

Mammoths, Inc.: Nature, Architecture, and the Debt, Part 1

AUTHOR

Arindam Dutta

[View full image +](#)

Nineteen pages of Thomas Jefferson's *Notes on the State of Virginia* are devoted to mammoths.¹ Novice readers of early American history may well be puzzled by this inordinately long exposition, practically the lengthiest treatment of any single topic in a report written in the midst of a revolutionary war. Why this ambling and amicable, more to the point, *extinct*, animal should so exercise Jefferson's mind may appear even more baffling if one considers the circumstances of his writing. The *Notes* is a wartime intelligence report written in response to an anxious request by the secretary to the French legation in Philadelphia,

The two essays of *Mammoths, Inc.* look into the workings of public debt: a ghostly, spectral technology foundational to the liberal state and modern capitalism alike. These two essays are part of a three-volume study,

François Barbé-Marbois, as Jefferson himself withdrew from Richmond to Charlottesville under attack from Cornwallis's ships. Further, ignominious, retreat was called for as Jefferson abandoned Monticello itself to evade a fast-moving inland British commando raid, squirreling himself away into the nearby Blue Ridge Mountains. Throughout these military maneuvers of cat-and-mouse, and despite the tragic death of his daughter sometime in the middle of 1781, Jefferson carried the voluminous jottings for the *Notes* with him. His response, finished a year after the original request, remained somewhat sketchy in parts, but was by no means a slapdash tract, given that Jefferson submitted the document, after a further series of revisions, to a printer in Paris to publish 200 copies for private distribution in 1785.

That the mammoth was no chance insert is easily supported by a number of subsequent actions by Jefferson, the aggregate of which evince nothing less than a lifelong pursuit that he would continue till his death. As early as November 1782, for example, he wrote to James Steptoe—his agent in Williamsburg charged with purchasing natural specimens as they arrived from the frontier—of his hope that the latter “would be able to procure for me some of the big bones.”² Big bones comprise also the principal preoccupation of the first page and a half of Jefferson's letter to James Madison of February 20, 1784. Political theorists may well pass over this somewhat innocuous prelude given the letter's other contents, which concern, one presumes, the much more pressing matter of the difficulties faced by Jefferson and Madison in assembling enough members of a fugitive Congress to ratify the external and internal borders of the seven or nine (depending on the point of view) United States.³ Once again, the mammoth appears in a strange kind of parataxis. It rears its beastly head in the midst of a momentous political and strategic discussion, impertinently trumpeting its presence amidst all the telegraphic talk of secession and cessation, cession and scission, among the future heads of a yet-undetermined state. And it is not as if this monstrous specter, conjured up in some alternate paroxysm of liberation, withers away as the American state finds a surer foothold on the coasts of the Atlantic. The refrain appears again and again throughout Jefferson's correspondence: “Could I so far venture to trouble you on this subject ... to procure the [mammoth] bones above mentioned?” he wrote to fellow Committee of Five member Robert R. Livingston in 1800.⁴ The quest for mammoth fossils underlies the principal injunction given by Jefferson to André Michaux in the latter's assignment to explore the “western boundary” of the United States in 1793; likewise

titled *Ancestralities*, on the relationship between architecture, public debt, and sovereignty in the last four centuries.

TAGS

volume 2

DOWNLOAD PDF

the instructions provided to Meriwether Lewis a full 10 years later, the latter in fact comprising a fully funded, clandestine state commission initiated in the second year of Jefferson's presidency. Go find the shortest and most convenient route of communication between the United States and the Pacific Ocean, says Jefferson, learn about everything you pass on the way, and report as you go. There is a more or less tacit caveat here, which, if overlooked, would be to miss the very nature of the exercise contemplated: keep yourself to the "*temperate latitudes*."⁵ And, sure enough, "Under the head of animal history, that of the mammoth is particularly recommended to your inquiries, ... to learn whether ... [it] is found in those parts of this continent, or how far north they come."⁶

That for Jefferson this search remained somehow critical to imagining the future horizon of the nascent state is given further weight by the display of the spectacular "mammoth" cranium in the living room at Monticello after a lifetime of pursuit and 25 years after writing the *Notes*. The cranium was obtained on the second expedition financed by Jefferson, headed by Meriwether Lewis in 1807 to the Big Bone Lick on the Ohio River, Cincinnati (the site from which Buffon's own specimen had been obtained) after the first finds of the Lewis and Clark mission were lost in transit. Even today, these bones occupy pride of place on a table kept by the right-hand wall as one enters Monticello.

Why this to-do about fossils? This strange, obsessive quest, interleaved amongst the missives of a political quest, this vexed desire threading together the historical exigency of the present with the mechanics of prehistoric glacial retreat? Why this sustained program to witness the unwitnessed, this need to place the extinct in the very middle of political birth?

§ 1

J.G.A. Pocock has argued that the American Revolution be considered as much a British one, equally describable in "terms of a *divergence* of political styles within what had been a *common* tradition, and so [the scholarly task is] to ask how it happened that the divergent nationalities acquired the political styles that they did."⁷ At its inception American insurgency was directed against Parliament and not against king, in that sense the Revolution comprised a continuing ramification of the internal dynamics of 1688 on British politics, where sovereignty would emerge only as an unexpected, fortuitous outcome. In what follows, it will be argued that, in the context of the Revolutionary War, the

mammoth is constituted as a form of evidence in a conflict over not only rights and territory, but also the very epistemic frames in which questions of rights and of territory, of government, might be evaluated, indeed, comprehended. For Jefferson, the elephant, as much of the literature suggests, is not just a threatened cultural emblem of an unrealized national project, nor is it purely a counterfactual specimen that will cure a defective science.⁸ Something much larger is at stake, something that can be better understood only if one recasts the *Notes* as what they are: a treatise on political economy designed to persuade the future state's potential financiers of the economic viability of America. Which is to say: of the United States as an autonomous economic territory, prised loose from the cash-crop supplying debt-mechanisms of British capital. The mammoth appears under the query titled, "A Notice of the Mines and Other Subterranean Riches; Its Trees, Plants, Fruits, &c." To be sure, there are the appropriate opening passages on gold and lead, which lead moreover to descriptions of marble deposits, salt, grape, limestone and iron, strawberries and muskmelons, as Jefferson strives to scrupulously answer the queries of his French interlocutor.

The *Notes* is an application for a loan. Its observations are structured, and numbered, according to the various "Queries" in the format furnished by Barbé-Marbois—the equivalent of loan officer in question—in 1780 to not just Jefferson but several respondents as well, the objective being to ascertain the productive wealth of America. For the French state, on the other hand, the physiocratic format of the queries represents an attempt to determine its collateral in an escalating, 100-year contest with Britain over their ballooning credit, two bends in which would be the American and French revolutions themselves. In pursuance of that credit, the year of the publication of the *Notes*, 1784, was also the year that Jefferson was sent to Paris to negotiate economic treaties, in the course of which he "discovered that the Confederation government was too weak to impress the great powers of Europe who held the keys to Atlantic commerce."⁹ This is after all the portrait that the lists of minerals and fruits, of land and institutions, of climate and terrain are meant to sketch out in stipple, a sort of promissory note for capital, if you will.

Alongside the many military wars fought as part of this competition over credit, fought as avidly in the faraway territories of Canada and India as on the European continent, one also encounters—as did Jefferson—what has been termed "the Newton Wars,"¹⁰ a long-running epistemological and institutional conflict, still ongoing today,

over the limits of knowledge itself, limits that would define the very legitimacy of the debt, not to rule out government as such. The mammoth thus constitutes not just a piece of evidence, but also the very figure of strife, as the ancestral decider by which Nature and its “oeconomy” might be seen to fall into one or the other kind of “system.”¹¹ In that sense, the *Notes* presents not only an estimation of future wealth, the calculation of collateral, but also a riposte to the prevailing calculus itself; the mammoth barges in, literally marauds the very appropriateness of the question by complicating and confounding the form of its response. It is the butting head of a retort, a lumbering juggernaut whose alterity begins to overflow the banks of the reservoir from which the hydraulics of the questionnaire has been framed, mussing up the table and the very format of data gathering. It is not by chance that the chapter on mines is by far the longest in Jefferson’s report, twofold its nearest rival, and the least to the point.

§ 2

Within European institutions, the publication of Newton’s *Principia* in 1687 had triggered a crisis in the world of letters in what was already and widely felt as a cognitive divide since the publication of Descartes’ *Meditations* in the 1640s. In the Cartesian universe, the reflexive verifiability availing within mathematics is given primacy over the senses in ascertaining truths about the cosmos. “Even before, when I was completely preoccupied with the objects of the senses, I always held that the most certain truths of all were the kind which I recognized clearly in connection with shapes, or numbers or other items relating to arithmetic or geometry, or in general to pure and abstract mathematics,” writes Descartes in the *Fifth Meditation*, on “the essence of material things.”¹² This “transcendental revolution” threatened, paradoxically, to erase precisely that which it purported to systematically understand, in that the demotion of the sensible appeared to make matter “disappear” or render it intangible, confirmable only through the reflexive and systematizing power of the intellect.

The success of Newton’s *Principia*, in its thoroughgoing formal explication of the forces availing in the universe, opened up a theological dispute over causality that Newton himself was hard put to settle. In opening up the “closed world to the infinite universe,” to use Alexandre Koyré’s famous phrase,¹³ Newton remained skeptical of the

“systematic” implications of his own discoveries, in that the very regularity observable in the cosmos and its behavior appeared to him the confirmation of a deistic power that willed it as such. The Leibniz-Clarke debates—the latter “violently and acerbically” egged on, occasionally ghost-written, by Newton himself¹⁴—can be characterized as a methodological conflict between the descriptivism of the Newtonians and the speculative metaphysics advocated by Gottfried-Wilhelm Leibniz, the latter echoing the Cartesian argument. For Leibniz, that science should restrict itself only to understanding the regularity of phenomena, as the *Principia* had done, rather than speculate upon cause—*why* the world was this way and not otherwise—verged on the “occult,” of a “*deum ex machina*” that acted arbitrarily at every turn, subscribed to no laws, and made irrelevant the efforts of science in that it rendered suspect the lawfulness of the whole of the system as consistent with its parts.¹⁵ For Samuel Clarke, the Cartesian concept of the universe as a perpetual motion machine (a theory already experimentally dismissed as a chimera), a giant clockwork preternaturally wound up for eternity appeared to suggest a God with no volitional discretion whatsoever, a God without power of amendment, bound by his own natural laws as to rule out his very supernaturality, therefore condemning the world and human history as bound by ineluctable fate rather than by divine providence.¹⁶ A Cartesian God was merely an *a priori*, a principle of impetus, with no lapsarian agency of interfering with his own creation. Voltaire would ridicule such a “spirit of system”¹⁷ in *Candide*: “...car, tout étant fait pour une fin, tout est nécessairement pour la meilleure fin. Remarquez bien que les nez ont été faits pour porter des lunettes; aussi avons-nous des lunettes.”

In effect, the *Principia* had proved that “a purely materialistic or mechanistic physics [is] impossible... Newton exorcised the machine; he left the ghost intact.”¹⁸ For the Newtonians, the self-referential absolutism of the Leibnizian calculus was indicative of a metaphysical hubris, tantamount to philosophical heresy, that forsook the limits on understanding placed by the senses, delivering reason rather to a terrain of abstract, solipsistic flights of the imagination about adamantine, unchanging “first principles” driving contingency in the universe. A case in point was the Cartesians’ “fantastic” conjuration of negative and imaginary numbers (essential to the Leibnizian calculus) as well as the mathematical concept of infinity, to the Newtonians a sheer, absurd contradiction in terms. An “infinite universe” governed by inflexible laws inevitably offered an alibi for despotism, as opposed to a “closed world”

designed by a God who retained his freedom to rewrite the rules. This ontological skepticism about infinity might be said to define the Enlightenment, cleaving it down its middle. The skeptics' faction included within its ranks luminaries such as Berkeley, Pascal, Voltaire, Malebranche, Locke, and Hume, not to rule out the Burke of the *Reflections*, for whom the finite limits posed by the senses provided little insight into the ultimate causes and God's design of the universe, confusing as they did teleology with eschatology. For these skeptics, what was required, rather, was an "epistemological modesty" or descriptivism restricted to the observation of regularity in natural patterns. The schism between rational explication and descriptive empiricism would not be "solved" until Kant's "critical turn" or "correlationist" argument of the 1780s.¹⁹

§ 3

One of the questions around which this dispute about causality and contingency began to revolve in mid-century was the size of the debt or, more importantly, the public debt. Between 1755, the year of the onset of the Seven Years' War, and 1783, the conclusion of the first eight years of the war with America, the National Debt in England grew from around 72 million pounds to 262 million pounds.²⁰ As public realization grew that the debt was now a permanent institutional entity—a perpetual motion machine in its own right—which the State would have to service in perpetuity in the form of interest, the apprehensions raised by this exorbitant figure—a negative number seemingly verging on infinity—was described by some in terms of the sublime, a new despotic power curtailing precisely the freedoms which it was supposed to sponsor. Peter de Bolla has written of the anxieties created by this inordinate expansion in the analogy of the "sublime," the 18th-century figure of discursive excess, in that this infinite figure appeared to represent an unrepresentable *negative* exorbitance that questioned the very basis of the discourse of sociality and taste exemplified in Shaftesbury's civic humanism and the Scottish school of political economy. De Bolla describes the sublime, in its economic connotations, as the "production of an inflationary element within the bounds of the legislated territory": for 18th-century political economy, "the representation and legislation of the 'real' excess of credit that flooded the national financial markets during the [Seven Years'] war" presented not only a cognitive absurdity but also, in its ability to interfere with the power of sovereignty itself, struck at the very moral premises of their new science.²¹ The

‘exogenous’ determination of the value of money, outside the stabilizing modalities of natural exchange and outside the fiat of the sovereign, seemed to many yet another despotic power emerging precisely through the battles over representational devolution defining the politics of this period.²²

The “financial revolution” of the 18th century was, as P.G.M. Dickson has described it, “an age of wagers on the lives of private and public men, the chances of war, and the occurrence of natural events, as well as the issue of a horse-race, the fall of dice, the turn of a card.”²³ If the attestations here appear too numerous to recount, they are nonetheless marked by an extraordinary unanimity. In the *Tatler* and the *Spectator*, Addison and Steele lampooned the venal “stock-jobbers” in Change Alley and the ruinous temptations of the lottery as no different from the dismal appearance of “Lady Credit” in the Bank of England.²⁴ Adam Smith likewise spoke of legal Bank tender in the *Wealth of Nations* as the flighty “Daedalian wings of paper money” as opposed to the “solid ground of gold and silver.”²⁵ Thomas Paine’s *Dissertations on Government* of 1786 (a response to Pennsylvania’s defalcation on certain debts), describes paper money as akin to “dram drinking,” a “deceitful sensation [that] *gradually diminishes the natural heat* ... a bubble and ... attempted vanity. Nature has provided the proper materials for money, gold and silver, and any attempt of ours to rival her is ridiculous.”²⁶ And here is Patrick Murray, Baron Elibank, writing in the immediate prelude to the Seven Years’ War, speaking to the nub of concern:

...what must be the miserable situation of trade and manufactures, in a state, where the policy and interested motives of individuals have so contrived it, that the entrance of money, which would be the necessary consequence of its trade, is debarred by a kind of stratagem or illusion, *viz.* by creating an imaginary money of paper, which the substance, credit or interest of the projectors makes to supply the place of *real* money? Now, such is our own situation, an immense value of bank-notes hath been poured in upon us, and increaseth daily.²⁷

At stake in this assumption of credit, this new nomenclature of writing, was the prerogative of making war, global war, or rather the right to borrow in anticipation of the spoils of war—the profits from investments in biocommodities from distant lands—against the tax revenues from a century of agricultural “improvement” from newly enclosed

Parliamentary lands.²⁸ Indeed, it is impossible not to see the financial revolution in England as one whose credit reliability lay precisely in the ability to make war (with France), a form of accounting elaborated at great detail in William Knox's tract on trade and finances at the conclusion of the Seven Years' War.²⁹ The successes of Britain's wars, the reason for the debt in the first place, increased its credit in the eyes of investors both in London and on the continent, thus rendering it eligible to take on more debt. Given the higher constancy and rates of Britain's debt repayment schedule compared to other European nations, the interrelationship between war and debt thus became "dangerously close to an infinite chain of cause and effect,"³⁰ where, "*great borrowings*, in their effects, augment the necessity for *still greater* ... a system [under which] peace-establishments grow with war-establishments—the loans for during each war, render ... the next peace establishment more onerous."³¹ Kant himself acutely noted this self-propelling tendency in his writing on *Völkerrecht* or "international right": "No peace will last long enough for the resources saved during it to meet the expenditure of the next war, while the invention of a national debt, though ingenious, is an ultimately self-defeating experiment."³²

In the 66 years between 1688 and the outbreak of the Seven Years' War in 1756, England and France were at war for 29. The Seven Years' War, called the "French and Indian War" in the Americas and the "Third Carnatic War" in India, was a global conflict in every sense of the term, involving all the major European powers and viciously fought as far as the southern peninsula of India—including the Battle of Plassey due to which the British obtained the *Diwani* of Bengal—and the banks of the Allegheny and Ohio rivers, where a young Virginia officer named George Washington first saw action. If Britain emerged the victor from this bloody battle over global territory, the French were to have something like a pyrrhic revenge with their support of the American Revolutionary War two decades later, the context of Jefferson's *Notes*. Subsequently, the French Monarchy's own inability to raise money in 1789—beginning with the failure of Jacques Necker's attempt to convert the private *Caisse d'Escompte* into a public bank and the issue of *Assignats* directly modeled on the Bank of England, followed by the convening of the Estates General to raise taxes by increasing the representation of the Third Estate and its subsequent collapse—precipitated the onset of the French Revolution.³³

It is in this sense that the American Revolution should be seen in continuum, as Pocock suggests, with the Whig agitationism of the 18th century. Its inception is owed

precisely to the sentiment that rights over taxation, ordained in the limits posed by natural law, had been abrogated by the illimitable compass of the public debt in Parliament's headlong attempt to assert its supremacy. As an essay in political economy, Jefferson's *Notes* has to be read as an intervention into that ongoing discourse. It is in the abyss opened up between two rival conceptions of wealth—as a law-bound phenomenon defined by natural finitude, as opposed to a speculative forum driven by the exorbitant profligacy of debt—that the mammoth's interred bones sound their cryptic call.

§ 4

Consider, then, what follows after the pages on mammoths: One is brought expressly into a discussion on race, race understood as variants of natural performance, realized in the less or more efficient correspondences between skin and precipitation. At issue is a sort of cuticular performance, the effectiveness of epidermal behavior and the role of formational “juices” in an atmosphere primarily composed of “moisture and heat.” Everything revolves around the question of porosity, of secretions, of fluids and their tissue retention, around the basis for the organism's viability within a given atmosphere. It is in this mode that one finds the discussion on skin coloration later in the *Notes*:

Whether the black of the negro resides in the reticular membrane between the skin and scarf-skin, or in the scarf-skin itself; whether it proceeds from the color of the blood, the color of the bile, or from that of some other secretion, the difference is fixed in nature, and is as real as if its seat and cause were better known to us. And is this difference of no importance?³⁴

This in a chapter on “The Administration of Justice.” Everything—labor, production, government—depends on the management of moisture, its retention and release, and the efficacy of skins. The blacks secrete less by the kidneys, and more by the glands of the skin, which gives them their recognizable and disagreeable odor. But this greater degree of transpiration renders them more tolerant to heat, owing possibly to a structural difference in the pulmonary apparatus, the very likely regulator of animal heat, which makes them part with more of their bodily fluids. The implication in terms of the relationship between motor abilities and labor is clear. Animal confronts aboriginal,

bison and Negro, in an as yet unformed, painfully unsure episteme, in a “half-known world” where the quantum of data far outweighs the available rationales to understand them.

The entire descriptive deportment of the *Notes* is a double one: a primary, physico-physiological machine drives the gears of all the secondary ones, the derivative social machinery of phenomena as diverse as war, marriage, colleges, currency, or elections. This primary machine or set of sub-engines—the heat of the sun, its vestigial entrapment within the earth’s core, their effect on moisture, winds, and terrain—is the superstructure actuating the myriad components of natural wealth, from minerals to the biological capacities of animal, aboriginal and human alike, along with the fecundity of species, the particular genius given to certain races, and, lastly, social behavior and government as well. The generation and degeneration of the earth and the many populations that inhabit it are thus as if set upon a griddle, a vast calorific transfer over the epochs where the meal being cooked is history as such. It is from this broader heliocentric coliseum of thermal forces from which alone one can deduce the mechanisms of being, and from which, consequently, the laws for the most intimate and public concerns of humans can be inferred.

In the *Notes*, matters thus continually oscillate between animate and inanimate physiologies, bringing together what may appear to be unconnected frames of reference.

Mammoths populate the chapter on mines, and quite in the same parataxical, disjunctive fashion, Jefferson turns, in the chapter on “Colleges and Public Establishments,” to what would also be for him, like the mammoths, a lifelong pursuit: architecture. Here, Jefferson describes himself as generally unenthused about the extant architecture in America, few of which he deems “worthy of mention.” His attention is once again drawn by the question of moisture, this time involving a very different kind of skin. Is the dew that gathers inside brick walls a result of the rain seeping through or an atmospheric effect owing to brick and stone being colder than its proximate air? He reckons on the latter, given that moisture on the inside of brick houses is easily dispelled by kindling a fire. And here, in contemplating the deteriorative tendencies of wood and its inability to dispel humidity, he posts a peculiar plaint, shifting the deliberation to a wholly other domain:

A country whose buildings are of wood, can never increase in its improvements to any considerable

degree. Their duration is highly estimated at 50 years. Every half-century then our country becomes a *tabula rasa*, whereon we have to set out anew, as in the first moment of seeing it. Whereas when buildings are of durable materials, every new edifice is an actual and permanent acquisition to the State, adding to its value as to its ornament.³⁵

Let us observe closely the modus of this statement, keeping it in abeyance as a critical indication of the epistemology within which it is posed. In buildings built in stone, the State actuates itself, reprises its role as repository of wealth, ensuring the forward movement of history by guarding against the decomposition and degeneration of accumulated capital back into a primal state. The State's viability rests on its retention of value, built up from a *tabula rasa*, a prior state of nature into which all culture threatens to revert if not governed properly. A distinction is implied between the "actual and permanent" as opposed to the virtual and fleeting bases of value, underlining a nervousness, a disquiet about the chimerical, imaginary countenance of what must be held as, withheld precisely in its physical durability as, wealth. Both State and value appear to operate under a horizon of doubt, an uncertain ontological suspension whose decidability is the very métier of political economy and, consequently, of government. Mammoths and stone construction are thus part of a single, discontinuous epistemological frame, a rubric that encompasses in its widest reaches other theaters of encounter between moisture and heat: coal, fruit, Indians, Negros, bison, and the genius of the European mind.

Throughout the *Notes*, indeed throughout his lifelong correspondence with figures in both the New and Old Worlds, Jefferson is shadow-boxing with an epistemological tradition whose stalwarts one finds strewn throughout his passages: Buffon, Daubenton, and Linnaeus. A principal point of reference, referred to again and again in Jefferson's writing throughout his life, is the 44-volume *Histoire naturelle, générale et particulière, avec la description du Cabinet du Roi* published in quarto between 1749 and 1804 by Georges-Louis Marie Leclerc, Comte de Buffon, director of the Jardin du Roi (later the Jardin des Plantes) since 1739. It is in these pages that one finds the pertinent passages to which Jefferson's queries on the mammoth attempt to form a response. I cite here from volume five of William Smellie's (somewhat liberal) English redaction, titled "Dissertation on Animals Common to Both Continents," i.e., the Old World and New:

In this New World, therefore, there is some combination of elements and other physical causes, something that opposes the amplification of animated Nature: There are obstacles to the development, and perhaps to the formation of large germs. Even those which, from the kindly influences of another climate, have acquired their complete form and expansion, shrink and diminish under a niggardly sky and an unprolific land, thinly peopled with wandering savages, who, instead of using this territory as a master, had no property or empire; and, having subjected neither the animals nor the elements, nor conquered the seas, nor directed the motions of rivers, nor cultivated the earth, held only the first rank among animated beings, and existed as a creature of no consideration in Nature, a kind of weak automaton, incapable of improving or seconding her intentions... Hence no union, no republic, no social state, can take place among them... Their heart is frozen, their society cold, and their empire cruel... Every thing must be referred to the first cause: They are indifferent, because they are weak; and this indifference to the sex is the original stain which disgraces Nature, prevents her from expanding, and, by destroying the germs of life, cuts the root of society.³⁶

An abject climatic predestination consigns life and government in America to the primitive, arresting the taking root and cultivation of modern civilization, and it is here, in this referral to “first causes,” that one can begin to see the source of Jefferson’s disquiet about the *tabula rasa*, about the backwardness to which the hard-won “establishment” of America could always lapse. In a letter written to the Marquis de Chastellux in 1785, Jefferson noted that Buffon himself was not to be faulted for the recent controversy over degeneration which had erupted across the Atlantic. It was rather the Abbé Raynal whose words had so grated the Virginia “plantocracy” and “natural history” enthusiasts of the incipient nation, words that are quoted in Notes untranslated from the French: “*On doit etre etonné que l’Amerique n’ait pas encore produit un bon poëte, un habile mathématicien, un homme de genie dans un seul art, ou seule science.*”³⁷ Not only is the climate and moisture itself degenerative in North America, but it also consigns the human denizens of the New World—*Europeans or otherwise*—to an unalterable system unaffected by the play of natural and human vicissitude, and immune to the potentials of

economic and political husbandry that is the Enlightenment. Throughout the *Notes*, it is clear that what discommodity is expressed is based on this second, specific, thesis alone; by no means is the broader, general logic of Buffon's observation refuted in the least.

As to the degeneracy of the man of Europe transplanted to America, it is no part of Monsieur de Buffon's system. He goes, indeed, within one step of it, but he stops there. The Abbé Raynal alone has taken that step. Your knowledge of America enables you to judge this question, to say, whether the lower class of people in America, are less informed and less susceptible of information, than the lower class in Europe: and whether those in America, who have received such an education as that country can give, are less improved by it than Europeans of the same degree of education.³⁸

Can cultivation reproduce the same level of refinement and productivity upon humans of different kinds in America as those in Europe? Can Enlightenment be transplanted? Transplanted, just as tobacco and cotton had been, to thrive in the new clime? And immediately one sees the gambit represented in this question, a gambit that underlies the entirety of the *Notes*, and indeed goes to the core of the correlation between the temperature of the earth and the retreat of the mammoths: Can capitalism straddle the Atlantic?

Recount now the enormous corpus of archaic as well as modern literature on the interconnections between climate and industry, and between climate and bodies and body politics. Men of the "southern nations," wrote Marcus Vitruvius Pollio, were "quick in understanding, and sagacious in council, yet in point of valor ... inferior, for the sun absorbs their animal spirits."³⁹ Recount also, then, the colloquial set of associations between temperature and temperament long nourished in so many thought traditions of the world, even as it appears to define the West as such: "Play it *cool*," one says; "We have to face up to facts, to the voice of *cold hard reason*"; "It went badly between me and her, things got *heated*." Reason has a temperature, a calorific setting at which it cooks best. For Montesquieu, there is a direct linkage between political and corporeal bodies. In hot climates, men were more delicate, less resistant to pain and consequently to coercion, their heightened sensibility signaling a greater amenability to social order; on the other hand, "a Muscovite has to be flayed before he feels

anything,” predisposing the colder nations toward anarchy.⁴⁰ In temperate zones, love is “accompanied by a thousand accessories,” whereas sex in cold climates is of a more direct, violent character.

This ancient conceit would continue unabated through the Enlightenment, if anything acquiring greater and greater authority as the putative mainspring of the new empire of Reason. Establishing correlations between climates, physiologies, and mentalities would thus constitute something like a *topos* in 18th-century thought, forming the basis of work as diverse as that of Montesquieu as well as the physiocrats and Buffonian naturalists, to Kant’s *Anthropology*, not to exclude its “technological” deployment such as in the clinical nosology of mental health formulated by Philippe Pinel and Jean-Étienne Esquirol, and realized in the architecture of clinical practice such as in Charenton.⁴¹

§ 5

For Buffon, the slow process of the earth’s cooling is the predominant catalyst in the development of species.⁴² The work of the “primary science,” Buffon begins in the *Histoire naturelle*, is to deduce the “particular appearances” of the “oeconomy and manners of animals” and plants as responding to the “different materials of which the earth itself is composed.” Mountains, deserts, forests, latitude and longitude, the movement of the ocean currents, patterns of wind, all these constitute direct inputs into the molding of organisms, which, on the other hand, present as if morphological responses to these combinations of stimuli. A doubling or displacement of organism and mechanism makes itself apparent, where life both relies on the geomechanical environment, while at the same time (by definition) excluding mechanism as such: Natural history is to be “considered as appertaining to physics; but, is not all physical knowledge, [but comprises that] where system is excluded.”

As comets once crashed into the sun, pieces of it fell away to form the planets. The largest and lightest were thrown the farthest, while the smaller, denser fragments, such as the earth, heaved closer. As the earth separated from its star, its fire gradually abated. Cooling down, it became twice as dense, resolving itself into the antithetical materials of earth and water. Because of its rotation, more mass gathered toward the equator rather than the poles, accounting for the highest mountains and the largest continents being in the temperate zone rather than the arctic. Different parts of the

earth cooled unevenly, with a mix of factors—the differential motions of water, slime, clay, sand, stone—accounting for the unevenness of the earth’s surface.

This cooling could be divided into six epochs. This is *Les Époques de la Nature* (1778) published three years before Jefferson’s writing of *Notes*, and probably was the gift Buffon personally gave Jefferson on their first meeting, where Jefferson cordially accosted him about large mammals in America. (“He replied with warmth,” Jefferson recalled, “that if I could produce a single specimen with horns one foot long, he would give up the question.”)⁴³ In the course of the six epochs, the earth, fused by fire, gradually assumed its form and was subsequently covered by the seas, which nourished the organisms that formed the calcareous bodies that one finds everywhere on the continents. Eventually the sea receded. In Epoch Five, the earth cooled enough such that elephants, hippopotami, “giants of every kind” roamed the northern regions, species borne out of the “vigour and magnitude” which the still-ardent earth fed them.⁴⁴ As the north cooled further, the elephants fled south into the Old World, vanished entirely from the New World. They became smaller. This explains why the fossil teeth and prehistoric grinders daily being uncovered in Siberia are bigger than any contemporary specimens of ivory being sold in the Paris markets. This is Buffon’s theory of “degeneration”⁴⁵ : the process of climatic enervation by which modern species, in physical terms at least, come to be a pale shadow of their prehistoric selves.

The axiomatics of each epoch also set up the comparative rubric, a kind of tabular structure, through which different species can be classified. The *Histoire naturelle* rests, throughout, on a double-decker type of arrangement. On the one hand, it presents the measurable aspects of matter, such as temperature, weight, and atmospheric pressure with reference to the constants of natural law. On the other hand, this data is related to the diversity of species, cataloguing evincible phenotypes in terms of the degeneration or change through which the cooling of the planet manifests itself in the diversity of animal morphologies and species.

Here, organisms are broken down into a logic of wholes and parts, a functional order of limbs and organs, by which their relative place in the biome can be determined. In both humans and quadrupeds, for example, the heart is the center of the animal-machine. The difference between the species, on the other hand, can be explained by the relative distance of the extremities of each species from the heart, thus determining the work that each type has to undertake in

order to survive within a given, differentiated environment. The term that Buffon uses for this relationship of parts to parts, this functional differentiation, is, literally, “oeconomy,” a tabular framework wherein comparable functions are accomplished in each species by different organic manifestations. The diversity of species thus retains a kind of teleological commensurability: “In most insects, the organization of the principal part of the animal oeconomy is singular. Instead of a heart and lungs, we find parts which perform similar functions, and for that reason have been regarded as analogous to those viscera.”⁴⁶ A principle of exchange, of the potential substitution of one part of nature with another, becomes palpable, a principle carried forth with great effect through the immense “transplantation” and “acclimatization” programs carried out both within European states and by various colonial firms, including Buffon’s own timber estates at Montbard.⁴⁷

What are the “levers” by which the inanimate forces of climate motivate the animate capacities of the organism? What is the interface in the irreconcilable dualism opened up in the Cartesian universe, between matter and life, between physical entropy and organic degeneration (and generation)? We leave aside Buffon’s response in the form of that hypothetical, submicroscopic element called *moules intérieures*, somewhat on the lines that Newton foreclosed the parallel and potentially infinite regressions of microscopic matter and mathematical scaling through the “crossover” element that he termed *fluxions*.⁴⁸

§ 6

A point of strife immediately presents itself, a strife amounting to nothing less than a crisis in that the model above threatens to undermine its own validity. For Buffon, the temperate climes inherently lend themselves to greater vigor and the dynamic generation of species; the animals of Asia, fed from a more munificent bounty of vegetation, are larger and more prodigious than those of Europe, “less degenerated than any other region.”⁴⁹ However, if this correlation is extended to humans as well, it begs the entire *topos* of temperature and reason that is noted above, of the association between coolness and Enlightenment, with all of its attendant implications on the industry and wealth of Northern Europe and so on.

How is it that the cold humidity of Europe is able to generate the advanced societies and states that produce “*un bon poète, un habile mathématicien, un homme de génie*”: a Newton, or,

for that matter, a Buffon? A similar question besets the *Notes on Virginia*: Either nature is an overdetermining power, which over the long term will reduce the European to the stunted stature of the Indians, or everything depends on cultivation, on which it can be presumed that Indians can be ameliorated alongside the estates of the whites.

A *second* system, secondary but *supervening*, thus becomes necessary in the Buffonian scheme, to guard against this crucial pitfall where the causative force of the primary, morphogenetic engine seems at odds with its effects. A different set of rules, Buffon appears forced to argue, applies to the development of the mind, which is led less by the primordial impulses of nature than by the subsequent strictures of “education.” There is more than an echo of Locke here.⁵⁰ The child, still animal, only partially human, when left at liberty outside the gaze of a governor, neither thinks nor reflects, pursues every path to pleasure, acts without reason or architectonic, “goes and returns, without design or preconceived project.” But when appropriately directed by its guardians, it sizes itself up, gives direction to its actions, thus showing that it has retained the ideas that have been communicated to it by them. “Reflection”—the ability to synthesize ideas unique to humans—therefore needs to be set aside from climatic determination. Buffon describes this as a dissociative, prophylactic capacity by which the primary, immediate animal responses of the senses are relegated by the human brain to an “intermediate and secondary cause of action.” The will triumphs over the body. Even so, at certain times of the day, when one is indolent or fatigued, or when the “vapours” are dominant, even adults can feel the tug of that primary engine, feel themselves at odds, torn, even act contrary to judgment.⁵¹ *Homo Sapiens*—wise man—in Linnaeus’s classification is in Buffon’s terminology, literally, *Homo Duplex*, a being internally composed of two antipodal machines:

The internal man is *double*. He is composed of two principles, different in their nature, and opposite in their action. The mind, or principle of all knowledge, wages perpetual war with the other principle, which is purely material. The first is a bright luminary, attended with calmness and serenity, the salutary source of science, of reason, and of wisdom. The other is a false light, which shines only in tempest and obscurity, an impetuous torrent, which involves in its train nothing but passion and error.⁵²

The human presents a constitutive contradiction. This dualism becomes clear if one examines the illustrative plates commissioned by Buffon for the *Histoire naturelle* between 1749 and 1760 by the artist Jacques Eustache de Sève. A statuesque Great Dane stands in front of a neoclassical terrace overlooking a formal garden, a carefully manicured scene of culture that gives way to wilderness in the immediate foreground, on the edge of which the dog stands. A hippopotamus stands in front of an exotic temple; a pig leans over a sewer gushing from a far village in the background; a pigeon rests on the gatepost of a classical mansion. An armadillo shell, sans the fleshy being within, stands on a podium in front of the ruined walls of a palace. The theme of degeneration is inescapable. In each plate, the animal's continental habitat is signaled by a piece of architecture. The elephant stands in front of—one is led to assume—"Asian" architecture; the zebra in front of what appears to be adobe construction.







Figs. 1-4. Engravings (likely) by C. Baquoy, showing a Great Dane, a hippopotamus, an encoubert (a type of armadillo) shell, and an elephant. C. Baquoy, after Jacques Eustache de Sève, illustrations for Georges-Louis Marie Leclerc, Comte de Buffon, *Histoire naturelle, générale et particulière, avec la description du Cabinet du Roy* (Paris: Imprimerie Royale, 1749–1783).

In all the etchings, the tableau of animal and architecture falls away to reveal, in the foreground, an underside of wilderness—weeds, rotting logs, straying roots, loose dirt—the orderly world, such as it is, teeters on chaos. The animal stands, literally, on a threshold. Historical posteriority—architecture—establishes the index, the frame of reference, for understanding what is primordial, prior; culture offers the contrapuntal measure extricating cultivated nature from an untamed universe.

§ 7

This strife poses a further double bind: The division comprises a controlling mechanism that places constraints on both sides. Think back to that defining strife of the Enlightenment that is already recounted above, between the rational insistence of the Cartesians and the epistemological modesty of the empiricists. Buffon, deeply implicated in the *ancien régime*, a scion of the powerful Burgundy Parlements,

a member of the French Royal Academy of Sciences, and director of the Jardin du Roi, epitomizes the latter tradition. The *Histoire naturelle* is, emphatically, a *histoire*, a descriptive, anti-theoretical, tabulation of the range of found species, on this side of finitude and distancing itself from any speculation on ultimate cause: "...the more we suffer ourselves to wander into these kinds of reasonings, the more we lose the sight of truth in the labyrinth of infinity; ... it is placing the object out of sight, afterward saying it is impossible to see it..."⁵³

Thus, if on the one hand, the reflective power of reason supervenes material determinism, on the other hand the material groundedness of the senses provides a check against the flights of fancy to which abstract reason is so susceptible. (In Descartes *Optics*, for instance, "sight" is explicitly a *bodily*, and not mental, attribute.)⁵⁴ Body continues to pose a limit for primacy of mind, across the boundary of their "perpetual war." And it is in this modus of physical restraints, a natural "order of things" as it were, that one sees a moral economy extrapolating itself from the animal oeconomy and imposing itself on political economy as such, passing from nature to society, posing as if a kind of quantitative limit upon the prerogative of government.⁵⁵

Linked to the powerful Daubentons through family connections, Buffon's entry into the nepotistic Royal Academy was secured on the basis of a more or less humdrum paper on mathematics peer-reviewed by his own sponsors. Mathematics was his earliest academic interest, and certain mathematical forms of argument underlie much of the *Histoire naturelle*, particularly substantiated by his insertion, in 1777, in Volume IV of the *Supplément*, of a reworked version of his *Essai d'arithmétique morale*, written much earlier in 1730.⁵⁶ The piece is emblematic of a widespread debate of the time about the nature of numbers, about numbers *and* nature, and today offers a good sense of the critical bridge between the Newtonian emphasis on empirical referents and the Buffonian method of natural history.

According to this **arithmétique morale*, nature cannot be studied without a presumption of regularity in natural laws, however difficult to ascertain. The senses cognize different entities and truths, whose past and future can be conjectured only in the form of probabilities drawn from "evidence" constituted as such only by their conformity to certain axioms. This axiomatic necessity, however, also predisposes evidence, however physical, into nothing more than a reflexive attribute, quite like the internal reflexivity of

mathematics itself: “For there is nothing in mathematics and other purely speculative sciences other than the difficulty of disentangling what we ourselves have put there.”⁵⁷

Such reflexivity is of little use in studying the external world. What is more important is the need to make what at best are provisional judgments on the basis of observed regularities. “Certitude,” such as it is, would ever only be conditional, pending additional data; by no means do such certitudes afford any eternal verities, an unmediated window into the mind of God. Probability, in this sense, must be understood as an *anti-mathematical* technique devoted to the estimation of experience rather than to defining the internal attributes of quanta per se.

Buffon gives some examples. If a man has seen the sun rise one day in his life, he has an expectation of one in two that it will rise again tomorrow. On seeing it rise again the next day, he begins to hope that it will rise yet again, but he also doubts its possibility exactly as much. Over time, his doubt will be progressively dispelled to greater and greater degrees of certainty, as in the series, 1, 2, 4, 8, 16, ... , 2^{n-1} . No amount of observed sunsets, however, will dispel the possibility of radical contingency, of the sun not rising one fine day, since otherwise it would mean predicting an “eternal sequel” of sunsets based on eternal precedent, a power of observation available only to a transcendent witness, and not to humans. “Always” can therefore never mean “an absolute eternity, the ‘always’ of the future only being equal to the [empirically observed] ‘always’ of the past.”⁵⁸ The Linnaean schema is to be criticized for precisely presuming beyond that balance:

This manner of thinking causes us to invent an infinity of false connections between the things themselves. The common matrix of these things so unlike each other lies less in nature than in the narrow mind of those who poorly conceived her... Isn't what we are doing in these cases only bringing the abstractions of our limited mind to bear upon the reality of the Creator, and granting to him, so to speak, only such ideas as we possess on the matter?... Systems are constructed upon uncertain facts which have never been examined, and which only go to show the penchant men have for wishing to find resemblances between most disparate objects... Is it necessary to go any further to make it apparent that all these divisions are arbitrary and this method is not justifiable?⁵⁹

The morality of an *arithmétique morale* thus inveighs against the predominance of the purely mathematical. An economy must govern the “uses” to which science and economy are put, and that would check against its promiscuous application. Probability must be distinguished from “chance,” the latter distinguished by the *absence* of connection between precedent and subsequence. The gamblers, for instance, who believe that a card, having been thrown three times in a row, should also be thrown the fourth time, go against the very principle of chance and only deceive themselves that some greater law is at work. The mechanical workings of a clock ensure a certain regularity in the behavior of a pendulum; by no means should a gambler practicing the movements of his hand imagine that his throw of dice will fall with similar regularity.

In his description of physiocracy, Michel Foucault has described its entire understanding of value as a system of exchanges where the entire premise of society is “referred back [to] ... the unbalanced, radical, and primitive exchange established between the advances made by the landowner and the generosity of nature.”⁶⁰ Buffon’s *Histoire naturelle* might, in this sense, be said to offer a theory of the constraints posed by “nature”—seen as the primeval basis of wealth—upon the mathematical contours of value and of equivalents, as well as questions of future economic expectation. A certain structure of the bet, of expectations of number and of gambles, comes into play in the *Essai d’arithmétique morale* to elucidate the constraint that must be placed over numbers. The example that is advanced was then a *cause célèbre* widely known as the “St. Petersburg problem,” first proposed by Nicolas Bernoulli in a letter to Pierre de Montfort, and published in the second edition of the latter’s *Essai d’analyse sur les jeux de hazard* of 1713, one amongst a number of books on the “games of chance” published in the 18th century.

Pierre tosses a coin in the air. If it comes up heads the first time, Paul will pay him 1 ecu. If on tossing the coin the next time, it turns up heads again, Pierre will get 2 ecus. Reflecting the diminishing expectations, the third sequential heads will win Pierre 4 ecus, the fourth 8, the fifth 16, and so on. This is a game in which Pierre can only win, and Paul only lose. As commentators of the period realized, it was “not impossible” to think of heads coming up 15, 100, 1,000, or an infinite number of times. Pierre therefore stands to win an infinite sum of money. To even the stakes, how much indemnity—a fair counter-wager—should Pierre pay? The mathematical answer would be, if expectation is E :

$$E = (\frac{1}{2} \times 1) + (\frac{1}{4} \times 2) + (\frac{1}{8} \times 4) \dots ((\frac{1}{2})^n \times 2^{n-1}) + \dots$$

Buffon's reservations as to the framing of the problem (which he shared in correspondence with the Swiss mathematician Gabriel Cramer, and as such derived in part from Nicolas's brother Daniel Bernoulli's 1738 *Exposition of a New Theory on the Measurement of Risk* soundly exemplify what present-day scholars have termed the "clash between mathematical results and good sense." In other words, instead of elaborating the mathematical dimensions of the problem, 18th-century commentators used this problem to outline certain moral limits on the "utility" of mathematics.⁶¹ For Bernoulli, as well as for all his respondents, the infinite number proposed in the answer was significant only for its marked variance with the "real" one. As Buffon put it, "There is no man of common sense who would give 5 ecus let alone 10 in order to purchase that hope in putting himself in the place of him who can only win." On the 29th straight throw of heads, Paul would have owed to him 520,870,912 ecus, that is to say, more money than exists in all of France. All the money on earth could not suffice to make the sum owed at the 40th throw, since that would suppose 1,024 times the money existing within France, and the world does not have 1,024 countries as rich as France.

An infinite sum of money has only a notional existence, and does not exist in reality; and all the expectations founded upon those terms in an infinite series above 30 do not exist either. *There is here a moral impossibility which destroys the mathematical possibility.*⁶²

Money is here cleaved into two mutually opposed characteristics, as mathematical quanta and as socio-substantive equivalent, where the latter must eradicate the tendencies of the former. This premise or imperative of the "moral impossibility" is definitive for the definition of political economy as a science premised in scarcity; but paradoxically, in the Newtonian wars amongst the Whig aristocracy and the *fermiers généraux* of the 18th century, it also acquires an additional air of an anathema to excess and luxury. For Buffon and Jefferson, political economy is also a manner of husbandry, and it is to this husbanding of the earth that a proper "oeconomy" must be expressly confined, a computing of output from the collective inputs of land, fauna, labor, and their transplantation across the continents. Otherwise, money lost, Buffon says, is more deeply felt than

money won. The man who loses his entire livelihood after having staked it all on a wager loses to the scale of infinity, while he who wins from the same wager only doubles his wealth. Like *Homo Duplex*, then, money thus has two kinds of value, “both arbitrary, both conventional”: the first as the measure of “particular advantages,” a “most vague,” abstract, ruinous logic of numbers; the second, making up the “tariff of society” which one exchanges for the necessities of life, the “expenses which one is obliged to make in order to live as one has always lived.” Money is valued best when it is evaluated in the analogy of what has been described above as “certitude”: The natural order of expectations is traduced when money is used to buy superfluities (“expenses which can produce for us any new pleasures”) in the diminishing moral returns of which money loses its value, becomes worthless. “This is not some vague discourse on morality,” Buffon insists. The difference in sensibility with regard to positive and negative monetary gains is a quantifiable difference evincible in proof, a legitimate subject of probabilistic calculation.

§ 8

The same goes for aesthetics. A similar sensibility can be said to be at work in Francis Hutcheson’s *Inquiry into the Original of Our Ideas of Beauty and Virtue* of 1725, where beauty is shown to be, likewise, defined by a mathematical mean, a geometrical symmetry:

The Figures which excite in us the Ideas of Beauty, seem to be those in which there is Uniformity amidst Variety. There are many Conceptions of Objects which are agreeable upon other accounts, such as Grandeur, Novelty, Sanctity, and some others, which shall be mention’d hereafter. But what we call Beautiful in Objects, to speak in the Mathematical Style, seems to be in a compound Ratio of Uniformity and Variety: so that where the Uniformity of Bodys is equal, the Beauty is as the Variety; and where the Variety is equal, the Beauty is as the Uniformity.⁶³

Beyond a certain magnitude, numbers become signifiers without referent; something like a censure on pure textuality confronts one here in this structure of sumptuary regulation, a limit placed on discursive or linguistic excess posed as a moral reproof against luxury and superfluity. Inasmuch as they are generated by an internal, definitional rationality, an unbridled sequential deducibility, numbers are of no *value*

unless tied back to a discursive system seemingly grounded in material equivalents.⁶⁴

§ 9

In following that chain, humans could make nature a hundredfold more amenable and productive for their own needs than those unenlightened tribes entirely reliant on living off of wild species. It is because of their violation or ignorance of these principles, Buffon argues, the inefficient husbandry of the natural species and resources within their own domains, that the countries of northern Europe have risked their political integrity by overstretching themselves abroad. Particularly culpable in this respect are the British—says this most Anglophilic and Newtonian of French *philosophes*—who have committed “a great error by extending too far the limits of their colonies.”⁶⁵

Jefferson’s America, in that sense, may be construed as the other receiving side of that improvidence, of that prodigal overreach of a frugal architectonic. In the decades after 1750, the debt of Virginian plantation owners increased exponentially owing to a number of factors. These included the recurrent liquidity crises triggered by the various European wars, spiraling drops in commodity prices, not least the lifestyles of the new “plantocracy” aspiring to the lavish lifestyle of the English country squire. The Palladian tastes of this generation are in this sense of a piece with the loose credit made available to fund these extravagances:⁶⁶

I don’t remember to have seen such a thing as a turkey Carpet in the Country except a small thing in a bed chamber, Now nothing are [*sic*] are so common as Turkey or Wilton Carpetts, the whole Furniture of the Roomes Elegant and every Appearance of Opulence. All this in great Measure owing to the Cred[i]t which the Plant[e]rs have had from England & which has enabled them to Improve their Estates to the pitch they are Arriv[e]d at, tho many are ignorant of the true Cause.⁶⁷

In 1776, more than 10 of the great planters of Virginia had debt above 5,000 dollars; names like Jefferson and Washington figured in the 1,000–4,999 dollar range. Virginians were likewise apt to describe their misfortune, in the idiom of their continental counterparts, to the inordinate influx of paper money, an ironic perception since in every respect, whether in the patterns of agricultural outlays or

their lifestyles, English finance constituted the very *raison d'être* of their existence, not to rule out their power.⁶⁸ In Jefferson's writing, it is hard not to see his animadversion to America's growing inflationary hunger as a social blight—"like a dropsical man calling out for water, water, our deluded citizens are clamoring for more banks, more banks"⁶⁹—destined to enervate the natural ardor and future prospects of the fledgling nation:

[As for] The system of banking ... I contemplate it as a blot left in all our constitutions, which, if not covered, will end in their destruction, which is already hit by the gamblers in corruption, and is sweeping away in its progress the fortunes and morals of our citizens... I sincerely believe, with you, that banking establishments are more dangerous than standing armies, and that the principle of spending money to be paid by posterity, under the name of funding, is but swindling futurity on a large scale.⁷⁰

If buildings of wood revert wealth to a *tabula rasa* every 50 years, public debt—in the form of a central bank—eviscerates the possibility of accumulation for all eternity. In reading the extract from Jefferson's well-known letter to Madison of September 6, 1789, provided below, it is necessary to keep in mind the entire corpus of debate and experimentation that has been reprised above through Buffon's theory of "degeneration," a theory whose driving impetus, to be clear, is to explain *change* in species as the basis of the *generation* of wealth. In its culminating sections, the *Histoire naturelle* proceeds from the study of non-human species—the size and fertility of livestock to the biological machinery governing reproduction in seed—to the organological and statistical study of human populations themselves. In Jefferson's letter to Madison, the argument against the assumption of a public debt cites as its basis those very chapters of the *Histoire naturelle*, reprising in detail the mortality tables of French parishes in Buffon's chapter on "Life and Death,"⁷¹ and proceeding on their basis to offer a calculation of the lowered indemnity incurred by each debtor against the advancement of their age, with 54 years as the given average life-expectancy. Measured in those terms, Jefferson argues, the national debt of each state should be retired every 19 years, given that at the end of each such period, a new generation of humans emerges in the public and economic spheres whose freedom might be

indentured by the extravagances of previous generations. Jefferson writes:

The question Whether [*sic*] one generation of men has a right to bind another, seems never to have been started either on this [Jefferson was writing to Madison from his sabbatical in Paris] or our side of the water... I set out on this ground which I suppose to be self-evident, “*that the earth belongs in usufruct to the living;*” that the dead have neither powers nor rights over it. The portion occupied by any individual ceases to be his when himself [*sic*] ceases to be, and reverts to the society ... the received opinion, that the public debts of one generation devolve on the next, has been suggested by our seeing habitually in private life that he who succeeds to lands is required to pay the debts of his ancestor or testator, without considering that this requisition is municipal only, no moral ... but that between society and society, or generation and generation there is no municipal obligation, no umpire but the law of nature. We seem not to have perceived that, by the law of nature, one generation is to another as one independent nation to another.⁷²

Think of the Buffon who, in the grip of Newtonianism, railed against the principle of a permanent genetic mold dictating the phenotype of a species for all eternity, militating against the very possibility of the variation that was evident to human eyes. How absurd would it be to presume that each seed carries within itself the template for all future generations to come, such that each species would only appear as the mechanical copy of an ancestral schema “to the end of the world, or to the destruction of species ... possessing within [itself] an infinite posteriority.”⁷³ Compare now, to that riposte against a clockwork universe, Jefferson’s own characterization of the debt as an immutable social mold—an unerodable social contract for eternity written in numbers—that would militate against the very fecundity of a future America.

If on the one hand, one sees the *Notes* as an evidentiary falsification of the Abbé Raynal’s prediction about the innate inhibitions posed by the “first causes” of nature in America, then here one can see Jefferson inveighing against public debt in that it poses as a “second nature” that would just as well foreclose that very outcome. Thus, on the one hand, the quest for the mammoth *affirms* the Newtonian episteme, the facticity of its apparatuses of knowledge, and its modes of

valuation; the substances of the world more and more eroded every day by chimerical figures and flights of speculation.

“There is, indeed, one evil which awakens me at times, because it jostles me at every turn,” wrote the aging, mortgaged Jefferson. “It is that we have now no measure of value... I do not know, therefore, whereabouts I stand in the sale of property, nor what to ask, or what to give for it.”

Much rests on the serendipity of the mammoth, on the question “whether nature has enlisted herself as a Cis- or Trans-Atlantic Partisan?,”⁷⁵ not just because they may or may not exist in the interior, but because they may offer the key to a hidden code, a translational/transnational lexicality to render readable an as-yet incomprehensible continent. The mammoth is a lynchpin in a schizoid, post-colonial derivative episteme, both the nub of a generalized architectonic and a weak link in an organicistic chain where nature may be seen either to assist or impede the wealth of nations, if only through a chiasmus, a “duplex” formation.

On the other hand, the mammoth is also a figure of post-colonial difference, less an assertion of atavistic return than a stake upon the future: “Nothing is so important as that America shall separate herself from the systems of Europe, and establish one of her own,” Jefferson wrote in 1820, having lived well past his stipulated 54 years, to José Francisco Correia da Serra.⁷⁶ It is upon the mammoth that a certain bet on American fecundity and future growth can be placed, a bet against the Atlanticist cult of betting, a speculation to set at rest the speculations of the gamblers and stock-jobbers. Paleontogenesis offers here the revealed program for a future ontogenesis.

The bet here, in a sense, is verifiability itself, and its pertinence to a continent where little has been verified, and on the validity of a script for reading what is as yet a *tabula rasa*. For in the *Notes*, Jefferson had bet *wrong*, since the anticipation was not just that mammoths had once roamed this heart of darkness, but that there was every possibility that they could still be doing so, since to presume otherwise would mean to presume arbitrary interruptions in the Great Chain of Being. Strangely enough, Jefferson had come to this conclusion on the basis of Indian stories about living “Elephants” in the west relayed by a settler who had been their sometime captive:

It may be asked, why I insert the mammoth, as if it still existed? I ask in return, why I should omit it, as if it did not exist? Such is the economy of nature, that no instance can be produced, of her having

permitted any one race of her animals to become extinct; of her having formed any link in her great work so weak as to be broken. To add to this, the traditionary [*sic*] testimony of the Indians, that this animal still exists in the northern and western parts of America, would be adding the light of a taper to that of the meridian sun.⁷⁷

The prospects of wealth and of architecture are therefore to be realized in the same continuist idiom. There is much in the *Notes*, particularly when pertaining to the aboriginal American, that falls in with the Abbé Raynal's premise. Both marle and the sort of clay used to make bricks in Sturbridge, England, Jefferson says, are available on the North American continent,⁷⁸ but the Indians have not developed the technology to make these materials into durable buildings. No such edifice exists among the Indians that one could honor by the name of "monument"; when they die, the Indians leave only impermanent markers behind them, easily degraded in time. One observes a marked tone of consternation, therefore, in Jefferson's letter to the anthropologist Ezra Stiles of September 1, 1786, upon the reported finds of brick fortifications on the other side of Allegheny. It is incredible, Jefferson writes, given what one knows about Indians on this part of the continent, that they would have developed the technology necessary for brickwork, since that supposed "a greater degree of industry than men in the hunter state usually possess."⁷⁹ Indeed, if the antiquity of the Allegheny structure is proved, this would mean revisiting the question of whether the aboriginals of this continent have descended from Asia or "they from ours."

The strife within Eurocentrism carries over, in a manner of speaking, into a post-colonial strife, into the business—the State's business—of reconciling aboriginality within the rubrics of origin, of the pre-existing within the *a priori*. Even if it appears impossible that the Indians could have had an evolved civilization, nothing in the given evidence indicates that Indians and Negroes, if carefully husbanded, could not be the equal of "*Homo sapiens Europæus*." After all, did Europe not meander for 16 centuries after the Roman crossing of the Alps, before a Newton could be—Jefferson's choice of verb is telling—"formed"?

It is here, in the husbanning of Indian and Negro, forest and farm, in the further extension of property relations (the absence of which placed the Indians as direct obstructions in the way of future passages into the interior) that one sees the

later Jefferson, President Jefferson, come to a radically new sense of husbanding debt itself. In late February of 1803, with negotiations for the Louisiana Purchase—conducted by Jefferson’s old interlocutor in the *Notes*, François de Barbé-Marbois, now Napoleon’s *Trésor public* or Treasury Minister—ongoing in France, Jefferson wrote, in an “unofficial, and private” capacity, to William Henry Harrison, then Governor of the Indiana Territory, on his preferred policy toward Indians. (We remember that the impetus for the Purchase was the slave revolt in Haiti, where France reneged on its own revolutionary commitments to universal rights, while the United States under Jefferson refused to recognize the new nation in the fear that it would lead to insurrection in the slaving South.) The “just & liberal” principles to which the United States held itself mandated a “system ... to live in perpetual peace with the Indians ... [and] to cultivate an affectionate attachment from them,” offering them redress “within the bounds of reason, and by giving them effectual protection against wrongs from our own people.” One can immediately sense the contradictions that pose themselves to Jefferson here between the professed principles of this liberalism, the rights of property etc. enshrined in Whig and physiocratic doctrine, and in adducing the Indian as the subject of those rights.

As seen above, *Notes*, written on the cusp of a constitutional debate, is riven by a profound ambivalence, one manifestation of which is the question of whether the Indians may themselves husband *or are to be* husbanded into the precinct of political economy. In the Harrison letter, one can see this very political economy as producing a very definite image of the Indians: as squatters, albeit by customary right, over resources that their lack of civilization disposes them little to properly harvest. If the Buffonian schema decries European overstretch by dint of the inflationary expansion of credit, the aborigine on the other hand presents the opposite case, of little comprehension of industry and the productive potential by which the fruits of nature can be mobilized to justly expand the base of national wealth. For it is evident, Jefferson had argued in the *Notes*, that where food is regularly supplied by agriculture, opposed to hunting and gathering, a single farm will support more cattle than the number of wild buffaloes supported by a whole country of forests. Nine days before writing to Harrison, Jefferson wrote to Benjamin Hawkins reiterating the same conceit, that the Indians would be much better off giving up their pursuit of hunting, settling instead upon agriculture which would “enable them to live on much small portions of land... While they are learning to do better on

less land, our increasing numbers will be calling for more land, and thus a coincidence of interests will be produced between those who have lands to spare, and want other necessities, and those who have such necessities to spare, and want lands.”⁸⁰

This exchange to achieve a mean, and these means of exchange, must be kept a secret amongst the whites, since “this idea may be so novel as that it might shock the Indians, were it even hinted to them.” This, then, is the brunt of Jefferson’s subsequent letter to Harrison: how to expropriate land without breaking the patina of American peacemaking and its avowed commitment to ecumenical justice, however asymmetrical. What is therefore necessary in order to obtain Indian land, he writes to Harrison, is to turn Indians toward farming, thus bringing their mode of production and consumption into the mainstream of the economy. The expansion of the United States relies on a commensurate contraction of the Indian’s sense of their domain. To achieve that, *debt* will be key. The abstract, impersonal coercion exerted by personal debt might open up a way to dissipate the collective opposition or interest that might ensue from more direct forms of political coercion:

When they withdraw themselves to the culture of a small piece of land, they will perceive how useless to them are their extensive forests, and will be willing to pare them off from time to time in exchange for necessities for their farms & families. To promote this disposition to exchange lands which they have to spare and we want for necessities, which have to spare and they want, *we shall push our trading houses, and be glad to see the good and influential individuals among them run in debt, because we observe that when these debts get beyond what the individuals can pay, they become willing to lop them off by a cession of lands.*⁸¹

✓ Transparent Peer Reviewed

Arindam Dutta, “Mammoths, Inc.: Nature, Architecture, and the Debt, Part 1,” *Aggregate 2* (December 2014), <https://doi.org/10.53965/ESSED4125>.

*Transparent peer-reviewed

¹ Thomas Jefferson, *Notes on the State of Virginia* (New York: Harper & Row, 1964). [↑](#)

² Thomas Jefferson, *The Works of Thomas Jefferson*, Federal Edition, Vol. III, ed. Paul Leicester Ford (New York: The Knickerbocker Press, 1904), 304. [↑](#)

- 3 "I had never met with the particular fact relative to the grinders of the incognitum found in Brasil & Lima and deposited in the British Museum, which you mention from Dr. Hunter. I know it has been said that in a very few instances such bones have been found in S. America. You will find these in 2. Buff. Epoq. de la Nature, 187... I wish you had a thermometer. [We] are keeping observations for a comparison of climate." Jefferson, *Works*, Vol. IV: 305. [↑](#)
- 4 Jefferson, Letter to Robert R. Livingston, December 14, 1800, *Works*, Vol. X: 151. [↑](#)
- 5 Jefferson, "Instructions to André Michaux for Exploring the Western Boundary," *Works*, Vol. VII: 208–212. Also see "Confidential Message on Expedition to the Pacific," Jan. 18, 1803, *Works*, Vol. X: 420–34. [↑](#)
- 6 Jefferson, "Instructions to André Michaux....," 210. [↑](#)
- 7 J.G.A. Pocock, *Virtue, Commerce, and History* (Cambridge: University of Cambridge Press, 1985), 80. [↑](#)
- 8 I am aware that I am, at least with respect to what is written in these pages, skimming over a substantially researched field. The authoritative study on America's "first unofficial totem animal," i.e., the mammoth, is Paul Semolin, *American Monster: How the Nation's First Prehistoric Creature Became a Symbol of National Identity* (New York: New York University Press, 2000). Much of the work on the early United States' pursuit of natural history, including Semolin's, flesh out their salient argument from the standpoint of cultural studies, which is to say that they tend to imbricate their arguments in the aid of recuperating a proper American "subjectivity" as conditioned by the conflict between its European inheritance and the political and economic challenged posed by the New World. The argument that follows below in this paper studiously avoids that "nationalist" or "ethno-allegorical" conundrum, focusing rather on the metaphysical questions driving certain forms of 18th-century thought, particularly when they impact events on a transcontinental scope. Early America in this study remains only a situation. Also see Charles A. Miller, *Jefferson and Nature: An Interpretation* (Baltimore: Johns Hopkins University Press, 1988); Myra Jehlen, *American Incarnation: The Individual, the Nation, and the Continent* (Cambridge, MA: Harvard University Press, 1986). [↑](#)
- 9 John Lauritz Larson, *Internal Improvements: National Public Works and the Promise of Popular Government in the Early United States* (Chapel Hill: University of North Carolina Press, 2001), 42. [↑](#)
- 10 J.B. Shank, *The Newton Wars and the Beginning of the French Enlightenment* (Chicago: The University of Chicago Press, 2008). [↑](#)
- 11 See Margaret Schabas and Neil De Marchi, *Oeconomies in the Age of Newton* (Durham, NC: Duke University Press). [↑](#)
- 12 René Descartes, *Meditations on First Philosophy, with Selections from the Objections and Replies*, trans. John Cottingham (Cambridge: Cambridge University Press, 1986, 1996), 45. [↑](#)
- 13 Alexandre Koyré, *From the Closed World to the Infinite Universe* (Baltimore: Johns Hopkins University Press, 1957). [↑](#)
- 14 "As its President for the last 24 years of his life, Newton saw to it that the Royal Society 'was represented on any governmental body which might remotely be involved with a scientific question', presaging 'a new form of scientific organisation and control'. 'Even if allowances are made for the general truculence of scientists and learned men,' ... Newton 'remains one of the more ferocious practitioners of the art of scientific controversy'. Yet he was always able to persuade himself that his rivals had sinned against the truth and Newton's unique revelation. When Leibniz claimed to have invented the calculus before him, Newton used his now dominant position in the Royal Society to mount a campaign in which he never appeared publicly but which he master-minded. 'The violence, acerbity and uncontrolled passion of Newton's attacks, albeit directed into socially approved channels, are almost always out of proportion

with the warranted facts and character of the situations.’ This is true of his historical no less than of his scientific controversies.” Christopher Hill, “Newton and God’s Truth,” *London Review of Books*, Vol. 2, No. 17, September 4, 1980, 11. [↑](#)

15 Leibniz’s Fifth Paper, *The Leibniz-Clarke Correspondence*, H.G. Alexander (ed.) (Manchester: Manchester University Press, 1956), 91. [↑](#)

16 Clarke encapsulated well, if only in exasperation, the principal objections of Leibniz and the Cartesian faction: “When a body moves in a circle, without flying off in the tangent; ‘tis certain there is something that hinders it: but if in some cases it be not mechanically explicable, or be not yet discovered, what that something is: does it therefore follow, that the phenomenon itself is false?” Clarke’s Fifth reply, *The Leibniz-Clarke Correspondence*, 118–19. Also see Keith Michael Baker’s essential *Condorcet: From Natural Philosophy to Social Mathematics* (Chicago: The University of Chicago Press, 1975). More contemporary discussion of the post-Kantian and post-Heideggerian reformulations of this problem is available in Quentin Meillassoux, *After Finitude: An Essay on the Necessity of Contingency* (London: Continuum, 2008). [↑](#)

17 See Jessica Riskin, “The ‘Spirit of System’ and the Fortunes of Physiocracy,” in Margaret Schabas and Neil De Marchi, *Oeconomies in the Age of Newton* (Durham, NC: Duke University Press, 2003). [↑](#)

18 See Noam Chomsky, *On Nature and Language* (Cambridge: Cambridge University Press, 2002), 83. [↑](#)

19 Quentin Meillassoux has described this turn in the following terms, “[Kantian] Correlationism consists in disqualifying the claim that it is possible to consider the realms of subjectivity and objectivity independently of one another... Thus, one could say that up until Kant, one of the principal problems of philosophy was to think substance, while ever since Kant, it has consisted in trying to think the correlation. Prior to the advent of transcendentalism, one of the questions that divided rival philosophers most decisively was ‘Who grasps the true nature of substance? He who thinks the Idea, the individual, the atom, God? Which God?’ But ever since Kant, to discover what divides rival philosophers is no longer to ask who has grasped the true nature of substantiality, but rather to ask who has grasped the more originary correlation: is it the thinker of the subject-object correlation, the noetico-noematic correlation, or the language-referent correlation? The question is no longer ‘which is the proper substrate?’ but ‘which is the proper correlate?’” Quentin Meillassoux, *After Finitude: An Essay on the Necessity of Contingency*, trans. Ray Brassier (London: Continuum, 2008), 6. [↑](#)

20 For a comprehensive history see J.J. Grellier, *The History of the National Debt from the Revolution in 1688 to the Beginning of the Year 1800; with a preliminary Account of the Debts Contracted Previous to that Era* (London: John Richardson, 1810). [↑](#)

21 Peter de Bolla, “The Discourse of Debt,” *The Discourse of the Sublime: History, Aesthetics and the Subject* (Oxford: Basil Blackwell, 1989), 109. The next few paragraphs rely strongly on this work. [↑](#)

22 See Prabhat Patnaik, *The Value of Money* (New Delhi: Tulika Books, 2008), 17. [↑](#)

23 P.G.M. Dickson, *The Financial Revolution in England: A Study in the Development of Public Credit, 1688–1756* (New York: Macmillan, 1967), 45. My observations here reflect a broader study that will be fleshed out in the forthcoming book. Other references on the “financial revolution” are: John Clapham, *The Bank of England, A History*, 2 vols. (Cambridge: Cambridge University Press, 1966); John Brewer, *The Sinews of Power: War, Money and the English State, 1688–1783* (Cambridge, MA: Harvard University Press, 1988); Bruce G. Carruthers, *City of Capital: Politics and Markets in the English Financial Revolution* (Princeton: Princeton University Press, 1996); J. Lawrence Broz and Richard S. Grossman, *Paying for Privilege: The Political Economy of Bank of England Charters, 1694–1844*, published paper, Weatherhead Center for International Affairs, Harvard

University, January 2002; John Francis, *History of The Bank of England from 1694 to 1844* (New York: The Banker's Magazine, 1862), republished by *The Michigan Historical Reprint Series*. [↑](#)

24 A good compendium of these articles is provided in the section on "Getting and Spending" in *The Commerce of Everyday Life: Selections from The Tatler and The Spectator*, ed. Erine Mackie (Boston: Bedford/St. Martin's, 1998). [↑](#)

25 Adam Smith, *The Wealth of Nations* (New York: Penguin, 1987), 420. [↑](#)

26 Italics added, Thomas Paine, *Dissertations on Government, The Affairs of the Bank, and Paper Money* (1786) (London: R. Carlile, 1819), 50–51. The tract was issued as a response to the state of Pennsylvania's defalcation to the Bank of North America, a situation in which Paine's own position was complicated. For an account of this position, see Alfred Owen Aldridge, "Why Did Thomas Paine Write on the Bank?" *Proceedings of the American Philosophical Society*, Vol. 93, No. 4 (September 9, 1949), 309–15. [↑](#)

27 Patrick Murray, Baron Elibank, *Essays, I. On the public debt, II- On paper-money, banking, &c. III. Frugality* (London, 1755), 21–22. [↑](#)

28 For a contemporary account of the relationship between public debt and military expenditure, see William Morgan, *An Appeal to the People of Great Britain on the Present Alarming State of the Public Finances and of Public Credit*, 5th ed., (London: J. Debrett, 1797). Also see Larry Neal, "Interpreting Power and Profit in Economic History: A Case Study of the Seven Years' War," *The Journal of Economic History*, vol. 37, No. 1, March 1977, 20–35. [↑](#)

29 "No nation ever terminated a war against a powerful antagonist with more reputation than this Great Britain the last she waged with the united power of the house of Bourbon. Her armies had frequently triumphed, and her fleets were every where victorious: Her people, regardless of their burdens, were eager for the continuance of the war, and her trade seemed to flourish the more for the taxes which were laid upon it. The expences of the state were beyond all example; but her successes gained her credit, and her credit gained her loans equal to her disbursements." William Knox, *The Present State of the Nation, particularly with respect to its Trade, Finances, &c, &c. Addressed to the King and both Houses of Parliament* (London: J. Almon, 1767). [↑](#)

30 De Bolla, "The Discourse of Debt," 107. [↑](#)

31 This description of the finances of the Seven Years' War is from almost a century later. See Thomas Doubleday, *A Financial Monetary and Statistical History of England, from the Revolution of 1688 to the Present Time* (London: Effingham Wilson, 1847), 103–104. [↑](#)

32 Immanuel Kant, "On the Common Saying, 'This May be True in Theory, but it does not Apply in Practice,'" in *Political Writings*, trans. H.B. Nisbet (Cambridge: Cambridge University Press, 1991), 90. [↑](#)

33 See Stasavage, "Partisan Politics and Public Debt in France, 1689–1789," in *Public Debt and the Birth of the Democratic State*. [↑](#)

34 Jefferson, *Notes...*, 133. [↑](#)

35 Jefferson, *Notes...*, 148. [↑](#)

36 Comte de Buffon, "Dissertation on Animals Common to Both Continents," *Natural History*, Vol. V, trans. William Smellie, 128–130. [↑](#)

37 Jefferson, *Notes*, 64. [↑](#)

38 Jefferson, Letter to Francois Jean de Beauvoir, Chevalier de Chastellux, Paris, June 7, 1785, *The Papers of Thomas Jefferson, Digital Edition*, ed. Barbara B. Oberg and J. Jefferson Looney (Charlottesville: University of Virginia Press, Rotunda, 2008), 184. Chastellux was a member of the Académie française and the principal liaison officer between the French expeditionary forces and George Washington. [↑](#)

- 39 Marcus Vitruvius Pollio, *De Architectura*, translated as *The Architecture of Marcus Vitruvius Pollio*, trans. Joseph Gwilt (London, Priestley and Weale, 1826). [↑](#)
- 40 Montesquieu, *The Spirit of the Laws*, trans. Anne M. Cohler, Basia Carolyn Miller, Harold Samuel Stone (Cambridge: Cambridge University Press, 1989), 231–32. [↑](#)
- 41 Thus it was that in the month Nivôse (December–January) of year three, in the dead of cold, a maniac could not bear to keep his clothes on, “so rapid was the evolution of the natural heat of the system. He sat up all night with no covering on his body, and when the door was opened in the morning, ran out naked to the interior court of the hospital, where he seized handfuls of snow and applied it to his body, left it to melt on his bosom.” Philippe Pinel, *A Treatise on Insanity, in which are Contained the Principles of a New and More Practical Nosology of Maniacal Disorders...*, trans. D.D. Davis (Sheffield: W. Todd, 1806), 33. Also see Robin Middleton, “Sickness, Madness and Crime as the Grounds of Form”, Parts 1 and 2, in *AA Files*, No. 24, Autumn 1992 and No. 25, Summer 1993; Pierre Pinon, *L’Hospice de Charenton* (Brussels: Mardaga, 1989). [↑](#)
- 42 “Details of particular facts relating to the oeconomy and manners of animals, or to the culture and vegetation of plants, are not, perhaps, so much the objects of natural history as general deductions from the observations that have been made upon the different materials of which the earth itself is composed, as its heights, depths, and inequalities; the motions of the sea, the direction of mountains, the situation of rocks and quarries, the rapidity and effects of currents in the ocean, &c.” Buffon, *Natural History, General and Particular, by the Count de Buffon*, trans. William Smellie, Vol. 1, 2nd edition (London: W. Strahan and T. Cadell, 1785), 1. [↑](#)
- 43 Semonin, *American Monster*, 222. [↑](#)
- 44 Buffon, “Facts and Arguments,” *Natural History*, Volume IX, p. 303–307. Volume I lays out the history of these terrestrial transformations in detail, in addition to discussing various theories on the divine motivation behind natural history advanced by William Whiston (*A New Theory of the Earth*, 1696), Thomas Burnet (*Sacred Theory of the Earth*, 1681), John Woodward (*Toward a Natural Theory of the Earth*, 1699), Leibniz and Johann Jakob Scheuchzer (*Beschreibung der Naturgeschichte des Schweitzerlandes*, 1708). [↑](#)
- 45 Buffon, “Of the Degeneration of Animals,” *Natural History*, Vol. VII. [↑](#)
- 46 Buffon, “Dissertation on the Nature of Animals,” *Natural History*, Vol. III. [↑](#)
- 47 E.C. Spary has detailed a pervasive program across European nations in the 18th century by which naturalists, agronomists, and travelers came to embrace the process of “acclimatization,” of transplanting and testing the efficacy of different species across different climates, carried out through a vast complex of newly built horticultural and pleasure gardens, climatic observatories, state forests, agricultural farms, tropical botanical gardens. E.C. Spary, “Naturalizing the Tree of Liberty,” *Utopia’s Garden: French Natural History from Old Regime to Revolution* (Chicago: University of Chicago Press, 2000), 144–47. [↑](#)
- 48 “It therefore appears very probable, by the above reasons, that there really exists in nature [an infinity] of small organized beings, alike in every respect, to the large organized bodies seen in the world; that these small organized beings are composed of living organic particles, which are common to animals and vegetables, and are their primitive and [incorruptible] particles; that the assemblage of these particles forms an animal or plant, and consequently that reproduction, or generation, is only a change of form made by the addition of these resembling parts alone, and that death or dissolution is nothing more than a separation of the same particles.” Buffon, “The Generation of Animals,” Chapter II, “Of Reproduction in General” (*Histoire naturelle*, Vol. II), trans. J.S. Barr, in *From Natural History to the History of Nature*, 173. [↑](#)
- 49 Buffon, “The Degeneration of Animals,” 399. [↑](#)

50 See John Locke, *Some Thoughts Concerning Education and of the Conduct of the Understanding* (Indianapolis: Hackett, 1996); for an expert elucidation of Locke's theory of education and the parental guidance of children, see Uday Singh Mehta, "Molding Individuality: Direction and Compromise," *The Anxiety of Freedom: Imagination and Individuality in Locke's Political Thought* (Ithaca: Cornell University Press, 1992). [↑](#)

51 Buffon, "Of the Nature of Animals," *Natural History*, Vol. III: 232, 264–66. [↑](#)

52 Buffon, "Homo Duplex," *Natural History*, Vol. III: 264. [↑](#)

53 Buffon, "Of the Generation of Animals," *Natural History*, Vol. VII: 172. [↑](#)

54 René Descartes, "Optics," in *Selected Philosophical Writings*, trans. John Cottingham et al. (Cambridge: Cambridge University Press, 1988). [↑](#)

55 For Condorcet, this emphasis on finitude manifests itself in an argument (with the American Revolution in the backdrop) against the unqualified extension of the electoral franchise, the profusion of judgments being seen to sever the organic link between genius and the world of facts. "A very numerous assembly cannot be composed of very enlightened men. It is even probable that those comprising such an assembly will on many matters combine great ignorance with many prejudices. Thus there will be a great number of questions upon which the probability of the truth of the vote of each voter will be below $\frac{1}{2}$." This comprises the main chance behind the new science of "social mathematics" and probability in the waning *ancien régime*: to cancel out cumulative error produced in consensus by recourse to a mathematicized calculus. (This ideological propensity against popular franchise would also thoroughly pervade the Virginian plantocracy's contention for an Electoral College, from Madison's responses to Hamilton in the *Federalist Papers* to the proposals of the Virginia Plan and its subsequent adoption by the Constitutional Convention of 1787.) Condorcet, "Essay on the Application of Mathematics to the Theory of Decision-Making" (1785), extracts, in *Selected Writings* (Indianapolis: The Bobbs-Merrill Company, 1976), 49. Also see, in the same volume, "A General View of the Science of Social Mathematics" (1793). [↑](#)

56 Jacques Rogers, *Buffon: A Life in Natural History*, trans. Sarah Lucille Bonnefoi (Ithaca, NY: Cornell University Press, 1997), 12. [↑](#)

57 Buffon, "An Essay on Moral Arithmetic," in *From Natural History to the History of Nature*, ed. and trans. John Lyon and Phillip R. Sloan (Notre Dame: University of Notre Dame Press, 1981). [↑](#)

58 Buffon, "Essay on Moral Arithmetic," 54. [↑](#)

59 "Initial Discourse" to the *Histoire naturelle*, trans. John Lyon, in *From Natural History to the History of Nature*, 101, 116. Also see Phillip R. Sloan, "The Buffon-Linnaeus Controversy," *Isis*, Vol. 67, No. 3 (September, 1976). [↑](#)

60 Michel Foucault, "Exchanging," *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage Books, 1970, 1994), 195. [↑](#)

61 See Gerd Gigerenzer, Zeno Swijtink, Theodore Porter, Lorraine Daston, John Beatty, Lorenz Krüger, *The Empire of Chance: How Probability Changed Science and Everyday Life* (Cambridge: Cambridge University Press, 1989), 14–19. Also see Abraham de Moivre, *The Doctrine of Chances: or, A Method of Calculating the Probability of Events in Play (to Isaac Newton)* (London: W. Pearson, 1717); John Ham, *Of the laws of chance, or, a method of calculation of the hazards of game, plainly demonstrated, and applied to games at present most in use; which may be easily extended to the most intricate cases of chance imaginable* (London: B. Motte and C. Bathurst, 1738). Also see Lorraine Daston, *Classical Probability in the Enlightenment* (Princeton: Princeton University Press, 1995). [↑](#)

62 Buffon, "An Essay on Moral Arithmetic," 68. [↑](#)

63 Francis Hutcheson, *An Inquiry into the Original of Our Ideas of Beauty and Virtue in Two Treatises* (Indianapolis: Liberty Fund, 2004), 29. This passage has been expounded upon at length in Mary Poovey, "Experimental Moral Philosophy and the Problems of Liberal Governmentality," *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago: University of Chicago Press, 1998), 185. [↑](#)

64 One counterpart to this "middling aesthetic" is the concept of comfort, literally conceived in the 18th century as tying together physiological performance within a discourse of genteel accumulation: The many Newtonian machines in Monticello—the dumbwaiter, the heating devices, the retractable bed—here epitomize the mechanical counterpart of this tempered, corporeal ideal. Everything—politics, economics, physics, natural history, art, literature, beauty itself—has to be determined by these controlled displacements, these checks on a profligate metaphoricity, each domain shoring up the other as if in a semiotic chain, each constrained by secular limits in an otherwise nontransparent transcendental order. See John E. Crowley, *The Invention of Comfort: Sensibilities and Design in Early Modern Britain and Early America* (Baltimore: Johns Hopkins University Press, 2001). For a thoroughgoing account of this interdependence between science and sensibility, see Mary Poovey, *A History of the Modern Fact*. [↑](#)

65 Buffon, "When the Powers of Man Assisted those of Nature, Facts and Arguments," *Natural History*, Vol. IX, 395. [↑](#)

66 See Chapters 6–10, James S. Ackerman, *The Villa: Form and Ideology of Country Houses* (Princeton: Princeton University Press, 1990). For an account of the Europhilic architectural accouterments, decorations, and sculptures that Jefferson used to outfit Monticello, see George Green Shackelford, *Thomas Jefferson's Travels in Europe, 1784–1789* (Baltimore: Johns Hopkins Press, 1995). Also see Susan R. Stein, *The World of Thomas Jefferson at Monticello* (New York: Harry N. Abrams, 1993); Jack McLaughlin, *Jefferson and Monticello: The Biography of a Builder* (New York: Henry Holt, 1988); Frederick Doveton Nichols and Ralph E. Griswold, *Thomas Jefferson: Landscape Architect* (Charlottesville: University Press of Virginia, 1978). [↑](#)

67 q. T.H. Breen, *Tobacco Culture: The Mentality of the Great Tidewater Planters on the Eve of the Revolution* (Princeton: Princeton University Press, 1985), 131. [↑](#)

68 Thus, in 1767, Richard Corbin complained that paper currency had driven out specie and "introduced a Train of luxury and Extravagance. Debts were wantonly Contracted, when they could be so easily paid in this fictitious representation of Money; and to this is owed the present distress of individuals, the great debts they owe are Melancholy ... this makes them very importunate for a Loan office, but what relief they can receive to borrow of one to pay Another I do not understand." q. Breen, *Tobacco Culture*, fn. 131. [↑](#)

69 Jefferson, Letter to Charles Yancey, January 6, 1816, *Works*, Vol. XI: 494–95. [↑](#)

70 Jefferson, Letter to John Taylor, May 28, 1816, *Works*, Vol. XI. Also see, in the same volume, the long letter written on the same subject to John W. Eppes, dated November 6, 1813. [↑](#)

71 Buffon, "Of Old Age and Death," *Natural History*, Vol. II. [↑](#)

72 Jefferson, Letter to James Madison, September 6, 1789, *Works*, Vol. VI, 3–6. [↑](#)

73 Buffon, "The Generation of Animals," *Natural History*, Vol. VII: 172. [↑](#)

74 Jefferson, Letter to Nathaniel Macon, January 12, 1819, *Works*, Vol. XII, 112. [↑](#)

75 Jefferson, *Notes*, 64. [↑](#)

76 Jefferson, letter to José Correia da Serra, October 24, 1820, *Works*, Vol. XII, 167. Da Serra was the founder of the

Portuguese Academy of Sciences and a later associate of Joseph Banks. [↑](#)

[77](#) Jefferson, *Notes*, 48–49. [↑](#)

[78](#) Jefferson, *Notes*, 29. [↑](#)

[79](#) Jefferson, Letter to Ezra Stiles, Sept. 1, 1786. *Works*, Vol. V., 183. [↑](#)

[80](#) Jefferson, Letter to Benjamin Hawkins, February 18, 1803, *Works*, Vol. IX, 447. [↑](#)

[81](#) The Federal Edition of *The Works of Thomas Jefferson*, interestingly enough, does not carry this letter. See <http://www.let.rug.nl/usa/presidents/thomas-jefferson/letters-of-thomas-jefferson/jeff151.php>, accessed January 22, 2013. [↑](#)