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Staffordshire's Involvement with Genesis and Evolution: Keeping it in the family.

When Charles Darwin published the Origin of Species, 150 years ago, his work met with a very mixed reception, symbolized by the great Oxford Debate, featuring Bishop Wilberforce and Darwin's Bulldog, Thomas Huxley. (Huxley had already expressed his frustration with the Church-Moses and the Comminatory Noticeboard.) Darwin's proposals about evolution were raising acute questions about the place of a creator God and the authority of the Bible. This, of course, is well travelled ground and is a topic still debated today, particularly by the Creationists. What is less well known is that the debate had already started in the C.18th.

The C.18th. was a time of enormous intellectual ferment and, so far as England was concerned, this centred very much on Staffordshire, and on Lichfield, which, in those days, was more important than Birmingham. Lichfield was, of course, home to the great Samuel Johnson, though he spent more time in London, but, more interestingly, Erasmus Darwin, the Grandfather of Charles, lived and worked there from 1756-1781. Erasmus was at the heart of the Lunar Circle, or Society, as it later became known. A group of thinkers, experimenters and designers, who greatly influenced the Industrial Revolution, and it was, largely, as a result of his work that the debate between Genesis and Evolution was enjoined.

Erasmus Darwin lived a century earlier than his more famous Grandson, Charles Darwin. He was born in Elston, in Nottinghamshire, in 1731, went to school in Chesterfield for nine years, before studying (1750-53) in Cambridge, and then to Medical School in Edinburgh. He finally graduated from Cambridge in 1755, and started medical practice in Nottingham. However, after a few months, he moved to Lichfield (1756). Here, in Darwin House, on Beacon Street, having married Mary Howard, known as Polly, he lived and worked as a Physician, for 25 years, before moving back to Derbyshire with his second wife, Elizabeth, the widow of Colonel Pole, in 1781.

ED was the leading Physician of his day. He had a far-reaching and lucrative/successful practice, earning £1000 a year, by the late '60s, perhaps as much as £100,000 today. The King asked him to become his Physician, but he refused, preferring to stay in Lichfield caring for rich and poor alike. Accomplished medic as he undoubtedly was, there was much more to ED. He had an inquiring mind and an entrepreneurial spirit. He excelled in many fields, especially science and technology; he gave valued advice to many- on canals to Josiah Wedgwood -on tiles to Sir Harry Harpur of Calke Abbey; and he even entered business, speculating in developing mills at Wychnor and Alrewas. He was also a good poet. He had written poetry as a child and student, and woo'd both his wives using it. Later he would write his great scientific books in poetic form: poetry, which was admired by Coleridge, who called him 'the foremost literary mind in Europe'.

It was in the late '50s and '60s, Darwin began to gather round him a fascinating group of eminent thinkers. Early on, the group included the American Scientist and Politician, Benjamin Franklin, who became a mentor for him, John Whitehurst the clockmaker and Geologist, and Brindley of canal fame.. Later, stimulated by the arrival of Dr Small, from the USA, many more were added, men like Wedgwood, the Potter, Watt working away at steam, and Priestley the exciting Chemist. It was this growing circle, which became the Lunar Society, whose experiments and inventions influenced the Industrial Revolution. ED was a leading light- inventing a turning mechanism for carriages, a spoked and sprung wheel for better stability en route, and a horizontal windmill for grinding materials in Josiah Wedgwood's pottery. He explained elementary gas laws,

photosynthesis and Artesian wells. His was altogether a most impressive mind and he could well be called 'Britain's answer to Leonardo da Vinci'!

It is however his work in the Natural Sciences, which was ground-breaking and paralleled the work of his more famous Grandson, Charles. The story begins with his interest in Geology. His Father was credited with finding, in 1718, what we now know to be a Dinosaur fossil, which he presented to the Royal Society (via Wm. Stukeley). Whether this influence persisted or not, we cannot know, but early in the '60s, he became involved with Josiah Wedgwood in the building of the Grand Union Canal. (ED even advised JW on routes, tributaries and tariffs. He had a commercial eye!) and in 1767, JW sent ED a box of fossils found in the Harecastle Tunnel. In a letter of response, ED says some were relatively familiar, others were not, and he jokingly compared some of them to the bones of a Patagonian Ox! He also asked to know what strata they came from. Clearly, he knew about the growing body of geological knowledge, stemming from men like James Hutton, with whom he corresponded, and John Whitehurst, the oldest member of the Lunar Society, who worked on the geology of Derbyshire, only just over the border.

Changes in thinking were certainly afoot as may be seen from a study of Hutton, who would paved the way for Lyell and Uniformitarianism, vital to Charles Darwin's work. From our point of view, however, perhaps John Whitehurst is the more interesting. He was born in Congleton in 1713. A Clockmaker, inventor and scientist, he was, like many of his time, aware of the knowledge acquired through mining and the building of canals, and, by his own careful observation, made a substantial contribution to the growing science of geology. He described the fossils of sea creatures now extinct, speculated as to the formation and age of the earth, and believed that many rocks were formed through volcanic action bursting through growing layers of sedimentary rocks formed before the great flood. Significantly, by his own admission, he had great problems reconciling geology and his faith. His most important publication *An Inquiry into the Original State and Formation of the Earth* (1778) put forward his views, being careful not to offend in Part I, but in Part II he gave a far more scientific documentation of the Derbyshire rocks, establishing the successive strata of the Carboniferous. He describes Millstone Grit, for example, as volcanic in origin and coal as formed from vegetation. ((Erasmus Darwin was perplexed by the differences between the two parts of the book. "I own myself astonished beyond measure, he says in a letter to Thomas Bentley, at the laboured and repeated accounts to bring in and justify the mosaic account beyond all rhyme and reason".))

We may be sure that ED would have shared this sort of material and understood it, and so he must have puzzled over the presence of unrecognisable and, probably, extinct marine animals and tropical style ferns in different layers of rock in the centre of England! His perplexity in trying to understand the fossils, we may assume, sowed the seeds of his developmental/evolutionary theory. So much for Darwin's Geology, but it is clear that his study of living fauna and flora, also, moved him to greater conviction about evolution, and a reassessment of the role of God in creation.

Although The C.19th. was the period of extensive plant collection, this had begun some time before. Men like John Ray (Middleton Hall) and several on the Continent were collecting species of both fauna and flora. Joseph Banks (1743-1821) reputedly persuaded the King, George III, to support voyages to new lands so that he could indulge his passion for Botany, and he published Linnaean descriptions of the plants of Labrador and Newfoundland. He went to the South Pacific, and even found 800 new species in Australia, between 1768 and '71, the time when Erasmus Darwin was establishing his extensive Botanic Garden in Lichfield. a garden about which we know very little, but which may well have contained species from overseas. Whilst ED would have learnt from these great collectors, we know that he also had, on his bookshelves, the works of Le Comte de Buffon, another notable natural scientist, and that he was aware of the work of Linnaeus. Indeed, he would go on to translate Linnaeus, who systematised plants, showing their relationship through their reproductive parts.

The point about all this is that studying plants across the world in this way also raises acute questions about their origin. I experienced this recently in Costa Rica, where I found a small pink Mimosa, known as the tracker plant in Malaysia. How did this come to be in two such different areas? I also recently came across a series of botanical paintings by two Conyers (Matilda and Henrietta, from Essex) dating from 1752 and 1769, which show the sort of plant species that may have puzzled ED. There is one, a Bindweed, which is different from our Calystegia (pink bracteoles, for example) and has on it a Caribbean bug!

On the fauna side, he observed and recorded variation in animal life and speculated as to its significance for the **Survival of the Fittest** and the development of the species.

In the struggle to reproduce, Erasmus *observed* that all living creatures had to breed and in some species the male creature had to fight to win his mate. He *concluded* ‘The final cause of this contest among the males seems to be, that the strongest and most active animal should propagate the species, which should thence become improved’. (*Zoonomia* 1, 507, 1797)¹

In the struggle to survive, Erasmus *observed* that all living creatures have to eat, and that the various types of birds have developed different beaks, and so they do not have to compete for food.
‘Some birds have acquired harder beaks to crack nuts, as the Parrot
... Others for the softer seeds of flowers, or the buds of trees, as the finches.’
(*Zoonomia* 1, 508)

And that each has its own way of escaping or hiding.

‘Some have acquired wings instead of legs, as the smaller birds ... Others great swiftness of foot, as the Hare. Others have acquired hard shells, as the Tortoise ...’
(*Zoonomia* 1, 508, 513)

This study of natural variation and its value for survival in the living fauna and flora, and his study of fossils led him, led him to hint at the development of species, in a letter to Josiah Wedgwood in 1769, and by 1770, he had come up with the idea of evolution, seeing fossils as evidence of earlier, and generally, less complex, forms of life, and began to use a family crest of three shells with the motto ‘e conchis omnia’. Canon Seward at the Cathedral objected (of course!) and he had to remove it from public sight on his carriage, but it remained his bookplate.

Although Darwin seems then to have hit on evolution, as we now call it, by 1770, he delayed publishing his ideas, fearing that so bold an assertion would lead to ridicule, or worse, and affect his medical practice. However, it would be strange if talk of these ideas did not feature in the meetings of the Lunar Society, and it certainly infected his family, as we shall see later. Eventually, he made public his conclusion (that spontaneous generation had begun a process of development through reproduction² (?)), when he spoke about this in *Zoonomia*, published in 1794. He wrote

Organic Life beneath the shoreless waves
Was born and nurs’d in Ocean’s pearly caves;
First forms minute, unseen by spheric glass,
Move on the mud, or pierce the watery mass;
These, as successive generations bloom,
New powers acquire, and larger limbs assume;
Whence countless groups of vegetation spring,
And breathing realms of fin, and feet, and wing.

Darwin was by this time well known. His books had been translated into other languages, and the poetry in which they were written was much admired. Hence Coleridge’s reaction. But, now, the

¹ *Zoonomia*, 1794

² *Temple of Nature*, 2003 edn., line 295

honeymoon did not persist, because the idea of development through evolution, and the acceptance of the concept of extinct species, challenged the current view of creation. At that time, it was thought that the world was created by God in 4004 BC (Archbishop Usher), that every species was created by God across the world, and that the flood, perhaps about 2500 BC, had destroyed all except those saved with Noah in the Ark! To get a flavour of this traditional approach, one could look at another Staffs worthy, Dr Floyer.

Floyer offers us a glimpse of the way in which the authority of the bible record in Genesis, affected C.17th.medical practice. Dr Floyer, a Lichfield Physician, lived between 1649 and 1734. In his 'Advice to a Young Physician'³, written for his son, who sadly died in infancy, he rationalises the calling and work of a Physician, as coming from God. Disease, he says, is the result of the Fall (Genesis 3). "Death and disease arose from the poison of the forbidden fruit". When Adam and Eve ate it "the tranquillity of their minds was disturbed, and this, in time, produced diseases, which end in the dissolution of our bodies. Driven out of Eden, Adam and Eve moved into 'air more unhealthful and fruits less mature and sweet', and their descendants developed 'hatred, revenge, envy, covetousness, tyranny, impiety and lust..'. The flood, he goes on, 'further corrupted the air, made the earth less fruitful and made men's lives shorter'. So, all success in the Physician's practice depends on God, and making proper use of all that he has provided as the 'Author of Physic'.

That attitude was what Erasmus was up against, why Canon Seward criticised his public use of *e conchis omnia*, and it is the main reason why he did not publish his thoughts earlier. He did not want to hinder his successful medical practice. When he did, eventually publish, he met opposition. What happened was this.

Members of the Lunar Society were free thinking and concerned for change. Erasmus, for example, had been flirting with radical ideas and had expressed his support for the revolution in his poetic work, *The Botanic Garden*. This work, a selective encyclopaedia of science, expressed in verse and backed up by extensive scientific notes, was published in 1791. When the French Revolution began in 1789, members of the Lunar group rejoiced that at last the French might be able to enjoy the same liberties as the British. However, in their innocence, Erasmus and his Lunar friends did not appreciate how their rejoicing at the French Revolution might be perceived by their more conservative neighbours. In that same year, when the Revolution was 2 years old, a violent mob attacked the homes of several wealthy Birmingham citizens thought to be freethinkers, dissenters or supporters of the revolution. Joseph Priestley's house, library and laboratory were burnt down, and Matthew Boulton had to arm his workers to defend his Soho Works.

Darwin then became much more cautious in publishing his own opinions. He was anxious because of his medical practice, fearing to offend his more conservative patients, who were all for king and church. He realised how his support of the struggle for freedom, in France, had been mistaken as being anti-church and anti-king. However, his continued support for the French Revolution is obvious from his letters. In October 1792, he wrote to an old friend, Richard Dixon, "*the success of the French gives me great pleasure and I hope they will preserve their liberty and spread the holy flame of freedom over Europe*".

Two years later, in 1794, Britain was at war with the French; France was plunged into the bloodbath known as the reign of terror; and the British government was accusing reformers of treason, punishable by death or by transportation. Using a magazine called 'The Anti Jacobin' the government launched a vicious attack, which cast doubt on his thinking and wounded Darwin deeply. He did not see himself as a revolutionary but as a believer in freedom. However, his views on the natural world, coupled with his revolutionary tendencies and radicalism, associated with the Lunar society, led to his being less popular and esteemed than his genius merited, and accounts for the fact that he was not well remembered.

Before leaving this account of Staffordshire's and Erasmus Darwin's contribution to evolution, we should look at his religious views, not only because he was anxious not to offend his contemporaries but because they are not

³ Advice to a Young Physician by Sir John Floyer, ed. Gibbs and Wilson 2007

dissimilar to those of Charles. It is worth recognising that Erasmus did not dispense with a ‘creator God’, but, in *Temple of Nature*, spoke of “God the First Cause!- in this terrene abode.”⁴, and described creation in the following way:

Nymphs of Primeval Fire! Your vestal train
Hung with gold-tresses o’er the vast inane,
Pierced with your silver shafts the throne of Night,
And charm’d young Nature’s opening eyes with light;
When LOVE DIVINE, with brooding wings unfurl’d,
Call’d from the rude abyss the living world.
‘Let there be light!’ proclaim’d THE ALMIGHTY LORD.
Astonish’d Chaos heard the potent word;-
Through all his realms the kindling Ether runs,
And the mass starts into a million suns;
Earths round each sun with quick explosions burst,
And second planets issue from the first;
Bend, as they journey with projectile force,
In bright ellipses their reluctant course;
Orbs wheel in orbs, round centres centres roll,
And form, self-balanced, one revolving Whole.
-Onward they move amid their bright abode,
Space without bound, THE BOSOM OF THEIR GOD

It’s the ‘Big Bang’ theory!, but, at its heart, is the notion of a creator God, to whom he refers, touchingly, from the Christian’s point of view, in a footnote recalling St. Paul saying to the Athenians, on the Areopagus “In Him we live, and move, and have our being” (Acts 17.28). There can be little doubt that, for all his scientific rigour and challenging conclusions about the process of life, he retains a living faith in a creator God. His theistic references do not stop there. On the opening page of *Zoonomia* he writes:

‘The great CREATOR of all things has stamped a certain similitude on the features of nature, that demonstrates to us that the whole is one family of one parent.’

And in a long footnote, in the *Temple of Nature*,⁵ having cited others, who had, also, spoken of progressive development, he writes:

Perhaps all the productions of nature are in their progress to greater perfection! an idea countenanced by modern discoveries and deductions concerning the progressive formation of the solid parts of the terraqueous globe, and consonant to the dignity of the creator of all things.

(One cannot doubt his theism and this is confirmed, possibly, by another saying. In his biography of his grandfather, Charles Darwin cites an ode written, earlier, by Erasmus, which ridicules Atheism.⁶ “Dull Atheist, he says, could a giddy dance of atoms, lawlessly hurled, construct so wonderful, so wise, so harmonised a world?”) There can be little doubt that, for all his scientific rigour and challenging conclusions about the process of life, he retains a living faith in a creator God, even if, as he said to Thomas Oakes in a letter in 1754, he doubted that ‘that he influences things by a particular providence’.⁷

⁴ Ibid, line 223, compare the opening lines of canto 1: By firm immutable immortal laws
impress’d on nature by the GREAT FIRST CAUSE.

⁵ Op. cit., footnote to line 122

⁶ *Charles Darwin’s The life of Erasmus Darwin*, edited by Desmond King-Hele, 2003, p.62

⁷ Collected Letters DKH 2007 54.4 p.22

However, although he seems to have retained faith in a living God, and even given God a role in creation, it is difficult to find any evidence that he grappled, directly, with the problems raised for biblical authority by evolutionary thought. Others of this time do evidence that they realised what was going on. Josiah Wedgwood, on reading Whitehurst's publications on Derbyshire's geology, recognised the problem. He was perplexed by the differences between the two parts of the book. "I own myself astonished beyond measure, he says in a letter to Thomas Bentley, at the laboured and repeated accounts to bring in and justify the mosaic account beyond all rhyme and reason". Another was James Hutton, who certainly abandoned, explicitly, the timescale of Genesis, whilst Buffon wrote about the longevity of the earth, but did not abandon Genesis, referring to his own writings as speculation. There was, obviously, a reticence, which we have seen in ED, for challenging tradition and authority! As we advance into the C.19th. the evidence for the longevity of the earth forces people to grapple with the six days and the flood. The flood was credited by some with producing the fossils: some spoke of the biblical flood as the last of a series, even seeing each day of creation as an era after which the creative fiat was uttered again; Figuier, in 1763, suggested that the biblical flood was localised (Asiatic); and later John Goss argued that God might have placed the fossils in rocks to fool mankind and suggested they were prochronic, (the omphalos theory). Evolution was more or less accommodated but the genesis account and the role of God remained sacrosanct.

Staffordshire and ED made a substantial contribution on the evolution front, during the C.18th. and the battle lines were drawn, but Darwin's direct influence on C.19th evolutionary thinking was negligible, because he fell from favour. However he may have had more impact than we imagine and he has been given credit for.

CD himself records that he read *Zoonomia*. In his autobiography, Charles records "I listened in astonishment (to a lecture on evolution by Dr Robert Grant at Edinburgh), and as far as I can judge, without any affect on my mind. I had previously read the *Zoonomia* (1794) of my grandfather in which similar views are maintained, but without producing any effect on me. Nevertheless it is probable that the hearing rather early in life such views maintained and praised may have favoured my upholding them under a different form in my *Origin of Species*. At this time I admired greatly the *Zoonomia* ..."⁸

This is fairly dismissive of his Grandfather's influence, however, in the full edition of his biography of his Grandfather, he pays far more tribute to the way in which he feels he was influenced by the great man.⁹ First he speaks about the family heritage, recording that three sons survived from the five children his Grandfather had with Polly. Charles, who died from infection dissecting in Edinburgh was a collector and experimented with machines. He was also a poet and keen on science. Erasmus, a Lawyer like his Grandfather and Uncles, drowned at 40. Like his father, he wrote poetry. He also collected coins and was keen on statistics. Erasmus' other surviving son, Robert became a Doctor in Shrewsbury. Although his son, Charles, records that he was not much of a scientist, it is known that he believed in evolution, and retained the use of his father's bookplate 'e conchis omnia'. (Robert, of course, married the daughter of Erasmus Senior's good friend, Josiah Wedgwood, and Charles Darwin was the result! (Charles Darwin, incidentally, married his cousin, his father's niece!))

The biography was published in 1879, but, interestingly, the edition was 16% shorter than the original draft, recently published by DKH. This was because his daughter edited it and cut out several passages some of which reflected well on Erasmus and, she may have thought, would detract from Charles' glory! One of these is interesting.

As we have been considering how much or how little the same tastes and dispositions prevail in the same family, I may be permitted to add that from my earliest days I had the strongest desire to

⁸ Charles Darwin, *Autobiography* (ed. N.Barlow) 1958 p.49

⁹ Charles Darwin's *The Life of Erasmus Darwin, 1887*, edited by Desmond King-Hele, 2003

*collect objects of natural history; and this was certainly innate or spontaneous, being probably inherited from my grandfather. Some of my sons have inherited the same innate taste for science.*¹⁰

In a further expurgated passage, he pays handsome tribute to his Grandfather:

Quote: n 88/9?

He may have hoped that 'no such calumny prevails' but, of course, there was the Oxford Debate and the tension between Genesis and Geology has continued, even if CD's work has been largely accepted. Even today, the Creationists are adamant that God was directly involved in each creation, and seek to maintain the truth of the Genesis account. This could lead us to glance briefly at our own James Bateman.

Bateman was an accomplished scientist, studying Botany and Geology in his day. Born in 1812, he moved to Biddulph Grange in 1840, and established the extensive gardens. In the following decade, he built the gallery (as an entrance), in which he portrayed and celebrated the creation of God, as it is recorded in Genesis.

James Bateman, then, was very firmly, as were the majority of his peers, tied to a doctrine of creation, based on the Genesis narrative, with its 6 day timescale and sequence of 'events' occurring around 6004, and to the immutability of species, which were all seen as divine creations, which had survived with Noah and his family.

From an early age he was fascinated by plants, and collected widely, in particular developing a fine collection of Orchids. He supplied Charles Darwin with specimens, helping him with their names, material which CD found helpful in developing his ideas about evolution, and yet, in 1874, in his Preface to his monograph of *Odontoglossae*, he challenges CD's use of this material to argue for the development of species rather than special creation. He wishes, of course, as an Evangelical Christian, to retain his hold on the biblically based doctrine of a creator God involved in the origination of all fauna and flora. CD did not, of course, feel any such obligation, and nor had many who had preceded him in the C.18th and C.19th., amongst whom, of course, was Erasmus Darwin. So, in his Introduction to *Monograph of Odontoglossi* published in 1874, James Bateman challenges Darwin's use of the variation amongst orchids to support his evolutionary theory of the progressive development of species.

'Not only is the theory in question utterly rejected by Professor Reichenbach, the *facile princeps* of living orchidists, but the greater our knowledge of the order, the less countenance does it seem to yield to the Darwinian view.' He continues 'the marvellous and inexhaustible variety of form (in the Order is not) due to its ancient lineage, nor yet to the vast periods through which endless transformations are assumed to have been continually taking place, because (and this is where he betrays his biblical credentials) Orchids- according to geologic reckoning- are but a thing of yesterday, and have never been found in the fossil state. Yet their constant companions the Ferns trace their pedigree to the earliest vegetation of the primaeval world! To the believer (and here he reveals his true colours!) this problem is not hard to solve. Ferns and other flowerless plants came early in the Divine programme, because the coal, into which they were to be ultimately converted, had need to be long accumulating for the future comfort and civilization of our race; while the genesis of Orchids was postponed until the time drew near when Man, who was to be soothed by the gentle influence of their beauty, or charmed by the marvellous variety of their structure, was about to appear on the scene'

No wonder, then that James Bateman set out to demonstrate a process of creation, which accorded with the seven days of Genesis and yet also accorded with the geological record. By associating the

¹⁰ P.16

sequenced rock strata and selected fossils with the six days of God's creative activity, each of which he was ready to allow spanned a considerable period of time, Bateman, not only satisfied his scientific and biblical understanding of the truth, he also made a positive statement about the process of Divine creation, which could be followed by others and thus, in a way, must be judged to be a fine Apologist for the faith of the Church.

In conclusion, Staffs can be proud of its contribution to the development of evolutionary thought, and even if one cannot claim direct influence on the thinking of Charles by Erasmus, relish the thought that he acknowledged the great family influence. Surely Erasmus Darwin played a significant part in preparing the ground for the Origin of Species, evolution and Darwinism today.

This concludes my rather rapid survey of Staffordshire's involvement with Genesis and evolution, but I do have a footnote for you.

I have focussed on Dr Floyer as a C.17th. medic, but in Lichfield Cathedral library, there is a mss. entitled 'Floyer's Receipts', which contains a 'veterinary section'! Some examples:

To scour a Dog

'Take a handfull of Groundsel, boil it in milk and give the milk to the dog, it seems to scour and cure of sickness.'

For Trotts in the Belly

'Take 1 handfull of white salt and 1 quart of fair water. Give it to your horse and ride him 1 hour very temperately.'

Godwin's Powder to purge a horse.

'Take anis seeds, cumin seeds, long pepper , tumerick ... Tobacco, Licoris and bay ..berries and grams of Brimstone. Beat all to form a powder- keep it close in a bladder. When you use it, take a quart of ale, scalding hot and put in a spoonful of the powder and ½ tsp of diapsids. Give it to your horse, after blood letting and a mash after it.' Father Archbold

To make a horse's hoofs tough

Turpentine, hogs graw and beeswax, honey boiled together to make an ointment. Works in 2 or 3 weeks.