FROM ANTHROPOMIMETIC TO BIOMIMETIC CITIES - THE PLACE OF HUMANS IN "CITIES LIKE FORESTS"

HENRY DICKS

INTRODUCTION

In *Biomimicry: Innovation Inspired by Nature,* Janine Benyus argued that the key to sustainability is to learn from the 3.8 billion years of "research and development" already carried out by nature.[1] Since the publication of her book, biomimicry has been heralded as "the mantra for Silicon Valley and other regions of the techno-sphere"[2] and as a "revolutionary concept" capable of underpinning a "Second Industrial Revolution."[3] In keeping with this, biomimicry is also attracting increasing attention from architects and urbanists. The famous architecture critic, Charles Jencks, has noted that "the basic trend of the time [is] towards biomimesis,"[4] and there is a growing tendency amongst both architects and urban theorists to see natural ecosystems—especially forests—as models for the city.[5]

Perhaps the most significant limitation of current thinking in and around biomimicry is that it focuses almost exclusively on technological innovation. Turned resolutely towards the future via the concept of sustainability, biomimicry practitioners—usually engineers, designers, architects, or urbanists— typically focus on how basing artificial entities or systems on natural models can provide a coherent response to the ecological destruction wrought by conventional technologies. If biomimicry is as important as its advocates believe, however, then it also raises important questions for the humanities,

> " THROUGHOUT WESTERN HISTORY THE DOMINANT MODEL FOR THE POLIS, *QUA* BOTH CITY AND STATE, HAS BEEN THE HUMAN BEING "

including such disciplines as urban and architectural history, anthropology, political theory, sociology, and philosophy. If buildings and cities are henceforth to be based on "natural models," then how is this different from what went on in the past? Did architects and urbanists previously design things without reference to models or did they just use different models? If the cities of the future are to be based on natural ecosystems, then what place might humans occupy in these cities and how might the emergence of these cities affect human self-understanding? And, given the important but often overlooked relation between the polis *qua* city and the polis *qua* state, what implications might the rise of biomimetic urbanism have for political theory?

With a view to responding to these questions, this article will be split into three parts. In the first two parts, I will argue that the traditional model for both the state (Part 1) and the city (Part 2) is the human being. Then, in the third part, I will briefly examine the emerging model of the natural ecosystem, and in particular the forest, before going on to consider—via an articulation of Heidegger's thinking of the clearing with some recent theoretical insights into human evolution—how this new model calls for a radical shift in human self-understanding.

1 ANTHROPOMIMICRY IN POLITICAL AND SOCIAL PHILOSOPHY

The polis of the ancient Greeks was both city and state. This is not to say, however, that there was not a certain distinction between the two. For thinkers like Plato and Aristotle, the community of citizens that made up the state was far more important than the buildings and streets that made up the city; politics was far more important than urbanism. This split between politics and urbanism has been exacerbated in more recent times as the geographical coincidence between city and state eroded and the nation-state became the primary political unity. The result is the almost complete divorce between political philosophy, on the one hand, and architecture and urbanism, on the other. This is not to say, however, that political philosophy and urbanism have followed totally different paths. Indeed, ever since the ancient Greeks, thinking about the state and thinking about the city have evolved in parallel, conceiving their object in very similar terms: both the state and the city have been conceived via the same foundational model—the human being.

The first major manifestation of "anthropomimetic" political philosophy occurs in Plato's *Republic*.[6] Seeking a response to the question of the nature of justice, Plato argues that the ideal state would be composed of three classes—philosophers, auxiliaries, and businessmen—each

of which corresponds to a "part" of the human soul—reason, courage, and moderation. Justice, he goes on to argue, results from each class "minding its own affairs," for doing so gives rise to that state of harmony and balance between the different parts of the state that Plato sees as the essence of justice. Harmony and balance between the different parts of the human soul thus constitute a model for the organization of the state and therewith also an answer to the question of the nature of justice.

A similarly "anthropomimetic" approach to political philosophy was also common in the Middle Ages, a famous example being John of Salisbury's *Policraticus*, which drew an extensive analogy between the organs of the body and the organs of the state.[7] Modern political philosophy was also strongly marked by this approach. Hobbes's *Leviathan* famously opens with the description of the state as an "artificial man,"[8] and Rousseau's 1755 article in the *Encyclopédie* on political economy likewise contains an extended analogy between the organs of the state and the organs of the human body.[9] Moreover, it is also important to note the role played by speculative anthropology in modern political philosophy. The state was conceived in analogous terms to the human individual in the state of nature. As individuals entered the social contract, thus leaving the state of nature behind, the state of nature did not completely disappear but was instead elevated to the international level; the war of all against all would henceforth take place between nations, not individuals.

In the wake of the French Revolution, as representative democracy fitfully emerged as the dominant form of politics in the West, an important shift occurred in political philosophy away from the nature and role of government towards what Hegel and Marx called "civil society." Indeed, for Marx, all traditional history had focused on the "super-structural" issues of religion, politics, and

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"HARMONY AND BALANCE BETWEEN THE DIFFERENT PARTS OF THE HUMAN SOUL THUS CONSTITUTE A MODEL FOR THE ORGANIZATION OF THE STATE"

ideology, thus overlooking the relations and forces of production that make up the economic "base." The separation of civil society from the state, and therewith also the shift from the "political question" to the "social question,"[10] in turn made possible the emergence of sociology. From its very inception, sociology supposed a specific model for society: the physiological one of the organism. Grappling with the newfound separation between state and society, Saint-Simon developed a theoretical understanding of the latter via the concept of "social physiology" (la physiologie sociale).[11] In order to understand society scientifically, he thought, it was necessary to use concepts drawn from physiology, an approach which led him to inquire into the various "organs" of the "social body," while at the same time seeing political economy, law, and public morality as the basic "rules of hygiene" of this same social body. Strongly influenced by Saint-Simon, Auguste Comte may have abandoned the expression "social physiology" in favour of the neologism "sociology," thus founding the latter as a stand-alone discipline, but he did not abandon the organismic model.[12] For Comte, the very possibility of sociology as a positive science depended on seeing society as an "organism," an approach that led him to import a wide number of key operational concepts—organs, illnesses, etc.—from physiology. Likewise, in *De la Division du Travail Social*, Durkheim also took up this physiological view of society, arguing that the division of labour in the "social organism" corresponds to the functional division of the "biological organism" into different members and organs.[13]

For our purposes, there are three key points to underline regarding anthropomimetic political and social philosophy. The first is that specifically in political philosophy, one finds a strong tendency to focus on the soul or mind of the human individual and its mimetic counterpart at the level of the state. Plato, for example, focuses on what he sees as the three different parts of the soul and their mimetic counterparts in the state. Likewise, while Rousseau's article on political economy draws an extensive analogy between the parts of the human body and the parts of the state, his political philosophy—as developed most notably in *Du Contrat Social*—focuses rather on analogies between the mental faculties of human individuals and their corresponding attributes in the state, the most notable example being his invocation of the individual will as a model for the "general will." The second is that the emergence of sociology in the nineteenth century did not amount to a change of model—away from the "anthropological" one favoured by political philosophers from Plato to Rousseau and towards a new and different "physiological" or "biological" one—but rather a shift in focus within the same basic model,

such that the traditional emphasis on the mind, and therewith also on the activities of government and science, was replaced by a focus on the body, and therewith also on socio-economic activity, particularly the work. The third key point is that all the political and social philosophy discussed above sees the political or social community as composed solely of human beings. Plato's state is composed of people, not things. The parts of Hobbes's state that correspond to the different parts or attributes of the human individual (the soul, memory, joints, nerves, strength, etc.) are all people (the sovereign, counsellors, magistrates, etc.),[14] hence the famous depiction of the state on the frontispiece of *Leviathan* as a composite of human individuals. Similarly, in Comte and Durkheim's work, the parts of the social organism that they think correspond to the parts of the biological organism are all different categories of people. In short, human beings provide not just the form but also the matter of the traditional view of the state.

2. ANTHROPOMIMICRY IN URBAN THEORY

The first key manifestation of anthropomimicry in architecture and urban theory occurred in early Renaissance Italy in the work of such important and influential figures as Leon Battista Alberti, Filarete, and Francesco di Giorgio Martini.[15] According to the French urban historian Françoise Choay, the fundamental explanation for this phenomenon lies in what she calls the "scandal of homo artifex."[16] Unlike other species, whose constructions follow paths determined by their nature, humans are free to build things however they choose. So, whereas the laws that govern the construction of beehives or ant nests are determined by the nature of the species, humans, as uniquely autonomous agents, must give themselves their own laws of construction. This in turn raises the question of what laws and guidelines they should give themselves. The response, Choay

explains, was that the construction of artefacts should follow the form of the human body, for the human body was considered the most perfect form in all of nature, primarily on the grounds that it combined the fundamental attributes of all the various different spheres of creation, from the growth of plants and the sentience of animals to the rationality and spirituality of bodiless angels.[17] The result was an approach to the planning and design of cities that would dominate Western architecture for hundreds of years: the form of the city should follow the form of the human body.

There was, however, a complication with this "anthropomimetic" approach to urban planning and design. Unlike Vitruvius, who saw the human body as a purely formal or aesthetic architectural model, the architects and urban theorists of the early Italian Renaissance also looked for functional equivalents to the different parts of the human body.[18] The complication was that it was not easy to find meaningful points of comparison between internal organs of the human body and corresponding functional parts of the city. There was, as Choay notes, a "blank" in the city where the internal organs should be.[19]

Four hundred years later, this blank was eventually filled in. The moment of transition is most clearly visible in the contest between Antoni Rovira i Tras and Ildefonso Cerda for the renovation of Barcelona in the mid-nineteenth century. Rovira's project accepted the basic methodology of the early Italian Renaissance: the renovation of Barcelona was to follow the ideal aesthetic form of the human body. As Antonio Lopez de Aberasturi explains: "[f]rom the head – the forum to the peripheral members, the proportions of its [the proposed city's] elements are modelled on the proportions of the human body, in conformity with the teachings of the great treatises of classical architecture."[20] (my translation) Cerda, on the other hand, introduced a functionalist approach. The city should not have the aesthetic form of the human body, but rather the functional efficacy of the biological organism. The urbanist, in this new framework, takes on the role of both "anatomist" and "doctor" of the "urban organism." His role is first to dissect the city, to analyse its biological functions—its systems of consumption, digestion, circulation, evacuation of waste, and so on—and then, in the case of pathology, to intervene in such a way that the city may be cured of any "illness." So, just as Auguste Comte's founding of sociology as a positive science required society to be seen as an organism, so the emergence of urbanism as a positive science—which Choay traces back to Cerda's *Teoría General de l'Urbanización*—likewise required the city to be seen in this same physiological way.[21]

But the city, as theorized by the nascent science of urbanism, was not just any old organism. Indeed, as the development of urban infrastructures over the course of the nineteenth and twentieth centuries has testified, the principal technological developments in the thinking and practice of urban planning and design typically evoked the model of the specifically human or animal organism. For example, the mid-nineteenth century British hygienists, and Frederick Ward in particular, proposed new forms of centralized urban water systems whose pipes were based on the model of "arteries," "veins," and "capillaries," whose steam-powered pumps used to transport water uphill were based on the "heart," and whose impermeable paving, which was thought to protect the city from disease, was modelled on the "skin."[22] Perhaps the greatest example of this way of thinking, however, is to be found in Le Corbusier's *Urbanisme*, which describes the city as a "human organism," its buildings as "cells," its roads as "arteries," its parks as "lungs," and the urbanist as its "doctor" or "surgeon," depending on the severity of the treatment required. In the book's appendix, Le Corbusier even provides various diagrams of the internal organs of the human body, explicitly referencing them as models on which his practice as an urbanist is grounded.[23]

In view of the above analyses, it is clear that the evolution of Western thinking about both states and cities has followed a similar path. Indeed, while some moments in history have given rise to particularly intense moments of activity for the former (e.g., the Enlightenment) and others for the latter (e.g., the Renaissance), it is also true that there have been periods of strong convergence, most notably the mid-nineteenth century, which saw the simultaneous emergence of both sociology and urbanism, viewed as positive sciences, thanks in large part to a shared grounding in the physiological model of the organism. This is not to say, however, that history does not also reveal significant

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theoretical differences between the polis qua city and the polis qua state. We have already seen that the mid-nineteenth century marked a change in focus from the Enlightenment vision of the human soul or mind as model for the workings of government to the sociological vision of the functional differentiation of the biological body or organism as model for the social division of labour. In the case of urban theory, by contrast, the shift is not from mind to body, but rather from the outward, aesthetic form of the human body to its internal, functional organization. A second major difference concerns the composition of the anthropomimetic state in contrast to that of the anthropomimetic city. Whereas the former is composed solely of human beings, the latter is composed rather of houses, temples, fortresses, city walls, market places, and other artificial constructions, though later also infrastructure, most of which was inanimate, as in the case of transport, water, and energy networks, though some of which was composed of living beings, as in the case of the new urban parks, whose creation was justified throughout the Western world on the grounds that they constituted the "lungs of the city."[24]

3 THE BIOMIMETIC POLIS AND THE QUESTION OF THE HUMAN

It is not hard to see that modelling cities and states on human individuals is ecologically problematic. Viewed ecologically, humans are "consumers." To base cities and states on the model of human individuals is thus to create urban and socio-political systems whose continued existence depends on the extraction and consumption of vast quantities of energy and materials from their environment and which also generate huge quantities of waste and pollution. Conversely, to base cities and states on natural ecosystems would be to create urban and socio-political systems which generate their own usable energies and materials while also recycling their wastes in processes analogous to natural nutrient cycling.

To get a brief idea of the power of this new model, let us briefly consider the potential implications of Braungart and McDonough's motto, "[i]magine a building like a tree, a city like a forest,"[25] for sustainable energy systems. According to this model, every building would capture all or almost all of the energy it requires using solar panels, whether photovoltaic or, in the future, using techniques closer to natural photosynthesis. As for distribution, just as in the forest the rhizosphere connects the trees together such that excess sugars may be passed on to mycelium in the soil and thereby also on to other trees, so "energy positive" buildings would pass on their excess energy to buildings that do not meet their own energy requirements via a distributed underground grid. And finally,

just as in the forest the mobile organisms—the insects and animals—obtain their energy in the first instance from the plants, so in a city like a forest, the mobile elements— cars, trams, drones, etc.— could also obtain their energy directly from the buildings.

While it would in theory be possible to develop all sorts of other examples of how forest ecosystems could help us re-think the technological foundations of our cities and states, the key question that the remainder of this article will seek to address is rather the anthropological one of the "place" humans might occupy in the biomimetic polis, and therewith also the issue of how basing the polis on forest ecosystems calls on us to re-think our self-understanding. Before developing a response to these questions, it is important to recall two key features of the basic anthropology supposed by modern political philosophers: first, the key opposition that structures this anthropology is that of a body shared with the rest of nature and a mind unique to humans; second, human individuals— *qua* syntheses of bodies and minds—provide both the form on which the state is modelled and the matter of which it is composed. In this manner, the state provides a place where these dual aspects of the human may find fulfilment: bodily fulfilment may be attained via the activity of consumption we share with animals and mental fulfilment by the intellectual activities—politics, science, art, etc.—that humans alone possess. In view of this, it could perhaps be thought that the biomimetic polis runs the risk of going to the opposite extreme of the anthropomimetic polis (i.e., of excluding the human altogether). If the basic models for the different elements of the state are provided by nature—plants, animals, fungi, etc.—and not by the
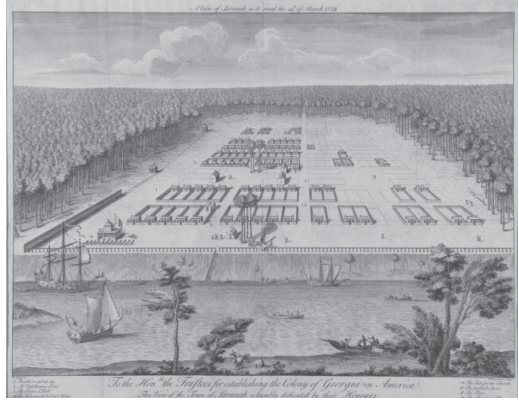

FIGURE 1. THE CONSTRUCTION OF THE CITY OF SAVANNAH, GEORGIA IN AN AREA OF CLEARED FOREST

human, then what place might the biomimetic polis accord to humans? In response to this question, the key argument sketched out in the remainder of the article is that it is possible to think the place of the human in "cities like forests" via the development of a speculative philosophical anthropology that combines Heidegger's ontological thinking of the "clearing" with various anthropological insights that have emerged from the study of human evolution and pre-history.

4 THE CLEARING IN ANTHROPOLOGY AND PHILOSOPHY

In "The End of Philosophy and the Task of Thinking," Heidegger describes the clearing as "the open region for everything that becomes present and absent."[26] This becoming present, he thinks, depends on humans' unique ability to understand Being (i.e., the "as"), for it is "as" things—as tools, as other humans, as animals, as Gods, etc.—that beings show up in the clearing. It is widely assumed in the secondary literature on the subject that the clearing in the forest is ultimately just a "metaphor" for this uniquely human ability to understand the "as."[27] On this reading, the clearing in the forest is simply a figurative representation of being-in-the-world, and in particular of its spatiality. In what follows, we will see that it is possible to draw on contemporary interpretations of human evolution and pre-history in order to interpret the clearing not as mere metaphor, but rather as a literal and insightful description of the "there," understood as the space where the "as" reveals itself.

For the first four or five million years since our hominid predecessors separated from the common ancestor they shared with chimpanzees, the driving force behind human evolution was the thinning out of the tropical forests of Africa and therewith also the transition from an arboreal lifestyle to one which increasingly took place in open environments.[28] According to the French paleo-anthropologist Pascal Picq, it was precisely the completion of this transition to open environments—and not an increase in brain size, the generalization of tool-use, bipedalism, language, or any other single factor—that defines the genre homo,[29] and therewith also what are widely referred to as "early humans." The emergence of "modern humans," approximately 1.5 million years later, again marked a significant shift in our ancestors' relation to the environment. If "anatomically modern humans" emerged approximately 200,000 years ago, it was not until approximately 50,000 years ago—during the depths of the last Ice Age—that so-called "modern behaviour" emerged. Then, as soon as the glaciers receded some 12,000 years ago, a dramatic increase in the human population came about thanks largely to the widespread practice of

deforestation, whether to create space in which to dwell, hunt, and gather or to adopt the agriculture and architectural techniques characteristic of the Neolithic Revolution.[30] The clearing, on this view, is not a metaphor for the space where humans dwell, for the genre homo is not only biologically adapted to living in the clearings or open environments opened up several million years ago by climate change, but also, and largely because of this adaptation, has in its most recent incarnation—behaviourally modern humans—constantly sought to clear forests, a practice that has now spread so far and wide that human habitation of clearings goes largely unnoticed.[31]

But the clearing is not just a physical habitat, an open environment to which members of the species homo sapiens are biologically and culturally adapted, for it must also be seen in Heideggerian terms as the space where Being "reveals itself," thus "opening itself" to understanding. In what follows we will not seek to understand the complex philosophical issue of the "self-disclosure" of Being in its entirety, but rather to analyse one important feature of this process that is particularly important for the present inquiry: concomitant with the self-disclosure of the "as" there emerges the possibility of seeing one being "as" or "like" another being. This feature of the self-disclosure of Being resonates with the argument put forward by the cognitive anthropologist Steven Mithen that what ultimately distinguishes modern humans from early humans is "cognitive fluidity." By cognitive fluidity, Mithen means the ability to combine the various different categories of thought and forms of intelligence so as to produce original syntheses.[32] So, whereas Mithen thinks that the Neanderthals had what he calls a "natural history intelligence," a "technical intelligence," and a "social intelligence," each of which was more or less as fully developed as that of modern humans, he also thinks they were unable to combine these various different forms

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of intelligence and the categories of thought on which they depend to produce novel syntheses.

It is not hard to see that it is this openness of the "as," this cognitive fluidity, which gives humans the unique ability to blend together their understandings of nature, of technology, and of humanity, that constitutes the ontological ground for the creation of both the anthropomimetic and the biomimetic polis. It is what makes it possible to conceive cities and states based on the model of the human individual, understood as a composite of an animal body and a human mind, just as it is also the ontological ground that allows humans to conceive cities and states based on the model of the forest, understood not just as a natural ecosystem, but also as containing clearings and therewith also the open relationship to the "as" that is unique to humans. With this in mind, it would seem that the transition from an anthropomimietic to a biomimetic model of the polis makes possible a new way of thinking about what distinguishes humans from nature: in contrast to the traditional distinction between the mind and the body, the new distinction would be based instead on the opposition between the forest and the clearing. After the "mind/body" dualism of modernity, which identifies the human with the mental and the natural with the bodily, there may thus emerge what I propose to call an "enlightened naturalism" (naturalisme éclairé), which, as the word "naturalism" suggests, seeks to explain the emergence of the human in naturalistic terms via the study of human evolution, while at the same time also making it possible to think about what is ontologically distinctive about the human—the open relation to Being—via the concept of the "clearing" (clairière).

CONCLUSION

Whereas the traditional model for the polis was the "anthropomimetic" one of the human being, the emergence of biomimicry has led to the possibility not only of taking the forest as a model for the polis, but also of understanding the genesis of this model from out of the clearing, understood not only as an open environment, but also as the space where the "as" discloses itself, thereby making it possible to see one thing "as" or "like" another thing. This in turn calls for a radical shift in human self-understanding: rather than seeing ourselves as composites of an animal body and a human mind, we may henceforth see ourselves as former forest-dwellers who have come to dwell in open environments and who, in doing so, have ultimately acquired an open relation to Being, hence the possibility of conceiving states as "artificial men," societies as

"organisms," cities like "forests," and so on and so forth. From this perspective, rather than trying to overcome the much-maligned mind-body dualism of modernity in the name of either reductionist monism (e.g., scientific naturalism) or postmodern pluralism, the task we face is rather to theorize an "enlightened naturalism" (naturalisme éclairé), which articulates naturalistic explanations of human evolution with ontological thinking about the "clearing" (clairière). Moreover, as far as the relation between architecture and philosophy is concerned, although Heidegger's significance for architecture has been much discussed,[33] the idea that building takes place in clearings and that there may be an important link between clearings in the naturalistic and ontological senses has, to my knowledge, yet to be explored. From Vitruvius[34] to Le Corbusier,[35] it has commonly been assumed that the first ever buildings were constructed in forest clearings, but this has not been linked to the ontological sense of the clearing, and thereby also to the question of the being of buildings, and in particular to their openness to being seen "as" imitations of the perfect human form, "as" cells in an urban organism, or "as" habitable imitations of the trees that made way for them in the first place. Lastly, it is of course also important to consider how the model of the forest may allow us to rethink not just architecture and urbanism, but also the polis in the political sense. Could the model of the forest biome help provide a model for the political economy of entire nation states and in particular for their agricultural and industrial production? And, if the forest is the model for the polis, could the clearing perhaps provide a model for the agora, understood as the economic and political space of markets, parliaments, tribunals, and so on, where the essential discussions and decisions of its human inhabitants take place?

> **" THE EMERGENCE OF BIOMIMICRY HAS LED TO THE POSSIBILITY NOT ONLY OF TAKING THE FOREST AS A MODEL FOR THE POLIS, BUT ALSO OF ACCORDING HUMANS A PLACE WITHIN THIS MODEL "**

ENDNOTES

[1] Janine Benyus, *Biomimicry: Innovation Inspired by Nature* (New York: Harper Perennial, 1997).

[2] Dickson Despommier, *The Vertical Farm: Feeding the World in the 21st Century* (New York: Picador, 2011), 34.

[3] Freya Mathews, "Towards a Deeper Philosophy of Biomimicry," *Organization & Environment* 24, no. 4 (2011): 364-387.

[4] Charles Jencks, *The Story of Postmodernism* (Chichester: John Wiley, 2011), 225.

[5] See Michael Braungart and William McDonough, *Cradle to Cradle: Re-Making the Way We Make Things* (London: Vintage, 2009); Luc Schuiten and Pierre Loze, *Vers une Cité Végétale* (Wavre: Madraga, 2010); Vincent Callebaut, *Paris 2050: Les Cités Fertiles Faces Aux Enjeux du XX siècle* (Paris: Michel Lafon, 2015); and Maibritt Pedersen Zari, "Ecosystem Services Analysis: Mimicking Ecosystem Services for Regenerative Urban Design," *International Journal of Sustainable Built Environment* 4, no. 1 (2015): 145–157.

[6] Plato, *The Republic*, trans. Desmond Lee (London: Penguin Classics, 1974).

[7] John of Salisbury, *Policraticus: of the Frivolties of Courtiers and the Footprints of Philosophers*, trans. Cary J. Nederman (Cambridge: Cambridge University Press, 1990).

[8] Thomas Hobbes, *Leviathan or the Matter, Form & Power of a Commonwealth Ecclesiastical and Civill* (London: Andrew Cooke, 1651).

[9] Jean-Jacques Rousseau, "Discours sur l'Economie Politique," in *Du Contrat Social*, ed. Robert Derathé (Paris: Gallimard, 2007), 66.

[10] Serge Moscovici, *Essai sur l'Histoire Humaine de la Nature* (Paris: Flammarion, 1977).

[11] Claude Henri Saint-Simon, *De la Physiologie Sociale: Œuvres Choisies* (extraits 1803-1825), ed. Georges Gurvitch (Paris: Presses Universitaires de France, 1965).

[12] Auguste Comte, *Leçons de Sociologie: Cours de Philosophie Positive* (Paris: Flammarion, 1995), 47-51.

[13] Emile Durkheim, *De la Division du Travail Social,* (Paris: Editions Norph-Nop, 2011).

[14] The only significant exceptions to this are money and goods, which Hobbes depicts as the "blood" of the "artificial man."

[15] Jütte has documented how in late medieval Europe houses were often

conceived by analogy with human beings, but he also notes that it was only with the Renaissance that the "boom" in anthropomorphic architecture truly began. See Daniel Jütte, "Living Stones: The House as Actor in Early Modern Europe," *Journal of Urban History*, 42, no. 4 (2015): 659-687.

[16] Françoise Choay, "La ville et le domaine bâti comme corps dans les textes des architectes-théoriciens de la première renaissance italienne," *Nouvelle Revue de Psychanalyse* 9 (1974): 239-251.

[17] Ibid., 247.

[18] Ibid., 244.

[19] Ibid., 246.

[20] Antonio Lopez de Aberasturi, "Introduction," in *La Théorie Générale de L'Urbanisation d'Ildefonso Cerdà*, trans. Antonio Lopez de Aberasturi (Paris: Editions du Seuil, 1979), 22.

[21] Françoise Choay, *La Règle et le Modèle: Sur la Théorie de l'Architecture et de l'Urbanisme* (Paris: Editions du Seuil, 1996).

[22] Frederick Ward, *Discours Prononcé à la Séance d'Ouverture du Congrès International de Bienfaisance*, (Bruxelles: Librairie Européenne, C. Muquardt, 1856), 9-31.

[23] Le Corbusier, *Urbanisme* (Paris: Flammarion, 1994).

[24] Catherine Ward Thompson, "Linking Landscape and Health: The Recurring Theme," *Landscape and Urban Planning* 99 (2011): 191.

[25] Michael Braungart and William McDonough, *Cradle to Cradle*, 139.

[26] Martin Heidegger, "The End of Philosophy and the Task of Thinking," in *Basic Writings*, ed. David F. Krell (Oxford: Routledge, 1993), 442.

[27] See Richard Capobianco, *Engaging Heidegger* (Toronto: University of Toronto Press, 2010), 89; Thomas Sheehan, *Making Sense of Heidegger: A Paradigm Shift* (London: Rowman and Littlefield,

2015), 20-21.

[28] Jean-Jacques Hublin, *Quand d'Uutres Hommes Peuplaient la Terre* (Paris: Flammarion, 2008).

[29] Pascal Picq, *Au Commencement était l'Homme* (Paris: Odile Jacob, 2009), 99-100.

[30] Michael Williams, *Deforesting the Earth: From Prehistory to Global Crisis* (Chicago: University of Chicago Press, 2002).

[31] Robert Harrison, *Forests: The Shadow of Civilization* (Chicago: University of Chicago Press, 1992), 245.

[32] Steven Mithen, *The Prehistory of the Mind: A Search for the Origins of Art, Religion and Science* (London: Thames and Hudson, 1996), 203.

[33] See Miguel De Beistegui, *Thinking with Heidegger* (Indianapolis: Indiana University Press, 2003); Adam Sharr, *Heidegger for Architects* (Oxford: Routledge, 2007).

[34] Choay, "La ville et le domaine," 239-251.

[35] Le Corbusier, *Vers une Architecture* (Paris: Flammarion, 1995).