgow and over the next ten or so years he worked on improvements. His first improvement was to attach a condenser outside the cylinder to collect the expired steam and the second was to convert the up and down motion to rotary by a crankshaft.

When we see Johnson referring to coal as a 'fossil fuel' we might be tempted to imagine that he was aware that coal represented material from a distant geological past, which is the way we use it today.

However for him it was a mineral in the way that iron or copper ores were minerals. 'fossil' came from the Latin fossa meaning a ditch, so fossil meant anything dug up from the earth.

Fossil adj [fossilis, Latin; fossile, French] That which is dug out of the earth.

The fossil shells are many of them of the same kinds with those that now appear upon the neighbouring shores; and the rest such as may be presumed to be at the bottom of adjacent seas.

Woodward's Natural History

What is interesting about this quote from John Woodward (1665-1728) is that while he is aware that some shells found in the ground differ from those he knows, he does not envisage that this could be explained by saying they come from some distant past and represent now extinct sea creature.

Instead he, takes the easier path by assuming that examples of these shells do exist today, but they are somewhere deep in the ocean where they cannot be discovered. The understanding of geological time was to await the nineteenth century and I will return to this later.

## Canals

The increased demand for coal raised the problem of transporting it to places where it was needed. Most roads were very poorly maintained and the cost of carriage by horse-drawn cart or packhorse became a major expense.

Defoe describes the effects of clay in the Midlands where the Northern Road passed through Leicester and Northampton:

*On this road ... you enter the deep clays, which are so surprisingly soft that it is perfectly frightful to travellers, and it has been the wonder of foreigners, how, considering the great number of carriages which are continually passing with heavy loads, those ways have been made practicable; indeed the great number of horses every year killed by the excess of labour in those heavy ways, has been such a charge to the country that the building of causeways, as the Romans did of old, seems to be a much easier expense. (p 429)*

One solution was to set up sections of road where those using it would pay a toll. These were called turnpikes after the gate used to open them which were hinged on pikes. Johnson includes the word in his dictionary as referring to the gate:

*Turnpike n s [turn and pike, or pique]*

*1. A cross of two bars armed with pikes at the end, and turning on a pin, fixed to hinder horses from entering.*

*2. Any gate by which the way is obstructed.*

*The gates are shut, and the turnpikes locked  
Arbuthnot*

River transport had been used for centuries and Defoe describes the importance of the River Trent, stating that: 'About four thousand ton of Cheshire cheese [was] brought down the Trent every year from those part of England to Gainsborough and Hull' p 450-451.

At the end of the seventeenth and start of the eighteenth century rivers like the Trent had been widened and deepened to make them more navigable, but this did not solve the problem where there were no rivers at all.

Canal building began in the 1760s and for the next 80 years, until the introduction of steam locomotion, they were the major means of transport. The greatest single product carried in canals was coal.

Although three meanings of 'canal' appear in Johnson's dictionary, the only indication of a canal that could possibly be used for transport is a reference to Holland:

Canal [*canalis*, Latin]

A bason of water in a garden.

The walks and long canals reply

Pope

Any tract or course of water made by art; as the canals in Holland

[In anatomy.] A conduit or passage through which any of the juices of the body flow

He also refers to a canal in an anecdote about the father of a friend of his, the classical Scholar Bennet Langton:

*He never clarified his notions by filtrating them through other minds. He had a canal upon his estate where at one place the bank was too low. – I dug the canal deeper, said he. (p542)*

Canals had already been in use in Europe for over one hundred years. In 1757 the 21 year old Duke of Bridgewater, on his Grand Tour of Europe had visited the Canal de Midi in southern France that formed a 240 km link between two rivers to join the Mediterranean and Atlantic coast, and which had been completed almost a hundred years earlier in 1661.



*The Canal de Midi in Southern France*

The Duke saw a similar canal as an ideal way to bring coal from his coalfields at Leigh, northwest of Manchester into the city. One barge, floating on water, could carry as much coal as ten horse drawn carts, and this would enable him to sell coal in Manchester for 5d per hundredweight, one third of its price if transported by land. The canal was completed to Manchester by 1765. At the same time, work was begun on an extension to the port of Liverpool, which gave access to the Atlantic. This was completed in 1776.

The original canal involved crossing the Irwell River, which was done by building an aqueduct, shown on the right.



*The Bridgewater Canal, joining Leigh with Manchester and with Liverpool*

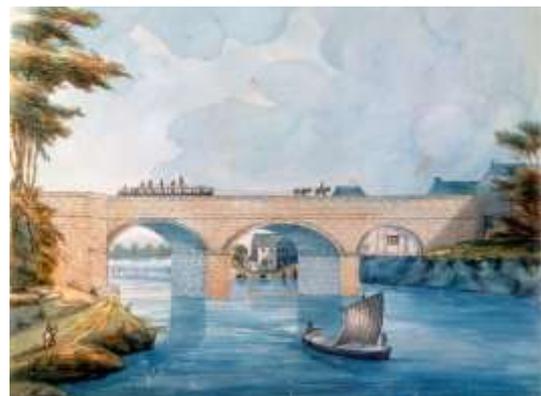
Josiah Wedgwood's pottery was located at Stoke on Trent. Shortage of coal was not a problem, as the pottery was located at a site where both fine clay and coal were available. Wedgwood's problem was that of transporting his fine porcelain; transport by cart often lead to breakages.

Wedgwood saw the advantage of a canal to carry his goods to Liverpool via the Mersey River. But he realised that he could also make a connection with the Trent River, so that pottery could then be transported right across England to Hull on the eastern coast. Work began on 26th July 1766, when Josiah Wedgwood cut the first sod of soil. James Brindley, the engineer responsible for the Bridgewater canal took it away in a wheelbarrow.

The canal was opened in 1771 and we have a letter from Samuel Johnson to Mrs Thrale dated July 3rd of that year:

*'else might relate how I crossed the Staffordshire canal, one of the great efforts of human labour, and human contrivance; which from the bridge on which I viewed it, passed away on either side, and loses itself in distant regions, uniting waters that nature had divided, and dividing lands which nature had joined.*

Notice that typical Johnson use of point-counterpoint; Uniting what had been divided i.e. joining two rivers; and dividing – by cutting the canal – what had once been whole.





## Canals and fossils

The building of canals of necessity involved making cuttings if locks were to be avoided. Cuttings opened up layers of earth and therefore strata and the fossils they contained.

William Smith (1769-1839) first worked in coal mines in Somerset and then surveyed the Somerset Canal – built to transport coal from the coal fields to major urban centres. He realised that fossils could be used to identify particular strata over long distances.

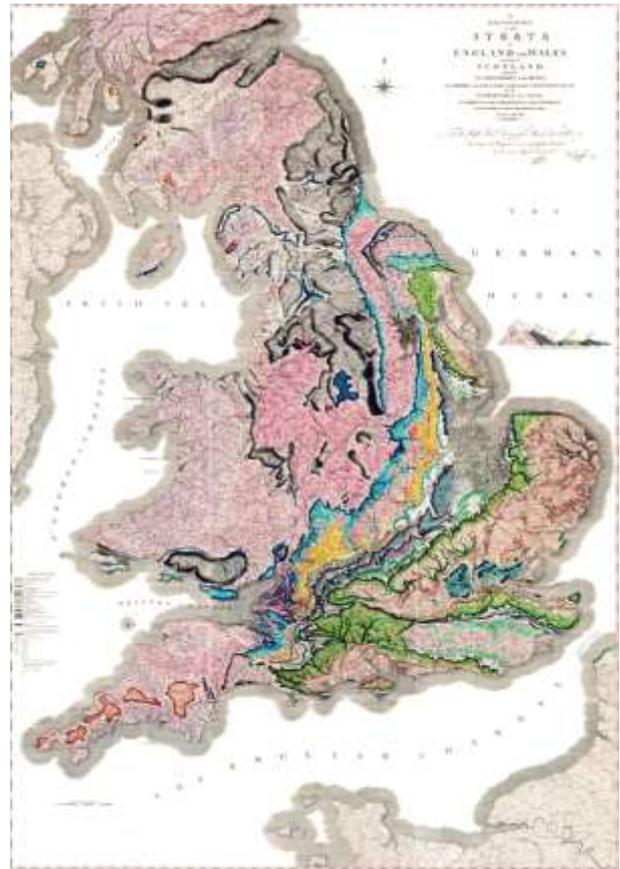
*Fossils have been long studied as great curiosities, collected with great pains, treasured with great care and at a great expense, and shown and admired with as much pleasure as a child's hobby-horse is shown and admired by himself and his playfellows, because it is pretty; and this has been done by thousands who have never paid the least regard to that wonderful order and regularity with which nature has disposed of these singular productions, and assigned to each class its peculiar stratum.*

His work on the canal finished in 1799 but he continued surveying and engineering jobs all over England and Wales, drawing and collecting fossils.

The importance of fossil evidence was that in the case, for example, of two beds of shale hundreds of kilometres apart, the presence of the same set of fossils would indicate that they were laid down at the same time. Using this evidence from across England, he 1815 he produced the first geological map of England.

The next stage was to arrange strata in a sequence and by making assumptions about the time required to form particular layers one could deduce that the earth had a far longer history than the 6000 years deduced from a literal interpretation of the Bible.

In an American Bible first published in 1872 the date of creation was given as September 1, 4004 BC and the Great Flood is dated at 2348 BC. Calculations were based on the life-spans of the characters mentioned in the Bible from Adam onwards.



This in turn gave sufficient time for natural selection to have its effects on the evolution of species.

Which neatly brings us back to Samuel Johnson and his membership, with Charles Darwin's grandfather Erasmus, of the Lunar Society.