

ARTICLE

Three Concepts for Crossing the Nature-Artifice Divide: Technology, Milieu, and Machine

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ABSTRACT: The distinction between nature and artifice has been definitive for Western conceptions of the role of humans within their natural environment. But in order to distinguish between nature and artifice, the human must be separated from nature. This separation, in turn, facilitates a classification of knowledge in general, typically cast in terms of a hierarchy of sciences that ascends from the natural sciences to the social (or human) sciences. However, this hierarchy considers nature as a substantial foundation upon which artifice operates and to which it responds. Here I examine three inter-related concepts that, by focusing on events rather than substances, operate beyond the nature–artifice distinction and thereby resist the hierarchical classification of the sciences: Foucault’s concept of technology, the concept of milieu as it crosses over historically from physics to biology and anthropology, and Deleuze and Guattari’s reconfiguration of the concept of milieu in terms of their concept of machine.

Keywords: Nature, Artifice, Technology, Milieu, Machine

“My poor child, do you want me to tell you the truth?
I’ve been given a name that does not suit me:
For I am called Nature, yet I am all art.”
– Voltaire, *Philosophical Dictionary*

In a 1988 interview, Deleuze indicated that he would like return to joint work with Guattari “and produce a sort of philosophy of Nature, now that any distinction between nature and artifice is becoming blurred.”¹ My intention here is not to ask what such a philosophy of nature might look like, and neither is it to provide reasons why the nature–artifice distinction is something to overcome (although I hope some inadequacies of the distinction may become apparent); here, rather, I examine a few conceptual resources drawn largely from Deleuze and Foucault that are helpful for dismantling the division between nature and artifice.² The divi-

¹ Deleuze, Gilles, *Negotiations*, Trans. Martin Joughin, (New York: Columbia University Press, 1995), 155.

² Bruno Latour’s work constitutes perhaps the most sustained interrogation of this division. See Bruno Latour, *We Have Never Been Modern*, Trans. Catherine Porter, (Cambridge: Harvard University Press, 1993)

sion itself facilitates the disciplinary classification of knowledge in general, typically cast in terms of a hierarchy of sciences that ascends from physics, chemistry, and biology (the natural sciences) to anthropology, sociology, and economics (the social sciences). But humans must first be separated from nature in order to have sciences of humans over and against sciences of nature.³ Moreover, while each of these sciences enjoy different methods and objects of inquiry (whether physical, biological, or economic), the hierarchical arrangement of the sciences considers nature as a substantial foundation upon which human artifice operates and to which it responds. By focusing on events rather than substances, the concepts of technology, milieu, and machine suggest a different way of considering the complicated relation between the various registers of knowledge, beyond the hierarchical classification that turns upon the division between the natural and the artificial.⁴

1. Technology

1.1 *The concept of technology in general*

In an 1982 interview with Paul Rabinow on architecture, Foucault laments the fact that our use of the word ‘technology’ is confined to such a narrow meaning of “hard technology, the technology of wood, of fire, of electricity,” but considers that if we disabuse the term of its narrow confines, we find that “*government* is also a function of technology: the government of individuals, the government of souls, the government of the self by the self...”⁵ To be sure, there seems to be a *prima facie* distinction to be made between the material logistics of “hard technologies,” of instruments and machines, on the one hand, and the social institutions of government (despite its seemingly mechanical and insensitive bureaucratic procedures), on the other. But Foucault endorses a wide concept of technology, *techne* understood generally as “a practical rationality governed by a conscious goal.”⁶ If we understand a material instrument as artifact that is constructed for a certain goal, as a clock is built to tell the time; and if we understand government as an artifice constructed to conduct human activity, then the technological dimension of both the material instrument and the social institution comes into view: both the clock and government are practical and artificial constructions that rationally conduct or govern us toward a conscious goal. The concept of technology thus enjoys the critical capacity to bypass the boundary between the social and the material, the human and the nonhuman,

and Bruno Latour, *An Inquiry into Modes of Existence: An Anthropology of the Moderns*, Trans. Catherine Porter, (Cambridge: Harvard University Press, 2013).

³ On this point, see Pierre Hadot, *The Veil of Isis: An Essay on the History of the Idea of Nature*, Trans. Michael Chase, (Cambridge: Harvard University Press, 2006), 91-98.

⁴ Philipp Descola provides a magisterial account of the distinction as the result of a particular ethnographic experience. Philipp Descola, *Beyond Nature and Culture*, Trans. Janet Lloyd, (Chicago: University of Chicago Press, 2013).

⁵ Michel Foucault, *Power*. James D. Faubion & Paul Rabinow (eds.), (New York: The New Press, 2000), 364. Italics mine. For an analysis of the ethical dimensions of Foucault’s philosophy of technology, see Steven Dorrestijn, “Technical Mediation and Subjectivation: Tracing and Extending Foucault’s Philosophy of Technology,” in *Philosophy & Technology*, 25 (2), pp. 221-241. (Springer, 2012).

⁶ Foucault *Power*, 364.

which in turn allows us to conceive a world order of things unencumbered by the bifurcation between the natural and the artificial.

In fact, Foucault's general concept of technology recalls the Aristotelian formulation of *techne*, which often holds material elements alongside physiological and political elements. Consider the virtue of *megalopsychia*, or 'greatness of soul', surely one of the most striking (and least discussed) virtues in the *Nicomachean Ethics* (NE 4.3. 1123b-1125a).⁷ Aristotle is tellingly detailed when describing the *megalopsychon*, or the great-souled person: "a slow step is thought proper to the proud man, a deep voice, and a level utterance; for the man who takes few things seriously is not likely to be hurried, nor the man who thinks nothing great to be excited, while a shrill voice and a rapid gait are the results of hurry and excitement" (1025a12-16). While the vain person (*chaunotes*) indulges in honors from "casual people and on trifling grounds," and while the humble person (*mikropsychion*) refuses gifts and honors that he nonetheless deserves, the *megalopsychon* accepts great gifts and honors in a great way, at a great time, etc. We are presented here with an art of giving and receiving honorably, a style or *techne* of character composition that seems to be analyzable in terms of gait, step, voice, prosody, breathing and speed.⁸

To be sure, I do not mean to delve into the finer complexities of the *Nicomachean Ethics* here; rather, I mention the walking *megalopsychon* because it can guide us through a wider concept of *techne* that Foucault endorses, *techne* beyond the opposition between the natural and the artificial. Aristotle's evaluation of the *megalopsychon* can illuminate the way the concept of technology is critical of the natural/artificial distinction precisely because the socio-political phenomenon of becoming *megalopsychon* involves *time and materials*: it is constituted by a certain technology of walking slowly through ancient Greece, perhaps with an appropriate train, and it requires the artful reception of politically valorized material objects, that is to say, gifts, with a technology of the body—a deep voice and a level prosody. Of course, it is not just the *megalopsychon* in the agora who engages walking as a techno-political activity, we too move in a social space, dressed in some sort of attire, outfitted with shoes and canes and wheelchairs. Furthermore, alongside these technological prosthetics, we have a certain *way* of carrying ourselves which cultivates a certain affect, in the sense that we are able to affectively respond to the ways that other people acknowledge or greet us on our walks, and we have practical techniques for avoiding physical accidents as well as social blunders. Both these ma-

⁷ Aristotle. *Complete Works*, vol. 2, Jonathan Barnes (ed.), (Princeton: Princeton University Press, 1984), 1773-1776.

⁸ In Book IV of the *Nicomachean Ethics*, Aristotle does not discuss the *megalopsychon* in terms of *tekhnē*, which is thematically treated in Book VI alongside *epistēmē* (knowledge). However, in Book IV Aristotle is concerned with a descriptive catalogue of virtues as they stand, while *tekhnē* designates the becoming or the practical production of contingent things. So while it is clear that *tekhnē* is not *arête* (virtue), it is nonetheless involved in the *production* of *arête*. This highlights the essentially temporal dimension of *tekhnē* discussed below. Notably, Aristotle proceeds to discuss *megalopsychia* from the outset through its relation to external goods and objects: "Greatness of Soul, as the word itself implies, seems to be related to great objects; let us first ascertain what sort of objects these are," (1123b1).

terial and institutional artifices form a concrete ensemble of technologies that produce the *event* of walking down the street through town.

And it is in this regard that Foucault suspects that “if one placed the history of architecture back in this general history of *techne*, in this wide sense of the word, one would have a more interesting guiding concept than by the opposition between the exact sciences and the inexact ones.”⁹ In other words, Foucault reckons that the concept of technology (taken in the general sense) would allow us to examine the relation between humans and the nonhuman material architectures surrounding them in a better fashion than the confrontational opposition between the hard sciences and the social sciences and humanities. But Foucault’s suspicion is not only a suggestion for the discipline of architectural history, it is also an invitation to reevaluate divisions between the human and the nonhuman, the division between social artifices and natural substances. And as we shall see in the last section of this paper, this wide sense of *techne* shares a critical capacity with Deleuze and Guattari’s concept of machine in *Anti-Oedipus*, since machines also dismantle the traditional bifurcation of nature and society. In his case history, “Joey: A ‘Mechanical Boy,’” Bruno Bettelheim relates the story of a schizophrenic child whose performance of “intrinsically human” actions “never appeared to be other than machine-started and executed.”¹⁰ While Bettelheim focuses on the abnormal emotional development of a child ignored by his mother in a mechanized society, Deleuze and Guattari examine Bettelheim’s case study as a testimony of the *machinic* nature of desire itself: little Joey can eat, sleep, and communicate only by being plugged into machines. In other words, the events that constitute the state of affairs surrounding little Joey are not the expression of some internally hidden unconscious psyche but rather the productions of a process conducted, quite literally, by machines. Ultimately, Deleuze and Guattari’s concept of machine allows them to conclude that “man and nature are not like two opposite terms confronting each other...rather, they are one and the same essential reality.”¹¹

1.2 Uncertainty and the management of time and society

In *Security, Territory, Population*, Foucault undertakes a brief examination of the capitalization of towns, beginning with a case study of Pierre Lelievre's planning of Nantes in 1932. There, the question of technology is broached within the context of Foucault's analysis of sovereignty, discipline, and security. While “*sovereignty* capitalizes a territory, raising the major problem of the seat of government,” and while “*discipline* structures a space and addresses the essential problem of a hierarchical and functional distribution of elements,”

⁹ “Space, Knowledge, and Power,” in Foucault, *Power*, 364.

¹⁰ Bruno Bettelheim, “Joey: A ‘Mechanical Boy,’” in *Scientific American*, March 1959.

¹¹ Gilles Deleuze and Felix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia*, Trans. Robert Hurley, Mark Seem, and Helen R. Lane, (Minneapolis: University of Minnesota Press, 1983), 4-5.

security will try to plan a milieu in terms of *events or series of events or possible elements*...the specific space of security refers then to a series of possible events, it refers to the temporal and the uncertain which have to be inserted within a given space...the milieu.¹²

Security thus addresses the problem of how to manage a series of events within a civic space, forming a kind of diagram for the town that considers time and its various possibilities. Foucault observes that the development of Nantes, which unfolds according to an idea of security, an idea of planning and preparing for the possible events that may occur in the future, constitutes a technical problem, again in the wider sense of *techne* because the town must be organized in a practical way oriented towards a conscious goal. The problem of developing Nantes, for example, took into consideration *hygiene* (since pockets of dense population had to be opened up to ventilation); *trade* (since the streets had to facilitate the transportation of goods into the town and outside of the town); *traffic* (since the streets had to open onto outside roads that had to be manageable in order for customs to maintain control of trade); and *surveillance* (since the suppression of city walls made necessary by economic development entailed that one could no longer close towns in the evening or closely supervise daily comings and goings—which meant that criminals might creep in at any time from the country, which is of course, Foucault quips, where criminals come from).¹³ The essential point here is that in each of these cases, the technical problem of town development is oriented toward time and knowledge: “What must be done to meet something that is not exactly *known in advance*?”¹⁴ Technical problems are problems that concern the eventual as the *limit of knowledge*, because the eventual future, when apprehended in terms of knowledge, harbors an element of uncertainty. From an epistemic perspective, in other words, the future signifies uncertainty, an uncertainty that needs to be managed and conducted—and we find that *techne* is precisely the way to conduct the present into the future. In this regard, *techne* is a mode of intervening upon becoming, it is a way of ordering time and events.

1.3 Technology, knowledge, and time

In the *Nicomachean Ethics*, Aristotle distinguishes *techne* from *episteme* (knowledge derived from first principles) in terms of variability: *techne*, or art concerned with making, treats things that admit of variation, while *episteme*, or knowledge that can be demonstrated (e.g. geometrical proofs), treats things that are invariable.¹⁵ In other words, *episteme* is concerned with “things that are universal and necessary,”¹⁶ while *techne*, as Heidegger observes, “is concerned with beings only insofar as they are in the process of becoming.”¹⁷ Thus, the distinction be-

¹² Michel Foucault, *Security, Territory, Population*, Trans. Graham Burchell, (New York: Palgrave Macmillan, 2007), 20.

¹³ Foucault, *Security, Territory, Population*, 18-20.

¹⁴ Foucault, *Security, Territory, Population*, 19. Italics mine.

¹⁵ Aristotle, *NE* 6.4-6. 1140a-1141a.

¹⁶ Aristotle, *NE* 6.6. 140b30.

¹⁷ Martin Heidegger, *Plato's Sophist*, Trans. Richard Rojcewicz and André Schuwer, (Bloomington: Indiana University Press, 1997), 29. Citing Aristotle, *NE*. 6.4. 1140a10-11; cf. *Met. Z.7.* 1032a12-13. In this regard, see

tween *techne* and *episteme* in terms of variability, contingency, and necessity, harbors a more profound distinction in terms of time: *techne* deals with things as they are coming into being while *episteme* deals with invariant truths of things that are.

But this is all to say that from an epistemological perspective, the essence of contingency is uncertainty, or in other words, uncertainty is presented to *episteme* as a limit, a lack of knowledge. From this epistemic perspective, *techne* can be seen as an attempt to remedy or compensate for this limitation. But from a temporal and metaphysical perspective, we may understand contingency (and thus uncertainty) productively. On this account, contingency is essentially the novelty of becoming, the fact that the new cannot be wholly determined by the known. Contingency is thus understood as a creative eruption at the edges of knowledge; in other words, contingency and uncertainty are not mere *deficiencies* of knowledge but rather *productive effects* of the essentially creative advance of becoming. The distinction between the epistemic perspective and the temporal/metaphysical perspective reveals the socio-political dimension of knowledge, since the epistemic perspective treats contingent events as something to be governed and conducted through techniques. The rationality of techniques thus emerges from within a society invested in determining and conducting the future in advance, and so we discover the will to know as a socio-political will. *Techne*, in this sense of practical rationality, is a mode of intervening upon becoming within the context of a social order, a mode of conducting events in order to *determine* precisely those aspects of the future that are not *knowable* in advance. The ‘rationality’ of *techne* is socio-political rationality rooted in a set of practices aimed at conducting so many contingencies and becomings that lie beyond the purview of *episteme*, yet within the purview of security and determinability. And since the rationality of technology is rooted in the social order, particular technologies remain unintelligible apart from the social orders within which they hold their function of conducting events.

It is telling, then, that architecture is the context from which Foucault endorses *techne* as a better guiding concept than the distinction between exact and inexact sciences. Aristotle tells us that architecture is a *techne* because it is a rational quality concerned with making (*NE* 6.4 1140a). And while we can imagine how *episteme* might convene with *techne* in architecture, as geometric knowledge of cylinders and regular polygons may aid in the building of the Parthenon, Aristotle’s aim is to distinguish *techne* from *episteme* by reference to architecture’s concern with things that are in the process of becoming. But this reveals the fundamentally temporal dimension of architecture—architecture is not simply the art of the becoming or production of a spatial edifice, rather, it is more profoundly a study of the arrangement of time and events. What is at stake in the construction of the Parthenon is not, after all, simply the production of a building, but rather the determination of events, affects, and significance—it is a temple, a symbol, a landmark, a place, in other words, built through a practical rationality oriented toward conducting a series of social affects and events. The point here is not to make the obvious claim that the arrangement of space is value-laden, the point is rather that Foucault’s suggestion to reintroduce *techne* as a guiding concept for architecture exhibits the fun-

also Bernard Stiegler, *Technics and Time, 1: The Fault of Epimetheus*, Trans. Richard Beardsworth and George Collins, (Stanford: Stanford University Press, 1998), 9.

damentally temporal orientation of designing space: the arrangement of space is secondary to the determination of events and affects. Even when building a home, one is attempting to manufacture a sequence of affects and events called “living at home” that would emanate from and converge upon the space of the house. This is what it means to say that *techne* is properly concerned with time and becoming, it is a mode of arranging events or intervening upon becoming.

2. Milieu

2.1 The concept of milieu in general

Hippocrates, in his *On Airs, Waters, and Places*, encourages the student of medicine, upon arriving “into a city to which he is a stranger,” to “consider its situation, how it lies as to the winds and the rising of the sun; for its influence is not the same whether it lies to the north or the south, to the rising or to the setting sun...From these things he must proceed to investigate everything else” (I-II).¹⁸ What is striking is not merely the course of Hippocratic investigation, which starts by reading the geographical environment in order to decipher “the diseases peculiar to the place, or the particular nature of common diseases;” but also its overarching resolve: “if it shall be thought that these things belong rather to meteorology, it will be admitted, on second thoughts, that astronomy contributes not a little, but a very great deal, indeed, to medicine. For with the seasons the digestive organs of men undergo a change” (II), and it is through the medium of the digestive organs, Hippocrates contends, that climate influences the characters and dispositions of the various races of people (XXIII).¹⁹ The fulcrum of the Hippocratic treatise, then, is to comprehend the changes in man through changes in the world, because the causes of human malady do not lie exclusively within the body, rather, they lie quite distantly outside of it, distributed throughout the surrounding geography and even, farther off, among the stars.²⁰

Accordingly, Hippocrates provides a classification of races that brings together various *anthropological* elements, such as physiological and political constitutions, as well as various *geographical* elements surrounding cities, such as their position with regard to the sun and waters, as well as the seasonal dews and breezes that characterize them:

The races in Europe differ from one another, both as to stature and shape, owing to the changes of the seasons...These changes are likely to have an effect upon generation in the coagulation of the semen, as this process cannot be the same in summer as in winter, nor in rainy as in dry weather; wherefore, I think, that the figures of Europeans differ more than those of Asiatics...and the same may be said of their dispositions, and therefore I think the

¹⁸ Hippocrates, *On Airs, Waters, and Places*, Trans. Francis Adams, (Whitefish: Kessinger Publishing LLC, 2010), 3-4.

¹⁹ Hippocrates, *On Airs, Waters, and Places*, 4, 30.

²⁰ Hippocrates writes, “One ought also to be guarded about the rising of the stars, especially of the Dogstar, then of Arcturus, and then the setting of the Pleiades; for diseases are especially apt to prove critical in those days” Hippocrates, *On Airs, Waters, and Places*, 11.

inhabitants of Europe more courageous than those of Asia...where the changes of season are very great, [the inhabitants are]...naturally of an enterprising and warlike disposition.²¹

But how, exactly, are we to account for the interaction between such vast and heterogeneous elements like airs, waters, digestive organs, semen, wars, cities, and stars? To be sure, in Hippocrates, the influence is one-way from the environment to the individual, but the problem motivating his treatise is clearly legible: how does change circulate throughout the various registers between organism and environment? In other words, how are heterogeneous series of events (the seasons, organic processes, campaigns of war) linked together?

As we saw above, the development of Nantes constituted a technical problem because a series of uncertain events had to be managed in advance. The town, that is, must be *planned*, which is to say that the future, along with the complex of heterogeneous elements that it involves, must be coordinated within the social space of the town. Foucault calls this “space in which a series of uncertain elements unfold” a *milieu*—it is the spatial arrangement of rivers, streets, and institutions (with regard to hygiene, trade, traffic, and surveillance, in the case of Nantes) that attempts to orchestrate events and affects:

The milieu is a set of natural givens—rivers, marshes, hills—and a set of artificial givens—an agglomeration of individuals, of houses, etcetera...What one tries to reach through this milieu, is precisely the conjunction of a series of events produced by these individuals, populations, and groups, and quasi natural events which occur around them.²²

The milieu, then, is the site of the conjunction between the so-called ‘natural givens’ and ‘artificial givens’. The character of the events that occur within the space of this conjunction is therefore heterogeneous or, ‘quasi-natural’. While *techne* is a practical rationality that attempts to intervene upon eventualities, the *milieu* is the field of determination for these eventualities—the space, as it were, of technological intervention. We may say, then, that the milieu (literally, the ‘middle place’) is a live space that conjoins the heterogeneous series of organism and environment through the artifices that conduct their mutual eventualities. The milieu is thus not so much a given space, but a space composed through the conjunction of heterogeneous eventualities.

Of course, the concept of the milieu is not native to urban planning. In this section, I provide a short history of the concept of milieu, from 17th century natural philosophy up until its reformulation by Deleuze and Guattari in terms of the concept of machine. As we shall see, the concept of milieu was introduced into biology through Lamarck and Comte but, as Foucault reminds us, it was already operative in Newtonian mechanics.

²¹ Hippocrates, *On Airs, Waters, and Places*, 23.

²² Foucault, *Security, Territory, Population*, 20-21.

2.2 Action at a distance: from Descartes to Newton

The milieu, Foucault tells us, is “what is needed to account for action at a distance of one body on another. It is therefore the medium of an action and the element in which it circulates.”²³ The concept of action at a distance is one of the most controversial issues in the history of mechanics, because it is not at all clear how distinct physical bodies can affect each other across distances, as in the apparent case with phenomena such as gravitational or magnetic attraction.

In Query 31 of the *Opticks*, Newton asks, “Have not the small particles of bodies certain powers, virtues or forces, by which they act at a distance?”²⁴ For Newton, apparent action at a distance was something that required experiment before explanation, and so the empirical testimony of gravitational, magnetic, and electric phenomena granted at least the *possibility* of action at a distance, despite the impossibility that natural philosophers encountered when trying to imagine it. Continental natural philosophers, most famously Leibniz, understandably criticized Newton for reintroducing occult qualities that threatened the hard-won rational picture of the world—for how can action at a distance even be conceived? If we consider two distinct bodies acting at a distance, is there not a material explanation that connects them? Does not reason fill in the gap left by the senses? Championing the principle of action by physical contact, Leibniz maintained that while empirical phenomena such as magnetic attraction seems to display action at a distance, such phenomena must be rationally interrogated until they confess motion by contact: “a body is never moved naturally, except by another body which touches it and pushes it; after that it continues until it is prevented by another body which touches it. Any other kind of operation on bodies is either miraculous or imaginary.”²⁵ Newton’s defender Samuel Clarke did not merely agree with Leibniz, he took the principle of contact to betray logical truth: “That one body should attract another without any intermediate means, is indeed not a miracle, but a *contradiction*: for ‘tis supposing something to act where it is not.”²⁶ The dispute, of course, did not regard the apparent fact of action at a distance, since the appearance of action at a distance is perfectly clear. Rather, the dispute revolved around the question of knowledge, of what could count as knowledge. If the world is material, then it follows the principles of mechanism, and so knowledge of the world must be mechanistic. The concept of action at a distance seemed to go against the conditions of mechanistic knowledge; consequently, it was not only inconceivable, but also a considerable threat to the image of rationality. Corpuscular philosophy and Newton’s empiricism were not equal rivals, because the corpuscular system was the standard of intelligibility, the condition for the rational apprehension of the physical world.

In an early point of agreement between Chomsky and Foucault in their 1971 debate, Chomsky noted that Newton’s advancement upon the corpuscular philosophy brought with it

²³ Foucault, *Security, Territory, Population*, 20-21.

²⁴ H.G. Alexander (Ed.), *The Leibniz-Clarke Correspondence: Together with Extracts From Newton’s Principia and Opticks*, (Manchester: University of Manchester, 1956), 174.

²⁵ Alexander, *The Leibniz-Clarke Correspondence*, 66.

²⁶ Alexander, *The Leibniz-Clarke Correspondence*, 53. Italics mine.

new rules for the reasonable construction of scientific explanation.²⁷ Similarly, Descartes' advancement upon scholastic philosophy brought a new way of understanding phenomena, such as thinking and the willful movement of limbs, which seemed unexplainable by the scholastic principles of action. Chomsky suggests that such phenomena compelled Descartes to postulate a second substance in order to account for that which was unaccountable by the purely material substance:

The move of Descartes to the postulation of a second substance was a very scientific move; it was not a metaphysical or an anti-scientific move. In fact, in many ways it was very much like Newton's intellectual move when he postulated action at a distance; he was moving into the domain of the occult, if you like. He was moving into the domain of something that went beyond well-established science.²⁸

Descartes' concept of the cogito, and the separation of mental and corporeal substance within which it settled like a habitat, was an alien concept that remained incompatible with the scholastic picture of nature; and similarly, Newton's empiricism introduced a foreign and impossible concept of action at a distance into the corpuscular philosophy.

From the perspective of corpuscular philosophy, the reasons for condemning action at a distance are quite clear. For Descartes, of course, matter is continuous and identical with extended space—corporeal substance is the universal plenum of *res extensa*. But Newton's "active powers" imply *discontinuous* space, since they are active across distances. Consequently, *res extensa* cannot possibly harbor "active powers," which would be other than strictly material, if not perfectly immaterial. But we realize here the severity of the incompatibility between action at a distance and corpuscular philosophy. There is literally no room in corpuscular philosophy for action at a distance, since there are no distances in matter. Action at a distance is therefore incompatible with the corpuscular concept of matter itself. To make matters worse, Newton's active powers did not only offend the picture of *res extensa*, they also disturbed the concept of mental substance. After all, while the material and the mental are strictly separated in Descartes, the two substances still negatively define each other. In other words, physical phenomena are to be wholly explicable in material terms alone, precisely because it is wholly separated from the mental—the separation between the body and the mind strictly circumscribes physical phenomena within the bounds of *passive* material action by contact. It is in this sense that, within the corpuscular system, material continuity forms the con-

²⁷ Noam Chomsky & Michel Foucault, *The Chomsky-Foucault Debate: On Human Nature*, (New York: The New Press, 2006), 12. Chomsky repeats this point in several places. See his article, Naom Chomsky, "Language and Nature," in *Mind*, New Series, Vol. 104, No. 413 (Jan., 1995), 1-61; his book, *On Nature and Language*, (Cambridge: Cambridge University Press, 2002); and his lecture, "The machine, the ghost, and the limits of understanding: Newton's contributions to the study of mind," at the University of Oslo, September 2011. Chomsky, of course, thinks there is an absolute basis of human nature that grounds rationality, whereas Foucault does not separate rationality from the historical knowledge/power relations that facilitate it—a difference that produces their disagreement when the debate turns to politics and human nature. See Noam Chomsky & Michel Foucault, *The Chomsky-Foucault Debate*, 57.

²⁸ Noam Chomsky & Michel Foucault, *The Chomsky-Foucault Debate*, 12.

dition of physical intelligibility, so the entire regime of intelligibility of corpuscular philosophy is compromised by the concept of action at a distance. Active powers do not merely introduce discontinuous spatial distances into the concept of matter, for they are *active* powers, and so they introduce a different kind of element altogether into the concept of matter. In this fashion, Newton admits *heterogeneous* non-material (following the corpuscular definition of matter) elements into the concept of matter. While Newton's various aethers could be rare and subtle matters, active powers are patently not material (again, in the corpuscular definition) while acting at a distance. This constituted a problem not only for Newton's critics but also for Newton himself. As one commentator asks, do "the aether's actions have material causes, or are they the effects of a non-material active source? Are the ultimate sources of alchemical and mechanical activity material or non-material?"²⁹ From this perspective, the accusation of occultism seems almost mild, if not completely appropriate.

Now, since the concept of action at a distance introduces heterogeneous elements into the landscape of natural phenomena, we may recognize within it the concept of the milieu. And further, the heterogeneous elements conjoined in the concept of milieu disrupts the categories of mind and matter, just as the concept of *techne* presented a limit to *episteme* and blurred the division between exact and inexact sciences, disrupting the categories of the natural and the social. In both cases, the source of this limit is the becoming of eventualities—*techne* was a mode of determining uncertain events, and the milieu is the conjunction of heterogeneous eventualities that compose phenomena in space. By admitting heterogeneous elements into his account of natural phenomena, Newton's milieu of distant action departs from the corpuscular categories of knowledge—it brings together the disparate elements of rational material and irrational immaterial active powers and blurs the distinction between the corporeal and the incorporeal, which is why Newton, ultimately, is compelled to admit that "We cannot say that all nature is not alive."³⁰ It is not simply the category of matter that loses its integrity here, the categories of mind, and even of life, lose their strict boundaries: after Newton, we no longer have a concept of matter, but only a concept of milieu.

2.3 *The milieu in French biology after Newton—from Lamarck to Comte*

"The French mechanists of the eighteenth century," Canguilhem tells us, "called "milieu" what Newton had referred to as "fluid." In Newton's physics, the type—if not the sole archetype—of fluid is aether...insofar as the fluid penetrates all these bodies, they are situated in the middle of it [*au milieu de lui*]."³¹ Newton's luminiferous aether is an intermediary between distinct physical bodies such as a light source, for example, and the ocular apparatus that reacts to it.³² The light, then, is transmitted through the milieu, and the milieu is a vehicle of the

²⁹ Alan Gabbey, "Newton, active powers, and the mechanical philosophy," in *The Cambridge Companion to Newton*, I. Bernard Cohen & George E. Smith (eds.), (Cambridge: Cambridge University Press, 2002), 341.

³⁰ From a draft variant of Query 23 of the 1706 Latin edition of the *Opticks*, cited in Gabbey, 344.

³¹ Georges Canguilhem, "The Living and Its Milieu," in *Knowledge of Life*, Paola Marrati and Todd Meyers (eds.), Trans. Stefanos Geroulanos and Daniela Ginsburg, (New York: Fordham University Press, 2008), 99.

³² Canguilhem notes that Newton's *Optics* may be the first explanation of an organic phenomenon through the action of the milieu, albeit defined in terms of strictly physical properties. Canguilhem, 100.

forces that act through it. But this is not to suggest a return to the universal plenum of corpuscular philosophy—action at a distance is not ‘bridged’ by the aether (such continuity would cancel the problem of the milieu)—again, the aether ‘transmits’ or ‘communicates’ active powers across distances between bodies. The most important point to focus on here is that the milieu is an intermediary *between two centers* (e.g. light source and eye), which makes the milieu an essentially relative notion.³³ This can perhaps be more clearly seen with regard to Newton’s gravitational aether, since gravitational force is a consequence of one body put into relation with another body—in other words, it is a *relational consequence*.³⁴ The milieu can only be conceived as an environment surrounding a central body, like a bowl of water surrounds a goldfish, by dismissing its essentially relative and intermediary status. Such a dismissal imparts a substantial quality to the milieu, as if it were a substance in and of itself. And it is precisely the conflict between the milieu as an active relative notion and the mechanical (substantial) notion of milieu as a field surrounding a body that is of chief interest in its conceptual crossover into biology through Lamarck and Comte.

When Lamarck spoke of “milieus,” Canguilhem observes, he always spoke of them “in the plural—by which he expressly means fluids like water, air, and light,” and when he designates the complex of actions that operate in the space external to the organism (the milieu in Hippocratic or environmental sense), he uses the phrase, “influencing circumstances.”³⁵ So Lamarck adopts the *mechanical* sense of milieu as a fluid, in the sense that organisms function *mechanically* within certain spatial milieus, like a bird’s wings carry it through the ‘milieu’ of air or like a fish’s tail propels it through the ‘milieu’ of water. For the *complex* sense of milieu, as the relational space in between the organism and its complex environment, Lamarck reserves the term ‘influencing circumstances’. Comte, on the other hand, uses ‘milieu’ to designate not only the fluid within which a body operates, but the “total ensemble of exterior circumstances necessary for the existence of each organism.”³⁶ However, while this use of milieu might seem complex, Comte understands “exterior circumstances” mechanically, as a cluster of mechanical mediums or fluids. Thus, instead of treating the milieu as a relative intermediary *discontinuously* connecting organism and environment, in the *Course of Positive Philosophy* Comte conceives of the milieu as a *continuous function* that took, for its variables (or fluids), “weight, air and water pressure, movement, heat, electricity, and chemical species—all factors

³³ Canguilhem, 100.

³⁴ See Eric Schliesser, “Newton’s substance monism, distant action, and the nature of Newton’s empiricism: discussion of H. Kochiras “Gravity and Newton’s substance counting problem,” in *Studies in History and Philosophy of Science, Part A*, (2011), 42(1): pp. 160-166. The concept of action at a distance in Newton has recently been the focus of lively debate. See also Hylarie Kochiras, “Gravity’s cause and substance counting: contextualizing the problems,” in *Studies in History and Philosophy of Science, Part A*, (2011), 42(1): pp. 167-184; and Andrew Janiak, “Three concepts of causation in Newton,” in *Studies in History and Philosophy of Science, Part A*, (2012 in press). For an account of Newton’s influence on natural philosophy throughout 18th century England, see Robert Schofield, *Mechanism and Materialism: British Natural Philosophy in An Age of Reason*, (Princeton: Princeton University Press, 1970).

³⁵ Canguilhem, 100.

³⁶ Citing Comte’s fortieth lesson of the *Course of Positive Philosophy*, Canguilhem, 101.

that can be studied experimentally and quantified by measurements."³⁷ From Canguilhem's biological perspective, the *Course* seems to consider the qualitative categories of biology as empirically quantitative variables of mechanical functions. Canguilhem contends that while there is a subordination of the mechanical to the vital in Comte's later works, in the early *Course* the physical variables of the environment seem to completely subsume the organism, to the point that the biological organism is reducible to the physical functions that support it.³⁸

However, there is an important dimension of the biological use of the term that is acquired from Comte's early usage of 'milieu'. Whereas Lamarck's 'influencing circumstances' (a term eclipsed by the success of 'milieu') suggests a privileged center around which influences swarm (or circum-stand), Comte's continuous milieu dissolves the entity into an abstract, homogeneous *extensa* that cannot even be said to surround it:

The representation of an indefinitely extendible line or plane, at once continuous and homogeneous, and with neither definite shape nor privileged position, prevailed over the representation of a sphere or circle, which are qualitatively defined forms and, dare we say, attached to a fixed center of reference.³⁹

In Comte's usage, the milieu is an abstract interface that allows for the reduction of all phenomenon into quantifiable variables: "the now refers to the before; the here refers to its beyond, and thus always and ceaselessly. The milieu is truly a pure system of relations without supports."⁴⁰ It is this abstract prestige of the term that is Comte's contribution, which encouraged French neo-Lamarckians to use the concept of milieu to argue that "fish do not lead their lives on their own; it is the river that makes them lead it; they are persons without personality."⁴¹ Thus, without the supports of qualitative differences, the milieu becomes a conceptual instrument for a one-way determinism of the organism through physical variables, fashioning the organism as uncreative, mechanical automata. We have thus returned to a picture of *res extensa* and Cartesian animal-machines. The concept of milieu once again finds itself between two poles: by identifying itself with material variables, it gains all the quantifiability of those variables; in turn, however, the relative and qualitative differences (or the active heterogeneities) of the milieu are dissolved precisely to the extent that it is identified with material variables, rendering it merely a piece cut out from the homogeneous universal plenum. Consequently, Canguilhem finds that from "Galileo and Descartes on, one had to choose between two theories of milieu, that is, between two theories of space: a centered, qualified space, where the *mi-lieu* is a center; or a decentered, homogeneous space, where the *mi-lieu* is an intermediary field."⁴²

³⁷ Canguilhem, 102.

³⁸ "If Comte anticipates the idea of a subordination of the mechanical to the vital—the idea he would later formulate in mythical form in *The System of Positive Polity* and *The Subjective Synthesis*—here [in the *Course of Positive Philosophy*] he nevertheless deliberately represses it," Canguilhem, 103.

³⁹ Canguilhem, 103.

⁴⁰ Canguilhem, 103.

⁴¹ From Louis Roule's *La vie des rivières*, cited in Canguilhem, 103.

⁴² Canguilhem, 117.

The concept of the milieu, then, is faced with two possibilities. It can either maintain the homogeneity of the natural, thereby separating the natural from the artificial and maintaining the traditional categories of knowledge, which separate the material from the mental and the rational from the irrational; or it can dismantle those traditional categories and admit of irreducibly qualified, relative, active, and heterogeneous elements. Lamarck effectively chose the latter through his notion of ‘influencing circumstances’ since the milieu did not act directly upon the organism, but at a distance, as it were: “it is via the intermediary of need, a subjective notion implying reference to a positive pole of vital values, that the milieu dominates and compels the evolution of living beings. Changes in circumstances lead to changes in needs; changes in needs lead to changes in actions.”⁴³ To be sure, this is not to suggest that the milieu does not have a physical dimension, but rather that the constitution of the biological milieu cannot be the object of a materialist reduction. Thus, Lamarck’s ‘influencing circumstances’ continues the trajectory that Newton advanced by installing active powers within the milieu, a maneuver that also prohibited the wholesale subsumption of the natural into the material. And it is this legacy of the milieu that Canguilhem endorses:

Of course, we might still speak of interaction between the living and the milieu even from a materialist point of view—between one physic—chemical system cut out from a larger whole, and its environment. But to speak of interaction does not suffice to annul the difference between a relation of the physical type and a relation of the biological type.⁴⁴

To be sure, the reduction of nature to the lowest common denominator holds little promise for the study of life with its irreducibly qualitative phenomena—the worlds of organisms are populated by affects, not colliding particles, and organisms do not merely react to stimuli, they evaluate and respond—thus we cannot compose the organic order out of elementary physical mechanisms. In short, biology requires an approach of relative, qualitative, asymmetrical construction, where organism and milieu operate alongside each other in order to conduct a complex sequence of events.⁴⁵ But more profoundly, by insisting on the heterogeneous, relative, and active dimensions of the milieu, we find that the concept of milieu resists a hierarchical structure of nature *tout court* (such as Comte’s, which escalated from physics to chemistry and biology, culminating with sociology), and encourages a real heterogeneous and relative composition of eventualities, beyond any structure of knowledge that isolates distinct categories such as the material and the mental.

⁴³ Canguilhem, 104.

⁴⁴ Canguilhem, 111.

⁴⁵ Canguilhem suggests a geographical model to examine the relations between complexes, “Geography has to do with complexes—complexes of elements whose actions mutually limit each other and in which the effects of causes become causes in turn, modifying the causes that gave rise to them.” Trade winds are exemplary in this context because they “displace surface water that has been heated by contact with the air; the cold deep waters rise to the surface and cool the atmosphere; low temperatures engender lower pressure, which generates winds; the cycle is closed and begins again” Canguilhem, 109.

2.4 Artificial life, or, the role of milieu and technicity in the eventual composition of organic life: von Uexküll and Leroi-Gourhan

Jacob von Uexküll, in his *Foray into the Worlds of Animals and Humans*, presents a strong case for the qualitative and relative composition of organism and environment. His description of a tick's *umwelt*, or worldly environment, remains one of the most memorable illustrations of the life of an insect.⁴⁶ The tick, after all, leads a very simple life. At one to two millimeters, it climbs up some shrubbery and waits for its mammalian prey, which it discerns by smelling the butyric acid in its sweat. Once it detects its prey, it either falls on top of the mammal or lets itself be brushed off by it. Then it scurries to the least hairy spot, which it finds through its sense of touch, and bores its head completely into the mammal's skin in order to pump a warm flow of blood into itself, swelling to the size of a pea.

What is interesting about this is that out of the theoretically infinite sensory possibilities that the world has to offer, the blind and deaf tick initially responds only to the smell of sweat—"just as a gourmet picks only the raisons out of the cake, the tick only distinguishes butyric acid from among the things in its surroundings."⁴⁷ And further, if a drop of butyric acid is placed on a metal table underneath the tick, it will drop but, sensing cold metal instead of warm skin, it will climb back up to its outpost and resume its patient waiting. Neither does the tick have any judgment of taste, for it will pump any warm liquid into its body once it bores its head past a skin-like membrane. Here is a composition of a world in three strokes, a series of *sense-events* of touch, smell, and temperature. Of course, the tick does more than sense, it also effects, but the composition of its life in the form of *effect-events* simply follows the sequence of sense-events—if it smells butyric acid, then it drops; if it touches the mammal, then it searches for skin; if it touches skin, then it bores; if it senses warm blood, then it slowly begins to pump. If any sense-event in the sequence does not produce the effect-event, then the sequence begins anew. And the tick can lie waiting for a sense-event for an incredible eighteen years without any effect-event being triggered.⁴⁸

"Figuratively speaking," von Uexküll says, "every animal subject attacks its objects in a pincer movement—with one perceptive and one effective arm."⁴⁹ That is to say, each animal subject *perceives* only that which interests its organic constitution, and it moves through the sequence of its life with *effective* techniques by which it attempts to conduct the events that interests it. The worldly milieu is thus relative to the animal, composed with regard to its qualitative selections of percepts and its technical actions. In this sense, the space between humans and ticks is relative to their perceptive and effective capacities. The human organism does not exactly share a common world with ticks; rather, we may say that the human and tick *intervene* upon each other's relative eventualities. And the relativity of these eventualities en-

⁴⁶ von Uexküll, Jakob. *A Foray into the Worlds of Animals and Humans with A Theory of Meaning*, Trans. Joseph D. O'Neil, (Minneapolis: Minnesota University Press, 2010), 44-52.

⁴⁷ von Uexküll, 53.

⁴⁸ von Uexküll, 52.

⁴⁹ von Uexküll, 48.

tails that there is no overarching *umwelt* that contains all the animal *umwelten*.⁵⁰ The problem of the body and the environment becomes a temporal and technical problem rather than a substantial and spatial one; it is a question of techniques for perceiving and effecting.

Leroi-Gourhan's analyses of anatomical technicity in *Gesture and Speech* allow us to conclude that humans, while of course different from ticks, are not exempt from this relative and eventual composition of organism and environment. Arguing against the myth of the ancestral monkey, Gourhan discusses the discovery (in Kenya in 1959) of the remains of the *Zinjanthropo* (*zinj* for East Africa), an adult *Australopithecus* (Latin *australis* for "southern"; Greek *pithekos* for "ape") accompanied by stone implements. The *Australopithecus* enjoyed an upright gait, a face with a relatively retreated mandible, and a very small brain. The myth of the ancestral monkey, on the other hand, conceived of walking upright as a largely cerebral initiative—the brain enlarging and becoming more and more complicated until, one fine evolutionary day, a monkey 'thought' to walk upright and use tools. The discovery of *Australopithecus* with small brain-cases provided compelling evidence that the brain was not the cause of erect posture but rather its beneficiary.⁵¹ It was a development of our anatomical technicity, Gourhan argues, which conditioned the subsequent cerebral development that required the protrusion of the skull through a forehead: mechanically, an upright posture encourages the recession of the mandible, which in turn encourages the protrusion of the forehead (a protruded mandible entails a longer face with a brain pan barred by the orbital ridge, as we see in the monkey with its hunched over posture).

But the important factors in this evolutionary story are the coincidental freedoms that the head, mouth, and hand acquire through bipedalism. The hand, for example, is freed from its locomotory assignment by an upright gait, and it can thus be used primarily for digital manipulation, while the mandible (and the mouth in general) is freed from its specialized task of reaching for and grasping non-manipulated food. Gourhan admires Gregory of Nyssa's *Treatise on the Creation of Man* in this regard:

If man had been deprived of hands, his facial parts, like those of the quadrupeds, would have been fashioned to enable him to feed himself: his face would have been elongated in shape, narrow in the region of the nostrils, with lips protuberant, horny, hard, and thick for the purpose of plucking grass.⁵²

Of course, the ramifications of bipedalism reach far beyond the composition of the human face. The freeing of the hand from locomotion allows for the emergence of complex manual and digital operations required for tool making, and the mandible retreating allows for the articulation of the tongue as the forehead protrudes. Gregory of Nyssa continues, "If our body had no hands, how could the articulated voice form inside it? The parts around the mouth would not be so constituted as to meet the requirements of speech. In such a case man would

⁵⁰ Bruno Latour makes this point in his 2013 Gifford Lectures, "Facing Gaia: Six lectures on the political theology of nature."

⁵¹ Leroi-Gourhan, André, *Gesture and Speech*, (Cambridge: MIT Press, 1993), 35.

⁵² Gregory of Nyssa cited in Leroi-Gourhan, 35.

have had to bleat, bark, neigh, low like the oxen, or cry like the ass, or roar as the wild animals do.”⁵³ In other words, we cannot understand the hand, the mouth, the face, and the head in isolation—they are consequences of *coincidental freedoms* that emerge in relation to one another.

The freeing of the hand from its locomotory assignment so that it can gesture and digitally manipulate is an instance of what Leroi-Gourhan calls *de-specialization* or *generalization*. The mouth-mandible structure is similarly freed from its specialized function for plucking food and gains the capacity for articulation, and with it the head is freed for the concentration of sensorial orifices in the face.⁵⁴ All a result of bipedalism, these de-specializations culminate in the emergence of an *anterior field* composed through the heterogeneous coordination of the facial and the manual poles that resulted from bipedal development.⁵⁵ This anterior perceptual field draws not only a ‘front’ and a ‘behind’ of the body, it constitutes, rather, an entire directional space constituted by perceptual and effective events. The eye and the hand share a destiny in the human, in the sense that what the eye sees is related to what the hand manipulates, and so on—the sensory features of humans do not exist in isolation, but compose the anterior field through their heterogeneous coordination. In this fashion, the anatomical technicity of bipedalism ultimately determines the effective space and time of human beings through the composition of the anterior field. The elementary construction of human environments is thus a relative consequence of such perceptive and effective technologies. Far from being exclusive to the tick, the eventually constructive and relative dimension of the milieu is equally operative in the human.

Of course, the development of various technologies, from tool-making to orality and literacy, elaborates the human milieu considerably, “initiating a long transitional period,” Leroi-Gourhan writes, “during which sociology slowly took over from zoology.”⁵⁶ The evolved hand becomes available not only for complicated digital operations, but for gestures to accompany the vocal utterances of the mouth, which in turn has become available for speech alongside the development of the brain. While the *Australopithecus* seemed to have possessed their stones in fingers like animals have claws, as if they were mere anatomical extensions, we enjoy a certain distance from technologies, in the sense that our tools are comfortably detached from our body, not only spatially but temporally (since we use tools only when the occasion arises). Gourhan attributes this to the fact that, as previously mentioned, our evolution was one of generalization, evolution in the opposite direction from specialized animals: “we run less quickly than the horse, cannot digest cellulose like the cow, climb less well than the squirrel...our whole osteomuscular mechanism is super-specialized only in remaining ca-

⁵³ Leroi-Gourhan, 35.

⁵⁴ This reiterates Gourhan’s denial of a cerebral cause to bipedalism: the brain is incidental in Gourhan, since it advances only as the face shortens and the mechanical stresses of the mandible diminish (since the forehead requires a rearrangement of the stresses of the anterior territories so that the occipital cavity can extend in the measure that the base of the skull or the mandible is shortened). Leroi-Gourhan, 71-75.

⁵⁵ See Deleuze’s treatment of the evolution of the eye, where luminous excitations are bound, and a novel and asymmetrical difference is produced, namely the formed eye or the seeing subject. Gilles Deleuze, *Difference and Repetition*, Trans. Paul Patton, (New York: Columbia University Press, 1994), 96.

⁵⁶ Leroi-Gourhan, 90.

pable of doing all of those things."⁵⁷ So it is paradoxically our generalized or de-specialized evolution that conditions the richness of human consciousness—the distance we have from our techniques allows us to select from among them, a process of selection characterized by conscious deliberation toward a goal. Nonetheless, the most fascinating aspect of Gourhan's evolutionary story is that the distance between the incorporated technologies of *Australopithecus* and the detached technologies of *Homo sapiens* is a distance produced by a series of steps *installed within technological sequences themselves*: we cannot practically separate consciousness from technics. Discussing this point, Leroi-Gourhan shows how the historical stages of technology betray memorial advances—from the bifaced stone whose two-strike construction requires only a two-step memory to the flakes and knives of later periods that require a sequence of steps that must be memorized for their construction. Of course, such sequences do not simply imply a more elaborate memory of the past; after all, the construction of such tools also indicates anticipation of future occasions for their use, and we may presume that alongside a more complex past there emerges a more complex future. Furthermore, in the case of tools like the axe there must be an *imagined* result that no longer even resembles the original working material of stick and stone, indicating a level of abstraction within technical syntax. In this fashion, Leroi-Gourhan discerns a *parallel evolution* between so-called intellectual capacities and technological advancement, between milieu and technics. The crucial point here is that consciousness itself may be considered as a technical activity: from the bi-faced stone to orality and literacy, we think through our technologies.

Ultimately, Gourhan finds technological advancements such as orality and literacy do not merely indicate an extension of human abilities, but rather an entire re-ordering and re-conceptualization of humans and society.⁵⁸ Similarly, alongside the development from techniques of hunting to the techniques of stockbreeding there emerge the artifices of new social orders, from hunting to stockbreeding societies.⁵⁹ The significance of the correlation between technological development and social development is thus immense—from migrating hunting societies to sedentary stockbreeding and agricultural societies, there is an entirely new arrangement of bodies, with entirely new hierarchies, codes of filiation, and modes of delibera-

⁵⁷ Leroi-Gourhan, 228.

⁵⁸ Gourhan finds, for example, that the transition from mythological thinking to rational thinking was a "very gradual shift exactly synchronous with the development of urban concentrations and of metallurgy. The earliest beginnings of Mesopotamian writing date back to about 3500 B.C., some 2,500 years after the appearance of the first villages. Two thousand years later, toward 1500 B.C., the first consonantal alphabet appeared in Phoenicia...by 350 B.C. Greek philosophy was advancing by leaps and bounds." Mythological or pre-rational thinking, on the other hand, deploys different (non-consonantal) techniques: "The fact that verbal language is coordinated freely with graphic figurative representation is undoubtedly one of the reasons for this kind of thinking, whose organization in space and time is different from ours and implies the thinking individual's continuing unity with the environment upon which his or her thought is exercised. Discontinuity begins to appear with agricultural sedentarization and with early writing. The basis now is the creation of a cosmic image pivoted upon the city. The thinking of agricultural peoples is organized in both time and space from an initial point of reference—*omphalos*—round which the heavens gravitate and from which distances are ordered" Leroi-Gourhan, 210-211.

⁵⁹ Leroi-Gourhan, 97-183.

tion. In a largely overlooked early work, Deleuze presents a thesis that seems indebted to Leroi-Gourhan, claiming that institutional artifices “impose on the body, including its involuntary structures, a series of models, and provides intelligence with a kind of knowledge—a possibility of foresight in the sense of a project.”⁶⁰

From these considerations, we may be led to conclude that anatomical technicity is extended and transformed by so-called ‘artificial’ technologies that continually rearrange the distinctive eventualities of human beings. Yet, from those same considerations, we can no longer presume a ‘natural’ human being who eventually thought ‘artificially’ and began to make tools. The organism is *already* artificial—equipped with an anatomical technicity characterized by ways of perceiving and ways of effecting marks upon the milieu, both of which are artificial and compositional, albeit unconscious. The distinction here is thus not between natural and artificial technicity, but between conscious and unconscious technicity. The human being, just like the tick or the crab, is invested in its milieu artificially, which is simply to say that techniques conduct events (and not the other way around). What is distinctive about the human milieu is the detachment of technicity from its *specialized* assignment, as is the case with the *generalization* of the hand, mouth, and head because, for Leroi-Gourhan, this detachment allows for the hand, mouth, and head to be *re-assigned* for gestures, speech, deliberation, etc. And it is this re-assignment that, in turn, constitutes a field of practical rationality within the composition of sequences of events. Practical rationality is thus rationality dispersed throughout the artifices that conduct events. In this fashion, the human technically composes a milieu in which his eventuality unfolds. But the bottom line is clear: from the perspective of eventuality, *nature is thoroughly artificial*, all the way through its organic constituents.

3. Machine

3.1 Machines and eventualities

While Foucault’s concept of technology, as practical rationality, hinged upon consciousness, Leroi-Gourhan’s concepts of technics and milieu covered both conscious techniques, such as the production of an axe and stockyard, as well as unconscious technicity, such as the production of an anterior field through the heterogeneous coordination between the eye and the hand. But just as the milieu of the tick is different from the milieu of the hummingbird, the snail, and the human, so there are different times or arrangements of becoming that are produced through the respective eventualities of such creatures. When discussing the time of conscious technology, I have employed the term ‘event’, reserving the term ‘eventuality’ to denote the temporality of unconscious technicity. But this raises another question, namely, if we grant that technology conducts events, and not the other way around, then how do technologies and events arise in the first place? This question asks for the genetic conditions of technology and events, and to some extent, the concept of milieu serves as an answer—the milieu is the space and time composed through the heterogeneous eventualities, that is, a

⁶⁰ Gilles Deleuze, *Instincts et institutions*, Georges Canguilhem (ed.), (Paris: Hérissé à Évreux, 1971), xi. This text was originally published in 1953. Leroi-Gourhan presents his theory of the relation between the technological and the ethnic in *Milieu et techniques*, (Paris: Albin Michel, 1945).

space and time produced through the conjunction of various elements across various disciplinary registers (physical, chemical, biological, social, etc.). But how are these heterogeneous eventualities produced? And what are the conditions that facilitate their conjunction? Deleuze and Guattari's concept of machine furnishes us with a promising approach to these questions precisely by addressing the unconscious register of what I have been calling eventualities, a term which thus far has been used without explication. This section outlines how the concept of machine reconfigures the concept of milieu, and how the machinic theory of milieu involves two temporal axes, a conscious time of technics and an unconscious time of machinic production.

3.2 *The concept of machine in general*

The cover-leaf of *Anti-Oedipus* bears a painting by Richard Lindner, *Boy with Machine*, depicting, as the title suggests, a boy embedded within a complex of gears, pulleys, levers, and cartridges. It illustrates the situation of little Joey, a child "who can live, eat, defecate, and sleep only if he is plugged into machines provided with motors, wires, lights, carburetors, propellers, and steering wheels: an electrical feeding machine, a car-machine that enables him to breathe..."⁶¹ Little Joey functions, we might say, within a machinic assemblage that constitutes the milieu of his desire. In a way, these are technical machines, in the aforementioned sense of *techne*, since they are part of a practical rationality oriented toward the conscious goal of eating, for example. Of course, this is no ordinary technical apparatus. In fact, the machines would sometimes "explode" and he would scream "Crash, Crash!...hurling items from his ever present apparatus—radio tubes, light bulbs," until one of the thrown objects would shatter, at which point "he would cease his screaming and wild jumping and retire to mute, motionless nonexistence."⁶² So it is difficult to distinguish where little Joey 'ends' (as an operator) from where the assemblage of technical machines 'begin' (as operated), at least without tearing little Joey apart, as it were, since the machines are required for his functioning: he is quite literally plugged into his concrete environment of actions and events through a machinic assemblage—his desires are machinic, he is himself a complex of machines.

As Daniel Smith notes, Deleuze and Guattari's concept of desiring-machines is something of a resolution of Freud and Marx on the question of the unconscious origin of our conscious desires.⁶³ Basically, for Freud, the foundation of desire was *libidinal economy*, some internal drama hidden in the deep recesses of the psyche; whereas for Marx, the source of desire was *political economy*, emerging from class-consciousness and the socio-political relations external to the subject. If desire begins with the individual unconscious, it must nonetheless go through the turbulence of social integration; on the other hand, if desire begins with social structures, then those social structures must nonetheless reach quite far, extending to infantile development. What Deleuze and Guattari accomplish, through their concept of desiring-machines, is to draw a line perpendicular to the opposing starting-points of Freudianism and

⁶¹ Deleuze and Guattari citing Bruno Bettelheim's *The Empty Fortress*, in *Anti-Oedipus*, 37.

⁶² Bettelheim, 3.

⁶³ Daniel W. Smith, "Deleuze and the Question of Desire: Toward an Immanent Theory of Ethics," in *Essays on Deleuze*, (Edinburgh: Edinburgh University Press, 2012), 182-183.

Marxism: libidinal economy is *already* political economy: “social production and desiring-production are one and the same.”⁶⁴ Desire is located neither ‘inside’ nor ‘outside’ of a subject, but rather is *produced* by an assemblage of machines, which traverse the entire milieu of the subject, as little Joey is embedded within a complex of machines that render him functionally continuous with his environment.

The difficulty of distinguishing between operator and operated in the case of little Joey brings us right to the heart of the problem between technology and machines. Foucault repeatedly emphasized the correlation between technology, knowledge, and society. We can take, for example, lepers in the Middle Ages—where we find a technology of *exclusion* that produces knowledge of lepers—the question was “who are the lepers?” The answer to this question was produced through a technology of separating them through laws and sets of religious rituals, which produced the knowledge of lepers: the lepers are those that are banished, excluded from the community. This technology of exclusion becomes one of *quarantine* with the 16th and 17th century problem of the plague: in order to identify who were the plagued, we find a technology of inspection, regulations indicating where people can go, requiring them to present themselves to inspectors, an entire disciplinary system oriented toward finding out where the plague was, who were the plagued, and subsequently detaining them within the town. Things change with the outbreak of smallpox in the 18th century, when the question becomes “how many people are infected with smallpox, at what age, with what effects, with what mortality rate, lesions or after-effects, the risks of inoculation, the probability of an individual dying or being infected;” in other words, the problem is no longer one “of exclusion, as with leprosy, or of quarantine, as with the plague, but of *epidemics* and the medical campaigns that try to halt epidemic or endemic phenomena.”⁶⁵ These examples highlight the historical correlation between technology (exclusion, quarantine, epidemics and medical evaluation) and knowledge (Who are the lepers? Where is the plague? What is the mortality rate, effects, etc. of smallpox?), which informs the social order (how bodies and individuals are identified and arranged within a social space). Similarly, anthropologists like Leroi-Gourhan often describe the connection between techniques and an ensemble of social and environmental factors: we cannot understand a stockyard outside of a stockbreeding society, with all that entails. And Marx, of course, had already made this essential point in *Capital*:

Technology reveals the active relation of man to nature, the direct process of the production of his life, and thereby it also lays bare the process of the production of the social relations of his life, and of the mental conceptions that flow from those relations.⁶⁶

There is little need, then, to say we all have technologies through which we relate to nature, and that these technologies garner their intelligibility from the social formations within which

⁶⁴ Deleuze and Guattari, *Anti-Oedipus*, 116.

⁶⁵ Foucault, *Security, Territory, Population*, 10. Italics mine.

⁶⁶ Karl Marx, *Capital: A Critique of Political Economy, Volume One*, Trans. Ben Fowkes, (New York: Penguin, 1976), 493-494.

they operate.⁶⁷ Of course, Deleuze and Guattari's concept of machine does not simply reiterate the plain fact that there is a connection between nature, technology and society; rather, it identifies the *same process* at work in producing both: "man and nature are not like two opposite terms confronting each other...rather, they are one and the same essential reality."⁶⁸ In other words, instead of starting with the social and the natural as the two poles of an elementary confrontation, Deleuze and Guattari focus on the process that produces the very distinction between the social and the natural, revealing the artificiality of the distinction itself.

3.3 *Machines, flows, and the synthetic process of production*

The identification of man and nature within machinic process is facilitated by the essentially connective nature of machines themselves; that is, machines are non-metaphorically synthetic—connecting and disconnecting—as an infant's suckling mouth-machine connects to the mother's breast-machine to produce the eventual flow of milk, or as the mouth-machine can also produce sound through the larynx-machine tapping the flow of air, and so on. But this is not to suggest that machines are substantial entities, in fact, they resist reification by their essentially connective nature.⁶⁹ In order to examine this point, we may briefly examine the relation between the concept of machine and its correlate concepts of flow and synthesis.

Following biologists Umberto Maturana and Francisco Varela, Guattari defines a machine "by the ensemble of interrelations and its components, independently of the components themselves."⁷⁰ In other words, the relational syntheses that obtain among the components constitutes the machine, not the componentry itself. For example, the mouth-machine is constituted by its synthetic relation to other machines, and so it is only a machine insofar as it is engaged in the machinic production of a flow, such as the flow of milk or the flow of sound. The term 'flow' here can be understood in an economic sense, which in turn illuminates the productive aspects of machines. Take, for example, the flow of money as it is distributed throughout a capitalist arrangement: the owner of a factory or some means of production employs a laborer to extract labor and produce surplus, augmenting the owner's capital while merely preserving the laborer. The laborer, finding the situation unfair, may purposefully go on strike, disconnecting from the flow of money, but the capitalist may be in a position to

⁶⁷ Guattari notes that with "*techne*, there are ontogenetic elements, elements of the plan, of construction, social relationships which support these technologies, a stock of knowledge, economic relations and a whole series of interfaces onto which the technical object attaches itself." Felix Guattari, "On Machines," in Andrew Benjamin, (ed.), *Complexity*, JPVA, No 6, 1995, 8-12. Similarly, Deleuze acknowledges that "it's easy to set up a correspondence between any society and some kind of machine, which isn't to say that their machines determine different kinds of society but that they express the social forms capable of producing them and making use of them." Gilles Deleuze, "Postscript on Control Societies," in *Negotiations*, Trans. Martin Joughin, (New York: Columbia University Press, 1995), 180.

⁶⁸ Deleuze and Guattari, *Anti-Oedipus*, 4-5.

⁶⁹ The mouth is not machinic in a substantial sense, it is itself composed of other machinic interrelations between teeth, saliva, tongue and lips, just like the larynx holds a machinic relation to thyroid glands, abducting and adducting muscles, and the epiglottis. The emphasis here is on inter-relational composition, which affords variable functionality.

⁷⁰ Guattari, "On Machines," 8-12.

simply wait, suckling on his capital. After all, the laborer has less capital, and must eventually return to work in order to reconnect to the flow of money, to survive and perhaps to provide for dependents. But this arrangement works only because the laborer and the capitalist *both believe in money*. In other words, the flow of labor, the flow of money, and the flow of ownership requires an investment in capital. And for Deleuze and Guattari, this investment in capital does not arise from an internal psyche or the social structures outside of the individual, and neither is it a merely epistemic belief in money. Rather, investment is constituted by an arrangement of desiring-machines, in the sense that flows of labor, money, and ownership are produced and facilitated through machinic assemblages. The conscious desire for money is a *state* of machines produced through their synthetic assemblage. And since machines are not defined by scale but by their synthetic function, it makes no difference if we consider vast social machines such as the internet or small desiring-machines such as the eye that consumes its images. Furthermore, the term 'flow' also highlights the temporal orientation of machines, since flows of money, flows of milk, and flows of sound are not so much substantial entities but moments or products of a machinic process. However, this machinic process cannot be understood as a law of nature or some abstract elementary process, since the machines themselves are constituted by syntheses and flows. A tick is a machine when intervening upon the flow of blood, but the flow of ticks cannot be abstracted from the flow of mammals alongside which their eventualities unfold. Just as technologies are unintelligible apart from the social orders that facilitate them, machines are indistinguishable from their connections with other machines and flows within an assemblage.

3.4 Production and connective assemblages

Deleuze tells us that an assemblage "is a multiplicity which is made up of many heterogeneous terms and which establishes liaisons, relations between them, across ages, sexes, and reigns—different natures. Thus, the assemblage's only unity is that of a co-functioning: it is symbiosis, a 'sympathy'."⁷¹ The reference to "sympathy" here does not merely suggest a return to occult qualities, it nominates the assemblage as a machinic theory of milieu. In this fashion, Deleuze and Guattari reformulate the problem of the milieu (how heterogeneous elements such as cities, dews, humans, stars, carburetors, and wars, for example, are all linked together) into a problem of machinic assemblages (how are machines attached and detached, or *synthesized*, so as to produce or interrupt a flow of dew, of starlight, of sound, war, etc). This machinic reformulation of the concept of milieu recasts the heterogeneous elements of the milieu within a synthetic process of production beyond the disciplinary hierarchies of knowledge (the physical, chemical, biological, and sociological, or the natural and the social, the mental and the material, etc.). Beyond these categories of knowledge, Deleuze and Guattari describe milieus as "vibratory blocks of space-time" that communicate asymmetrically "from the inorganic to the organic, from plant to animal, from animal to humankind, yet with-

⁷¹ Gilles Deleuze & Claire Parnet, *Dialogues II*, (New York: Columbia University Press, 2007), 69.

out this series constituting a progression."⁷² The absence of a progression here is crucial, since Deleuze and Guattari do not postulate two registers of reality, a higher level register of technologies, of cities, dews, humans, and wars, and a lower level register of differential machines and flows that produce them. There is only a difference of *regime* within the same process of production. But in order to examine this point, we must distinguish two temporalities at work in technologies and machines.

Events are *conducted* through technologies as so many states of affairs, but they are *produced* through heterogeneous syntheses, as the eye and the hand produce an anterior field or, to borrow John Protevi's example, as lightning is "produced from a field of electrical potential differences between cloud and ground."⁷³ But differing potentials are of a different temporality, not quite on the order of events, but rather on the order of eventualities, which belong to a productive regime of flows, breaks, and interruptions through the syntheses of machines. While the laborer can be represented as working for the event of getting paid, the real process of production must account for the entire investment upon the full body of capital, and the event of getting paid is merely a technical abstraction from the vast syntheses of eventualities that condition the event. While events can be scheduled on a calendar, the relative consequence between the eye and the hand that conditions the sense and investment of calendar time cannot be understood according to the same calendar. Technologies such as calendars are conscious mechanisms oriented toward scheduling, but the machines that produce those technologies are unconscious syntheses that span across an immemorial history. The conscious evaluation of time itself, in other words, is a product of an unconscious process that cannot be evaluated in the same terms. In this sense, there can be no priority of machines because the succession that such a priority would entail operates on the level of technology and events. Machines are not lower level conditions for technology, and neither are events subsequent to eventualities. Thus, the practical rationalities of techniques are not produced by machinic investments like a cause produces an effect; rather, production and product are identified in machinic process, so the events produced are produced by their investment *within* the immense syntheses of eventualities that constitute them. It is in this sense that practical rationalities are produced by machinic investments, although to be sure they fall back upon their investments, as technologies conduct events by intervening upon the eventualities that produce them.

⁷² Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, Trans. Brian Massumi, (Minneapolis: University of Minnesota Press, 1987), 313.

⁷³ Protevi, John. "Deleuze and life," in *The Cambridge Companion to Deleuze*, Daniel W. Smith and Henry Somers-Hall (eds.), (Cambridge: Cambridge University Press, 2012), 240. Cf. Deleuze, *Difference and Repetition*, 118-119.

Conclusion

The concepts of technology, milieu, and machine are efforts to reinstall the human within her concrete environment: technically, an environment composed of sense-events and effect-events, and machinically, the milieus that compose that environment as so many eventualities acting transversally across distances of time and space, across distances of strata, acting upon what Deleuze and Guattari call a “plane of consistency.”⁷⁴ Foucault called *Anti-Oedipus* a book of ethics precisely because it encourages us to reconceptualize the composition of humans and environments, releasing desire from the constraining opposition between human and nature. If we reconsider the *megalopsychon*’s deliberate step through the *agora* from the machinic perspective, we find that the *megalopsychon*’s affected movements, just like our own habits of movement, engage techniques of walking in the fashion of little Joey, embedded within a complex of machines that do not make a substantial distinction between the human and the non-human or the natural and the artificial: “there is no such thing as either man or nature now, only a process that produces the one within the other and couples the machines together...the self and the non-self, outside and inside, no longer have any meaning whatsoever.”⁷⁵ Deleuze and Guattari’s concept of machine thus scrambles the lines that govern the hierarchical configuration of nature (ascending from the physical to the social, from the natural to the artificial) and, instead, draws the profile of a concept of nature along entirely productive lines. This is a nature made entirely of art – a composition of the world in asymmetrical and heterogeneous strokes, a world where a wasp is brought into delirious communication with an orchid.

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⁷⁴ Describing “abstract machines,” Guattari writes that they “traverse various levels of reality and establish and demolish stratifications. Abstract machines cling not to a single universal time but to a trans-spatial and trans-temporal *plane of consistency*.” Felix Guattari, *The Machinic Unconscious: Essays in Schizoanalysis*, Trans. Taylor Adkins, (Los Angeles: Semiotext(e), 2011), 11.

⁷⁵ Deleuze and Guattari, *Anti-Oedipus*, 2.