BUFFON ON DEATH AND FOSSILS

Death appears in many guises across the thirty-six volumes of Georges-Louis Leclerc de Buffon’s Histoire naturelle (1749–89). In his chapter “On Old Age and Death” from the Histoire naturelle de l’homme, Buffon outlines his physiological theory of aging and death as the gradual drying out and hardening of the bones and fibers. In his chapter “On the Senses in General,” he conducts a thought experiment in which he imagines a first man awakening to his senses to discover not only pleasure and knowledge but also a painful sense of his own mortality. In his chapter on racial and cultural diversity, “Varieties in the Human Species,” he touches on the funeral rites of non-European peoples, taking this ethnographic description as an occasion to deplore the neglect of death and the dead in his own culture. In a number of different volumes, he provides demographic tables of life expectancy in Paris and the French countryside and analyzes the “moral arithmetic” to be derived from them. And in his Histoire naturelle des minéraux, published at the very end of his life, he turns his discussion of fossils and the history of the earth into a reflection on his own impending death and its consequences for his natural philosophical project.

From a modern perspective, these various approaches to the problem of death may seem incongruous. This is due in part to the fact that Buffon’s work spans the modern disciplines of cosmology, physiology, anthropology, demography, zoology, and geology. But it is also due to the fact that Buffon made no distinction between, on the one hand, theories or facts about death that might today be referred to as scientific and, on the other, philosophical, ethical, or even personal meditations on death. To grasp the coherence and significance of Buffon’s view of death thus requires an awareness of what Michel Foucault called the archaeology of the human sciences. But it also

ABSTRACT This article addresses the association between death and fossils that Buffon developed across the thirty-six volumes of his Histoire naturelle and its implications for his literary project. Through a study of the connections between Buffon’s physiological theory of death, his fable of the first man, his anthropological treatment of funeral rites among non-European peoples, his statistical studies of life expectancy, and his personalized discussion of fossils at the end of his life, I argue that over the course of Buffon’s career the imaginative trope connecting death to ossification and petrification shaped both his natural philosophy and his literary project. This trope found its richest expression in Buffon’s last work, the Histoire naturelle des minéraux, which I interpret as his testament.

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requires, as I will argue here, an awareness of the literary dimension of Buffon’s project. It is well known that Buffon, a member of the Académie française and author of an influential discourse on literary style, was viewed in the eighteenth century as one of the best prose stylists of his time. In recent years, Buffon’s status as a literary writer has once again been consecrated by his entry into the prestigious Pléiade collection and by a renewed attention to his work among literary scholars. Nonetheless, as Stéphane Schmitt observes in his introduction to the Pléiade edition, “The literary dimension still remains (scandalously) underestimated.” In particular, the coherence of imaginative tropes across the many volumes of the Histoire naturelle, and the complex ways these tropes shaped Buffon’s natural philosophy, have not yet received the attention they deserve. The connection between death and fossils that Buffon developed over the course of his life’s work is one striking example of the crucial role played by such tropes in Buffon’s natural philosophy. This trope has a special significance for Buffon’s project because at the end of his life, when he had come to view the Histoire naturelle as his complete works, it became the basis for a poetics of testamentary writing that retrospectively gave shape to his entire project.

Death surfaced in the earliest volumes of Buffon’s work, in a chapter entitled “On Old Age and Death” from the Histoire naturelle de l’homme (1749). It was here that Buffon developed his physiological theory of death as a slow process of ossification whereby the bones and fibers, as soon as they are no longer susceptible to growth, become increasingly dense and gradually lose their liquidity and ductility: “The membranes become cartilaginous, the cartilage becomes bony, the bones become more solid, all the fibers harden, the skin dries out, wrinkles form little by little, the hair turns white, the teeth fall out, the face loses its shape, the body becomes stooped, etc.” This account of aging and death—with its charming and terrible etcetera—was by no means entirely original. Buffon was indebted to René Descartes, who had speculated that the hardening of bodily fibers gradually compromised the nutritive functions necessary to life. Similar views were held by eighteenth-century physicians such as the Rouen-based surgeon Claude-Nicolas Le Cat, who described the process by which the conduits in the nerves, as John McManners puts it, “gradually became encrusted, as it were with stalactites.” But Buffon placed particular emphasis on ossification in his version of these views, explaining changes in bone structure through analogy to the formation of tree trunks: “Finally the substance of the bone becomes over time so compact that it can no longer let through the fluids necessary to the kind of circulation that provides nutrition to these parts; from then on the substance of the bone is necessarily altered, just as the wood of an old tree is altered once it has acquired all its solidity; this alteration in the
very substance of the bone is one of the first causes that make the deterioration of our bodies necessary.”

Buffon’s emphasis on the role of bones in the processes of aging and death—which underpins the connection between death and fossils he developed later in his career—was quickly picked up by his contemporaries, as evidenced by Louis de Jaucourt’s article “Ossification” in Denis Diderot and Jean le Rond d’Alembert’s Encyclopédie.

Buffon’s theory of ossification was characteristic of his method as a naturalist in the sense that it was both highly speculative and based in empirical research (in this case, experiments on the hardening of wood conducted by Buffon and Henri-Louis Duhamel du Monceau, combined with the latter’s studies of bone development). It also reflected a broad trend, which can be linked to vitalist medicine, toward viewing death as a gradual transition rather than as a distinct event with discernible symptoms. As Peter Hanns Reill has observed, “Vitalist physicians expressed strong doubts about the reliability of the traditional ‘outward’ signs determining death. By the end of the century, it had become an article of medical and educated belief that death was very difficult to differentiate from dying, that great differences existed between the really dead and the apparently dead.”

This belief sparked widespread cultural anxieties surrounding premature burial (as evidenced by the spate of late eighteenth-century works on the topic, including one by Buffon’s close friend, the influential salon hostess Suzanne Curchod Necker) and impassioned revolutionary debates about whether guillotine victims could experience pain after being beheaded.

Buffon contributed to this trend by arguing that death did not constitute a marked change in the state of a natural being. Rather, it was the final nuance in a long, continuous process by which life gradually took leave of the body: “All the causes of deterioration we have just indicated act continually on our material being and lead it little by little to its dissolution; death, that ever so marked, ever so dreaded change of state is thus in Nature nothing but the final nuance of a preceding state.” This view of death informed a philosophical stance with distinctly Lucretian overtones. After refuting the belief that death is accompanied by violent suffering, Buffon concluded, “I have addressed this topic at some length only in order to try to destroy a prejudice so contrary to man’s happiness.”

Although he was specifically referring here to the belief that the physical experience of death was painful, his broader purpose seemed to be to characterize death itself as a prejudice, at least to the extent that death was understood as a dramatic change in the state of a natural being (it is worth noting that Buffon concerned himself solely with “natural” death resulting from old age and did not address disease or accidental death). Buffon’s physiological theory of death was thus an occasion for him to echo the Lucretian injunction that man look at things as they are and relinquish all fears of death.
The gradualist conception of death also had important epistemological implications. On the one hand, Buffon sought to banish his readers’ fear of death by assuring them that most men are not conscious of their final moments. This lack of awareness could stem either from a physical unconsciousness serving as a transition between life and death, or from a moral illusion that masked impending death even in the face of incontrovertible evidence. His empiricism notwithstanding, Buffon characterized the veil of unconsciousness and illusion surrounding death as one of Nature’s gifts to man: “The majority of men thus die without knowing it, and in the small number of those who retain their awareness up until their last breath, there is perhaps not a single one who doesn’t also retain some hope and who doesn’t flatter himself by believing in a return to life; Nature has, for the happiness of man, made this sentiment stronger than reason.” On the other hand, Buffon’s claim that the processes of death were omnipresent in life—that “life is extinguished by successive nuances, and death is nothing but the last term in this series of degrees, the last nuance of life”—meant that humans could begin to understand death in the midst of life even without experiencing its final stages. Indeed, Buffon’s unflinching description of the aging process (which, he claimed, we would be aware of in ourselves “if we observed ourselves better, if we flattered ourselves less, and if in all things others did not always judge us much better than we judge ourselves”) was intended to cultivate in his readers a personal awareness of death.

Buffon was of course not alone in upholding the philosophical or moral imperative to gain an understanding of death in life. The title of one of Montaigne’s essays, “That Philosophizing is Learning How to Die,” captures a conception of philosophy that can be traced to Socrates and that manifested itself in different ways in the spiritual exercises of Epicureanism and Stoicism. In a similar way, Christian practices of meditation and prayer revolved around the Pauline notion of “dying daily” and the belief that, as McMan-ners puts it, “the most important act of a lifetime is the act of dying, and a Christian’s chief duty is to prepare himself for death.” In Buffon’s time, this belief was disseminated in a vast body of devotional literature on preparing for death, the central message of which was captured in the title of one famous handbook, Pensez-y bien. What was particular to Buffon, in this context, was the sensationist orientation he gave to these traditions. In his famous fable of the first man awakening to nature and his senses, from the chapter “On the Senses in General,” Buffon gave poetic expression to the idea that the exercise of the senses was inseparable from man’s awareness of death. Like Etienne Bonnot de Condillac’s statue (but predating it by a few years), Buffon’s first man acquires each of his senses in turn, an experience that culminates in his discovery of a sixth sense combining sexual pleasure with self-awareness. But with the exercise of each sense, he also becomes
increasingly aware of the limits of his own existence. When forced by the brilliance of the sun to close his eyes, he instinctively experiences the ensuing darkness as a loss of self: “At that moment of darkness I believed I had lost almost my entire self [presque tout mon être].”22 Upon awakening from a deep sleep after tasting his first fruit, he becomes consciously aware for the first time of the finitude of his existence: “This annihilation I had just experienced gave me a certain feeling of fear and made me sense that I would not always exist.”23 Finally, after meeting “a second half of [him]self” and experiencing the sixth sense of sexual pleasure (with the implicit promise of reproduction), he undergoes a symbolic death in the last sentence of the fable, as night falls and recalls his initial slumber: “At that moment the daylight star extinguished its torch at the end of its course; I barely noticed that I was losing my sense of sight; I existed too fully to fear ceasing to be [j’existaï trop pour craindre de cesser d’être], and it was in vain that the darkness I found myself in reminded me of my original sleep.”24 Although one might conclude with Michel Delon that “the fatality of death disappears with the pleasure of love’s union and the implicit prospect of posterity,” the overall structure of the fable, in which the discovery of each sense brings both pleasure and a heightened awareness of death, logically leads the reader to expect that the man’s first night will be followed by a painful new understanding of his fate. 25 In this way, Buffon’s fable of the first man implicitly links enlightenment (understood here as the exercise of the senses and the attendant acquisition of knowledge of nature) to self-awareness and more specifically to the awareness of death.

In light of this association between enlightenment and death, it is not surprising that Buffon attacked his own ostensibly enlightened culture for what he viewed as its willful dissemblance of death. His remarks on the topic support the conclusions of social historians, notably Philippe Ariès, who have argued that the eighteenth century attenuated or neglected traditional funeral rites in an effort to put death at a distance.26 Dismayed by this neglect of death and the dead in his own culture, Buffon looked to the mortuary rituals of peoples across the globe to provide alternative models:

We will speak elsewhere about the customs of different peoples with respect to funerals, burial, embalming, etc. The majority even of savages pay more attention to these final moments than we do; they regard as their principal duty what for us is only a ceremony; they respect their dead, they dress them, they speak to them, they recite their accomplishments, praise their virtues, and we who pride ourselves on our sensitivity, we are not even human, we flee from them, we abandon them, we don’t want to see them, we have neither the courage nor the will to speak about them, we avoid even finding ourselves in places that may remind us of them; we are thus either too indifferent or too weak.27
For Buffon, our attitude toward death is an important part of what makes us human. In their avoidance of death, the civilized Europeans are “not even human,” in marked contrast to the “savages” whose rituals denote both their awareness of death and their courageous response to it. The European’s lack of humanity is associated with a lack of sensitivity, a term best understood in the context of the rich philosophical tradition, dating back to Aristotle, which ascribed self-awareness to the workings of the five senses in conjunction with a sixth, inner sense prior to the development of rational thought. As Daniel Heller-Roazen has shown, this tradition, which was interrupted and partially obscured by Descartes’s cogito, ascribed sensitivity and a corresponding self-awareness to both humans and animals, quite removed from human cognition and reason.28 Within this context, to be sensible was not just to mourn the dead; it was also to cultivate the kind of sensorial self-awareness that connected human beings to other living creatures and to the broader natural world. This was indeed the special sensitivity of Buffon’s first man.

Buffon’s interest in “savage” death rites was also part of a broader anthropological conversation about the treatment of the dead in various cultures, ancient and modern.29 This is reflected in the Encyclopédie articles under the rubric “Funérailles,” which detail the funeral rites of Egyptians, Greeks, Romans, Arabs, Turks, the Chinese, “American savages,” Misilimakinaks, Ethiopians, and Christians. Although these ethnographic descriptions highlighted the diversity of mortuary rituals, they were also an occasion to underline the natural and universal human imperative to care for the dead: “It seems that nature has everywhere inspired men to this final duty toward their fellow creatures, who are taken from them in death; & religion, whether true or false, has consecrated this practice.”30 This assertion laid the ground for the related claim, made in the article “Sépulture, [Droit naturel],” that burial was a human right that should not be denied even to the worst of criminals.31

Buffon’s intervention into this conversation was striking in the specific (and unusual) ethnographic example he chose to highlight. Despite his professed admiration for “savage” attitudes toward death and his promise to address them in detail, Buffon included only one reference to funeral rites in his chapter on racial and cultural diversity, “Varieties in the Human Species” (1749). This isolated ethnographic description—which he borrowed from a travel account rather than from the late seventeenth-century compendium of mortuary rituals that was the basis for the Encyclopédie articles—resonated in significant ways with his physiological theory of death:

They have very unusual customs in certain provinces of the Congo: for example, when someone dies in Lowango, they place the corpse on a sort of amphitheater, elevated to six feet, in the position of a man who is seated with his hands resting on his knees; they dress the corpse in the most beautiful things they have and then
light a fire in front of it and behind it; as it dries out and the fabrics are imbibed, they cover it with other fabrics until it is entirely dried out, after which they carry it into the earth with much pomp.32

Although Buffon did not draw any explicit connection between the rites described here and his own physiological theory of death, it seems safe to assume that he was struck by the fact that the Congolese technique of drying out the corpse in preparation for burial mirrored and furthered the natural process of ossification that led to death itself. In light of the continuum Buffon posited between life and death, such rites could be seen as not merely symbolic, but rather as a means of extinguishing any remaining vestiges of life in the corpse and thereby preparing for its integration into the inert realm of minerals. The choice of this particular example thus reflects not only Buffon’s critique of the place of death in his own culture and his belief that the transition between life and death warranted special human care but also his elaboration of a rich imaginative trope connecting death to ossification and petrification.

Buffon also treated death within the framework of what Lorraine Daston has identified as the theory of classical probability, and here one might conclude with Jacques Roger that “Buffon collaborate[d] in the dissimulation of death” that he criticized elsewhere as inhuman.33 As Daston has shown, Buffon’s statistical studies of human mortality, first published in the Histoire naturelle de l’homme and then revised and expanded in the fourth volume of the Supplément to the Histoire naturelle (1777), were part of a broader rise in probabilistic thinking that “labored over a model of rational decision, action, and belief under conditions of uncertainty.”34 Statistical research on the length of human life was undertaken from the late seventeenth century forward, the most famous example being Sir William Petty’s essays on political arithmetic. The main interest of many such works was in political economy and practical questions surrounding annuities and early forms of life insurance.35 Although Buffon did not exclude such considerations from his discussion, his real interest in the statistics lay in what he called the “moral arithmetic” that could be derived from them.36 His statistical studies were thus inseparable from his preoccupation with the place of death in Enlightenment culture. Like his ethnographic description of the Congolese rites, they were part of his attempt to elaborate an appropriate (and appropriately human) philosophical attitude toward death within a rationalist and materialist framework.

Buffon observed in the 1777 Supplément that his earlier discussion of life expectancy was a part of the Histoire naturelle de l’homme that, although crucial, was misunderstood by many of his readers: “Knowledge of the probabilities of
the length of life is one of the most interesting things in the Natural History of man; it can be drawn from the mortality Tables I have published. Several people seemed to me desirous of seeing the results in detail, & the applications for all ages, & I decided to give them here as a supplement, all the more willingly as I noticed that people often make mistakes in reasoning about this matter, & that false inductions were drawn from the reports presented in these Tables. In acknowledging that his mortality tables had been misinterpreted, Buffon may have been alluding to d’Alembert’s critique of his approach to calculating moral expectation. But he may also have simply been acknowledging that probability theory was new enough to provoke a certain amount of confusion amongst his broad readership, which included not only members of professional societies and academies but also salon audiences. Such confusion is not surprising when one considers that Buffon’s analysis of the tables combined a bold attempt to confront the omnipresence of death in eighteenth-century France, with a seemingly incongruous attempt to shield his readers (and perhaps himself) from any personal fear of death.

On one end of the life spectrum, the mortality tables served as a chilling reminder that most babies born in eighteenth-century France would not survive into adulthood. Buffon coolly summarized his findings as follows:

Here are the general truths this Table presents to us:

A quarter of the human race perishes, as it were, before seeing the light, since close to a quarter dies in the first eleven months of life, & in this short space of time many more die below five months than above.

A third of the human race perishes before reaching the age of twenty-three months, that is to say, before acquiring the use of the limbs & most of the other organs.

Half of the human race perishes before the age of eight years one month, that is to say, before the body is developed, & before the soul manifests itself through reason.

Two-thirds of the human race perishes before the age of thirty-nine, such that there is hardly a third of men who can propagate the species, & not even a third who can achieve a stable state in society.

Above and beyond the brutal facts of infant and child mortality, Buffon’s analysis underlined the extent to which enlightenment remained inaccessible to the majority of people born in eighteenth-century France simply by virtue of their life expectancy: one-quarter never saw the light; one-third never developed the use of their limbs or senses; one-half never acquired the use of reason; and two-thirds never reproduced or attained an established position in society. If one considers that one of the goals of the Enlightenment was, as Diderot put it in the Encyclopédie, to advance general instruction, this was a sobering reminder that until basic living conditions improved, enlightenment would remain the province of a privileged minority.
On the other end of the life spectrum, however, Buffon derived a surprisingly reassuring “moral arithmetic” from the very same mortality tables:

We have said that a reason for living is to have lived, & we have demonstrated it with the scale of probabilities for the length of life; this probability is in truth increasingly smaller as the age increases, but when it is complete, that is to say, at eighty years of age, this same probability, decreasing less and less, becomes as it were stationary and fixed. . . . The Philosopher must therefore regard old age as a prejudice, as an idea that is contrary to man’s happiness, & that does not trouble that of animals.42

On the basis of his statistical tables, Buffon observed that human life expectancy ceased to diminish significantly after age eighty, becoming “pour ainsi dire stationnaire & fixe.” The moral arithmetic he derived from the tables was thus that old age, like the fear of death, was yet another prejudice to be eradicated by the rational philosopher. Buffon was seventy years old when these analyses were published, and he had suffered from a life-threatening illness six years earlier, but he made no reference to his age or to his own attitude toward death. With hindsight, however, there is a curiously personal dimension to his concluding claim that an eighty-year-old man could “legitimately hope” to live another three years: statistics and legitimate hopes notwithstanding, Buffon died on 16 April 1788, at eighty years of age.

The last work Buffon published before his death was the *Histoire naturelle des minéraux*, five volumes and an atlas published between 1783 and 1788. This remains the least known of his works, despite his personal investment in it and the care he devoted to its redaction.43 Even the eminent Buffonian Jacques Roger expressed little enthusiasm for the work, judging that “with [its] numerous pages of detailed discussions written most often in the most prosaic style, the Natural History of Minerals was and remains a dry work.”44 Roger further downplayed the importance of Buffon’s last work by concluding his intellectual biography with a discussion of *Des époques de la nature* (1778), a work he considered the crowning achievement of Buffon’s career. Yet as the editors of the Pléiade edition have observed, the critical neglect surrounding the *Histoire naturelle des minéraux* is “unjust,” for this work “is no less rich in beautiful texts than the preceding series and . . . it is not lacking in general considerations.”45 To this I would add the stronger claim that the *Histoire naturelle des minéraux* merits special consideration as Buffon’s testament. By the time he wrote the mineral volumes, Buffon had suffered from a life-threatening illness that elicited discussions at Versailles about who should succeed him as director of the Jardin des Plantes. Although he recovered quickly from this illness (which may have been an abscess in the intestines), he began suffering from painful kidney stones shortly thereafter and continued to do so until his death.46 We thus have reason to believe that Buffon
wrote the *Histoire naturelle des minéraux* with an acute sense that his lifelong contribution to natural philosophy would soon be coming to an end. His awareness of his mortality made its presence felt, in subtle but tangible ways, in his last defense of his method as a naturalist, and above all in his discussion of fossils. It was here that the various strands of his lifelong reflection on the place of death in nature and human culture came together, and that the connection between death and fossils found its fullest and most eloquent expression.

Discussions of Buffon’s contribution to the earth sciences have tended to focus on the question of whether his conception of the earth was genuinely historical. In his study of early modern geology, Gabriel Gohau acknowledges that Buffon paved the way for a historical study of the earth by envisioning a far longer time span than the six thousand years of early modern Christian doctrine and by positing the irreversibility of the earth’s history. Nonetheless, he groups Buffon with other early modern thinkers who dispense with “the earth’s archives . . . because their mind judges itself capable of discovering the laws of nature allowing them to deduce the history of the earth.”

Martin Rudwick comes to a similar conclusion, observing that the *Époques de la nature* “superficially . . . might seem to anticipate modern reconstructions of geohistory. But in fact it was profoundly ahistorical, for it postulated a series of changes that had in effect been programmed into the system from the start, and that could be extended into the future with the same degree of confidence.” From the perspective of the history of science, thus, the general consensus today seems to be that Buffon did not significantly contribute to the “reconstruction of geohistory” that would fundamentally transform the earth sciences in the late eighteenth and early nineteenth centuries.

From a literary perspective, however, the historicist trend of Buffon’s late work remains highly significant. Unlike the earlier volumes, Buffon’s late works on the earth are organized chronologically: *Des époques de la nature* is structured around seven moments in the earth’s history (or, as Buffon puts it, “milestones on the eternal road of time”), and the *Histoire naturelle des minéraux* treats minerals in the order of their probable formation in the earth’s crust. As Buffon put it, “Here, the order of our ideas must be the same as that of the succession of time.” In both works, moreover, Buffon subscribed to the view, still controversial in his day, that species can become extinct, and to the even more radical view that all life on earth, including human life, would eventually succumb to the progressive and ineluctable cooling of the earth. Whether or not these aspects of Buffon’s late work constitute a genuinely historical view of nature, they are important from a literary perspective because they imply a broad shift from descriptive to narrative modes of writing, in conjunction with a marked emphasis on endings.
I am suggesting, in other words, is that at the same time Buffon was attributing an irreversible history to the earth, he was contemplating the end of his career as a naturalist and as a writer, and thinking about how to bring closure to his life’s work.

There are a number of indications that Buffon was preoccupied with bringing some form of poetic closure to the *Histoire naturelle*. Toward the end of his life, he began issuing a series of supplementary volumes that included previously unpublished works from early in his career (the first volume appeared in 1774). Thus, as Stéphane Schmitt has observed, Buffon “deliberately merged his principal scientific project with the edition of his complete works.” The edition of an author’s complete works is closely linked to the genres of biography and autobiography (and carries an inevitable association with death, since the edition cannot be seen as necessarily complete until the author dies). One of the initial instigations for Jean-Jacques Rousseau’s *Confessions*, for example, was his publisher’s request for an autobiography to accompany a projected edition of his works. Buffon’s case is quite different, since the *Histoire naturelle* was in important respects a collective work: Buffon relied on a vast network of traveling correspondents and collaborated with several naturalists, notably the anatomist Louis-Jean-Marie Daubenton, whose name appeared alongside that of Buffon in the original Imprimerie Royale edition of the quadruped volumes. Nonetheless, it seems clear that over the course of his career Buffon came increasingly to view his project as coterminous with his name and life as a writer. In 1767, he authorized an edition of the *Histoire naturelle* that excised Daubenton’s anatomical studies, making him in effect the sole author of the abridged work. This gesture was consistent with the views expressed in his famous *Discours sur le style* (1753), where he coined the phrase “le style est l’homme même” (style is man himself) and argued that only well-written works would be preserved for posterity.

Buffon’s preoccupation with closure became more marked in his last work, the *Histoire naturelle des minéraux*. Here he cast a retrospective glance over his career and offered a final defense of his method as a naturalist. In his chapter “On Iron,” he predicted (accurately) that his explanation for the formation of metallic mines would be criticized in subsequent generations as “flimsy and purely hypothetical.” Yet as he had done several times over the course of his career, he defended his recourse to hypotheses and “systems” in the study of nature as follows: “The goal of the naturalist Philosopher must therefore be to elevate himself high enough to be able to deduce from a single general effect, taken as a cause, all the particular effects; but in order to view Nature from this vast perspective, one must have examined it, studied it, & compared it in all the parts of its great expanse; a certain amount of genius, a lot of study, a little freedom of thought, are three traits without which one will only be able to disfigure Nature rather than representing...
her."56 To a certain extent, this was simply a straightforward defense of Buffon’s method, which as several scholars have observed was marked by its innovative blend of detailed empiricism and broad-ranging theories of nature.57 But a subtle shift in emphasis reflected the testamentary status of the Histoire naturelle des minéraux: here, Buffon justified his theories as the fruit of a lifetime of careful, empirical research. As a mature naturalist who had reached the end of his career, he believed he had attained the breadth of experience necessary to propose broad-ranging theories and systems.58

Buffon’s late defense of scientific speculation also took on a new dimension in light of his intimations that his death was approaching. In the chapter “Petrifications and Fossils,” published in the fourth volume of the Histoire naturelle des minéraux in 1786, just two years before his death, Buffon alluded to the fact that he could no longer hope to complete the empirical investigations that been one of the hallmarks of his career as a naturalist.59 With regret, he conceded that he would have to bequeath the study of fossils to future generations, despite the fascination they held for him:

This work on old Nature would require in itself more time than I have left to live, and I can only recommend it to posterity; it [posterity] must seek out these ancient titles of the nobility of Nature, with all the more care that it will be further away from the time of its origin. In gathering those titles and in comparing them attentively, one will see Nature greater and stronger in her springtime than she was in subsequent ages: in following the stages of her deterioration, one will recognize the losses she has incurred, and one will be able to determine a few more epochs in the succession of existences that has preceded us.60

This passage underscores what Benoît De Baere has identified as the epistemological paradoxes in Buffon’s history of the earth: On the one hand, Buffon granted that his history was provisional and that his followers might discover new epochs and species in the earth’s archives. On the other hand, he assumed that new empirical evidence would not fundamentally alter the theoretical underpinnings of his history of the earth. Subsequent generations would invariably discover a history marked by degeneration and decline, as progressively cooler temperatures adversely affected and gradually destroyed a succession of species. This was the “environmental determinism” that has led some historians of science to question whether Buffon’s thought can be seen as genuinely historical.61

Nonetheless, Buffon concluded his chapter on fossils and petrifications by underscoring the importance of empirical facts in the study of nature and refusing to record his speculations regarding fossils: “I repeat, it is with regret that I take leave of these interesting objects, these precious monuments of old Nature, that my own old age does not leave me the time to study sufficiently to draw the conclusions that I foresee but that, being founded only on glimpses, must not find their place in this work where I have made it a
rule for myself to present only truths supported by facts. Others will come after me.62 Here, we see Buffon envisaging not only his own death, but also the outer limits of the vast natural philosophical project in which he was engaged. An important part of that project was to engage in speculative thinking, to look beyond the confines of his existence, and, as De Baere puts it, “to describe the past, the present and, to a lesser degree, the future of our planet.”63 An equally important part, however, was to cultivate an awareness of man’s limited place within the broad history of nature. Human civilizations would rise and fall, and eventually all human life would succumb to the progressive cooling of the earth.64 On an individual level, even with the most optimistic calculation of life expectancy, human life was but a brief flicker against the backdrop of the long history Buffon boldly attributed to the earth. By inscribing his own mortality into his discussion of minerals, Buffon thus signaled not only the limits of his contribution to the natural sciences but also his acute awareness of his own place within the history of nature.

It was here, too, that these personal reflections converged with Buffon’s physiological theory of death as the gradual drying out and hardening of the bones. In explaining petrification to his readers, Buffon situated this mineralogical process on a continuum with the physiological processes of aging and death. Just as death was a gradual process that progressively transformed the body in the midst of life, petrification was a process in which mineral matter supplanted the living substance of plants and animals even as that substance was being destroyed: “Often even as the animal or vegetable substance is being destroyed, the stony matter takes its place, such that without changing shape, these woods and these bones find themselves converted into calcareous stone, marble, rocks, agates, etc.”65 Like the Congolese funeral rites, the process of petrification thus furthered the natural drying out and hardening of the flesh and bones, appearing as the final stage in a long process of mineralization. Moreover, Buffon viewed this process as Nature’s means of preserving a memory of past forms of life, seeming to pay her respects to the dead just as the Congolese did: “This operation of Nature is the great means she has used, and continues to use, to preserve forever the imprints of perishable beings; it is indeed through these petrifications that we recognize her most ancient productions, and that we have an idea of those species that are now destroyed, whose existence preceded that of all currently living or vegetating beings: these are the only monuments of the world’s first ages.”66 Thus, in his last work, Buffon’s physiological theory of death took on an important new dimension: the processes of aging and death paved the way not for the body’s ultimate destruction, but for its preservation as a monument to be excavated by future generations. Just as the first man developed an awareness of death in the midst of life, the record of each living being was inscribed into its body long before it actually died.
Less than ten years after Buffon’s death, in year four of the French Republic (1796 old style), Georges Cuvier read a paper that, as Rudwick observes, “was an occasion of outstanding importance for the history of paleontology, because for the first time the world of science was presented with detailed and almost irrefutable evidence for the reality of extinction.”67 Buffon did not live to witness this sea change in the earth sciences and the ensuing “reconstruction of geohistory in the age of revolution.”68 Nor, of course, did he live to witness the political and social revolution that would transform many of the cultural institutions he had embodied and that would bring his son “Buffonet” to the guillotine. On a certain level, the imaginative connection between death and fossils that Buffon developed over the course of his career shared more with the Renaissance view of fossils than with the modern view that was starting to emerge at the end of his life. At a time when the origin of fossils was still very much in doubt, some Renaissance naturalists subscribed to the view that fossils grew within the earth in a way analogous to living organisms. For these naturalists, Rudwick notes, “stones too clearly shared the characteristic of growth, as stalactites and crystals demonstrated. The decay of some minerals likewise suggested an analogy with disease, old age and death.”69 Certainly Buffon did not subscribe to such outmoded views some two hundred years later. Nonetheless, the connections he drew between the physiology of death and the process of petrification bear the mark of these Renaissance analogies.70 At the same time, I hope to have demonstrated that Buffon’s association between death and fossils has a broader significance beyond its (limited) place in the history of science. It was an imaginative trope that shaped both his natural philosophy and his literary project, making them in an important sense inseparable from each other. Indeed, aging, death, and petrification appear in the Histoire naturelle des minéraux as Nature’s way of writing the record of each living being for preservation in the earth’s archives. This idea takes on a special significance in light of Buffon’s allusions to his impending death, for he too was writing the record of his life as a naturalist even as he envisioned its outer limits. It is in this sense that I have described the Histoire naturelle des minéraux as Buffon’s testament, not only because it lends a personal dimension to his natural philosophy, but also because it brings closure to the Histoire naturelle.

Buffon died on 16 April 1788, attended by his dear friend Suzanne Curchod Necker and his household servant Marie Madeleine Blesseau. The autopsy performed on his body revealed fifty-seven stones in the bladder and left kidney, weighing altogether some eighty-four grams. As was customary at the time, these stones were distributed as keepsakes to a number of Buffon’s acquaintances, including the co-author of the Histoire naturelle des
quadrupèdes, Louis-Jean-Marie Daubenton. This was a strangely fitting way to memorialize the naturalist, encapsulating not only the suffering he had endured from 1771 forward but also his physiological theory of death and its connection to his late reflections on petrification and fossils. In a similar way, the testamentary poetics developed in Buffon’s *Histoire naturelle des minéraux* retrospectively gave shape to his entire project, making his contribution to natural philosophy inseparable from his reflection on death and writing. Like the kidney stones, the *Histoire naturelle des minéraux* was a fitting memorial for a writer who had coined the phrase “le style est l’homme même” and who had argued that only well-written works would be preserved for posterity. These volumes were an occasion for Buffon, who by the end of his life had “deliberately merged his principal scientific project with the edition of his complete works,” to cast a retrospective glance over his life’s work as a naturalist. They were also an occasion for him to evoke his impending death in a way that brought poetic closure to his work, not only because his life and career were coming to an end, but also because the various strands of his imaginative association between death and fossils were finally coming together. To read the *Histoire naturelle* today is thus not only to unearth past forms of knowledge; it is also to excavate the fossilized remains of Buffon’s life as a writer.

**Notes**

I would like to thank the members of the editorial board at *Representations*, and Jonathan Sheehan and David Bates in particular, for their extremely stimulating comments on an earlier version of this essay. I am also grateful to Jean Day for her care and expertise as an editor.

2. Stéphane Schmitt, introduction to Georges-Louis Leclerc, comte de Buffon, *Oeuvres*, ed. Stéphane Schmitt with Cédric Crémière, pref. by Michel Delon (Paris, 2007), xl. Although this edition offers a limited selection of Buffon’s work, I refer to it when possible because of its accessibility. Unless otherwise noted, all translations are my own. For primary works, the original French text is included in the notes.
3. Jeff Loveland has convincingly demonstrated the ways that rhetorical and stylistic considerations shaped Buffon’s presentation of his natural philosophy in *Rhetoric and Natural History: Buffon in Polemical and Literary Context* (Oxford, 2001).
4. “Les membranes deviennent cartilagineuses, les cartilages deviennent osseux, les os deviennent plus solides, toutes les fibres plus dures, la peau se dessèche, les rides se forment peu à peu, les cheveux blanchissent, les dents tombent, le visage se déforme, le corps se courbe, etc.”; Buffon, *Oeuvres*, 263.


7. “Enfin la substance de l’os devient avec le temps si compacte qu’elle ne peut plus admettre les sucs nécessaires à cette espèce de circulation qui fait la nutrition de ces parties; dès lors cette substance de l’os doit s’altérer, comme le bois d’un vieil arbre s’altère lorsqu’il a une fois acquis toute sa solidité; cette altération dans la substance même des os est une des premières causes qui rendent nécessaire le dépérissement de notre corps”; Buffon, Oeuvres, 266–67.


12. “Toutes les causes de dépérissement que nous venons d’indiquer, agissent continuellement sur notre être matériel et le conduisent peu à peu à sa dissolution; la mort, ce changement d’état si marqué, si redouté, n’est donc dans la Nature que la dernière nuance d’un état précédent”; Buffon, Oeuvres, 275.

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13. “Je ne me suis un peu étendu sur ce sujet, que pour tâcher de détruire un préjugé si contraire au bonheur de l’homme”; ibid., 279.


15. “La plupart des hommes meurent donc sans le savoir, et dans le petit nombre de ceux qui conservent de la connaissance jusqu’au dernier soupir, il ne s’en trouve peut-être pas un qui ne conserve en même temps de l’espérance, et qui ne se flatte d’un retour vers la vie; la Nature a, pour le bonheur de l’homme, rendu ce sentiment plus fort que la raison”; Buffon, *Oeuvres*, 276.

16. “La vie s’étient par nuances successives, & la mort n’est que le dernier terme de cette suite de degrés, la dernière nuance de la vie”; ibid., 268.

17. “Si nous nous observions mieux, si nous nous flattions moins, et si dans tout, les autres ne nous jugeaient pas toujours beaucoup mieux que nous ne nous jugeons nous-mêmes”; ibid., 262.


23. “Cet anéantissement que je venais d’éprouver, me donna quelque idée de crainte, et me fit sentir que je ne devais pas exister toujours”; ibid., 305.

24. “Une seconde moitié de moi-même”; “Dans cet instant l’astre du jour sur la fin de sa course éteignit son flambeau, je m’aperçus à peine que je perdais le sens de la vue, j’existaïs trop pour craindre de cesser d’être, et ce fut vainement que l’obscurité où je me trouvais me rappela l’idée de mon premier sommeil”; ibid., 306.

25. Michel Delon, preface to ibid., xi.

26. Ariès, *L’homme devant la mort*, 317–46. Translated by Patricia M. Ranum as *Western Attitudes Toward Death: From the Middle Ages to the Present* (Baltimore, 1974). For Ariès, the distancing of death initiated in the early modern period culminates in today’s modern hospital death. There is a striking parallel between Buffon’s (positive) account of the imperceptible nuances leading to death, and Ariès’s (critical) account of the engineering of death in the modern hospital: “Death has been dissected, cut to bits by a series of little steps, which finally makes it impossible to know which step was the real death, the one in which consciousness was lost, or the one in which breathing stopped. All these little silent deaths have replaced and erased the great dramatic act of death, and no one any longer has the strength or patience to wait over a period of weeks for a moment which has lost a part of its meaning” (88–89). For an overview of social historians’ contribution to the history of death, see Stephen Wilson, “Death and the Social Historians: Some Recent Books in French and English,” *Social History* 5, no. 3 (October 1980): 435–51.
27. “Nous parlerons ailleurs des usages des différents peuples au sujet des obsèques, des enterrements, des embaumements, etc. la plupart même de ceux qui sont sauvages font plus attention que nous à ces derniers instants, ils regardent comme le premier devoir ce qui n’est chez nous qu’une cérémonie, ils respectent leurs morts, ils les vêtissent, ils leur parlent, ils récitent leurs exploits, louent leurs vertus, et nous qui nous piquons d’être sensibles, nous ne sommes pas mêmes humains, nous fuyons, nous les abandonnons, nous ne voulons pas les voir, nous n’avons ni le courage ni la volonté d’en parler, nous évitons même de nous trouver dans les lieux qui peuvent nous en rappeler l’idée; nous sommes donc trop indifférents ou trop faibles”; Buffon, Oeuvres, 281.


29. See McManners, Death and the Enlightenment, 295–99. This conversation continues to this day in the anthropological literature. See, for example, Peter Metcalf and Richard Huntingdon, Celebrations of Death: The Anthropology of Mortuary Ritual, 2nd ed. (Cambridge, 1991).

30. “Il semble que la nature a part-tout inspiré aux hommes ce dernier devoir envers leurs semblables, qui leur sont enlevés à la mort; & la religion, soit vraie, soit fausse, a consacré cet usage”; “Funérailles, [Hist. mod.],” in Encyclopédie, ARTFL. Much of the material for the “Funérailles” articles was taken from Pierre Muret, Cérémonies funèbres de toutes les nations (Paris, 1679).

31. “Le droit de sépulture est fondé sur la loi de l’humanité, & en quelque sorte même sur la justice. Il est d’humanité de ne pas laisser les cadavres humains pourrir, ou livrés en proie aux bêtes”; “Sépulture, [Droit naturel],” in Encyclopédie, ARTFL.

32. “Ils ont des usages très singuliers dans certaines provinces de Congo, par exemple, lorsque quelqu’un meurt à Lowango ils placent le cadavre sur une espèce d’amphithéâtre élevé de six pieds dans la posture d’un homme qui est assis les mains appuyées sur les genoux, ils l’habillent de ce qu’ils ont de plus beau et ensuite ils allument du feu devant et derrière le cadavre, à mesure qu’il se dessèche et que les étoffes s’imbibent ils le couvrent d’autres étoffes jusqu’à ce qu’il soit entièrement desséché, après quoi ils le portent en terre avec beaucoup de pompe”; Buffon, Oeuvres, 366. With respect to the source of this information, Buffon remarks: “I took these facts from a relation that was communicated to me by M. de La Brosse who wrote the principal things he noticed during a voyage he made to the coast of Angola in 1738” (366). The editors of the Pléiade edition note that they have been unable to identify this traveler. On Buffon’s anthropological sources and reliance on travel literature, see Michèle Duchet, Anthropologie et histoire au siècle des Lumières, 2nd ed. (1971; reprint, Paris, 1995), 229–80.


35. Daston cites Jan De Witt’s Waerdye van Lyf-Renten [Treatise on life annuities] of 1671 as “one of the earliest attempts to extend the new mathematics of probability to other sorts of aleatory contracts besides games of chance”; Classical Probability, 27. Reinhart Koselleck links the emergence of life insurance and studies of life expectancy to the conceptual relationship between present and future in the early modern period, with its characteristic focus on rational prognosis;

36. The phrase “moral arithmetic” appears in Buffon’s Essai d’arithmétique morale, published in the fourth volume of the Supplément to the Histoire naturelle in 1777. This work was symptomatic of the alignment of mathematical and moral expectation in classical probability theory. See Daston, Classical Probability, 90–95; on the application of classical probability theory to the moral sciences among later writers, see 296–369.

37. “La connaissance des probabilités de la durée de la vie, est une des choses les plus intéressantes dans l’Histoire Naturelle de l’homme; on peut la tirer des Tables de mortalité que j’ai publiées. Plusieurs personnes m’ont paru désirer d’en voir les résultats en détail, & les applications pour tous les âges, & je me suis déterminé à les donner ici par supplément, d’autant plus volontiers que je me suis aperçu qu’on se trompoit souvent en raisonnant sur cette matière, & qu’on tiroit même de fausses inductions des rapports que présentent ces Tables”; Buffon, Histoire naturelle, générale et particulière: Supplément (Paris, 1777), 4:149. Unfortunately, the Pléiade edition does not include this key supplement to the Histoire naturelle de l’homme, but it can be accessed through Gallica, the Bibliothèque nationale de France’s digital library, at http://gallica.bnf.fr/ark:/12148/bpt6k97517m.

38. Daston notes that d’Alembert criticized Buffon’s method for failing “to coincide with psychological expectation, that is ‘moral experience’”; Classical Probability, 87. On d’Alembert’s critique of probability theory more generally, see 76–90.

39. “Voici les vérités générales que nous présente cette Table: Le quart du genre humain périt, pour ainsi dire, avant d’avoir vu la lumière, puisqu’il en meurt près d’un quart dans les premiers onze mois de la vie, & que dans ce court espace de temps il en meurt beaucoup plus au-dessous de cinq mois qu’au-dessus. Le tiers du genre humain périt avant d’avoir atteint l’âge de vingt-trois mois, c’est-à-dire, avant d’avoir fait usage de ses membres & de la plupart de ses autres organes. La moitié du genre humain périt avant l’âge de huit ans un mois, c’est-à-dire, avant que le corps soit développé, & avant que l’âme ne se manifeste par la raison. Les deux tiers du genre humain périssent avant l’âge de trente-neuf ans, en sorte qu’il n’y a guère qu’un tiers des hommes qui puissent propager l’espèce, & qu’il n’y en a pas un tiers qui puissent prendre état de consistance dans la société”; Buffon, Histoire naturelle: Supplément, 4:161.

40. McManners discusses the accuracy of these statistics in Death and the Enlightenment, 10–11; see also 89–119. With respect to Buffon’s surprising suggestion that those who die before age 39 do not have a chance to propagate the species, McManners observes that the “postponement of marriage was the keystone of the old demographic structure, the essential contraceptive device keeping population and resources in equilibrium” (69).

41. “Puisse l’instruction générale s’avancer d’un pas si rapide que dans vingt ans d’ici il y ait à peine en mille de nos pages une seule ligne qui ne soit populaire!” Denis Diderot, “Avertissement des éditeurs,” Encyclopédie, ARTFL. This “Avertissement” to the eighth volume was published in 1766.

42. “Nous avons dit, qu’une raison pour vivre est d’avoir vécu, & nous l’avons démontré par l’échelle des probabilités de la durée de la vie; cette probabilité est à la vérité d’autant plus petite que l’âge est plus grand, mais lorsqu’il est complet, c’est-à-dire, à quatre-vingts ans, cette même probabilité qui décroît de
moins en moins, devient pour ainsi dire stationnaire & fixe. . . . Le Philosophe doit dès-lors regarder la vieillesse comme un préjugé, comme une idée contraire au bonheur de l’homme, & qui ne trouble pas celui des animaux”; Buffon, Histoire naturelle: Supplément, 4:411.


44. Roger, Buffon: A Life in Natural History, 524.


46. See Roger, Buffon: Un philosophe au Jardin du Roi, 469.

47. “Les archives de la terre . . . parce que leur esprit se juge apte à découvrir des lois de la nature leur permettant d’en déduire l’histoire de la terre”; Gabriel Gohau, Les sciences de la terre aux XVIIe et XVIIIe siècles: Naissance de la géologie (Paris, 1990), 212.


50. Quoted in Rudwick, Bursting the Limits of Time, 143.

51. “L’ordre de nos idées doit être ici le même que celui de la succession des temps”; Buffon, Oeuvres, 1345.

52. Schmitt, introduction to ibid., xli. Roger gives a more pragmatic explanation for the publication of the supplementary volumes: “Certain volumes of the Supplement serve as a bit of a grab bag, and one cannot help thinking that Buffon made money for himself by reselling to Panckoucke old texts at the price of twelve thousand livres per volume.” Whether or not this was a factor, one might contest Roger’s claim that “the old articles on the strength of wood, the eccentricities of ligneous layers, and the effect of frosts on plants . . . have nothing to do with what he was doing at the time,” given the relevance of these texts to the imaginative association between death and fossils. Roger, Buffon: A Life in Natural History, 384.


56. “Le but du Philosophe naturaliste doit donc être de s’élèver assez haut pour pouvoir déduire d’un seul effet général, pris comme cause, tous les effets particuliers; mais pour voir la Nature sous ce grand aspect, il faut l’avoir examinée, étudiée & comparée dans toutes les parties de son immense étendue; assez de génie, beaucoup d’étude, un peu de liberté de penser, sont trois attributs sans lesquels on ne pourra que défigurer la Nature, au lieu de la représenter”; ibid., 2:345.


59. Even Buffon’s highly speculative history of the earth in *Des époques de la nature* was based on a lengthy and apparently accurate investigation into the amount of time necessary for metal balls of various sizes and substances to cool. See Roger, *Buffon: Un philosophe au Jardin du Roi*, 516–20.

60. “Ce travail sur la vieille Nature exigerait seul plus de temps qu’il ne m’en reste à vivre, et je ne puis que le recommander à la postérité; elle doit rechercher ces anciens titres de noblesse de la Nature, avec d’autant plus de soin qu’on sera plus éloigné du temps de son origine. En les rassemblant et les comparant attentivement, on la verra plus grande et plus forte dans son printemps qu’elle ne l’a été dans les ages subséquents: en suivant ses dégradations, on reconnaîtra les pertes qu’elle a faites, et l’on pourra déterminer encore quelques époques dans la succession des existences qui nous ont précédés”; Buffon, *Oeuvres*, 1356.


62. “Je le répète, c’est à regret que je quitte ces objets intéressants, ces précieux monuments de la vieille Nature, que ma propre vieillesse ne me laisse pas le temps d’examiner assez pour en tirer les conséquences que j’entrevois, mais qui n’étant fondées que sur des aperçus, ne doivent pas trouver place dans cet ouvrage où je me suis fait une loi de ne présenter que des vérités appuyées sur des faits. D’autres viendront après moi”; Buffon, *Oeuvres*, 1364.


64. On Buffon’s view of the rise and fall of human civilizations, see Eddy, “Buffon’s *Histoire naturelle*: History?” 658–61; and De Baere, “La philosophie de l’homme de Buffon.”

65. “Souvent même à mesure que la substance animale ou végétale se détruit, la matière pierreuse en prend la place, en sorte que sans changer de forme, ces bois et ces os se trouvent convertis en pierre calcaire, en marbres, en cailloux, en agates, etc.”; Buffon, *Oeuvres*, 1354.
66. “Cette opération de la Nature est le grand moyen dont elle s’est servie, et dont elle se sert encore, pour conserver à jamais les empreintes des êtres périssables; c’est en effet par ces pétrifications que nous reconnaissons ses plus anciennes productions, et que nous avons une idée de ces espèces maintenant anéanties, dont l’existence a précédé celle de tous les êtres actuellement vivants ou végétants: ce sont les seuls monuments des premiers âges du monde”; ibid., 1355.


68. This is Rudwick’s subtitle for *Bursting the Limits of Time*.


70. On Renaissance analogies, see Foucault, *Mots et choses*, 32–59. Rey notes that Buffon may have been influenced by Louis Bourguet’s work on fossils in developing the concept of the *moule intérieur* within his theory of generation; “Buffon et le vitalisme,” in *Buffon 88*, 404.
