

Deep time in 18th century France—part 2: influence upon geology and evolution in 18th and 19th century Britain

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The first part to this paper showed how, in 18th century France, the influence of non-scientific factors encouraged belief in deep time and a rejection of the Noahic deluge. There was a prior commitment, through Cartesian methodology, to remove the testimony of Scripture from science, and to prefer fallible human inductive inferences. There was also misrepresentation of the geological evidence where it supported Scripture; a growing preference for deep time and evolution, that partly stemmed from Eastern religions; and growing political agitation for revolution. This paper discusses, albeit briefly, how these influences from France shaped beliefs in Britain during the 18th century, specifically through the work of David Hume, Erasmus Darwin and James Hutton. Then it will be considered how these 18th century beliefs were re-shaped by Charles Lyell and Charles Darwin for 19th century consumption. The link to France was seemingly written out of the narrative, and the overt paganism was removed, while retaining the flawed naturalistic methodology that arbitrarily rejected biblical testimony. As part of this process a slow and silent attack was used against Christianity to avoid causing open offence, that is until after the publication of Darwin's *Origins*.

As discussed in part 1, through the early 18th century in France a belief in deep time gradually developed amongst parts of elite French society, and this fed into the belief that an evolutionary process had shaped life on Earth.¹ This development has been described by Lovejoy as the ‘temporalization’ of the Aristotelian concept of a Great Chain of Being.² It became more pronounced in the middle and latter part of the 18th century. With the placement of this chain within the context of deep time, acceptance of a directly created and designed hierarchical order was undermined. Lovejoy suggests Buffon, Diderot, and Jean Baptiste Robinet³ were major contributors to this change in France, but evidence presented in part 1 shows it extended back to Fontenelle and De Maillet.

The thinking of French academics encroached into the work of British men such as David Hume, James Hutton, and Erasmus Darwin. Reed comments that in the late 18th century the leading naturalists and proponents of deep time were French, but following the disruption of the French Revolution and Napoleonic wars the sphere of influence transferred to Britain.⁴ However, the debt to French academics was downplayed by Lyell and Darwin in 19th century Britain. This may have been partly for reasons of national prestige and pride, but there was also fear in the establishment of the revolution taking hold in Britain.⁵

The influence of Jesuits was briefly discussed in part 1. They were accused by well-regarded academics such as Pascal of the error of casuistry: effectively a system of

ethics that allowed the setting aside of the law in some cases. From this, it was noted that *some* Jesuit-trained academics deceitfully undermined the Creation and Flood accounts, possibly as an attack on the Protestant Reformation, but full motivation remains unclear. There is insufficient space to discuss it further here. This paper will first focus on the French influence upon David Hume, Erasmus Darwin, and James Hutton in the 18th century, and then look at the influence of Charles Lyell and Charles Darwin in the 19th century.

David Hume

David Hume (1711–1776) is not explicitly connected to the rise of belief in deep time and evolution in 18th century France, but the link is there (figure 1). He was central to the Scottish Enlightenment and wrote against miracles and the design argument.⁶ The well-connected Hume attended Edinburgh University at a young age, studying Roman authors such as Virgil and Cicero.⁷ In his early twenties he travelled to Paris and Reims, and later resided at the Jesuit Royal College of La Flèche for two years (1735–1737) conversing with the tutors, evidently as their guest. This was the same school that Descartes had attended. It was during this time that he may have come into contact with the Eastern beliefs of Hinduism and Buddhism, for instance through Jesuit missionaries such as Ippolito Desideri and Charles Francois Dolu. Alison Gopnick has noted similarity between

parts of Hume’s *Treatise of Human Nature*, which was written during this period, and the beliefs of Buddhism.⁸ However, it has also been suggested that Hume might have gained knowledge of Eastern religions through the *Dictionnaire Historique et Critique* of Pierre Bayle (a Jesuit-educated French academic) and perhaps also through the influence of Sextus Empiricus’s (AD 160–210) *Outlines of Pyrrhonism*.⁹ Pyrrho is believed to have travelled to India with Alexander the Great and catalogued the beliefs of Eastern religions. His work is now mainly known through the text of Sextus Empiricus, which was widely read during the early modern period by Western academics.

So, Eastern religious beliefs may have become entwined into Hume’s thinking during his stay in France. The Buddhist influence is noted by Gopnick in Hume’s attempt to reject the self, thus going further than Descartes’ philosophy which had made the self the foundation of knowledge.⁸ Furthermore, in later years, through his posthumously published *Dialogues Concerning Natural Religion*, Hume referenced the beliefs of Hinduism as well as Greek paganism to challenge the design argument. This work is written in the form of a dialogue between three characters: Demea, Cleanthes, and Philo.

“The world, say I [Hume’s character Philo], resembles an animal; therefore it is an animal, therefore it arose from generation. ... Hesiod, and all the ancient mythologists were so struck with this analogy, that they universally explained the origin of nature from an animal birth and copulation. Plato too, so far as he is intelligible, seems to have adopted some such notion

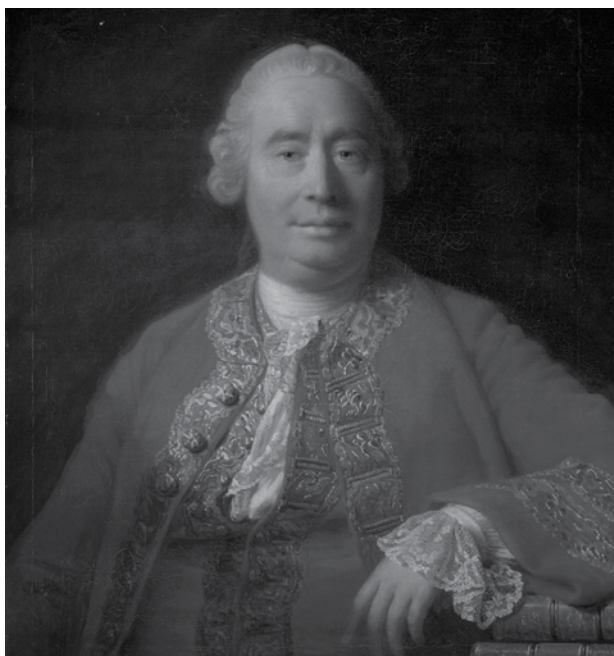


Figure 1. David Hume, 1711–1776. Historian and philosopher. Painting by Allan Ramsay, 1766.



Figure 2. Erasmus Darwin, about 1793. Oil painting by Joseph Wright of Derby, located in Derby Museum and Art Gallery.

in his *TIMAEUS*.

“The Brahmins assert that the world arose from an infinite spider, who spun this whole complicated mass from its bowels, and annihilates afterwards the whole part of it, by absorbing it again, and resolving it into its own essence.”¹⁰

Hume’s allusion here to Hindu beliefs suggests he believed in changes over millions or billions of years, or even to an eternal cyclical cosmology. However, scholars still debate Hume’s actual position in the *Dialogues*, and generally see him as skeptical of religion and the design argument in general. But it is notable that Erasmus Darwin, a close acquaintance of Hume, thought the position outlined in part VII of the *Dialogues* (partially quoted above) was Hume’s real belief. If so, Hume was arguing for an esoteric power of generation. Erasmus Darwin comments:

“The late Mr. David Hume, in his posthumous works, [*Dialogues*] places the powers of generation much above those of our boasted reason; and adds, that reason can only make a machine, as a clock or a ship, but the power of generation makes the maker of the machine, and probably from having observed, that the greatest part of the earth has been formed out of organic recrements ... he concludes that the world itself might have been generated, rather than created; that is, it might have been gradually produced from very small beginnings, increasing by the activity of its inherent principles, rather than by a sudden evolution of the whole by the Almighty fiat.”¹¹



Figure 3. Erasmus Darwin's coat of arms

Hume returned to Paris as the secretary to the British Embassy between 1763 and 1765, and then accompanied the exiled French–Swiss political philosopher Jean-Jacques Rousseau (1712–1778) back to England, where Rousseau later became acquainted with Erasmus Darwin.¹² Rousseau was also a close friend of the atheist Diderot and wrote for his *Encyclopédie*, and his writing was also an influence upon French revolutionary Jacobins such as Robespierre.

Erasmus Darwin

Erasmus Darwin (1731–1802; figure 2) expressed his belief in deep time extending over millions of years, and a form of evolution, in his written works: for instance, *The Temple of Nature*, *The Botanic Garden*, and *Zoonomia*. Mention of millions of years in Erasmus Darwin's works appears in the Philosophical Notes to *The Botanic Garden* (1791). He commented at some length on the changing nature of the earth's rock layers and formations: "extensive beds of clay, marl, sand-stone, coal, and iron, which were probably for many millions of years the only parts of our continent and islands, which were then elevated above the level of the sea".¹³

He was also an open advocate of the pagan beliefs of ancient Greece and Rome, was a leading Freemason, and used Rosicrucian imagery.¹⁴ In *Zoonomia*, first published in 1794, he spoke of the "magnificent idea of the infinite power of THE GREAT ARCHITECT! THE CAUSE OF CAUSES!"¹⁵ and asked whether it would

"... be too bold to imagine, that in the great length of time, since the earth began to exist, perhaps millions of ages before the commencement of the history of mankind, would it be too bold to imagine, that all warm-blooded animals have arisen from one living filament, which THE GREAT FIRST CAUSE endued with animality..."¹⁶

Such statements in his works relating to millions of ages and the deity of freemasonry seem to echo Voltaire's earlier reference to the Great Architect, and millions of years of change: "Revolutions of thousands of millions of years are infinitely less in the light of the Great Architect of Nature, than to us that of a wheel which compleats [sic] its round in the twinkling of an eye."¹⁷

In Hume and Erasmus Darwin's thinking there was evidently an understanding regarding evolution that stemmed from ancient paganism. Darwin's family motto was *E Conchis Omnia*, meaning "everything from shells", and he used the image of a scallop shell on the family crest, for a time painted on his carriage (figure 3).¹⁸ In Greek mythology, Aphrodite, the goddess of love (the Roman Venus), was often depicted riding the ocean upon a scallop shell (and also in Renaissance art—figure 4). While in Hesiod's *Theogony*, which Hume referenced in *Dialogues*, Cronos (sometimes considered synonymous with Chronos, the god of time) castrated his father Uranus, the god of the sky, and threw the members into the sea. After a long period of time a foam formed around them and within grew the beautiful goddess Aphrodite, who eventually floated to Cyprus:

"And so soon as he had cut off the members with flint and cast them from the land into the surging sea, they were swept away over the main a long time: and a white foam spread around them from the immortal flesh, and in it there grew a maiden. First she drew near holy Cythera, and from there, afterwards, she came to sea-girt Cyprus, and came forth an awful and lovely goddess."¹⁹

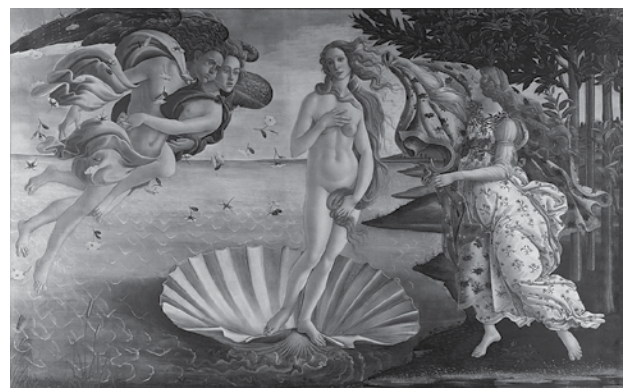


Figure 4. Sandro Botticelli, *The Birth of Venus*, 1484–1485. Erasmus Darwin later saw the birth and beauty of Venus as an allegory for evolution.

In *The Temple of Nature*, Erasmus Darwin spoke of the goddess Venus in terms of an allegory for evolution: “Amazed the Sea’s prolific depths I view, And VENUS rising from the waves in YOU! . . . Her beaux and beauties, butterflies and worms, Rise from aquatic to aerial forms.” In the footnote there is the comment: “Venus seems to have represented the beauty of organic Nature rising from the sea”²⁰ So, it may be seen that Erasmus Darwin read Venus/Aphrodite as an allegory for evolution occurring as a result of generating powers, and a similar view may have been held by Hume. These generating powers were deep time, sexual desire, and chaotic forces (effectively natural selection, but guided by an impersonal esoteric force in nature).²¹ The beautiful goddess was said to have risen out of the foam, and ridden the chaotic waves over extended periods of time. Charles Darwin (1809–1882) later developed the ideas in *Zoonomia* along more Epicurean lines, removing the overt paganism of his grandfather. But there was a commitment to long ages before any real scientific justification was available, and this passed primarily through earlier French sources. Charles Darwin seems to have borrowed heavily from *Zoonomia*.²²

As well as influence from Hume and Voltaire, Erasmus Darwin was evidently influenced by various geological theories that came out of France in the preceding decades, in the first instance through the work of Buffon. Copies of Buffon’s works were in Erasmus Darwin’s possession,²³ and he quoted him several times in his writing; for instance, in *The Botanic Garden* he discussed Buffon’s theory of the origin of the solar system.²⁴ However, Buffon was reticent to speak publicly of his belief in long ages beyond tens of thousands of years. On the other hand, Diderot was perhaps one of the first French authors to speak openly (in the middle of the 18th century) of evolutionary change occurring over millions of years, and blended this with his political beliefs. Diderot was also an influence upon Erasmus Darwin’s thinking, as Margaret Jourdain for instance has suggested.²⁵ In 1754, in *Thoughts on the Interpretation of Nature*, Diderot wrote:

“... might not the philosopher, left to his own thoughts [without religious instruction], suspect that animality had its elements from all eternity mixed up and dispersed in the mass of matter; that these elements happen to encounter one another ... [and] that millions of years passed between each of these stages ...?”²⁶

The other link to France in Erasmus Darwin’s thinking, albeit indirectly, was through James Hutton. Erasmus Darwin expressed some qualified support to Hutton’s scientific work, calling it ‘ingenious’. He understood that Hutton’s *Theory of the Earth* advocated an eternal universe: “according to the ingenious theory of Dr Hutton, who says new continents are now forming at the bottom of the sea to rise in their turn, and that thus the terraqueous globe has been, and will be,

eternal?”²⁷ Erasmus Darwin also discussed the idea of a receding ocean, as well as the emerging land mass: “by these means the solid part of the terraqueous globe has perpetually been in an increasing state, and the waters perpetually in a decreasing one”.²⁸

With the onset of revolution in France, those closely associated with the French thinkers in Britain were suddenly under suspicion. Some were arrested and imprisoned, although Erasmus Darwin only felt the force of state-sanctioned mockery through the short-lived *Anti-Jacobin* publication of 1797–1798, founded by Tory Government Minister George Canning.

James Hutton

James Hutton (1726–1797) was well connected to the thinking of 18th century French naturalists, and he acknowledges some of it in his writing (figure 5). He was present in Paris at the *Collège de Sorbonne* to pursue his medical studies in the year that De Maillet’s work was published (1748). His Parisian studies in medicine included chemistry and anatomy, and Dean suggests that he may have attended the lectures of Guillaume-François Rouelle, that also covered geology. Rouelle was the foremost authority on chemistry in Paris at the time, having gained the position of *démonstrateur* at the prestigious *Jardin du Roi* (later *Jardin des Plantes*) in 1743, this through the recommendation of Buffon.²⁹ The *Jardin du Roi* was established in part to collect and study herbs for medicinal purposes, but branched out

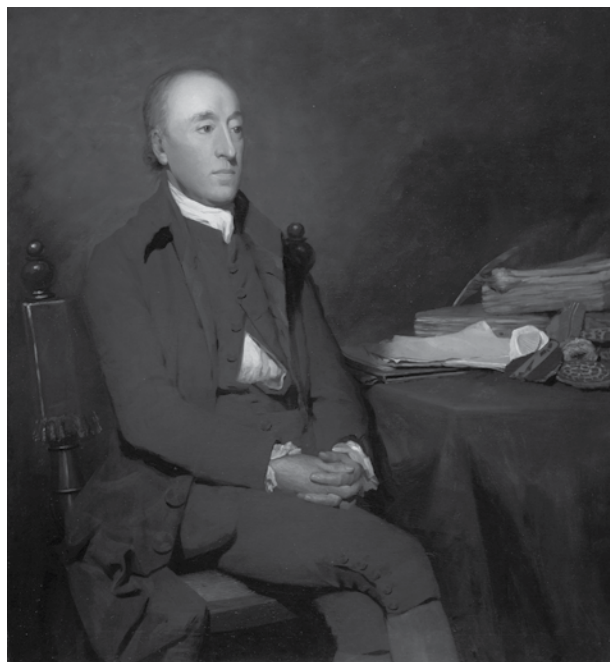


Figure 5. James Hutton, 1726–1797. Geologist, by Henry Raeburn, 1776.

to include research into chemical compounds, which led to studies in geological strata. As well as research, Rouelle's role as *démonstrateur* included practical and colourful demonstrations of chemistry, and these were popular and well attended by Parisian students. Geikie relates the revelation of Rouelle's student Nicholas Desmarest (1725–1815) who attended his mentor's classes. From this position Rouelle would inform the students of the systematic nature of the fossil record, wherein fossil shells were often found organised in the strata. His opinion was that such evidence could not have been laid down by a violent deluge such as Noah's Flood, echoing the earlier opinion of Fontenelle and Buffon.³⁰ By spending a couple of years in Europe, including time at college in Paris, Hutton had ample opportunity to acquaint himself with the latest views of the fossil record amongst French academics.

It is notable that Desmarest was a student of Rouelle in Paris around the period 1746 to 1748, and may have been acquainted with Hutton. Desmarest later studied the basalt formations in the Auvergne region of France in 1763 and compared them to the Giant's Causeway of Ireland. But although he recognised the influence of volcanism in shaping the landform he was also strongly influenced by Rouelle's flood theory for the formation of the sedimentary layers identified in France. Therefore, he considered that the power of volcanism to shape landforms was limited. Desmarest's studies also led to consideration of the erosive power of water upon the valleys of Auvergne over extended periods of time, and he speculated on rate uniformity. His research was published in several papers between 1765 and 1775.³¹

The geologists Hutton referenced in his works of 1788 and 1795 were primarily French, or French-speaking, and he quoted them at some length in their native language.³² This included Jean-André Deluc, and the Chevalier Déodat de Dolomieu who observed different forms of volcanic lava around Etna and the Lipari Islands (although he did not attempt to form it into a general theory). The other notable reference was to the French-Swiss Horace-Bénédict de Saussure and his work *Voyage dans les Alpes*. Saussure referenced the geology of the Alps in order to develop a general theory of the earth and accepted successive catastrophes over extended periods of time, primarily involving the action of water.³³ While in Paris, Saussure had opportunity to discuss geology with Buffon and Desmarest.³⁴

The influence of the French geologists was clearly evident in Hutton's thinking. But unlike their belief that an erosive ocean had shaped the earth's surface, Hutton included a general restoring force in his theory. This was seen in terms of a machine and as a 'reproductive operation' from pressure and volcanic heat. Internal forces then were considered necessary to lift the earth's surface above sea level to counter the erosional work of water upon the landforms. In this

way he attempted to develop his own general theory of the earth.³⁵ Rudwick observes that Hutton was more of a geo-theorist than some of the French academics, and only after presenting his theory did Hutton attempt to justify it from observations.³⁶ Hutton's work differed somewhat from Buffon's ideas even though both involved the action of heat and water.³⁷ However, Hutton's work was not without criticism. His extension of the power of heat to sedimentary rock formation such as limestone was widely questioned, not least because it was known through the industrial use of limekilns that excessive heat made limestone sufficiently brittle to form it into cement.³⁸

Like the French deists, Hutton saw in nature the work of an intelligent agent, and also believed that geological formations were evidence of the great age of the earth. While allowing that Moses may have recorded the origin of mankind in his 1788 paper, he thought the fossil record provided evidence of a much greater history: "We find in natural history monuments which prove that those animals had long existed."³⁹ And from the study of natural processes he thought it possible to "procure a measure for the computation of a period of time extremely remote, though far from being precisely ascertained".³⁹ Playfair, Hutton's interpreter, used Buffon's expression of an abyss of time to describe the length of time believed necessary for geological change to occur.⁴⁰ However, as Rudwick documents, it was generally recognised that Hutton was advocating an eternity of time in which the earth's surface might be changed.⁴¹ But at the same time, he was skeptical of calculating uniform rates because he thought the processes were acting too slowly. Without human written documentation over "millions ... of the races of men", reliance may only be placed upon inductive reasoning and scientific laws that are applied to the evidence.⁴² Hutton compared the problem with an attempt to measure distant objects in space without a parallax.⁴³

Hutton's work was later interpreted by Playfair; the excuse being to make Hutton's verbose work, which contained pages of notes in French, more readable. However, Rudwick suggests that Playfair effectively misrepresented Hutton's work by removing it from its deistic framework and sidelining the teleology, the purpose being to present it in a way that 19th century natural scientists could accept.⁴⁴

Charles Lyell and Charles Darwin

Charles Lyell (1797–1875) further promoted and extended the work of James Hutton, but downplayed the French connection (figure 6). Gould comments that Lyell was rewriting geological history, and prejudice meant that the influence of the French geologists was hidden in order to establish a British hero. Furthermore, the reconstructed historical narrative that Lyell wanted to portray was that

Hutton's gradual processes were accepted on the basis of empirical evidence against the untested theories of the hard-fighting catastrophists. Gould suggests this was "one of the most flagrant mischaracterizations ever perpetrated by the heroic tradition in the history of science".⁴⁵

Lyell was also evidently seeking to "free the science [of geology] from Moses"⁴⁶ but was doing so in a disguised manner. As Grinnell has suggested, there was a subtle, political attack on the Anglican establishment and the monarchical theory of government by a group of liberal academics and scientists. This liberal cause acted in a similar fashion to the one enacted in France against the Royal establishment, but in a more subtle manner to avoid the charge of sedition and revolution.⁴⁷ In private correspondence Lyell suggested that if triumphalism could be avoided, and charm and liberal compliments were used, it would be possible to get the "bishops and enlightened saints" to "join us in despising both the ancient and modern physico-theologians"⁴⁶ (i.e. those who were arguing that the geological evidence confirmed the Bible's account of Noah's Flood).⁴⁸ And yet his wider aims were hidden from view for a period of several decades.

"If I have said more than some will like, yet I give you my word that full *half* of my history and comments was cut out, and even many facts; because either I, or Stokes, or Broderip, felt that it was anticipating twenty or thirty years of the march of honest feeling to declare it undisguisedly. ... P.S. ... I conceived the idea five or six years ago that if ever the mosaic geology could be set down without giving offence, it would be in an historic sketch."⁴⁶

Evidence from private correspondence shows that Lyell included Charles Darwin (figure 7) in the deceitful plan of action to undermine biblical faith in Britain. While in early years Lyell did not openly accept evolution, he encouraged Darwin to write his work over a couple of decades and was only one of a few who knew of Darwin's plans initially. In a letter in 1836, the young Darwin seemed flattered that "Lyell entered in the *most* good natured manner, and almost without being asked, into my plans."⁴⁹ Lyell helped to direct the young Darwin's plans, and they put them into practice through a slow and silent attack upon Christianity, as Voltaire and other revolutionaries had done more forcefully in 18th century France. Like Voltaire, Lyell, and perhaps Darwin, were Unitarian deists, and hostile to the authority of the Anglican establishment in matters of science as well as faith. They wished to remove this influence from science. Darwin confesses his part in the plan in private correspondence in 1873:

"Lyell is most firmly convinced that he has shaken the faith in the Deluge ... far more efficiently by never having said a word against the Bible, than if he had acted otherwise. P.S. ... I have lately read Morley's



Figure 6. Portrait of Charles Lyell, date unknown, by George J. Stodart

Life of Voltaire & he insists strongly that direct attacks on Christianity (even when written with the wonderful force & vigour of Voltaire) produce little permanent effect: real good seems only to follow from slow & silent side attacks."⁵⁰

In Morley's biography of Voltaire, the French academic is praised for quick wit, intelligence and charm, but notes that his followers were careful in what they said for the purpose of promoting heterodox ideas slowly in a rather devious manner. "The strain that society has undergone since Voltaire's day has taught men to qualify their propositions. It has forced them to follow truth slowly along paths steep and devious."⁵¹ Lyell was also clearly aware of the deceit in Voltaire's work, and observed that he was acting with "bad faith" in order to "inculcate scepticism" and "strengthen prejudices" towards Christianity.⁵² So, there is documented evidence that Lyell and Darwin were working in secret over many years to undermine and remove the scriptural account of creation from science (and incidentally, like Voltaire, it is notable that Lyell was also willing to write about the beliefs of the 'Hindoos' and ancient Egyptians with more sympathy than towards the Old Testament).⁵³

Lyell's overconfidence also ran into Hume's problem of induction. It was openly stated in the subtitle of his *Principles of Geology as An attempt to explain the former changes of the earth's surface by reference to causes now in operation*. Hume had earlier recognized that "all inferences from experience suppose, as their foundation, that the

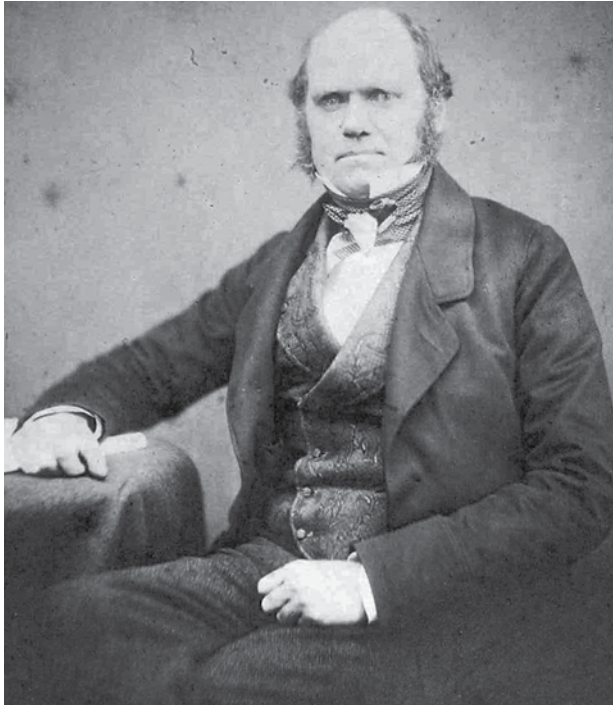


Figure 7. Photograph of Charles Darwin, 1855, by Maull and Polyblank—for Literary and Scientific Portrait Club

future will resemble the past”.⁵⁴ And as Hutton knew, all attempts at measuring the age of geological processes are like measuring distance in space without a parallax.⁵⁵ But Lyell ignored this, as did Darwin in later years. In the first edition of *Origins*, Darwin unwisely attempted to make a rough estimation for the age of the Weald in Southern England. He suggested that it would have taken 100 to 300 million years for erosion by river flow to denude the valley, although this estimate was later withdrawn.⁵⁶ Samuel Wilberforce criticized the estimation on the basis that Darwin was trying to hold together two mutually exclusive arguments: like Lyell, Darwin argued for the “extreme imperfection of the geological record” to account for missing evidence when it suited his cause, and yet at the same time was attempting to apply uniformity of rate over hundreds of millions of years.⁵⁷

Darwin's List

After Darwin's first edition of *Origin of Species* was published, he came under pressure to give credit to predecessors. For instance criticism came from the Rev. Baden Powell that there was insufficient acknowledgement given to previous researchers. Darwin felt under obligation to comply, and Rebecca Stott has highlighted the growing list of evolutionists that Darwin put together.⁵⁸ He included 'Demaillet' in the first list of 19 authors, alongside Aristotle, Buffon, Lamarck, and Geoffrey Saint Hilaire from 18th and

early 19th century France. This appeared in the Preface of the first American edition of *Origins* (1860).⁵⁹ He was also keen to show that his work was not overly influenced by French revolutionaries and the list grew to include others from Britain and Europe, including his grandfather. However, in 1860 Richard Owen criticized Darwin by comparing his 'imaginative temperament' to that of De Maillet (who had suggested that human beings may have evolved from mermen and mermaids).⁶⁰ The Preface reference to De Maillet was then removed and did not appear in subsequent English editions of *Origins*. As far as Darwin noted Buffon's prior claim to evolution, it was not given in very convincing, nor complete terms:

“... the first author who in modern times has treated it in a scientific spirit was Buffon. But as his opinions fluctuated greatly at different periods, and as he does not enter on the causes or means of the transformation of species, I need not here enter on details.”⁶¹

Charles Darwin also noted that his grandfather's work seems to have resembled the later work of Jean-Baptiste Lamarck: “It is curious how largely my grandfather, Dr Erasmus Darwin, anticipated views and erroneous grounds of opinion of Lamarck in his '*Zoonomia*'.”⁶² Lamarck was trained at a Jesuit college in Amiens, and later in 1788 gained position at the *Jardin des Plantes* (formerly *Jardin du Roi*) with the support of Buffon. His flawed theory of evolution was based upon the hereditary transmission of developed characteristics. This involved a force of nature that could direct the process towards greater complexity. As noted above, Erasmus Darwin spoke of an esoteric 'power of generation' at work in nature and gave reference to part VII of Hume's *Dialogues* (in which Hume referenced the Brahmins and Hesiod's *Theogony*).

Summary

It is evident that belief in deep time and evolution in Britain grew out of 18th century France. Reference to millions of years or ages of change first appeared in France around 1748–1754 with the work of De Maillet and Diderot, before appearing in James Hutton and Erasmus Darwin's work. Deep time had earlier been advocated in Fontenelle's fictional and scientific works from the late 17th century. Although some of the French writers, for instance De Maillet, had an interest in Hinduism in seeking to justify millions of years of change, the paganism became more overt in the writings of Erasmus Darwin and David Hume. The works of ancient Greece—of Hesiod, Plato, Aristotle and Pyhrro—were easily available to Enlightenment thinkers. James Hutton's geological theory was also clearly influenced by a network of mainly French researchers, with some connection to Buffon and the *Jardin des Plantes*. This closely connects Hutton to the French

camp, but the French link was played down by Playfair and Lyell.

Lyell also planned a secretive campaign to undermine the Anglican establishment in Britain, entraining the young Charles Darwin into his cause. The subterfuge of Voltaire seems to have offered a blueprint for both of them. Lyell and Darwin even admitted to a deceitful campaign against Christianity in private correspondence, and this has previously been discussed by creation authors.⁶³ It is also notable that attempts at measuring the age of the earth in terms of millions or billions of years run into the problem of induction. It must be assumed, without proper foundation, that present geological processes and observed rates are applicable through history. This problem becomes even more pointed when Darwin also argued that the record is extremely imperfect. This problem remains unresolved, although widely ignored by modern secular science.

There is insufficient space to discuss the influence of Jesuit education, but there does seem to be evidence that Christian belief was blended with the Eastern beliefs of deep time and evolution in at least some Jesuit thinking. It later appeared for instance in the writing of the Jesuit priest Pierre Teilhard de Chardin (1881–1955). He has become an icon for 20th century theistic evolutionists, although his beliefs were criticized by C.S. Lewis who described them as “evolution run mad” and “uncomfortably like Pantheism”.⁶⁴ It may be seen however, that the rise of belief in deep time and evolution arose during the 18th century, first in France then in Britain, as a result of the influence of ancient Greece and Eastern religions.

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