

Deep time in 18th-century France—part 1: a developing belief

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This paper considers the rise of belief in deep time in late 17th- and 18th-century France through the writings of Fontenelle, de Maillet, Comte de Buffon, and Voltaire. Evidence for the biblical Flood was rejected in favour of belief in millions of years of change by these men. Although the first three believed they were working within Descartes' scientific framework, it is apparent that there were many non-scientific factors at work: a vivid imagination, an interest in Eastern religions, and a willingness to misrepresent facts through deliberate deception. The Cartesian methodology, which is essentially methodological naturalism, also led to a perverse situation: the obvious candidate to account for the flood evidence, the Genesis Flood, was not allowed into the discussion because it was part of a religious text. Leclerc (Comte de Buffon) proposed a purely tranquil Flood, while Voltaire thought even acknowledging the fossil evidence publicly gave too much credence to Flood proponents. This paper offers possible reasons for their seeming desire to undermine Scripture, and points to the importance of upholding the integrity of the Genesis account as part of the Reformation.

Belief in deep time and an evolutionary process grew in late 17th-century and 18th-century France. There were a number of reasons for this: growing religious struggles, political unrest, and interest in non-Christian religions from ancient Greece, Egypt, and the Indian Sub-continent. During the middle of the 18th century there was also growing agitation for revolution, but suppression by the powers of State and Church only encouraged the revolution. Undermining the scriptural account of creation and the Flood arguably became part of the process of undermining the existing order, although that may not have been the initial or full motivation. In the 17th century the struggle between Protestantism and Catholicism over Church authority was at its height in Europe, and the Jesuits were central to that struggle into the 18th century. Following the work of the Jesuit-trained Descartes, an excessive skepticism in the name of reason was directed towards knowledge gained through Scripture, although with far less skepticism directed towards beliefs from eastern religions or the human imagination.

This study will look at a number of French philosophers of science, especially Fontenelle, de Maillet, Comte de Buffon, and Voltaire, and consider their endeavours to develop belief in deep time (figure 1). It becomes clear that there was willingness to use excessive speculation and sometimes deceit to fulfill their goals. Initially they sought to separate science from religious authority through the application of Cartesian philosophy. But de Maillet attempted to establish belief in billions of years of change through appeals to Hinduism and human speculation. A separate second part to this paper will look at evidence that Lyell and Darwin were influenced by the work of the French Enlightenment and used similar methodology to undermine the traditional Christian establishment in Britain.

Bernard De Fontenelle

Bernard de Fontenelle's (1657–1757) position at the Royal Academy of Sciences in Paris influenced the development of geological science in France through the early 18th century (figure 2). Fontenelle, who was trained by Jesuits at the Collège de Bourbon, wrote a book in 1686 that was arguably a work of science fiction, entitled *Conversations on the Plurality of Worlds* (*Entretiens sur la Pluralité des Mondes*). This was in the form of a dialogue between two people and discussed space travel and the possibility of life on the moon and other planets. It also introduced consideration of developments over long periods of time, and, as Stott suggests, opened up the French imagination and ideas for a century thereafter.¹ The purpose was officially concerned with the education of ordinary people by expounding the latest ideas of science, particularly in terms of heliocentrism. Through the dialogue he spoke of nature effecting changes very gradually over very long periods of time.

“Ought we to assert that what has lasted a hundred thousand times longer than we, must last for ever? No, ages on ages of our duration would scarcely be any indication of immortality. ... True, I replied; nature does nothing abruptly, her method is to effect every alteration by such gentle graduations that it is scarcely perceptible to us.”²

By writing it in the form of science fiction he could avoid the charge of heresy. In the Preface he spoke of the influence of Cicero, and that if challenged by the Catholic authorities on the suggestion that he believed men lived on the moon he would deny that they were men.

While being careful to not fully dismiss Scripture, probably out of fear of religious authority and an

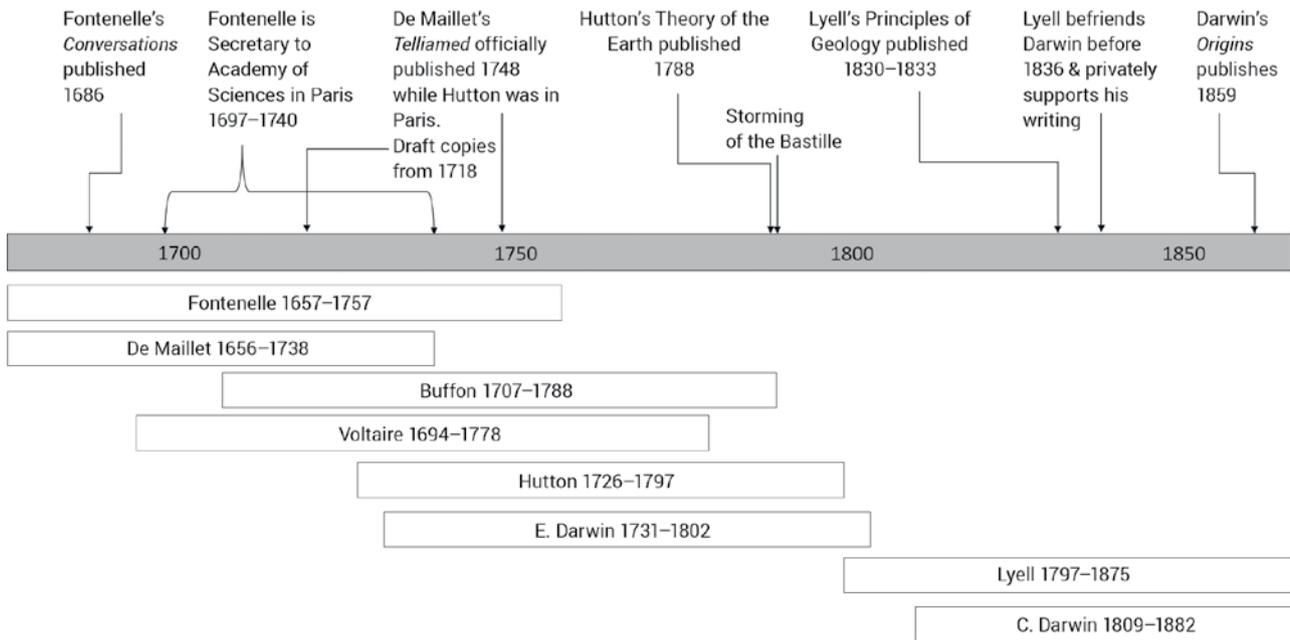


Figure 1. Timeline from Fontenelle to Darwin

unwillingness to make enemies, his approach cast doubt on other ancient texts, which he thought offered myths and not facts. For instance, he wrote *Of the Origin of Fables* (probably written in 1684, published 1724), in which he commented on the “ignorance of the first men”. However, he was careful not to undermine the Hebrew writings, commenting that “It is for this reason that there are no peoples whose history does not begin in fables, except the chosen people, among whom a particular care on the part of providence has preserved truth.”³ But in later years he spoke of the Noachic Flood in terms of it being merely hypothetical.⁴ While Fontenelle didn’t fully reject the Flood of Noah, he neutered its ability to explain the fossil evidence, and supported naturalistic explanations that extended history beyond the biblical timeframe.

Science and faith were separated in Fontenelle’s work along the lines set out by René Descartes, an approach which also appears in modern methodological naturalism. Descartes had developed a philosophy with doubt and skepticism at its core, especially as it relates to ancient or divine authority, and instead made mankind the arbiter of scientific truth. Although he was a self-confessed Catholic, his God was closer to the absentee landlord idea of later deism.⁵ From this it followed that science should be pursued without regard for the statements of religious texts; only reason and studies in nature were allowed. Descartes’ ideas on geology were published in 1644 in his *Principles of Philosophy* in which he envisioned the activity of underground air, water, and fire on smooth layers to shape the land surface through tectonic collapse and volcanic uplift. All of these he thought were explainable by natural processes.

Rappaport traces the subterfuge in Fontenelle’s work following his establishment as secretary within the Academy of Sciences in Paris in 1697, a position held until 1740. This gave him the opportunity to offer his own résumé in the *Histoire*, a shortened synopsis of the Academy’s *Mémoires*.⁶ His official task was to write a summary of the most noteworthy or remarkable research from published *Mémoires* papers, or summaries of unpublished papers, or comment on other correspondence. But, in reality, his summaries veered away from fully reflecting that research. Instead, they often reflected his own view regarding the nature of the fossil record and Earth history. He wrote in the Preface of the first publication, “we even took care on occasions of sowing our own clarifications to facilitate the



Figure 2. Bernard Le Bouyer de Fontenelle. He was secretary of the Royal Academy of Sciences in Paris for over 40 years. Portrait by Nicolas de Largillière, 18th century.

reading of the *Mémoires* (my translation)”.⁷ Through such clarifications, he used the occasion to try and persuade French academic society that an ancient history of the world could be arrived at through studies of nature with very little regard for belief in Noah’s Flood. There was only a weak commitment in 1708 to accept that the Flood might have explanatory ability for those fossils “which are in places where no other accident can have transported them, and where we cannot believe that there has ever been water since that time (my translation)”.⁸

He also subtly misrepresented the work of other early geologists in Europe: for instance, of Steno, Woodward, and Burnet, suggesting that such scientists were really following a Cartesian philosophical framework. “Descartes ... is the first to have thought of mechanically explaining the formation of the Earth, then Steno, Burnet, Woodward”⁹ But that was not really an accurate reflection of their work since the latter authors indicated that they had a desire to harmonize the evidence with the testimony of Scripture.¹⁰ The most direct contact Fontenelle had with Steno, Burnet, and Woodward came via correspondence with Leibniz in 1706.¹¹ Leibniz had previously discussed fossils with Steno and Woodward and held to the reality of the Flood of Noah. This he thought was explicable through mechanical processes without denying divine causation.¹² He proposed that some creatures may have fallen to the bottom of lakes and so become encrusted by sediment, and that a universal receding ocean might have left fossil fish in caves high on mountain tops. But Fontenelle was less inclined to hold to a literal reading of Scripture, and the following year (1707) considered the possibility of coastal erosion at one location covering a period of 12,000 years.¹³

Papers by Antoine de Jussieu and René Réaumur

In the years 1718 and 1720 Fontenelle was given renewed opportunity to extend and develop his theory of a universal ocean without recourse to the Noachic Flood. Firstly, through the writing of Antoine de Jussieu’s observations of fossil plants in Lyonnais of 1718, and later in 1720 with René Réaumur’s study of sedimentary layers around the town of Tours in France with its mass of broken shells. Jussieu recorded the findings of fossil plants in Lyonnais among marine shells and noted that the plants did not resemble local flora, although they were similar to those found elsewhere in the world, specifically from India and the West Indies. The volumes of botanical evidence, he suggested, composed “the oldest library of the world”.¹⁴ He wondered how such material might have been transported to be buried in France, but the leaves were considered to be laid too neatly to be attributable to such a violent event as the Noachic cataclysm. There was, however, recognition in Jussieu’s paper that much of the world was once covered by a global ocean, but that the water either gradually or suddenly retreated.¹⁵

Réaumur discovered that shell fragments were so profuse that the farmers collected the shells, ground them down, and used them as soil fertilizer. In his paper to the Paris Academy of Sciences in 1720 *Remarks on some fossil shells of Touraine and their uses* Réaumur noted that the Falun layers consisted of around seven metres of well-distributed sediment, consisting of complete and broken shells. He proposed that instead of this being attributable to a single watery event lasting no more than a year, the thickness of the sediment could mean that it was evidence of an inlet of the sea and that the layers would have taken a long time to be laid down. For Réaumur the shells were of biological origin, but he questioned the idea that a single event might potentially leave such evidence. He suggested from evidence of current coastal changes that it would have required thirty to forty centuries for the sea to retreat to its present position thirty-six leagues (about 160 km) from the present coastline. However, an alternative proposal, offered by Réaumur, allowed for sudden vertical adjustments in the landmass for sea creatures fossilized in sediments so far from the coast. Unlike Woodward and Steno, Réaumur was not concerned with defending Scripture, even though he accepted the evidence that fossils were once living organisms.

The work of Réaumur and Jussieu led Fontenelle to further speculate that life on Earth had long pre-existed the arrival of mankind, and that successive floods, or ‘revolutions’, over lengthy periods of time might have transported material to Europe. To explain the evidence in the Touraine a globally receding ocean was considered necessary, but one that receded erratically with successive floods inundating the landmass. And yet arbitrarily none of these floods were allowed to be the one recorded in Genesis, which was considered a single violent event; ironically, it was too violent to account for the botanical evidence, and yet unremarkable for his scientific model. The revolutions that he envisaged covered longer periods of time than those recorded in the Bible:

“... the changes which we know since the time of the Histories, or the Fables which have something historical, are in truth considerably small, but it gives us a place to easily imagine those which longer periods could lead to (my translation).”¹⁶

Fontenelle was however careful to allow that the evidence for the Flood was perhaps somewhere else, “It effectively remains that on the Earth there are many footprints of the universal Flood reported by Holy Scripture (my translation).”¹⁷

Benoît de Maillet

There were several other authors who attempted to undermine biblical authority, but they advanced their work clandestinely because of fear of the consequences. The most notable of these authors was Benoît de Maillet (1656–1738),

who was well connected in French society (figure 3). Through his work as a French diplomat he had opportunity to travel widely in the Middle East and studied the Egyptian pyramids, ancient pagan philosophies and Eastern religions. Officially he reported to the king's ministers, but secretly worked to undermine acceptance of the biblical Flood arguing that the earth was of the order of two billion years old.¹⁸ He had opportunity to read Fontenelle's *Conversations* and other scientific papers while travelling, and later Fontenelle offered him encouragement to expand the work. But while Fontenelle had argued along Cartesian lines in his *Histoires*, de Maillet also appealed to the beliefs of Hinduism to justify his estimation of the antiquity of the earth.

The major work of de Maillet was presented for publication in Paris in 1735, although draft copies had circulated in Paris as early as 1718 with gossip concerning its contents spreading through Parisian society.¹⁹ It was finally published in the French language in 1748 by a printer in Holland. This was several years after his death.²⁰ This publication was under a thinly veiled pseudonym as *Telliamed, or Conversations Between an Indian Philosopher and a French Missionary on the Diminution of the Sea, and the Origin of Men and Animals*.²¹ Telliamed is of course a simple reversal of his name, and this character was given the task of presenting the author's more radical views.²²

The Jesuit priest Abbé Jean Baptiste le Mascrier edited the original manuscript before publication in order to make



BENOÎT DE MAILLET *Gentilhomme Lorrain, Consul General du Roi en Egypte et en Tyrane, depuis Viceroy, Général des Echelles du Levant et de Barbarie; et nommé par Sa Majesté en qualité de son Envoyé vers le Roi d'Ethiopie; Auteur des Mémoires sur l'Egypte, et sur l'Ethiopie.*

Figure 3. Benoît de Maillet, *Description de l'Egypte*, Paris, painting by Étienne and Edme Jeaurat 1735. His edited work *Telliamed* ... was published after his death in 1748.

it more harmonious with Catholic doctrine, with the overt claims for billions of years withheld. It was finally published in the form of a semi-fictional dialogue, and although it still caused controversy despite the editing it proved to be a bestseller with influence extending across Europe. The work had presented the days of Genesis as long periods of time, but contended for an early theory of evolution where marine animals gradually turned into terrestrial forms as the sea receded. Flying fish became birds, and mermen and mermaids were said to have evolved into men and women. Those who opposed his views were considered obstinate for reasons of Christian conviction, but his own beliefs had developed from Eastern mysticism and pantheism.²³

At face value he presented an early uniformitarian theory, appealing to gradual changes in the earth. The age-related claims were determined from calculations of the rate at which water was receding into the earth via vortices. Through measurements over decades he estimated this to be at a rate of 3 inches (7.6 cm) per century, or 3 feet (91 cm) per 1,000 years. In le Mascrier's edited version we read; "Now according to this Estimation, the Sea ... diminished six feet in two thousand Years" and "for there certainly were before, in Places four or five hundred or a thousand Fathoms [one fathom is 6 feet, 1.83 m] above her present Surface, Habitations and Ports, frequented as ours are at present."²⁴ He ignored isostatic or vertical changes in the earth's surface, knew nothing of plate tectonics, and overlooked places where the sea had risen relative to the land. But if these estimates are multiplied the period is 2 to 2.4 Ma for the length of human civilization. And if his estimate for the diminution of the sea were extrapolated to account for the height of Mount Everest we would have around 11.7 Ma. He comments further:

"... this Globe was neither habitable, not inhabited till many Ages after the Appearance of our first Grounds; that Navigation ... [was] not known till long after the Existence of Men; and that after a Beginning ... the Progress of Navigation has been so slow, that from that Time till the Building of the Ship found in Sweden [allegedly in a mine 600 feet (183 m) underground], we may reckon an incredible Number of Years, and perhaps the half of the Age of the Earth."²⁵

In unpublished versions he was speaking in terms of 2 Ga for the age of the earth, which correlated with the Hindu view of the world.²⁶ The Hindu cyclical periods were first expounded in the Puranic literature that asserted that the universe undergoes a continual cycle of creation, destruction, and recreation. The 12-hour day of Brahma was said to last for 4.32 Ga, during which period the god Brahma, who governs the universe, is awake, followed by a night of similar length. It would seem that broad correlation in his estimates with the Hindu age of the earth was not coincidental.

There were a number of other authors who argued for some form of evolution in 18th-century France, including

Comte de Buffon, Diderot, Lamarck, and Geoffroy St Hilaire, and his son Isodore. Diderot wrote an anonymous *Letter on the Blind (Lettres sur les Aveugles)*, published in 1749. In this work he envisioned nature throwing up shapeless mutant monsters over millions of years, with destructive revolutions overturning existing orders followed by the establishment of new orders. There was no God in Diderot's system of nature, only mindless accidents. But despite attempts at anonymity, it was clear who the author was, and this led to his brief imprisonment in 1749. Upon release Diderot continued writing his *Encyclopédie* arguing that "Nature advances by nuanced and often imperceptible degrees".²⁷

Georges-Louis Leclerc—Comte de Buffon

According to Rappaport, Georges-Louis Leclerc, known as Comte de Buffon (1707–1788), also read Fontenelle's *Histoire* but apparently not the *Mémoires*, and this influence worked its way into Buffon's major works on natural history and a theory of the earth. In effect, then, Buffon was promoting and extending the ideas of Fontenelle, and he continued to separate the fossil evidence from the biblical Flood along Cartesian lines. Buffon was elected to the Paris-based Royal Academy of Sciences in 1734 and five years later became a director to the Royal Garden, *Le Jardin du Roi* (figure 4). From these positions he published thirty-six volumes under the title *Histoire Naturelle* between 1749 and 1789, in which he set out a theory of the earth and expressed affinity for the idea of a receding ocean (several were published after his death).

Buffon did not reject the Flood of Noah openly, but he could not accept that the Deluge had laid down the fossil shells in orderly strata if Burnet's and Woodward's accounts were true. He wrote, "it would have jumbled them together without any order or regularity".²⁸ Following critiques of these English authors' works, he developed his own theory of the earth and denied that there was any significant evidence for the Flood. Instead, he saw it as a supernatural event to chastise mankind, with the strata and trees and plants undisturbed in a rather tranquil event.

"We ought also to look on the universal deluge as a super-natural means of which the Almighty made use for the chastisement of mankind, and not as an effect of a natural cause. ... we see clearly by the scripture that it was designed for the destruction of men and animals, and that it did not in any mode change the earth, since after the retreat of the waters, the mountains and even the trees were in their place, and the surface of the earth was proper to receive culture, and produce vines and fruit."²⁹

He was, however, criticized by the faculty of Sorbonne in January 1751 because his writing was considered to be in opposition to the creed of the Church. Of particular offence was Buffon's assertion that present mountains and valleys

were formed by a receding ocean, or successive inundations of the sea, and not formed at creation. Buffon 'repented' of his speculation in public but had the support of the king and continued to develop his ideas in private.³⁰ Later, through experimentation on the cooling rates of different metals such as iron, he argued that the earth was of the order of 75,000 years old. This was presented in *Epochs of Nature* in 1778, although periods of 3 to 10 Ma were later found in unpublished drafts.³¹ But as a small concession to Scripture he allowed that the earth had gone through seven epochs of time, albeit long ages.³²

Although Buffon did not openly push the age of the earth at the time, there was a desire that the biblical Flood would fade in French society, for instance in the writing of Voltaire (discussed below). Buffon's volumes also influenced Georges Cuvier, who opposed evolution, but argued for a series of destructive catastrophes upon the earth, with the last one the account given by Moses. Through the late 18th century there was further interest in appeals to volcanism to describe the history of the world: for instance, in the work of Jean-Louis Soulavie (1752–1813), who elaborated further on Buffon's *Epochs*, and Francois-Dominique de Reynaud de Montlosier (1755–1838), who wrote in 1789 about the volcanoes of Auvergne in *Volcans d'Auvergne*, as had Nicolas Desmarest during the 1750s, '60s, and '70s.³³

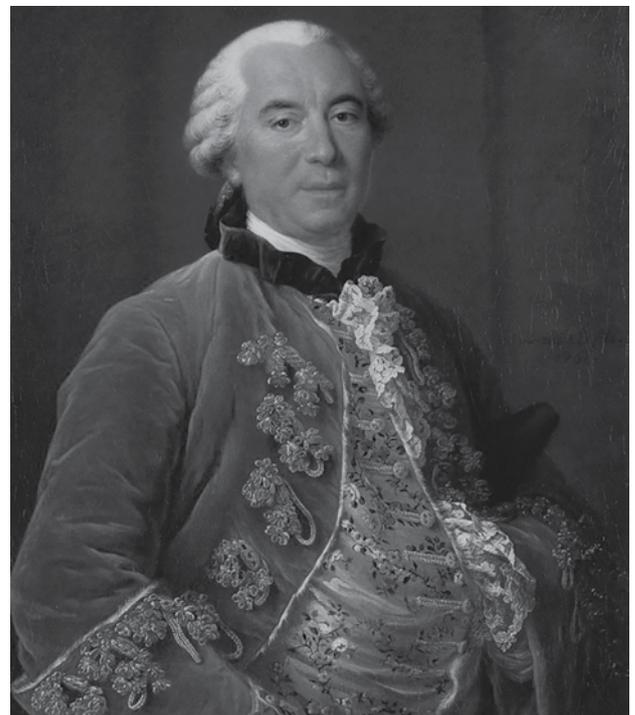


Figure 4. Georges-Louis Leclerc, Comte de Buffon, painting by François-Hubert Drouais, 1753. Buffon's *Theory of the Earth* extended the geological time-frame to tens of thousands of years.

François-Marie Arouet—Voltaire

While Fontenelle and followers reinforced the study of geology along Cartesian lines, and influenced many French scholars to reject the biblical time-scale, another Enlightenment philosopher was apparently sceptical of both the geological evidence and Scripture. The Jesuit-trained student Voltaire (François-Marie Arouet, 1694–1778) adopted some of the ideas of the 17th-century Jesuit Athanasius Kircher, having studied *Mondus subterraneus* at Collège Louis-le-Grand in Paris. This gave Voltaire awareness of Kircher's inorganic theory of fossil formation, where spontaneous generation through some esoteric power in nature was considered sufficient to account for the evidence. Voltaire's theology became more deistic with growing criticism of Catholic authority, together with an interest in Eastern beliefs (figure 5). This led to periods of imprisonment and exile. However, following the influence of Newton, he believed the present world of mountains, seas, and caves to be divinely and intelligently created and that catastrophic upheavals could not fit the patterns of nature.³⁴

A dispute arose between Buffon and Voltaire after an anonymous paper on geology was presented in Italian by Voltaire to the Academy of Bologna. This was later translated into French and English.³⁵ There was already a growing tension between him and Buffon, partly because the latter was elected to membership of the Paris Academy of Sciences, while this had been denied to Voltaire. Following news of the discovery of fossilized fish in the Alps, such as pike-fish and turbot, and other fossilized creatures in the Middle East, Voltaire went to great lengths to deny that they were real fossils or that they were attributable to the Flood or a receding ocean. Instead, he asserted that

“... it is much more natural to suppose, that these fish had been brought thither by some traveller, who, finding them spoiled, threw them away, and, in process of time, they became petrified ...”³⁶

Voltaire seemed to reject the evidence that tongue stones (*Glossoptera*) were the teeth of ancient sharks (fish-dogs), or that ammonites were in some way similar to the nautilus. He wrote that it was a mystery that philosophers did not accept that ammonites were produced naturally in the earth, or that they were remains of coiled eels or snakes. And he rejected Réaumur's studies of the shell-rich layers of Tours, arguing that the fossils could almost be seen to ‘vegetate’ if watched for long enough.³⁷ Buffon mocked these assertions, ironically in a manner typical of Voltaire, suggesting that he should have added that travelling monkeys might have dropped sea shells on European mountains.

“... why has he not added that it was monkies[sic] who transported the shells to the tops of these mountains, which were never inhabited by men? This would not have spoiled but rendered his explanation still more probable.”³⁸

Andrew Dixon White commented that Voltaire used “wisdom and wit” to support his deistic faith and this drove him to oppose the geological investigations of his time.

“[Voltaire's] system was opposed to that of the sacred books of the Hebrews; and, fearing that ... new discoveries [of marine fossils found at elevation in Europe] might be used to support the Mosaic accounts of the Deluge, all his wisdom and wit were compacted into arguments to prove that the fossil fishes were remains of fishes intended for food, but spoiled and thrown away by travellers; that the fossil shells were accidentally dropped by crusaders and pilgrims returning from the Holy Land; and that the fossil bones found between Paris and Étampes were parts of a skeleton belonging to the cabinet of some ancient philosopher.”³⁹

White commented that Voltaire was concerned that belief in a universal receding ocean gave too much support to Christians who believed the Genesis account. The British promoter of uniformitarian geology Charles Lyell believed that Voltaire really accepted the organic origin of fossils, but was acting to “inculcate scepticism” through deception because of the beliefs of the ‘vulgar’ people regarding Noah's Flood. Lyell remarked:

“He would sometimes, in defiance of all consistency,



Figure 5. François-Marie Arouet, known as Voltaire, painting by Nicolas de Largillière 1724–1725. Even his sympathizers have said he used deception in order to undermine the biblical Flood.

shift his ground when addressing the vulgar; and, admitting the true nature of the shells collected in the Alps and other places, pretend that they were Eastern species, which had fallen from the hats of pilgrims coming from Syria. The numerous essays written by him on geological subjects were all calculated to strengthen prejudices, partly because he was ignorant of the real state of the science, and partly from his bad faith.”⁴⁰

Voltaire recognized that the presence of organic fossils was the strongest evidence for the biblical Flood for believers, but Lyell suggested that he had resorted to “bad faith” when faced with such evidence out of “a desire to invalidate Scripture”. It is with some irony that Lyell’s criticism of Voltaire concerned to the latter’s ignorance and perceived toxicity towards geological science, and not because Voltaire was using deceit to establish the truth of a scientific theory and undermine Scripture.

Voltaire was also willing to accept the possibility of long ages, for instance, of a procession of the equinoxes over approximately 25,000 years. But he did not think scientists could accurately build a knowledge of the past. The French astronomer Chevalier de Louville suggested a climate-changing pole-to-pole, north–south progression of the earth upon a slowly rotating equatorial axis. This idea came in for specific criticism by Voltaire, who likened the speculations and imaginations of theorists and philosophers to that of the common people who demand a change of scene in a theatre. Voltaire commented that “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.”⁴¹

There was also a growing affinity for Hinduism within Voltaire’s thinking as the Oriental religion became popular in 18th-century elite French society. This interest grew alongside vegetarianism and acceptance of a religion of nature with its preference for evolutionary powers. Voltaire believed that the Eastern religion was based upon human experience and not divine revelation, and that it was the source of Pythagorean science.⁴² From this viewpoint the apparent antiquity of Hindu texts was used by Voltaire to denounce sacred Scripture.⁴³ He spoke for instance of the *Ezour Veda* as being a valuable gift, for which the Western powers owe a debt of gratitude to the Eastern nation, and although this particular work was not what it seemed (it was the work of over-zealous Jesuits), it showed his interest and commitment.⁴⁴

Conclusion

Although Fontenelle, de Maillet, and Comte de Buffon recognized that the evidence of fossils on mountains tops was evidence that the sea once covered the mountain, the obvious

flood candidate, Noah’s Flood, was arbitrarily rejected because it was perceived to be known only from a religious text. Fontenelle used his position to develop and promote his own theory along Cartesian lines, but subtly ignored the significance of the evidence presented and over-extended his imagination. Buffon said the Flood was so tranquil that it left no evidence, even leaving trees in place. Instead, he thought the fossil evidence was a result of previous unknown floods that happened many thousands or millions of years ago. De Maillet’s edited work also argued for millions of years of change by a receding ocean, but his thinking was also influenced by Hinduism. In unpublished papers he spoke of billions of years for the age of the earth. Voltaire was critical of the idea of a receding ocean because he thought it gave too much credence to the Flood supporters. However, even those sympathetic to his cause have suggested he was acting deceptively.

We can see, then, that the Genesis Flood account was undermined through use of deception, an excessive imagination and interest in Eastern religions. Despite the Flood having strong explanatory power, the Cartesian methodology ruled it out of geological science arbitrarily. This example also shows the weakness of methodological naturalism.

In terms of motivation, the influence of the Jesuits may be significant to this discussion, as they were strongly opposed to the Protestant Reformation with its commitment to *Sola Scriptura*. In the 17th century Pascal had even accused the order of moral laxity and an abuse of casuistry in his *Lettres provinciales* of 1656–1657.⁴⁵ Casuistry in practice may justify deception in order to achieve a perceived greater purpose. The order became very influential, but widely distrusted, and was banned in France in 1764 because it seemed to be out of the control of the political rulers. The order was also abolished by Pope Clement XIV in 1773, but reinstated 1814. It might be seen, then, that the attack on a literal reading of Genesis in 18th-century France was partly to undermine the Protestant maxim of *Sola Scriptura* in Europe. But there was also growing political unrest together with the rise of Eastern religions and atheism in French society.

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7. Fontenelle, B., *Histoire*, ref. 6, preface and p. 9, 1699 (Paris, 1702): "on a même eu soin dans les occasions d'y semer des éclaircissemens propres à faciliter la lecture des Mémoires", from Rappaport, ref. 4, pp. 282–283.
8. Rappaport, ref. 4, pp. 289, 292, 294: "qui se trouvent dans des Lieux où nul autre accident ne peut les avoir portés, & où l'on ne peut croire qu'il y ait jamais eu d'eau depuis ce temps-là." (Use of double negatives in French usually reinforces the negative, unlike in English where two negatives make a positive).
9. Rappaport, ref. 4, *Histoire ...*, 1708 (1709), p. 30: "Descartes ... est le premier qui ait eu la pensée d'expliquer mechaniquement la formation de la Terre, ensuite Stenon, Burnet, Woodward, et enfin M. Scheuchzer, ont pris ou étendu ou rectifié ses idées, & ont ajouté les uns aux autres." Fontenelle included M. Scheuchzer in the list.
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11. Rappaport, ref. 4, pp. 287, Fontenelle, *Histoire ...*, 1706 (1707) 9–11.
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13. Rappaport, ref. 4, pp. 288, Fontenelle, *Histoire ...*, 1707 (1708), 5–7: "En supposant qu'elle [la mer] avance toujours également, elle mine-roit 1 000 toises ou une petite demi-lieue de Moëlon en 12 000 ans."
14. Jussieu, *Examen des causes des Impressions des Plantes marquées sur certaines Pierres des environs de Saint-Chaumont dans le Lionnois, Mémoires ...*, pp. 287–297, 1718 (1719), pp. 287–297. In Rappaport, ref. 4, pp. 295–296: "autant de volumes de Botanique qui dans une même carrière composent, pour ainsi dire, la plus ancienne Bibliothèque du monde."
15. Jussieu, ref. 14, p. 287, Rappaport, ref. 4, p. 296: "La plupart des terres qui semblent avoir été habitées de temps immémorial, ont été originellement couvertes de l'eau de la Mer qui les a depuis ou insensiblement, ou tout à coup abandonnées."
16. Fontenelle, *Histoire ...*, 1720 (1722), pp. 5–9, in Rappaport, ref. 4, p. 297: "Les changemens qui nous sont connus depuis le temps des Histoires, ou des Fables qui ont quelque chose d'historique, sont à la vérité peu considerables, mais ils nous donnent lieu d'imaginer aisément ceux que des temps plus longs pourroient amener."
17. Fontenelle, ref. 16, in Rappaport, ref. 4, "il reste effectivement sur la Terre beaucoup de vestiges du Déluge universel rapporté par l'Écriture Sainte."
18. Repcheck, J., *The Man who Found Time: James Hutton*, Simon & Schuster, London, p. 99, 2003; de Maillet, B., *Telliamed, or Discourses between an Indian Philosopher and a French Missionary, on the Diminution of the Sea ...*, Carozzi, A.V. (trans. and ed.), University of Illinois Press, Urbana, Chicago & London, 1968; Dalrymple, G.B., *Ancient Earth, Ancient Skies: The age of the earth and its cosmic surroundings*, Stanford CA, pp. 28–29, 2004.
19. Stott, ref. 1, p. 116.
20. Stott, ref. 1, pp. 108, 130.
21. de Maillet, B., *Telliamed ou entretiens d'un philosophe indien avec un missionnaire françois, sur la diminution de la Mer, la formation de la Terre, l'origine de l'Homme*, etc, Put in order on the Memoirs of the late M. de Maillet by J. Antoine Guers, Amsterdam, The Honoured and sons, 1748.
22. One may wonder whether there is similarity between *Telliamed* and the Babylonian half-fish half-man god *Tamat*, bearing in mind de Maillet's obsession with mermaids and mermen.
23. Cutler, A., *The Sea Shell on the Mountaintop*, Penguin, London, p. 192, 2003. With influence from Epicurus, Averroes and Spinoza, de Maillet adopted vitalism, believing in an *âme universelle du monde* as *une matière déliée* (world soul as unbounded material). This is similar to Spinoza's *natura naturans*, a self-creating natural force; evidently pantheism. Spinoza, B., *Ethics*, parts 1 and 3, prop. 29, Scholium, Curley, E. (trans.), Penguin, London, 1996. Israel, J.I., *Enlightenment Contested: Philosophy, modernity, and the emancipation of man 1670–1752*, Oxford University Press, Oxford, ch. 28, 2006.
24. de Maillet, B., *Telliamed, or Discourses between an Indian Philosopher and a French Missionary, on the Diminution of the Sea ...*, English Translation, printed by Osborne, T., London, pp. 112, 128, 1750; see also Stott, ref. 1, p. 118.
25. de Maillet, ref. 24, p. 112.
26. Repcheck, ref. 18, p. 99; de Maillet, ref. 18; Dalrymple, ref. 18, pp. 28–29.
27. Stott, ref. 1, pp. 133–142. And Diderot, D., 'Animal'; in: Diderot and d'Alembert (Ed.), *Encyclopaedia*, vol. 1, p. 469, 1753–1772.
28. de Buffon, G.-L.L., Theory of the earth; in: *Natural History*, trans. from French 1792, vol. 2, article xix, printed by J.S. Barr, London, p. 238, 1792.
29. de Buffon, ref. 28, article v, vol. 1, pp. 151–152.
30. Rudwick, M.J.S., *Bursting the Limits of Time*, University of Chicago Press, Chicago, pp. 128–130, 2005.
31. de Buffon, G.-L.L., *The Epochs of Nature*, Zalasiewicz, J., Milon, A.S., and Zalasiewicz, M., (trans.), University of Chicago, p. xxvii, 2018; See also: Rudwick, ref. 30; Repcheck, ref. 18, p. 101; Prothero, D.R., *Bringing Fossils to Life*, 3rd edn, Columbia University Press, New York, p. 112, 2003; Baxter, S., *Revolutions in the Earth: James Hutton and the True Age of the World*, Weidenfeld and Nicholson, London, p. 55, 2003.
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33. Some of this is discussed in Reed, J.K., Three early arguments for deep time—part 2: volcanism, *J. Creation* 26(1):61–70, 2012.
34. Fellows, O., *From Voltaire to La Nouvelle Critique*, Librairie Droz, Geneva, pp. 22–32, 1970. McCalla, A., *The Creationist Debate*, Continuum, London, p. 156, 2006. Snobelen, S., "'This most beautiful system': Isaac Newton and the Design Argument"; in: God, Nature and Design Conference, Ian Ramsey Centre, Oxford, 2008: "all material Things seem to have been composed of the hard and solid Particles above-mention'd[sic], variously associated in the first Creation by the Counsel of an intelligent Agent." Newton, I., *Opticks*, Query 31, 4th edn, 1730.
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36. Voltaire, ref. 35, p. 243.
37. Cutler, ref. 23, p. 195.
38. de Buffon, G.-L.L., *Theory of the Earth*, ref. 28, article vii, vol. 1, p. 235; See also Fellows, ref. 34.
39. White, A.D., *A History of the Warfare of Science with Theology in Christendom*, vol. 1., D. Appleton and Co., New York, pp. 228–229, 1896. This work basically argued that Christianity was opposed to science.
40. Lyell, C., *Principles of Geology*, 9th edn, book 1, chap. 4, University of Adelaide, Adelaide, AUS, pp. 54–55, 1854 (this passage is also in early editions from 1834).
41. Voltaire, ref. 35.
42. Elst, K., *Decolonizing the Hindu Mind*, publ. India, Rupa, p. 44, 2001; Voltaire, *Lettres sur 'origine des sciences et sur celle des peuples de l'Asie*, 1st edn, letter dated 15 December 1775, Paris, 1777.
43. Stuart T., *The Bloodless Revolution: Radical Vegetarianism and the Discovery of India*, W.W. Norton & Co., New York, p. xxiv, 2006.
44. This particular work was later denounced as 'childish drivel', in reality a fraudulent mixture of Hindu and Christian sayings, and the work of over-zealous Jesuits; Muller, F.M., *Physical Religion*, The Gifford Lectures, Lecture 3, 1890. The Veda as Studied by European Scholars, Longmans Green & Co., London, 1891.
45. Casuistry is a system of ethics based on case studies or individual situations and not from higher principles, and if abused can argue that the end justifies the means.

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