Introduction: Evolution, the Science Napoleon Hated

Jessica Riskin
Stanford University

Napoleon cherished a well-publicized hatred of abstract ideas, which he considered to be (I'm paraphrasing) airy-fairy nonsense. He disliked intellectuals, for whom he repurposed the neologism "ideologue"—which the philosophe Destutt de Tracy had recently coined during the Revolution to denote practitioners of a new, modern science of ideas—into the political epithet it is today.[1] Napoleon saw himself as a man of action and a pragmatist with no time for ivory-tower frivolities. His valet, Louis Constant Wairy, told the story of one evening in the autumn of 1804, soon after Napoleon's arrival in Mainz on his grand tour of imperial inspection, when his metaphysically minded archchancellor, Jean-Jacques-Régis de Cambacérès, began to expound the principles of Kant. Napoleon cut him off, dismissed the sage of Königsberg as "obscure," and abruptly left him. The disgruntled Cambacérès sought refuge with the valet, Constant, who was amused to witness the struggle between Cambacérès's determination to admire Napoleon and his loyalty to Kant. The courtier grumbled that people often disparaged works of pure reasoning simply because of the trouble it took to comprehend them. "I enjoyed his little annoyance with the emperor (an annoyance he would not have admitted for all the world)," recalled Constant, "and took great pleasure in chatting with him."[2]

German philosophy was the farthest thing from Napoleon's taste. So too was Jean-Baptiste Lamarck, author of the discipline of biology and of the first fully elaborated theory of the transformation of living forms, or what we would now call evolution, who personified all that the

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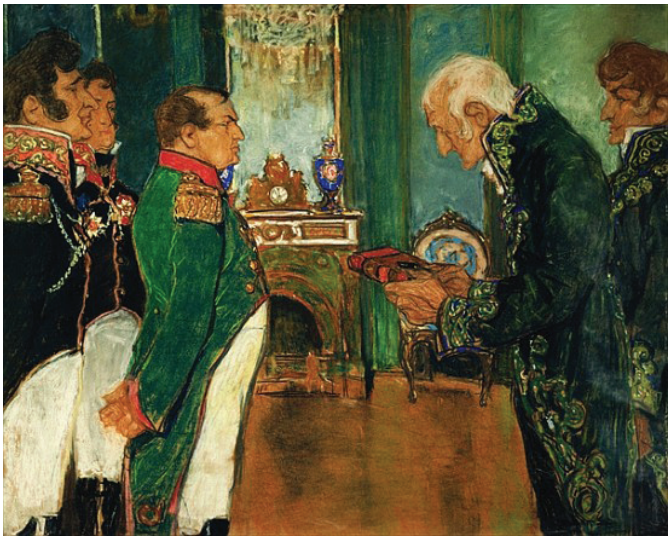
[1] For an analysis of Destutt de Tracy's optimistic coinage and how Napoleon transformed it into an epithet, see Maurice Cranston, "That Is an Ideology?," *Revue européenne des sciences sociales* 17, no. 46 (1979): 59–63.

[2] Louis Constant Wairy, *Mémoires de Constant, premier valet de chambre de l'empereur, sur la vie privée de Napoléon, sa famille et sa cour* (Paris: Garnier, 1910), 1:325–26.

Little Corporal most reviled. In particular, Lamarck personified a new sort of historical natural science that had been emerging over the previous half-century. Napoleon's imperial aversions were personal, intellectual, and political in equal measure. His dismissal of history and philosophy as modes of naturalist scientific understanding—let us call it "Napoleonism" to follow that era's neologistic tendency—had important repercussions for the subsequent development and history of science, especially the life sciences.[3]

By way of explanation, first, another story, probably the most frequently told story about Lamarck. Its source is the astronomer François Arago, and the events took place when Arago was a young man of twenty-three. On a frigid day in December 1809, the members of the Institut de France attended the emperor in a chilly salon of the Palais des Tuileries to present to him their new publications. The savants and men of letters were dressed in green, the aides de camp in gold brocade. Standing next to the young Arago was Lamarck, now sixty-five and in ill health, though he would live another two decades. Lamarck held a copy of his *Philosophie zoologique*, the magnum opus in which he developed the powerful idea that living forms might transform themselves continually toward greater complexity and in response to their environments. Arago and Lamarck together wryly observed the apparent panic of each of the men around them that he might fail to receive the emperor's notice.

Napoleon at last entered the room and approached Arago as he would a new conscript, fixing him with a stare and barking, "You're very young! What's your name?" Before Arago could answer, his neighbor on the left, eager to be noticed, replied, "He cultivates astronomy!" Napoleon: "And what have you done?" Arago's neighbor on the right, not to be outdone, announced, "He has just measured the meridian in Spain!" While Arago ruefully reflected that Napoleon must take him for a mute or an imbecile, the emperor turned to Lamarck, who presented his *Philosophie zoologique*. Not even looking at it, Napoleon growled "What is that? It's your absurd meteorology . . . that volume which dishonors your advanced years. Do natural history and I'll



Jean-Baptiste De Lamarck Handing the Book *Zoological Philosophy* to Emperor Napoleon Bonaparte, Mikhail Dmitrievich Ezuchevsky, 1920 (pastel on paper). Courtesy of Bridgeman Images.

[3] "Napoleonism" is at once an intellectual and a political sort of -ism, not to be confused with "Bonapartism," which has denoted a specifically political approach modeled on that of Napoleon I and, relatedly, advocacy of the House of Bonaparte in the decades after the end of the First Empire.

receive your works with pleasure; this one I take only out of consideration for your white hairs. Give it here!" Still without looking at the book, Napoleon thrust it into the hands of an aide-de-camp, while Lamarck, tears of frustration rolling down his cheeks, protested in vain that it *was* in fact a work of natural history.[4]

Quite apart from the fact that what Lamarck held in his hands was *not* one of his annual meteorological treatises, you may well wonder why Napoleon deemed these a disgrace, and I will come to that in a moment. But first a note about the phrase "natural history" as Napoleon employed it. This phrase had been undergoing a transformation from an older meaning toward a newer one, partly at the hands of none other than the late philosopher whom Napoleon so disliked, Immanuel Kant. Napoleon used "natural history" emphatically in its older sense, a usage that had frustrated Kant, who had regretted that the phrase in common parlance denoted the static "description of nature," whereas he wanted to designate a new form of natural history that would study transformations in nature over time. While the results of these transformations seemed to exhibit purposive design, they were in fact the products of "wholly undesigned mechanical generation." For the new kind of natural history that would study these ongoing processes of immanent mechanical generation, since the word "history" seemed already taken for another purpose, Kant had proposed "*archaeology of nature*."[5]

When Napoleon admonished Lamarck to stick to "natural history," although the emperor had the older sort of natural history in mind, Lamarck himself had in fact just reinvented natural history along Kantian lines, to study nature as a continual process of secular, material transformation driven from within by various internal agencies, and the results were in the book he proffered to the emperor.

This momentous book, Lamarck's *Philosophie zoologique*, explained how living beings could transform themselves in infinitesimal, incremental, and heritable ways that, when added together over generations, could explain the adaptation of organisms to their environments. Lamarck's theory made no reference, either implicit or explicit, to any kind of external divine agency but, rather, relied on two different sorts of internal, organic agencies propelling the development of living beings from within. The first was a natural force like the forces of contemporary experimental physics, such as gravity, electricity, or magnetism: a rudimentary, upward-striving "*pouvoir de la vie*" that drove living matter to elaborate and complicate its organization over time. This force began with the most rudimentary form of life, a mere "animated point," and acted over an "incalculable series of centuries." Organisms developed, grew, and transformed from that first tiny point through the action of the *pouvoir de la vie* purely as a result of their own

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[4] François Arago, *Mémoires de ma jeunesse*, vol. 1 of *Oeuvres complètes de François Arago*, 13 vols., ed. J.-A. Barral (Paris: Gide, 1854–62), XLVI.

[5] Immanuel Kant, *Critique of Judgement* (1790), trans. James Creed Meredith, ed. Nicholas Walker (Oxford: Oxford University Press, 2007), 256n2. For the older seventeenth- and eighteenth-century meaning, see, e.g., the article "Histoire naturelle," in *Encyclopédie, ou, Dictionnaire raisonné des sciences, des arts, et des métiers, par une societé des gens de lettres*, ed. Denis Diderot and Jean d'Alembert, vol. 8 (Paris, 1765), 225–30. For secondary work on the history of natural history, see Nicholas Jardine, J. A. Secord, and E. C. Spary, eds., *Cultures of Natural History* (Cambridge: Cambridge University Press, 1996); Paul Lawrence Farber, *Finding Order in Nature: The Naturalist Tradition from Linnaeus to E. O. Wilson* (Baltimore: Johns Hopkins University Press, 2000); Emma Spary, *Utopia's Garden: French Natural History from Old Regime to Revolution* (Chicago: University of Chicago Press, 2000).

movements, specifically the movements of fluids within them. Plants and animals were the sole beings on the planet to form themselves this way, Lamarck emphasized, using materials of their own composition.[6]

In addition to this rudimentary upward-striving force of composition and complexification, according to Lamarck, another kind of agency acted as well: responsiveness, an ability to react to the environment. In lower organisms, this responsiveness took various primitive and rudimentary forms, but from the level of birds and mammals, the responsiveness took the form of acts of will, through which animals formed "habits" and "ways of life" in response to their circumstances. Through this agency they gradually transformed their bodies. "When the will determines an animal to perform a given action," Lamarck wrote, "the organs that must execute this action are immediately provoked by the affluence of subtle fluids" to carry it out. Many repetitions of these "acts of organization" would then "fortify, extend, develop, and even create the necessary organs."[7]

Lamarck was convinced moreover that such a process was the only way to account for sentient life, because if each creature owed its organization to an exterior and foreign source, then instead of being animate machines, animals would have been "totally passive machines," lacking "sensibility or the intimate sentiment of existence," with no power to act, nor ideas, nor thought, nor intelligence. In short, they would not have been alive.[8] Had Napoleon known what was in the book he grudgingly accepted from Lamarck, with its revolutionary understanding of living nature as continually creating and re-creating itself from raw matter, he would surely have liked it even less than the meteorological annals (and I'm still coming to why he disliked those!). Lamarck's book was indeed a "natural history," but in the newest and most radical sense of the phrase.

A corresponding new sense of "history" was coming into usage in relation to the development of human society as well as of natural living forms. Voltaire, for example, who had transformed the writing of history in the middle decades of the eighteenth century, carefully distinguished profane from sacred history (the latter, he said, was a respectable endeavor but not his subject), ruling out gods, fables, anything counter to natural law, and, in general, "all that violates the ordinary course of nature." The categorical distinction of profane from sacred history and the attachment of profane history to the "course of nature" moved the meaning of "history" in a naturalist, empiricist direction. Voltaire further observed that these standards dictated that one consider the element of *time* as necessary to the emergence of complex phenomena. The astronomical achievements of the Babylonians, for instance, indicated that they had existed as a people for a great many centuries. "Arts are but the product of time, and the natural laziness of men leaves them for thousands of years without any knowledge or talent except to nourish themselves, to defend themselves, and to kill each other." Similarly, the first Egyptian cities must have existed for "a prodigious time" before the pyramids, in order for the ancient Egyptians to have developed the skills and tools needed to build them. Having restricted historical explanations to

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6 Jean Baptiste Lamarck, *Philosophie zoologique, ou, Exposition des considérations relative à l'histoire naturelle des animaux*, 2 vols. (Paris: Dentu, 1809), 2:95, 127; Jean Baptiste Lamarck, *Histoire naturelle des animaux sans vertèbres* (Paris: Déterville, 1801), 50, 134; Jean Baptiste Lamarck, *Hydrogéologie, ou Recherches sur l'influence qu'ont les eaux sur la surface du globe terrestre* (Paris: chez l'auteur, 1802), 188. On Lamarck's "ceaseless tendency" of living beings to compose and complexify themselves, a "continually active cause," see also his *Philosophie zoologique*, 1:132, 2:69, 100, 101, 104.

7 Jean Baptiste Lamarck, *Recherches sur les causes des principaux faits physiques* (Paris: Maradan, 1794), 50–62.

8 Lamarck, *Philosophie zoologique*, 2:310–11.

processes within "the ordinary course of nature," Voltaire considered time not only as chronology but also as a necessary dimension in the production of human history.[9]

During the previous half-century, then, influential people, including Voltaire and Kant, had been reaching for a new mode of historical understanding in relation to both human and natural history. This new mode of historical understanding would in fact bring the two—natural and human history—together by explaining complex phenomena in both domains as the results of intrinsic, contingent, material processes operating over time, bringing a great variety of agencies into engagement with one another. The volume Napoleon scornfully received from Lamarck represented an important culmination of these efforts. It was a "natural history" in the newest and most cutting-edge sense, and as I've said, had he but known it, Napoleon would have disliked the work even more than he disliked Lamarck's meteorological annals.

Now let us come finally to why Napoleon deemed Lamarck's meteorological annals a disgrace, since it is ultimately for the same reason that he would have disliked the *Philosophie zoologique*. The most immediate cause of Napoleon's disdain for Lamarck's meteorological annals was that Napoleon's teacher and supporter, and an influential member of his inner circle, the astronomer and mathematician Pierre-Simon de Laplace, whom he had recently made a count of the empire, had assured him that these annals were nonsense, that Lamarck had an overactive imagination and no scientific talent.[10] Several years earlier, in 1802, when Lamarck had tried to read one of his meteorological memoirs to the members of the First Class of the Institut de France, Laplace had scornfully interrupted him and commenced a campaign to cast the work as outdated superstitious nonsense.[11] Laplace had ridiculed Lamarck's meteorology in both loud and subtle ways, for example, as Lamarck lamented, by constantly referring to it as an "almanac" and to the probabilistic reasoning it contained as "predictions."[12] But if Laplace's loathing of Lamarck's meteorology explains Napoleon's attitude, what can explain Laplace's?

Once again, it was personal and intellectual and political. As a young man of thirty, Laplace had entered into an especially fruitful collaboration with the academician Antoine Lavoisier, a chemist, tax collector, and philosophical revisionist, who had since been guillotined but whose New Chemistry remained alive, if embattled. Together, Lavoisier and Laplace had performed a series of experiments on heat intended to do no less than remake the general understanding of the nature of matter. They claimed to have decomposed water, hitherto considered an element, into two separate kinds of air; and to have established, with the help of a long-suffering guinea pig, that respiration was a form of combustion, in which the respiring creature took oxygen from the air and combined it with carbon to produce carbon dioxide.[13] Implicit in these experiments and their interpretation was the New Chemistry (Lavoisier himself regarded it as a whole new

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9 François Marie Arouet de Voltaire, "Histoire," in Diderot and d'Alembert, *Encyclopédie*, 8:221–24.

10 Yves Delange, "Les phénomènes de l'atmosphère et la météorologie de Lamarck," in *Jean-Baptiste Lamarck, 1744–1829*, ed. G. Laurent (Paris: Éditions du Comité des travaux historiques et scientifiques, 1997), 133.

11 See Richard Burkhardt, *The Spirit of System: Lamarck and Evolutionary Biology* (Cambridge, MA: Harvard University Press, 1995), 10, 225n20. Burkhardt identifies the memoir in question as "Mémoire sur les variations de l'état du ciel," later published in *Journal de physique* 56 (1802): 114–38. The primary source of the incident is a letter from Étienne Geoffroy de Saint-Hilaire to Georges Cuvier, Institut de France, Fonds Cuvier, Ms 3225 (12).

12 Delange, "Phénomènes," 134.

13 Antoine Laurent Lavoisier and Pierre Simon Laplace, "Mémoire sur la chaleur," *Mémoires de l'Académie des sciences*, 1780 [1783], 355–408; Antoine Laurent Lavoisier, "Mémoire dans lequel on a pour objet de prouver que l'eau n'est point une substance simple" (1781), in *Oeuvres de Lavoisier*, 6 vols. (Paris: Imprimerie royale, 1862–93), vol. 2 (1862), 334–59.

science), also known as the "pneumatic chemistry" because it reduced all matter to varieties of air. The New Chemistry differed not only from the old chemistry, with its four Aristotelian elements of earth, air, fire, and water, but also from the newer phlogiston-based chemistry, in which "phlogiston"—the matter of fire, heat, and light—acted as the principle of all formation, composition, life, and growth.[14] The New Chemistry lacked any such active principle or agency, merely charting decompositions and recompositions of elements by weight.[15]

During the Napoleonic years, phlogistonists with their active and fiery view of nature and pneumaticists with their essentially inert, passive, and airy one remained embattled.[16] Laplace's and Lavoisier's victory was by no means secure, and Lamarck was among those who vehemently and publicly rejected the pneumatic chemistry in favor of his own "pyrotic theory," in which fire, as in phlogiston chemistry, played a key role, though not the starring role, which in Lamarck's theory went to living beings. These, through their "organic action," were the "principal productive cause of all compounds that exist."[17]

According to Lamarck, the myriad forms of matter in the world originated when living beings produced compounds, supplying these to the forces of nature, particularly the matter of fire, which then acted upon them to produce as "residues" the various kinds of inanimate matter. How the first living beings had come to exist, and whether there had already been inanimate matter such as minerals at the time, Lamarck confessed himself unable to know. But with regard to the present state of nature, he identified living things as the origin of every kind of compound matter, actively generating the building blocks for the matter of fire to forge into inanimate compound matter.[18] In his meteorological annals, Lamarck not only put these ideas to work but did so in a way that marshaled government support to coordinate scientific activity across France as meteorological observations poured in from every corner.[19]

Little wonder that Laplace hated Lamarck and his meteorological treatises and that he communicated these hatreds to his powerful patron. It was personal and at the same time it was intellectual and political: Laplace categorically rejected the view of nature that Lamarck developed throughout his work, including in the meteorological treatises, according to which the natural world itself—its very matter—emerged from the actions of organisms over time, as living beings continually generated and transformed the world around themselves.

The emperor had been further prepared for his act of public disdain toward Lamarck by another of his supporters and favorites, and another of Lamarck's colleagues and foes, the naturalist Georges Cuvier. The forty-year-old Cuvier held the chair in comparative anatomy at the

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14 See Jessica Riskin, *Science in the Age of Sensibility: The Sentimental Empiricists of the French Enlightenment* (Chicago: University of Chicago Press, 2002), chap. 7, for a discussion of the struggle (and its politics) between adherents of phlogiston chemistry and proponents of the New Chemistry.

15 For this reason, Hasok Chang has characterized the New Chemistry as "compositionist" in contrast with the older "principlist" approach. Hasok Chang, "The Hidden History of Phlogiston: How Philosophical Failure Can Generate Historiographical Refinement," *HYLE: International Journal for the Philosophy of Chemistry* 16, no. 2 (2010): 47–79.

16 On the persistence of phlogiston chemistry among younger as well as older natural philosophers during the last decades of the eighteenth century and first decades of the nineteenth, see ibid.; D. M. Knight, *The Transcendental Part of Chemistry* (Folkestone, Kent: Dawson, 1978), 29.

17 Jean Baptiste Lamarck, *Réfutation de la théorie pneumatique* (Paris: Agasse, 1796), 996. See also Lamarck, *Recherches*, 384, 391.

18 Lamarck, *Recherches*, 11.

19 Delange, "Phénomènes," 134.

Jardin des plantes, where Lamarck had been named a lowly professor of insects and worms (but had reconceived his post under a revisionary term of his own coinage, "invertebrates"). While Cuvier's career under Napoleon was very much in the ascendant—Napoleon had appointed Cuvier, and would go on appointing him, to a succession of ever-higher administrative posts[20]—Lamarck's, despite or, rather, because of the powerful theory at which he was arriving, was on the sharp decline.

Cuvier represented science that was cutting-edge and, at the same time, that bolstered rather than threatened an authoritarian order, first Napoleon's and then that of the Bourbon Restoration (Charles X would make him a baron). It was emphatically not the science of the materialist, atheist revolutionaries from whom Napoleon took such pains to distance himself in his ongoing struggle to seize and retain the royalists' ground. But nor was it the older science of the Catholic Church. Cuvier, in his Protestantism—he was a devout Lutheran—translated the authority of religion into science, a powerful modern concoction. Moreover, this was a perfectly Napoleonist concoction, to try out our neologism, enlisting religious ideas in the service of an absolute secular authority. Cuvier's central anatomical principle, the principle of correlation of parts, was an assertion of rational design: he claimed that one could infer all the parts of a creature from any single part because they all followed from one another by rational necessity. Cuvier's successes at predicting fossil discoveries appeared to vindicate this principle, though he also applied an extensive knowledge of comparative anatomy to the task.[21]

Cuvier was firmly committed to the fixity of species and understood the fossils of extinct creatures to reflect, not transformation, but rather a series of catastrophes, each eliminating the creatures of a given time and place, to be replaced later by brand-new, equally fixed and unchanging creatures. In the service of this theory, Cuvier conducted meticulous comparative studies of anatomical structures that led him to revisionary taxonomic changes such as the division of what had simply been "worms" into "internal worms" (e.g., intestinal parasites that lived inside other organisms) and "external worms" (e.g., earthworms). Lamarck, however, had casually hijacked Cuvier's new taxonomic categories to argue for what Cuvier absolutely rejected: namely, the continual transformation of living forms.

In Lamarck's view, as Stephen Jay Gould has shown,[22] Cuvier's new categories opened up a true can of worms by destroying the old notion that living beings were arranged on a ladder of increasing complexity. Internal worms were more complex than jellyfishes and sea urchins in some respects: for example, they had bilateral symmetry and directional motion. But they were less complex in others: they lacked both nervous and circulatory systems. For Lamarck, the internal worms thereby pointed the way from a ladder of complexity toward a branching tree in which the branches represented adaptive responses to various environments. He thus used Cuvier's taxonomic categories to subvert Cuvier's principle of fixity of species and his catastrophist understanding of fossils.

These principles of Cuvier's, which Lamarck had hijacked Cuvier's own results to overturn, implicitly supported the doctrine of special creation, that God had created each species for its

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20 Étienne Pasquier, Éloge de M. le baron Georges Cuvier, in *Chambre des pairs, Séance du 17 décembre 1832* (Paris, 1832), 15–19.

21 Martin Rudwick, *The Meaning of Fossils: Episodes in the History of Palaeontology* (New York: Elsevier, 1972), 104–15.

22 Stephen Jay Gould, "A Tree Grows in Paris: Lamarck's Division of Worms and Revision of Nature," in *The Lying Stones of Marrakesh: Penultimate Reflections in Natural History* (New York: Harmony, 2000), chap. 6.

niche in nature and had replenished the supply of creatures following each catastrophe (such as the Great Flood) by new acts of creation. Cuvier's support for the doctrine of special creation was implicit in his science, but what was explicit was the absolute authority of science against the dangerous radicals of France's previous chapter. This could hardly have been better suited to Napoleon's purpose. Here was a scientific doctrine of revolutionary change that was at the same time profoundly conservative, each revolution imposed from outside rather than rising up from within, each a return to the same ultimate authority, and the whole thing guaranteed, not by the Church, but by Napoleon's own savants.

Lamarck's natural world of inherent active powers, its substance literally generated and shaped by its own living denizens—a historical view of nature in the new sense of the term—was precisely the wrong vision of nature for Napoleon.

By association with the likes of Laplace and Cuvier—and with them, against Lamarck and the sort of natural philosophy he represented—Napoleon claimed for himself and his political order the absolute authority of religion translated into modern science. In relation to that supreme, modern, and scientific authority, Lamarck's view of nature and natural science was plainly subversive. In vain did Lamarck lament and protest—"What a strange thing!" to ban the work of someone such as himself, "not writing at all about politics and occupying himself only with studies of nature"[23]—but Napoleon was no fool and could see perhaps indeed more plainly than Lamarck himself that Lamarck's approach to natural history, making it "historical" in Voltaire's and Kant's sense of the word, undermined the very foundation of the new Napoleonist mode of authority. Laplace and especially Cuvier were, by and large, the victors who wrote the histories. In Cuvier's case, indeed, he wrote Lamarck's official "eulogy."[24] It was in fact an anti-eulogy, in which Cuvier described Lamarck's theory as poetry rather than science, which condemnation set the dominant tone for assessments of Lamarck's mode of natural history during the first decades of the nineteenth century.

The essays in this forum explore several aspects of this Napoleonist moment in the history of the life sciences and its implications for the development of evolutionary biology.

Pietro Corsi's opening contribution explains the politics of Lamarckism and its consequences. Core elements of Lamarck's science, in particular its materialism and its grand cosmological approach, relating all natural phenomena to an overarching cosmology, became politically notorious, Corsi shows, in the atmosphere of the post-Revolution. "**Systèmes de la nature and Theories of Life**" recounts how this intellectual politics put Lamarckian theory in ill odor during the decades following the Terror and through the Napoleonic period, and how transformism went underground to survive these decades, generating an important tradition that persisted into the nineteenth century, when it took new root. This surviving, underground tradition was at once literary, philosophical, and editorial. Corsi profiles in particular the writing of Nicolas-Edme Rétif de la Bretonne, who described human beings as having sprung from oysters and fishes, and the press that published both Rétif and Lamarck, the Cercle social.

Justin E. H. Smith continues the conversation with an examination of Napoleon's imperial commitment to mastering the "world of details," a conquest that must be at once political and

23 Jean Baptiste Lamarck, "Météorologie," in *Nouveau dictionnaire d'histoire naturelle, appliquée aux arts, à l'agriculture, à l'économie rurale et domestique, à la médecine, etc. Par une société de naturalistes et d'agriculteurs*, vol. 20, 475.

24 Georges Cuvier, "Eloge de M. de Lamarck, lu a l'Académie des sciences, le 26 novembre 1832," *Mémoires de l'Académie royale des sciences de l'Institut de France* 8 (1835): xx.

philosophical. According to Napoleon, Newton had offered but the bare outlines of nature with his scheme of general laws. These represented nature's uniformities but left out the great diversity over which the uniformities reigned. "**The Ibis and the Crocodile**" recounts Napoleon's Egyptian campaign as a quest for unity in diversity: a discovery and conquest of the world of details. But as Smith tells it, the story has a subversive twist.

Rather than conquering the world of details, subjecting them to the reign of imperial uniformity, Napoleon's savants—notably the naturalist Étienne Géoffroy Saint-Hilaire—began to succumb to them and to the implications of the ancient theological and cultural tradition with which they were associated. This tradition, through its anthropomorphic animal deities, and by preserving animals in their ancient forms through mummification, indicated two sorts of differences-yet-continuities: between animals and humans and between ancient and modern living forms. These examples of variation along a continuum acted in conjunction with the startling diversity of living forms that the traveling naturalists encountered to point in a transformist direction despite the naturalists' initial commitment to fixity of types.

The organizing principle of unity in diversity also unifies the diverse contributions to our forum, reappearing at the focus of **Robert J. Richards**'s essay. "**The Foundations of Archetype Theory in Evolutionary Biology**" examines how the German Romantic idea of the archetype, a single pattern underlying diverse forms of life and varying in different environments, was a pivotal precursor to Darwinian evolutionary theory. Two connected Romantic notions, Richards shows, crucially prepared the way for Charles Darwin to think in terms of transmutation of species. These were morphological unity of type, or archetype, and embryological recapitulation, the associated idea that embryos in development assume the forms of lower creatures in succession, proceeding from more primitive toward more advanced forms. Richards traces these ideas to three people: Kant, Johann Wolfgang von Goethe, and a friend and correspondent of Goethe's named Carl Gustav Carus, professor of medicine at Dresden. In Carus's hands, in particular, Richards reveals, these ideas informed an approach to the categories of living forms by way of their types and therefore by the parts that defined these, for example, the vertebra in vertebrate animals. Carus's approach culminated in an empirical demonstration of the vertebral theory of the vertebrate skull, tracing the plates of the skull in higher vertebrates to anterior vertebrae in lower ones.

Carus's ideas developed in the shadow of the same formidable opposing force as Lamarck's: Napoleon. While Carus was a medical student at Leipzig, some of Napoleon's troops occupied the central German lands, some of them even quartered at his parents' house. When Carus was starting his career as an assistant physician at the hospital, another great battle just outside Leipzig produced ninety thousand casualties, and Carus participated in organizing field hospitals, before contracting typhus. The experience led him to reflect that it was "not possible to have attained the elevated concept of the wonderful structure of man . . . and not feel a deep shudder when one . . . becomes aware of the contempt had for humanity in its masses."[25]

The same tension between human individual and human masses provides the focus, finally, for **Snait B. Gissis** in her contribution to this forum. She traces the consequences of Lamarck's notion of a first-person evolutionary self into the neurology and psychology of the nineteenth century. Indeed, Gissis's analysis of Lamarckian theory suggests that it was in the first instance a psychological theory or, better, a theory that placed psychology at the crux of natural history as a

25 Carl Gustav Carus, *Lebenserinnerungen und Denkwürdigkeiten*, 4 vols. (Leipzig: Brockhaus, 1865–66), 1:122–23.

primary cause driving the transformation of living forms. The "*sentiment intérieur*" that Lamarck ascribed to all sentient beings, the "intimate feeling of existence" constituting the "*moi*" of each being, was what allowed the organism to form transformative habits in response to its environment. "**Producing an Evolutionary Self**" follows Lamarck's inner *moi* into the sciences of selfhood of the nineteenth century. In particular, Gissis examines the ideas of the English neurologist and psychologist John Hughlings Jackson, who understood the nervous system as an evolutionary accretion of layers, with each new layer adding a dimension of complexity, and who explained neurological disorders as failures in the hierarchical coordination of these layers. Jackson's application of Lamarck's inner *moi* represents the persistence, despite Napoleonism, of an older tradition composed of materialist, historical (in Voltaire's and Kant's sense), and Romantic elements.

This persistent tradition viewed natural history as continually shaped and transformed by its living denizens, rather than vice versa: a science of life whose protagonists were living organisms themselves. A