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THE ANIMAL SERIES AND THE GENESIS OF SOCIALISM

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FROM THEIR EARLIEST DAYS, the botanical and anatomical collections of the Muséum d'Histoire naturelle reflected shifting understandings of French society. In the Jardin du Roi, collections of medicinal herbs included both exotic and utilitarian plants as symbols and instruments of the king's dominion. In the revolutionary period, the Muséum's specimens were models for a new political order that took its cues from natural law. Well into the First Empire, the acclimatization of foreign plants and animals was seen as a test of the power of French institutions to shape a new mankind.[1]

In the Restoration and July Monarchy (1815–1848), the collections at the Jardin des Plantes, the Muséum, and the Ménagerie continued to inspire comparisons between animal and human worlds. This was the time of a rising tide of scientific *vulgarisation* (popularization). Along with new reading rooms, lecture halls like the Athenée, weekly coverage of debates in the Académie des Sciences in the *feuilleton scientifique* (a newspaper science column) and the national expositions of industrial products, the Muséum was one of the central sites for a growing popular interest in the sciences, spurring reflection on the order of nature, the order of society, and the public role of science.[2]

This reflection was often rooted in the observation of the various species of Parisians, as found in the popular literary satires of character types called the *physiologies*, wherein the analysis of human species was modeled on the study of animals. In the frontispiece to the collection *Scènes de la vie privée et publique des animaux* (**FIGURE 16.1**), in which the conventions of the *physiologies* were used to depict animals enacting typical Parisian dramas, the illustrator J. J. Grandville drew himself sketching the captured specimens who wrote the text for the book, including the authors George Sand and Honoré de Balzac. In his other works, such as *Un autre monde,* Grandville delighted in showing the mirroring between the curious and frequently anthropomorphized animals collected at the Muséum and the bestial humans who gathered to observe them (**FIGURE 16.2**).[3]

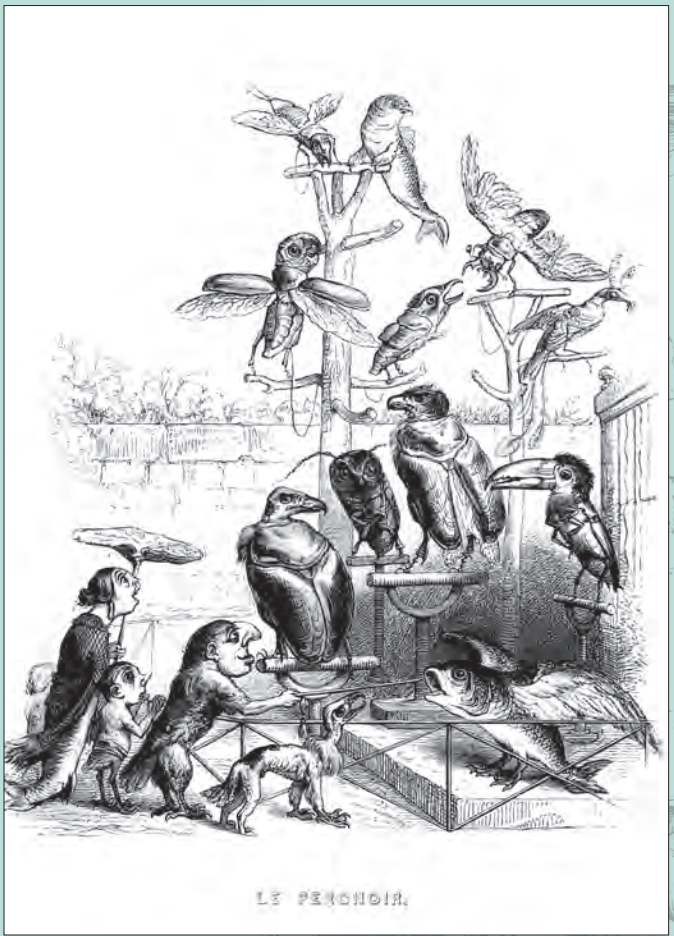
Similarities between human and animal worlds could serve the aims of comedy. They were also frequently the basis for the emerging sciences of society. The term "sociology" was coined in Paris in the 1830s by Auguste Comte, one of several thinkers concerned with creating a new science to make sense of recent political, economic, and industrial upheavals, and to

Fig. 16.1

J. J. Grandville sketching Balzac, Sand, and others at the Ménagerie of the Jardin des Plantes. Frontispiece of J. J. Grandville, *Scènes de la vie privée et publique des animaux* (Paris, 1840). Courtesy Rare Book and Manuscript Library, University of Pennsylvania.

Fig. 16.2

J. J. Grandville, *Le Perchoir*, from J. J. Grandville, *Un autre monde* (Paris, 1844). Courtesy Rare Book and Manuscript Library, University of Pennsylvania.



chart—as well as guide— the progress of humanity. The life sciences were a major inspiration for these early social scientists. Organic metaphors inspired analyses of the basis of social unity and the division of labor, as well as factors involved in social "crises" and adaptations.[4] One term ubiquitous among nineteenth-century social theorists in France was "series." Charles Fourier's phalanstery, a Utopian community, would be organized according to "passionate series," while the anarchist Pierre-Joseph Proudhon wrote that "everything that can be thought by the mind or perceived by the senses is necessarily a series."[5] Among its various sources, the term derived from life sciences and the concept of the "animal series." This was the portion of "The Great Chain of Being" that ranked all terrestrial creatures in a single line of increasing perfection or complexity, from lichens and sponges up to humans. The animal series had been central to Enlightenment natural history. It also served as the backbone for Jean-Baptiste Lamarck's theories of transmutation.[6]

According to a much-repeated argument in the history of biology, the concept of the animal series was outmoded by the early nineteenth century. According to this account, Georges Cuvier brought down the curtain on eighteenth-century natural history by shattering the "table of representations" and the animal series along with it, replacing them with his four distinct "embranchements" and his emphasis on the relation between organisms' functions and their conditions of existence.[7] Even though Cuvier insisted on the fixity of species, he has been portrayed as more modern than his rival, the transformist Lamarck. Others who insisted on using the animal series have been seen as atavistic and reactionary—for example, the American craniologist and polygenist Samuel Morton, who used the notion of a natural hierarchy among humans as a justification and naturalization of slavery.[8]

But in fact the concept of the animal series was still very much alive in mid-nineteenth-century French natural history, and not only among reactionaries. The anatomist Henri de Blainville (a major influence on the philosopher Auguste Comte) updated the chain of being with recent advances in physiology, while the doctrine of "unity of composition" advanced by Cuvier's most famous opponent, Étienne Geoffroy Saint-Hilaire, was closely associated with the animal series.[9] Furthermore, the animal series was an important term in the development of social science and movements of social reform. It served as a basis for historical comparison and analysis of crucial social functions and was also used to trace and predict the direction of social progress. Its impact was clearest in the work of the prophet of industry, Claude-Henri de Saint-Simon, and his followers, as well as those who broke away from that movement, including Auguste Comte and Philippe-Joseph-Benjamin Buchez. Another apostate, Pierre Leroux, is particularly interesting in this regard. Not only was he one of the first social philosophers to use the term "socialism," but he applied the animal series in a new way under the influence of Cuvier's opponent Geoffroy. These thinkers' use of the animal series shows one aspect of the central role the Muséum played in broader formations of French cultural and political life in the early nineteenth century. In particular, it suggests how discussions about the Muséum's specimens contributed to the political thought that led to the worker's revolution of 1848.

PROPHETIC PHYSIOLOGICAL SERIES

Saint-Simon, entrepreneur, bon vivant, and social prophet, dreamed of a society directed by the most talented and industrious in which a new religion preached by scientists would bring about social unity. His "Mémoire sur la science de l'homme" of 1813 grounded his predictions in historical comparison and in the increasingly influential science of physiology. In this essay, Saint-Simon merged the Marquis de Condorcet's notion of stages of intellectual and social development with the concept of the animal series. Condorcet drew on the idea of a progression from savagery to civilization used by Scottish stadial theorists such as Adam Ferguson and Adam Smith, who saw human history

unfolding in fixed stages from hunting and agriculture to commerce. Saint-Simon's concept of the animal series derived from the comparative anatomy being taught in the 1790s by Félix Vicq d'Azyr, for whom the notion of a hierarchy of beings in order of increasing complexity was a fundamental principle of classification.

The result was Saint-Simon's "tableau" of the successive "physiological" states of society, which placed the distinct phases of human history in historical order. This temporal order was also a ranking according to the extent of the division of labor, the state of the sciences and the arts, the degree of technical mastery over nature, and the overall harmony of the "organized machine" (*machine organisée*) of society. The "series," beginning with humans in a state barely different from animals (he referred to the *enfant sauvage*, the "wild boy" of Aveyron), continued through the Greeks and the Romans to the Arabs and medieval Christianity, finally reaching the nineteenth-century state of "crisis" in which industrial capacities had developed in the absence of social and intellectual unity. The twelfth and final stage—the necessary outcome of the preceding stages—would be a society in which industry and science were properly ordered. Physiology, as the basis for a kind of medical attention to the social organism, would take its rightful place alongside the science of "brute bodies" (*corps bruts*), directing all industry toward the increase of productive powers to improve the lot of "the poorest and most numerous class." In 1825, the year of his death, he made this the single commandment of his "New Christianity."[10]

Saint-Simon's followers, including Prosper "Père" Enfantin, Saint-Amand Bazard, Hippolyte Carnot, Michel Chevalier, Philippe-Joseph-Benjamin Buchez, and Pierre-Henri Leroux, created a full-fledged messianic movement of intellectual and industrial reform. In their published sermons of 1828 and 1829, they set the terms of critique and the agenda for reform that all later socialist movements had to respond to. The Saint-Simonian preachers identified a millennia-long history of class struggle and the different forms it had taken: the relation between slave and free, serf and master, and finally "industrials" and the "idle" owners. They also pointed out the harmful competition and spiritual disunity that characterized the present, denouncing the ideology of liberal individualism and its harmful moral and social effects. In their "historical series" they depicted a rising alternation between "organic," or unified periods, and "critical" periods, in which there was no common purpose. For these prophets, many of whom had trained as engineers at the École Polytechnique, the historical series was an ascending sine wave.

To "re-organize" society, they applied the classifying and serializing urge of natural history. Society would be divided into three main classes: scientists, workers, and priests. Priests coordinated the relations between the others, matching research to social needs and assigning people to their roles according to their capacities. The priest class was also aligned with artists, the literal "avant-garde" or advance troops of human progress, who depicted the advantages of the future state and appealed to the emotions. In addition to establishing the ideology of modern art, the Saint-Simonians were among the first modern feminists, with many women in their ranks, including Flora Tristan. Women were valued both as workers and for their emotional capacities, perceived as superior to those of men. Under the direction of Père Enfantin, the Saint-Simonians created an elaborate religious dogma based on a pantheist conception of divine matter, which they enacted with costumes, songs, and rituals. This "cult" culminated in their 1832 retreat to Ménilmontant, then a hamlet outside Paris, where they made a spectacle of the gospel of industry by growing their hair and beards and performing household labor: cooking, cleaning, and gardening.[11]

While the Saint-Simonians' view of progress drew upon their founder's "tableau physiologique," their writings also showed a new influence that also reinforced the importance of the animal series. The 1820 book, *Essai de palingénésie sociale*, by the liberal Christian philosopher Pierre-Simon

Ballanche was widely read in romantic-era Paris.[12] It depicted the Revolution as a divinely ordained "expiation," a painful period of transition required for a metamorphosis into a more just and more spiritual society. Ballanche took his central notion, palingenesis (rebirth), from the *Palingénésie philosophique* of the Swiss entomologist Charles Bonnet, a follower of the German philosopher Gottfried Wilhem Leibniz, whose doctrine of pre-established harmony held that this was the best of all possible worlds. According to the twentieth-century historian of ideas Alfred Lovejoy, Bonnet's work "temporalized the Great Chain of Being."[13] Bonnet depicted the animal series as a whole growing more perfect over time according to a pre-established plan, in harmony with shifts in the makeup of the earth's surface. Bonnet used the chrysalis as a metaphor for all life forms—both for the progressive material transformations of species and for the eventual "rebirth" of their "germ of restoration" at the last judgment. Bonnet was also one of the first to use the term "evolution" in a biological sense, applying it to the gradual unfolding of embryos.[14] Inspired by Bonnet and Ballanche's providential vision of embryological metamorphosis in both animals and humans, the Saint-Simonians wrote: "the doctrine of Saint-Simon does not want to bring about an upheaval or a revolution. It comes to predict and to complete a transformation, an evolution."[15] Their teachings would bring about the transition to the next stage in the historical series of social organisms.

Even after the decline of the movement in 1833, the former followers of Saint-Simon propagated their own visions of social science and social reform. For Auguste Comte, the founder of positivism, who had been Saint-Simon's secretary in the 1820s, the animal series was a foundational organizing principle. This was true not only in his writings on biology and sociology. Comte's fundamental concept of the "hierarchy of the sciences," which ranked them by the moment when each left theology and metaphysics behind, as well as by the power each science granted humans over their environment, was a great chain of disciplinary being.[16] Likewise, the Catholic physician Philippe-Joseph Buchez—depicted as a member of the group of idealistic social philosophers called the "Cénacle" in Balzac's novel *Les illusions perdues* (1837–43)—made "series" central to his vision of social reform. In his *Introduction à la science de l'histoire*, Buchez argued that the inevitability of social progress was confirmed by recent findings in physiology, zoology and geology. Correlations between the developmental stages of organisms, species, and the earth were proof that humanity's presence in the world "was no accident," and that "labor, devotion and sacrifice" were part of the "universal order"; reasoning by analogy to mathematics, he saw the "series" of historical facts forming a "progression" that indicated the gradual appearance of a socialist republic in fulfillment both of scripture and of the promise of 1789. Buchez's fusion of the animal series, embryonic series, geohistory and human history provoked an attack from Cuvier as well as praise from Geoffroy Saint-Hilaire.[17]

A NEW TWIST IN THE CHAIN

In the wake of his much-publicized debate with Cuvier in 1830, Geoffroy and his work became a focal point for romantic artists and social reformers. He hosted a weekly salon attended by Victor Hugo, George Sand, Franz Lizst, Heinrich Heine, Balzac, and many former Saint-Simonians. The notion of a chain of increasing perfection among animals that was associated with Geoffroy's doctrine of "the unity of type" was crucial to Balzac's *Avant-Propos* and inspired work by Sand and Jules Michelet. Thanks to Geoffroy's influence, the application of the animal series to social philosophy underwent a new twist in the doctrine of "Humanity" of Pierre Leroux.[18]

In 1830, the Saint-Simonians took over *Le Globe,* the journal that was the leading voice of liberal opposition and romantic arts, by recruiting its founding editor, Pierre Leroux, to their cause. After two years, offended by Père Enfantin's megalomania, Leroux broke away, launching a series of other

journals with the help of other former Saint-Simonians as well as George Sand, who not only supported Leroux but also wrote several novels that exemplified his philosophy. Leroux's ideas embraced new developments in romantic literature, new scientific ideas, as well as the study of Asian and Middle Eastern languages, literatures and religions inaugurated by German poet and critic Friedrich von Schlegel. Leroux's social philosophy opposed both liberal "individualism" and the centralized, hierarchical "absolute socialism" (*le socialisme absolu*) of the Saint-Simonians. Instead, he saw progress as the development of the central ideas of the eighteenth century: liberty, fraternity, and equality. These were themselves the latest installments of a long tradition of "Humanity" running throughout history. For Leroux, Humanity was "an ideal being" that exists "in the virtual state," manifesting itself in specific social and intellectual forms. Any living human was a doubled being: "a real being in whom lives, in the virtual state, the ideal being called humanity." The combined history of religions, philosophies, and social orders recorded the stages of this ideal being's development.[19]

Leroux frequently cited Geoffroy as part of the promising new wave of sciences, many associated with German *Naturphilosophie*, which treated nature as a dynamic process with all parts affecting each other. But beyond this "developmentalism," there was a more direct connection between the ideas of Leroux and Geoffroy's "philosophical anatomy." Against Cuvier's idea that the organisms of the world can be divided into four distinct *embranchements*, Geoffroy argued for the "unity of composition." In his anatomical studies, he identified analogies among the parts of different animals, which led him to conclude that despite morphological variations, there was actually only one "universal animal plan," which underwent metamorphoses to produce all the diverse animal forms. In the vertebrates, the sterna (breastbones) were simply geometrical modifications of each other; making even greater analogical leaps, he argued that lobster shells, for example, were simply bones turned inside out. He contended that "there is only one animal—there is only one single being: Animality, an abstract being that is perceptible by our senses under different shapes." Despite the kaleidoscopic forms of animals on earth, a single form or plan united them all: birds, mammals, reptiles, invertebrates, and even insects. Thus Geoffroy's "philosophical anatomy" embraced both multiplicity and unity, along with the developmental processes through which individuals and new species were formed.[20]

Geoffroy's junior associate, the embryologist Étienne Serres, analyzed the steps through which embryos unfolded, forming symmetrical organs and other quasi-mathematical patterns in animals. His writings on "organogenesis" borrowed from the work of the *Naturphilosophe* Lorenz Oken, which had been translated into French in the 1820s. Along with Etienne's son Isidore Geoffroy Saint-Hilaire, Serres launched a new field of study, teratology, which examined developmental abnormalities and monsters as a means of illuminating normal processes of development (**FIGURE 16.3**). Although Geoffroy himself did not argue for the animal series, Serres, like Oken, argued for a graduated hierarchy of animals. Geoffroy's "unity of type" was the intellectual underpinning for this refigured animal series.[21] Likewise, Serres saw comparative embryology as an empirical confirmation of Geoffroy's doctrine of the unity of type. He derived what came to be known as the "Meckel-Serres" law, which held that the higher animals, as embryos, passed successively through the stages corresponding to each of the lower animals in the series. According to Serres, "lower species" were thus "frozen embryos" of the higher species.[22]

The revision of the animal series brought about by Geoffroy and his followers—a chain of beings united by an underlying plan, in constant development towards perfection, with teratological deviations along the way—had its sociological analogue in Leroux's concept of Humanity. Leroux's history traced an embryological unfolding of a single, simple ideal into diverse and more complex forms. Geoffroy's ideal, universal "animality," which he called

Figs. 16.3, 16.4

Rita Christina (conjoined twins) from Étienne Serres, *Recherches d'anatomie transcendante sur les lois de l'organogénie appliquée à l'anatomie pathologique* (Paris, 1827). Courtesy of Cambridge University Library.

the "virtual conditions" for any individual, was an exact correlate to Leroux's notion of a virtual humanity. For Geoffroy and Serres, the endpoint of this process was never spelled out, but Leroux's series had a utopian destination. Throughout the universal "tradition" he identified—stretching from Vedism and Buddhism through Pythagoras and Plato, the Hebrew Bible and New Testament, and the *Encyclopédie*—the same great idea was expressed. This idea was the underlying identity between each individual and humanity and, therefore, our dependence on and responsibility for each other. Leroux saw this idea repeatedly expressed in ceremonies, including the recurrent ritual of the shared meal. According to Leroux, rites of communion were symbols and models for collective ownership of the means and fruits of production. For Leroux, a new, collective order of property—based on equality among individuals—would be the fulfillment of the series of human history.

SOCIALISM AS POLITICAL (BIO)TECHNOLOGY

In their writings of the 1830s and 1840s, romantic historians and social scientists such as Jules Michelet, Edgar Quinet, and even Karl Marx (who lived in Paris in the 1840s) came to portray the French Revolution as inevitable: the result of a natural necessity, a kind of "embryological force" demanding a continued evolution.[23] This same sense of a natural, necessary logic to history informed the works of the first social scientists and socialists. They also saw the revolutions of 1830 and 1848 as the results of crises in the social organism, produced by a disharmony that (once the spasms and fevers had passed) could be confronted and cured.[24] At the same time, however, notions equally indebted to the life sciences—such as "critical period" and "teratology"— suggested there might be unexpected ruptures and turns in this development. They also declared that humans would be able to direct it. Here, social science would intervene.

From this point of view, it should be no surprise that "sociology" emerged at the exact same moment as "socialism," and in many of the same texts. Social science was a tool for transforming the social organism. As Comte put it, "savoir pour prévoir, afin de pouvoir" (know in order to predict, predict in order to act).[25] The keys to remaking society were: identifying its anatomy, a task aided by concepts and methods from natural history; aligning the past stages in its development, in order to predict and bring about the next phase; and enacting that new order, not only by describing it, but by inventing new dogmas, new practices, and new rites. These historical and prophetic theories formed the intellectual backdrop for the Revolution of 1848 and the brief Second Republic that followed it.

While this paper has pointed out the importance of *biological* thought—and in particular, the notion of the "animal series"—for understanding early socialism, just as important was the role played by *technology*. For Saint-Simon, Comte, and Leroux, the series of stages of human history was determined in large part by the kind of technologies they employed. The human was thus presented in biological terms, but frequently defined as the *technological animal*—the creature that alters its environment (and itself) with tools. At the same time, these "children of the century" produced a forceful image of the human as the *ceremonial* animal: the being that undertakes repeated acts in collective gatherings in order to provide a direction for individual passions, arrange the givens of nature, and align the unfolding of time.[26] Such notions

were later central for Émile Durkheim, who argued that emotional solidarity in an "organic" society such as the Third Republic required collective rites in consecrated public venues for the production and diffusion of knowledge.[27] Among such sites we can count the Muséum d'Histoire naturelle: a place where natural and social orders were made visible, and where they might also be transformed.

1 Emma Spary, *Utopia's Garden: French Natural History from Old Regime to Revolution* (Chicago: University of Chicago Press, 2000); Richard W. Burkhardt, Jr., "La Ménagerie et la vie du Muséum," in *Le Muséum au premier siècle de son histoire*, ed. Claude Blanckaert, Claudine Cohen, Pietro Corsi, and Jean-Louis Fischer (Paris: Éditions du Muséum national d'Histoire naturelle, 1997).

2 Bernadette Bensaude-Vincent, "Un public pour la science: L'essor de la vulgarisation au XIX[e] siécle," *Réseaux* 11, no. 58 (1993): 47–66.

3 J. J. Grandville, *Scènes de la vie privée et publique des animaux* (Paris: Hetzel, 1840); J. J. Grandville, *Un autre monde* (Paris: H. Fournier, 1844); Philippe Kaenel, "Le Buffon de l'humanité: La zoologie politique de J.-J. Grandville (1803–1847)," *Revue de l'art* 74, no. 1 (1986): 21–28.

4 Judith E. Schlanger, *Les métaphores de l'organisme* (Paris: L'Harmattan, 1971); Claude Blanckaert, "La nature de la société: Organicisme et sciences sociales au XIX[e] siècle," in *Une histoire des sciences humaines*, ed. Claude Blanckaert and Laurent Mucchielli (Paris: L'Harmattan, 2004); I. Bernard Cohen, ed., *The Relations between the Natural Sciences and the Social Sciences* (Princeton, N.J.: Princeton University Press, 1994).

5 Charles Fourier, *The Theory of the Four Movements*, ed. Gareth Steadman Jones and Ian Patterson (Cambridge: Cambridge University Press, 1996); Pierre-Joseph Proudhon, *De la création de l'ordre dans l'humanité*, 2nd ed., 2 vols. (Paris. Garnier Freres, 1849), 1:244.

6 Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (Cambridge, Mass.: Harvard University Press, 1976); Richard W. Burkhardt, Jr., *The Spirit of System: Lamarck and Evolutionary Biology* (Cambridge, Mass.: Harvard University Press, 1995).

7 Henri Daudin, *Cuvier et Lamarck: Les classes zoologiques et l'idée de série animale* (Paris: Éditions des Archives Contemporaines, 1983); Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage, 1994); William F. Bynum, "The Great Chain of Being after Forty Years: An Appraisal," *History of Science* 13 (1975): 1–28.

8 Stephen Jay Gould, *Ontogeny and Phylogeny* (Cambridge, Mass.: Belknap Press of Harvard University Press, 1967); Ann Fabian, *The Skull Collectors* (Chicago: University of Chicago Press, 2010).

9 Toby Appel, "Henri de Blainville and the Animal Series: A Nineteenth-Century Chain of Being," *Journal of the History of Biology* 13, no. 2 (1980): 291–319.

10 Claude-Henri Saint-Simon, "Mémoire sur la science de l'homme (1813)," in Prosper Enfantin and Claude-Henri Saint-Simon, *Science de l'homme, Physiologie réligieuse* (Paris: Masson, 1858), 235–400; see also Saint-Simon, *Nouveau Christianisme* (Paris: Éditions de L'Aube, 2008).

11 Frank Manuel, *The New World of Henri Saint-Simon* (Cambridge, Mass.: Harvard University Press, 1956).

12 Pierre Simon Ballanche, *Oeuvres complètes* (Geneva: Slatkine Reprints, 1967); A. J. L. Busst, "Ballanche and Saint-Simonism," *Australian Journal of French Studies* 9 (1972): 291–92.

13 See Lovejoy, *The Great Chain of Being*, chap. 9.

14 Charles Bonnet, *La Palingénésie philosophique, ou Idées sur l'état passé et sur l'état futur des êtres vivants, ouvrage destiné à servir de supplément aux derniers écrits de l'auteur et qui contient principalement le précis de ses recherches sur le christian* (Amsterdam: M.-M. Rey, 1769); Arthur McCalla, "*Palingénésie philosophique* to *Palingénésie sociale*: From a Scientific Ideology to a Historical Ideology," *Journal of the History of Ideas* 55, no. 3 (July 1994): 21–39.

15 "La doctrine de Saint-Simon, nous le répétons, ne veut pas opérer un bouleversement, une révolution; c'est une *transformation,* une *évolution* qu'elle vient prédire et accomplir." "Première année, 1828–1829: 7ᵉ Séance, Constitution de la proprieté.—Organisation des banques," in *Doctrine Saint-Simonienne: Exposition* (Paris: Librairie Nouvelle, 1854), 154; italics in the original.

16 Patrick Tort, "L'échelle encylopédique: Auguste Comte et la classification des sciences," in Tort, *La pensée hiérarchique et l'évolution* (Paris: Aubier-Montagne, 1983).

17 ". . . il existe, dans la série historique, quelque chose d'analogue à ce que les géomètres appellent la raison, quelque chose qui sert, comme celle-ci, à reconnaître qu'une suite de faits forme un progression et non une succession d'actes sans rapport entre eux" (151–52); "C'est ainsi que l'état social devient une des causes les plus impulsives de la progression humaine" (164); "Cette considération n'est point sans importance philosophique. En effet, indépendamment de toute autre preuve, indépendamment de celles que nous avons fait précédemment valoir, elle suffit pour nous montrer que la présence de l'humanité, dans le monde actuel, n'est point un accident, ni un phenomène indifférent, mais un fait charactéristique appartenant à l'ordre universel" (177–78); "Elle [l'humanité] sait pourquoi le travail, le dévouement, et le sacrifice sont, aujourd'hui, les lois de son existence" (178–79); Philippe-Joseph-Benjamin Buchez, *Introduction à la science de l'histoire*, 2nd ed., vol. 1 (Paris: Guillaumin, 1842). See François-André Isambert, *De la Charbonnerie au Saint-Simonisme: Étude sur la jeunesse de Buchez* (Paris, Éditions de Minuit, 1966); on Cuvier's response to Buchez, see p. 32.

18 Franck Bourdier, "Le prophète Geoffroy Saint-Hilaire, George Sand et les Saint-Simoniens," *Histoire et Nature* 1 (1973): 47–66; Richard Somerset, "The Naturalist in Balzac: The Relative Influence of Cuvier and Geoffroy Saint-Hilaire," *French Forum* 27, no. 1 (2002): 81–111.

19 "L'homme est un être réèl dans lequel vit, à l'état virtuel, l'être idéal appelé humanité. L'homme est l'humanité dans une manifestation particulière et actuelle." Pierre Leroux, *De l'humanité, de son principe, et de son avenir, où se trouve exposé la vraie définition de la religion et où l'on explique le sens, la suite, et l'enchaînement du mosaisme et du christianisme*, 2 vols. (Paris: Perrotin, 1845), 1:256. See also Pierre Leroux, *Discours de Schelling à Berlin: Du cours de philosophie de Schelling: Du Christianisme* (Paris: J. Vrin, 1982); Armelle Le Bras-Chopard, *De l'égalité dans la différence: Le socialisme de Pierre Leroux* (Paris: Presses de Sciences Po, 1986).

20 "Pour cet ordre de considérations, il n'est plus d'animaux divers. Un seul fait les domine, c'est comme un seul être qui apparaît. Il est, il reside dans l'Animalité; être abstrait, qui est tangible par nos sens sous des figures diverses." Etienne Geoffroy Saint-Hilaire, *Principes de philosophie zoologique,* discutés en mars 1830, au sein de l'Académie royale des sciences (Paris: Pichon et Didier, 1830), *92*. *See* Hervé Le Guyader, *Geoffroy Saint-Hilaire: A Visionary Naturalist* (Chicago: University of Chicago Press, 2004); and Toby Appel, *The Cuvier-Geoffroy Debate: French Biology in the Decades before Darwin* (New York: Oxford University Press, 1987).

21 Étienne Serres, *Recherches d'anatomie transcendante sur les lois de l'organogénie appliquée à l'anatomie pathologique* (Paris: Thuau, 1827); Lorenz Oken, *Elements of Physiophilosophy*, trans. A. Turk (London: Ray Society, 1848).

22 Edward S. Russell, *Form and Function: A Contribution to the History of Animal Morphology* (Chicago: University of Chicago Press, 1982); Elizabeth A. Williams, *The Physical and the Moral: Anthropology, Physiology, and Philosophical Medicine in France, 1750–1850* (Cambridge: Cambridge University Press, 1994).

23 The influence of embryology on Marx is suggested in Arno Wouters, "Marx's Embryology of Society," *Philosophy of the Social Sciences 23, no. 2* (June 1993): 149–79, but with reference only to German sources, not the French sources Marx would have encountered in Paris.

24 David Bates, *Enlightenment Aberrations: Error and Revolution in France* (Ithaca, N.Y.: Cornell University Press, 2002).

25 This phrase of Comte's was an enduring slogan of positivism, as cited, for example, by his follower Émile Littré in *La Philosophie Positive: Revue* 27 (1881): 291.

26 Wendy James, *The Ceremonial Animal: A New Portrait of Anthropology* (Oxford: Oxford University Press, 2004).

27 Émile Durkheim, *The Elementary Forms of the Religious Life* (New York: Free Press, 1954).