

Power

Technology is social before it is technical.

—GILLES DELEUZE, *Foucault*

Thus far, I have considered protocol in both its physical and formal capacities. In the previous chapter I showed that protocol consists of an entire formal apparatus, one that encapsulates information inside various cultural wrappers exemplified by the Internet browser, the markup language known as HTML, among others. These wrappers tend to be ignorant of their contents. “That’s the trouble with bits,” writes computer guru Charles Petzold. “They’re just zeros and ones and don’t tell you anything *about* themselves.”¹ (Even smart markup languages like XML require the intervention of human brains to establish semantic contexts.) These wrappers control their contents through inflection, connectivity, contextualization, and other protocological techniques.

It is now time to consider protocol in its political sense, as a pseudo-ideological force that has influence over real human lives. Recall, then, Deleuze’s “control societies” described first in the introduction. Deleuze defines control societies as being primarily “digital.” They operate through “ultrarapid forms of apparently free-floating control.”² In a similar vein, Michel Foucault has argued that the further the progression into the post-modern (or digital) age, the more politics ceases to interest itself in the soul or the body. Instead, politics desires “life itself.” Foucault calls this type of politics “bio-politics.”

I argue in this chapter that protocol has a close connection to both Deleuze’s concept of “control” and Foucault’s concept of biopolitics. I show here that protocol is an affective, aesthetic force that has control over “life itself.” This is the key to thinking of protocol as power.

Within the protocological system, life engenders and molds itself into a type of social sculpture (Beuys). Protocol never operates *in general*, but instead exists through specific material management styles that are made visible

Epigraphs: Gilles Deleuze, *Foucault*, trans. Séan Hand (Minneapolis: University of Minnesota Press, 1986), p. 40. Georg von Lukács, “Thoughts Toward an Aesthetic of the Cinema,” trans. Janelle Blankenship, *Polygraph* 13 (2001), p. 16. Frederick Cohen, *A Short Course on Computer Viruses* (New York: John Wiley & Sons, 1994), p. 20.

1. Charles Petzold, *Code: The Hidden Language of Computer Hardware and Software* (Redmond, WA: Microsoft Press, 2000), p. 154.

2. Gilles Deleuze, *Negotiations*, trans. Martin Joughin (Minneapolis: University of Minnesota Press, 1990), p. 178.

within the institution of the digital network. Nonhuman life forms, referred to by artists and scientists alike as “artificial life,” exist already today in such digital networks. It is the goal of this chapter to explore the political landscape on which such artificial life forms exist.

Before examining protocol as power, let me restate the definition of protocol as it has thus far been considered.

- Protocol is a system of distributed management.
- Protocol facilitates peer-to-peer relationships between autonomous entities.
- Protocol is anti-hierarchy and anti-authority.
- Protocol engenders localized decision making, not centralized.
- Protocol is robust, flexible, and universal.
- Protocol can accommodate massive contingency.
- Protocol is the outcome (not the antecedent) of distributed behavior.

That said, I attempt to argue one additional thing in this chapter: that *life*, hitherto considered an effuse, immaterial essence, has *become matter*, due to its increased imbrication with protocol forces (via DNA, biopower, and so on discussed later).

This central observation has a few corollaries: first, it is clear that for many years now *matter has become life*, this coinciding with the emergence of autonomous life forms both nonhuman and hybrid such as robots, cyborgs, and artificial life systems; second, protocol is a system of management that only exists in a space populated by a multitude of independent, vital agents; third, because protocol is agent-specific, it must always be connected to the particular material milieu inhabited by those agents—their spaces and their own material bodies. I touch upon these corollaries in what follows.

In his short essay “Society Must Be Defended,” Foucault writes that “[i]n order to conduct a concrete analysis of power relations, one would have to abandon the juridical notion of sovereignty.”³ By this he means that it is impossible to explain forces of social control (from a materialist, or “concrete,”

3. Michel Foucault, *Ethics: Subjectivity and Truth—The Essential Works of Michel Foucault, Volume 1* (New York: The New Press, 1997), p. 59.

perspective) if one assumes that individual actors are endowed with primary rights or powers that they then *express* as political actors. Instead of studying the genetic terms of the political relationship, suggests Foucault, one must study the relationship itself.

Vilém Flusser corroborates this position when he writes:

We will have to reformulate many (maybe all) of the categories we have used until now. An example: we will have to replace the category of “subject-object” with the category of “intersubjectivity,” which will invalidate the distinction between science and art: science will emerge as an intersubjective fiction, art as an intersubjective discipline in the search for knowledge; thus science will become a form of art and art a variant of the sciences.⁴

This tendency in Foucault—to diminish the importance of individual expressive actors—may be summarized as Foucault’s desire to be anti-anthropological. In his historical genealogies, Foucault aspires to write a theory of history that is not based on living human beings. For example, in *Archaeology of Knowledge* Foucault expresses his desire to “define a method of historical analysis freed from the anthropological theme . . . a method of analysis purged of all anthropomorphism.”⁵ He claims that he wants to uncover the principles of an “autochthonic transformation”—that is, a transformation in the realm of words and things that is immanent, particular, spontaneous, and *anonymous*.

The anti-anthropomorphic tendency is also seen in his definition of discourse: “Discourse is not the majestically unfolding manifestation of a thinking, knowing, speaking subject, but, on the contrary, a *totality*, in which the dispersion of the subject and his discontinuity with himself may be determined.”⁶ In fact, Foucault writes that his interest lies in the “anonymous and general subject of history,”⁷ not the *social* subject of history. Foucault’s goal

4. Vilém Flusser, “Memories,” in *Ars Electronica*, ed. Timothy Druckrey (Cambridge: MIT Press, 1999), p. 206.

5. Michel Foucault, *Archaeology of Knowledge* (New York: Pantheon, 1999), p. 16.

6. Foucault, *Archaeology of Knowledge*, p. 55.

7. Foucault, *Archaeology of Knowledge*, p. 16.

is, in a sense, to seize upon a history filled with mostly dead objects and animate them: “In short,” he writes, “[what] we wish to do is to dispense with ‘things’. To ‘depresentify’ them. To conjure up their rich, heavy, immediate plenitude.”⁸ Foucault concedes that “what is discovered by the analysis of [discursive] formations is not the bubbling source of life itself, life in an as yet uncaptured state,” but rather a form of life that is the *agent* of its vitality, that creates its own vitality through the processes of living.

Indeed Foucault defines “life” in a fashion very similar to power itself. So similar, in fact, that in the late Foucault, the two terms merge into one: biopower.

In *The History of Sexuality* Foucault contrasts the older power of the sovereign over life (one characterized by the metaphysical concern of either the absence or presence of life), to a new mode in which life is either created or destroyed: “One might say that the ancient right to *take* life or *let* live was replaced by a power to *foster* life or *disallow* it to the point of death.”⁹ He continues: “The old power of death that symbolized sovereign power was now carefully supplanted by the *administration of bodies* and the *calculated management of life*.”¹⁰ Foucault argues that the deployment of sexuality in the modern age is a perfect example of this type of “calculated management of life,” for human lives themselves are engendered with a real, material sexuality during this period. He writes that *life enters history* at this moment—life was not a viable category before.¹¹ “Power would no longer be dealing simply with legal subject over whom the ultimate dominion was death, but with *living beings*, and the mastery it would be able to exercise over them would have to be applied at the level of life itself.”¹² Foucault lists the achievements of biopower: “[it gives] rise to the infinitesimal surveillances, permanent controls, extremely meticulous orderings of space, indeterminate

8. Foucault, *Archaeology of Knowledge*, p. 47.

9. Michel Foucault, *The History of Sexuality: An Introduction, Vol. 1* (New York: Vintage, 1999), p. 138.

10. Foucault, *The History of Sexuality*, pp. 139–140, emphasis mine.

11. Foucault, *The History of Sexuality*, pp. 141–142.

12. Foucault, *The History of Sexuality*, pp. 142–143.

medical or psychological examinations, to an entire micro-power concerned with the body.”¹³

A second term introduced by Foucault, biopolitics, has a slightly different meaning. Biopolitics is “the endeavor, begun in the eighteenth century, to rationalize the problems presented to governmental practice by the phenomena characteristic of a group of living human beings constituted as a population: health, sanitation, birthrate, longevity, race.”¹⁴ Elsewhere he elaborates that biopolitics “tends to treat the ‘population’ as a mass of living and coexisting beings who present particular biological and pathological traits and who thus come under specific knowledge and technologies.”¹⁵ Biopolitics, then, connects to a certain statistical knowledge about populations.

Foucault notes that it is dependent on the basic tenets of liberalism—namely, that people and their societies possess various statistical properties that can be measured. Biopolitics is a species-level knowledge. It is the type of knowledge that, say, UNICEF employs when it claims that the infant mortality rate in the United States is 7 per every 1,000 births.¹⁶ This is the moment of biopolitics.¹⁷

13. Foucault, *The History of Sexuality*, pp. 145–146. In a certain sense, the most important word in this section of *The History of Sexuality* is the word “eugenics” (p.148). In Foucault’s opinion, “the medicine of perversions and the programs of eugenics were the two great innovations in the technology of sex of the second half of the nineteenth century” (p. 118). So on the one hand Foucault offers perversion, and on the other hand an interest in breeding, hereditary, lineage, blood—all central concerns of the popular eugenics movements of the nineteenth and early twentieth centuries. The focus on eugenics in this section is crucial because it sets the stakes for biopower, it says that biopower really is about the control over life—be it fascist or pharmaceutical. Deleuze knew this too, writing about “pharmaceutical products, nuclear technology, and genetic engineering.” See Deleuze, *Negotiations*, p. 178.

14. Foucault, *Ethics*, p. 73.

15. Foucault, *Ethics*, p. 71.

16. See <http://www.unicef.org/statis>. This statistic was posted on December 26, 2000, and it derives from data from UNICEF, United Nations Population Division, United Nations Statistical Division, World Bank, and U.S. Bureau of the Census—all biopolitical organizations.

17. The birth of biopolitics in the United States can probably be traced to the 1890 census. For that year’s count, statistician Herman Hollerith developed a punch-card system that was

Ironically, while Deleuze is arguably Foucault's greatest champion, it is he who ultimately renders the anti-anthropological Foucault impotent, and, in a way, begins the process of *dating* Foucault. This comes late, in the "Post-script on Control Societies" (which first appeared in 1990). As discussed in the Introduction, Deleuze defines two historical periods in his essay: (1) the "disciplinary societies" of the modern age characterized by the rule of the sovereign, the "vast spaces of enclosure," the social castings and bodily molds that Foucault described so well, and (2) what Deleuze terms the "societies of control" that inhabit the late twentieth century—these are based on protocols, logics of "modulation," and the "ultrarapid forms of free-floating control"—words that to Deleuze in 1990 must have been bordering on pure science fiction. The disciplinary societies are characterized by the signature and the document, while the societies of control are characterized by the password and the computer.

Let me highlight one particular quality of the societies of control: their ability to engender nonorganic life—and this is Deleuze's intervention into the anti-anthropological concept of "subjectless patterning" I discuss earlier.

It turns on Deleuze's concept of "*dividuals*." He writes, "in control societies . . . the key thing is no longer a signature or number but a code: codes are *passwords*, whereas disciplinary societies are ruled (when it comes to integration by resistance) by *precepts*. The digital language of control is made of codes indicating where access to some information should be allowed or denied. We're no longer dealing with a duality of mass and individual" from the modern era. Instead, "individuals become '*dividuals*,' and masses become samples, data, markets, or '*banks*.'"¹⁸

processed by machine: "Hollerith's plan involved manila punch cards 6 5/8 × 3 1/4 inches in size. . . . The holes in these cards were organized into 24 columns of 12 positions each, for a total of 288 positions. These positions represented certain characteristics of a person being tallied in the census." See Perzold, *Code*, p. 241.

18. Deleuze, *Negotiations*, p. 180. In film one sees the pure, subjective individual inside the fetishistic camera play of *Picnic at Hanging Rock* (1975)—where Anne Louise Lambert's close-ups are pure pornography—or the social experiments of *Pygmalion* (1938) or Peter Brook's *Lord of the Flies* (1963). In these films the narrative unfolds in a strata dominated by affect, physical discipline, personal behavior, self-transformation, societal position, and training (or the lack

(While this essay is both exciting and disappointingly underdeveloped, what I want to point out is how it positions Foucault. For it is not simply Foucault's histories, but Foucault himself that is left behind by the societies of control. Foucault is the rhetorical stand-in for the modern disciplinary societies, while Deleuze claims to speak about the future. That is to say, in this essay Deleuze seals Foucault's fate *as theorizer of the modern*, and with it the potential for Foucault to adequately represent anti-anthropological, or protocological, thought.)

To sum up, biopolitics and biopower are Foucault's terms for protocol as it relates to life forms. They are Foucault's terms for the statistical coding, the *making-statistical*, of large living masses, such that any singular life-form within that mass may be compared in its organic nature to the totality. This is exactly how protocol functions, as a management style for distributed masses of autonomous agents.

Second Nature

The protocological management of life itself has an extensive prehistory. Foucault and Deleuze show how protocol exists today, yet life itself underwent many transformations during the modern era before it reached its current condition. As one of the greatest analysts of modern life, Karl Marx was intimately familiar with many of the sociopolitical transformations that prefigure the emergence of protocol. For example, the Marxist theory of reification is based, most simply, on a fear of life becoming matter, while, on the other hand, the theory of commodity fetishism shows vividly how matter can become alive. While these two transformations appear to move in opposing directions, they in fact foreshadow the existence of protocol.

Marx learned about materialism from the other Young Hegelians (particularly Feuerbach). He learned that the material or "natural" event that Hegel separated from spirit (i.e., from thought or idealism) must be thoroughly contemplated in its own right. "We must bore through [spiritual thinking]

thereof). Contrast this with "dividualized" films like Fuller's *The Naked Kiss* (1964), which reeks of a tabloid thinness and whose superficiality extends it decades into the future to a time devoid of wound-up interiority, and not at all afraid to traipse out in full view the depravities of real life. That is to say, today.

to the very foundations of truth,”¹⁹ he wrote. These foundations are the same foundations from which protocol springs. Yet matter does not simply mean bodies and dirt and steel in Marx, for all of social life is intimately connected to the material realities of a given sociopolitical space. Indeed, as many of the “culturalist” Marxists (from Louis Althusser to Stuart Hall) have shown, the immaterial realm of cultural is as worthy of analysis as the material bases of society. In Marx’s *Capital*, this “second” immaterial layer, this patina that is at once the thing itself *and* its artificial semblance, is introduced via what I term the concept of “second nature.”

Other thinkers have also identified this current. John Rajchman, talking about Foucault, writes that “[i]t is not the nature of the subject that is at issue, but its ‘*second nature*’; not what is given, but what allows the subject the possibility of giving itself.”²⁰

Hannes Leopoldseder writes that “second nature” is entwined with the concept of artificiality in general:

In the year 1991, the computer lost its innocence. On January 17, 1991, at 1.00 a.m. Central European time, to be exact, when the first laser-controlled bomb met its target, the Gulf War had started . . . The Gulf War, though, did not actually create the megatrend towards artificiality, but shifted it from a symposium topic into reality, even more clearly pointing out the begin [sic] of a new myth: the myth of the artificial, of a *second Nature*.²¹

For my purposes, “second nature” refers to the way in which material objects in the modern era have a tendency to become aesthetic objects. Through being aestheticized, they also tend to become autonomous, living entities in some basic sense. This tendency is a necessary precondition for protocol, and I would like to look closely at Marx’s *Capital* to illustrate how this happens.

19. See Karl Löwith, *From Hegel to Nietzsche* (New York: Columbia University Press, 1964), p. 73.

20. John Rajchman, *Philosophical Events: Essays of the '80s* (New York: Columbia University Press, 1991), p. 62, emphasis mine.

21. Hannes Leopoldseder, “Forward,” in *Ars Electronica*, ed. Timothy Druckrey (Cambridge: MIT Press, 1999), p. 8, emphasis mine.

Indeed, Marx can help me derive my theory of protocol by showing the origins of “aesthetic” materialism.

Consider the following thoughts taken from filmmaker Sergei Eisenstein’s October 13, 1927, notebook entry, as he contemplates his ambitious (but unrealized) dream of turning Marx’s *Capital* into a feature film:

Assuming that in any film work, certain salient phrases are given importance, the form of a **discursive** film provides, apart from its unique renewal of strategies, their rationalization which takes these strategies into account. Here’s a point of contact already with completely new film perspectives and with the glimmers of possibilities to be realized in CAPITAL, a new work on a libretto by Karl Marx. A film treatise.²²

Discursive film . . . a *libretto* by Marx . . . a film *treatise*! How could Eisenstein transmute philosophical concepts into moving images? Does *Capital* have an aesthetic essence accessible to the medium of film? How would it be possible to make such a film, and who would watch it? From a contemporary perspective, translating a decades-old work of economics into a feature film seems impossible, even absurd.

Yet the more one considers the relationship between *Capital* and aesthetic production, the more a film version of Marx’s classic text *seems like second nature*. As Annette Michelson has indicated, the “upside-downness” of life under capitalism is likened by Marx himself to both the inverted image projected on the retina and the inverted image within a *camera obscura*.²³ The tendency to invert life is shared by both the visual apparatus and the capitalist one. The cinema, then, following a path from text through the mediating space of discourse to film, seems to be an ideal form through which to represent the concept of *Capital*.

If *Capital* has a single concept, then it is the concept of the dialectical method itself. Upon close scrutiny of Eisenstein, that much is clear. The film version of “CAPITAL develops as visual instruction in the dialectical method,”

22. Sergei Eisenstein, “Notes for a Film of *Capital*,” October 2, Summer 1976, p. 4.

23. Annette Michelson, “Reading Eisenstein Reading *Capital*” (part one), October 2, Summer 1976, p. 27.

he writes in an April 6, 1928, notebook entry.²⁴ And a few days earlier: “The content of CAPITAL (its aim) is now formulated: **to teach the worker to think dialectically.** / To show the **method** of dialectics.”²⁵ Eisenstein considered his work to be closer in form to an essay than a conventional film. And, as his interest in montage matured, the dialectical method remained his central problematic. Michelson also points out that “Eisenstein was at pains to ground . . . montage in the dynamics of the dialectic and, further, to specify the manner in which the former is the concrete film form of the latter.”²⁶ Mirroring the dialectical method, montage is seen as the resolution of conflicting shots into a new form. Preparing the film in his mind, Eisenstein writes that “in CAPITAL, for example, the themes of textile machines and machine-wreckers should collide: electric streetcar in Shanghai and thousands of coolies thereby deprived of bread, lying down on the tracks—to die.”²⁷

What may come as a surprise is that Marx is no less imaginative in his prose than Eisenstein is with his Shanghai streetcars and starving coolies, as a reference to Marx’s “500 golden birds,” or to his “rational kernel” and “mystical shell,” or even to the “grotesque ideas” sprouting out of the commodity’s “wooden brain,” confirms.

What I would like to show, however, is that while Eisenstein shows how the aesthetic form of cinema can address discursive questions (e.g., via montage), the discourse of *Capital* itself was always already in aesthetic form, bolstered by never-ending naturalistic and vitalistic imagery (natural objects, biological processes, monsters, transmutations, and mystifications).

This vitalism in Marx heralds the dawning age of protocol, I argue, by transforming life itself into an aesthetic object. Eisenstein’s goal is to transform *Capital* from a work of political economy into a *discursive event*, one that may then manifest itself in film form. Paralleling Eisenstein, I would like to give importance to “certain salient phrases” as the first step in outlining an aesthetized space within *Capital*. The moments in Marx when he lapses into metaphor and imagery appear to be his own attempt at cinematography—that is, his attempt to aestheticize the vital forms contained in the book.

24. Eisenstein, “Notes for a Film of *Capital*,” p. 16.

25. Eisenstein, “Notes for a Film of *Capital*,” p. 10.

26. Michelson, “Reading Eisenstein Reading *Capital*,” p. 29.

27. Eisenstein, “Notes for a Film of *Capital*,” p. 8.

The more one reads Marx, the more there is a proliferation of discourses.²⁸ Yes, one is the dominant language of math, science, economics, formulas, thoroughness, exhaustiveness. And another is clearly the discourse of politics—the discourse that drove Marx to break with Feuerbach and be a politico rather than simply a materialist philosopher. Another is Marx’s murky analysis of the domestic sphere, both in the question of domestic labor, and in the reproduction of labor-power through sleep, food, and other nonwork activities.

Still another—what I turn to in this chapter—is the marginal language of metaphors, imagery, fantasy, poetics and suggestion. Marx’s language is constantly overrun by these many levels of discourse. They mark the difference between what he is saying and why he is saying a particular thing in a particular way—from his “Force is the midwife of every old society which is pregnant with a new one,”²⁹ to the rhetorical comparison of “lawyer’s fees, beetroot and music.”³⁰

Why is it important to dwell on this last discursive mode that explores capitalism’s “metaphysical subtleties and theological niceties”? Because more often than not, when this mode is employed it’s a question of *vitalism*. What exactly is Marx *doing* when, in the “Postface to the Second Edition” of

28. Several other critics have noted the existence of different discourses in Marx. For French philosopher Louis Althusser, Marx employed two distinct discourses: the ideological and the scientific. Maurice Blanchot projected a third voice in Marx, a revolutionary one called the “indirect” that is held in continuous juxtaposition with the first two (see Maurice Blanchot, “Les trois paroles de Marx,” *L’Amitié* [Paris: Gallimard, 1971]). This theory of a three-way textual discordance within Marx is also championed by Jacques Derrida in his *Specters of Marx* (New York: Routledge, 1994). Both Blanchot and Derrida urge readers to embrace the multivocal nature of Marx’s text. Blanchot writes that “[i]n Marx, and always coming from Marx, we see three forms of speech taking shape and finding force, all three being necessary yet separated and more-than-opposed, that is, juxtaposed” (p. 115). As Derrida writes, Blanchot asks readers “to think the ‘holding together’ of the disparate itself. Not to maintain together the disparate, but to put ourselves there where the disparate itself holds together, without wounding the dis-jointure, the dispersion, or the difference, without effacing the heterogeneity of the other” (p. 29).

29. Karl Marx, *Capital Volume 1*, trans. Ben Fowkes (London: Penguin, 1976), p. 916.

30. Karl Marx, *Capital Volume 3*, trans. David Fernbach (New York: Penguin, 1993), p. 953.

Capital, he advises potential critics of idealism to “discover the rational kernel within the mystical shell”?³¹ Why “kernel”? Why “shell”? What is the relationship between the mystified category of the “vital form” and the fully analyzed category of the social?

Capitalism, for Marx, is *second nature*.³² It is at once intuitive and naturalized—what Barthes would call a second-order system of signification. It is a “layer” that has been folded back on itself such that it is simultaneously its core self and its own patina. It is both raw and coded. Marx’s own discourse

31. Marx, *Capital Volume 1*, p. 103.

32. While Marx is interested in many different vital milieus, he often fixates on nature. The most common definition Marx offers is that the natural is the *spontaneous* (see Marx, *Capital Volume 1*, pp. 201, 284, 485, 453, 471, 504, 604, 638, 645, 647, 621; Marx, *Capital Volume 3*, p. 487). Nature’s spontaneity is due to its special place outside of production. Nature is a “material substratum” (Marx, *Capital Volume 1*, p. 133) that has material (but not valent) effectivity (Marx, *Capital Volume 3*, p. 955). Furthermore, nature is a type of endowment—“water, timber felled in virgin forests, and ores extracted from their veins” (Marx, *Capital Volume 1*, p. 284)—that offers forth “her gifts” (Marx, *Capital Volume 1*, p. 649) as material resources for man. In this sense nature has an “absolute fertility” (Marx, *Capital Volume 3*, p. 954) that must simply be tapped by labor power. In all of these extra-productive instances, to be natural means to be spontaneously produced. Other miscellaneous (even somewhat false) uses of nature in *Capital* include the posing of a state of nature through the Robinson Crusoe story in Book One and again in Book Three as he describes “the savage” who “must wrestle with nature to satisfy his needs” (Marx, *Capital Volume 1*, p. 959). Nature is also used in the sense of a natural biological essence to man’s body, as when he claims that a man can “strike so many blows per day, walk so many steps, breathe so many breaths, produce so much work,” and so on (Marx, *Capital Volume 1*, p. 366). Human nature is defined, then, in accordance with “natural needs, such as food, clothing, fuel and housing” (Marx, *Capital Volume 1*, p. 275). A concept of human nature is also seen when he describes how, when during cooperation, man “strips off the fetters of his individuality, and develops the capabilities of his species” (Marx, *Capital Volume 1*, p. 447). He also uses nature as a synonym for “in essence,” as when he writes “these means of production are in and for themselves, by nature, capital” (Marx, *Capital Volume 3*, p. 963). And finally, he lets nature stand in for history, albeit an anti-essentialist history that is opposed to capitalist history, when he boldly claims that “one thing, however, is clear: nature does not produce on the one hand owners of money or commodities, and on the other hand men possessing nothing but their own labour-power. This relation has no basis in natural history” (Marx, *Capital Volume 1*, p. 273).

is no exception. And it is for this reason that Marx takes the topic of capitalism—the greatest force of naturalization known to Marx—and bathes it over and over again in the language of nature³³ and other vital forms.

I would like to begin classifying the uses of vitalistic discourse in *Capital*. While this includes biological terminology, not all biological terminology is included in my classification. There are two main exceptions—the terms *metabolic* and *organic*—where Marx employs vitalistic terminology in a strictly neutral sense. Let me consider those first.

Marx uses the term “metabolic,” derived from the dynamic flow of biological processes, as an adjective to describe a relationship that is harmonious, systemic, and self-regulating, and in which skills and resources are evenly balanced yet constantly updated through a relationship of equilibrium. Marx introduces the term near the beginning of Book One of *Capital* to help describe the concept of non-owning need versus non-needing ownership: “In so far as the process of exchange transfers commodities from hands in which they are non-use-values to hands in which they are use-values, it is a process of social metabolism.”³⁴ The systemic quality of the concept of metabolism is highlighted when Marx writes, “The exchange of commodities breaks through all the individual and local limitations of the direct exchange of products, and develops the metabolic process of human labour”;³⁵ later Marx describes the “metabolic interaction between man and the earth”³⁶ in similar terms.

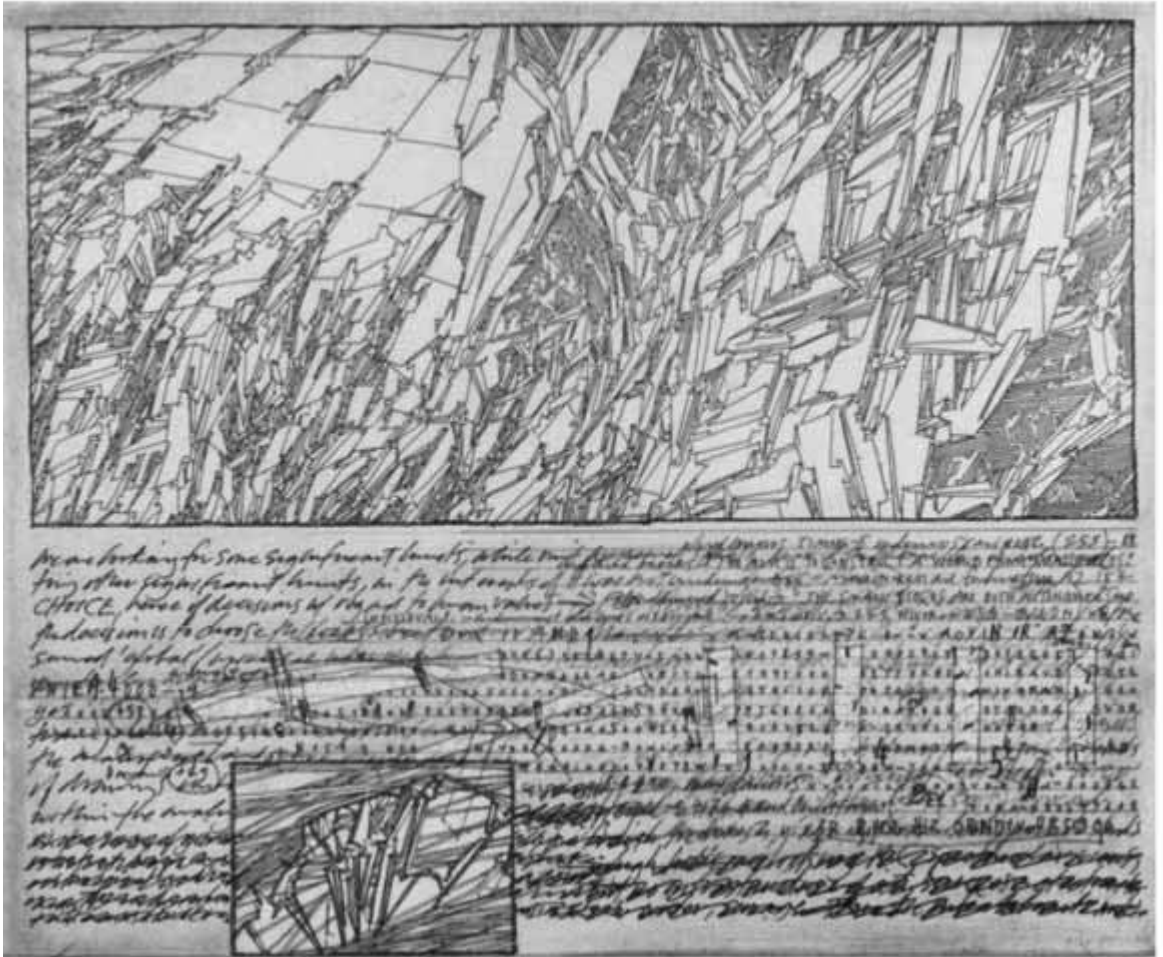
33. Nature has a very special place in Marxist science. It is its own antonym. On the one hand, the hated fetish form does nothing but *naturalize* real social relations. Yet on the other, the “natural” stands as a type of pre-capital, extra-productive force, endowing the world with useful material. The natural is also thought of as being quite literally opposed to the concept of both the social and the historical, two other crucial Marxist keywords. (The social is defined as both the supra-sensible and the supra-individual [Marx, *Capital Volume 1*, pp. 165, 207]. Social relations for Marx do not simply mean one buyer and one seller, but rather a large “network of social connections” that are “entirely beyond the control of the human agents” [Marx, *Capital Volume 1*, p. 207].)

34. Marx, *Capital Volume 1*, p. 198.

35. Marx, *Capital Volume 1*, p. 207.

36. Marx, *Capital Volume 1*, p. 637.

A distributed network is always caught, to use an expression from Deleuze and Guattari, *au milieu*, meaning that it is never complete, or integral to itself. The lines of a distributed network continue off the diagram. Any subsegment of a distributed network is as large and as small as its parent network. Distribution propagates through rhythm, not rebirth.



Lebbeus Woods, *Terrai* (1999), courtesy Henry Urbach Architecture

The contradiction at the heart of protocol is that it has to standardize in order to liberate. It has to be fascistic and unilateral in order to be utopian. It contains, as Jameson wrote of mass culture before it, both the ability to imagine an unalienated social life and a window into the dystopian realities of that life.



The NSA's Echelon station at Menwith Hill, UK
photo: Craig Stennett; courtesy the Campaign for the Accountability of American Bases

The second vitalistic term that is used quite neutrally by Marx is “organic.” Like “metabolic,” it is used to describe a relationship in which two or more parts fulfill individual functions for the good of the whole. This is seen in the idea of the “organic composition of capital,” which simply refers to the ratio of living parts (variable capital, or labor) to dead parts (constant capital, or machines) in the total capital put in motion by the capitalist. Marx also uses “organic” to describe certain types of production, specifically as it is contrasted with the “heterogeneous” form of manufacturing in Part Four of Book One of *Capital*, or through analogy to the inner workings of a musical orchestra.³⁷ As in the human body, organic organization simply means division of labor into a series of “subordinate functions.”³⁸ It is a synonym for “organization” as he describes the “organized system of machinery in the factory” as a type of “objective organism.”³⁹ Although they are terms associated with biology, both “metabolic” and “organic” have little significance for my analysis of vitalistic imagery in Marx.

The type of vitalistic discourse seen most clearly in *Capital* is that of vital objects. Although his “rational kernel” and “mystical shell” may be the most well known, Marx is obsessed with animals, plants and minerals of all kinds. He calls the commodity form the “germ” of the money form; he uses the phrase “gold chrysalis” to describe the gold standard; he calls the money-owner a “capitalist in larval form” who will eventually emerge “as a butterfly” in the sphere of circulation; he describes the circulation of commodities as being like the flight of “500 golden birds”; he compares capitalist monetary income to the “fruits of a perennial tree,” and so on.⁴⁰ The use of “congeal” and “objectification” also contributes to the proliferation of vital objects in the Marxist ontological field. When first describing the commodity, Marx writes that use-value gains value because “human labor is objectified or materialized in it.”⁴¹ Value is a “social substance,” or “‘objective’

37. See Marx, *Capital Volume 1*, pp. 461, 448–449.

38. Marx, *Capital Volume 1*, p. 644.

39. Marx, *Capital Volume 1*, p. 517.

40. For these citations, see Marx, *Capital Volume 1*, pp. 163, 227, 269; Karl Marx, *Capital Volume 2*, trans. David Fernbach (New York: Penguin, 1993), p. 495; Marx, *Capital Volume 3*, p. 960.

41. Marx, *Capital Volume 1*, p. 129.

property”⁴² derived from the transmutation of human labor into the natural world.

Often Marx’s vital objects take on more sinister, supernatural personalities. Specters, monsters, and vampires riddle his text. As Derrida has shown in *Specters of Marx*, the concept of haunting appears several times in *Capital* (although perhaps not as often as Derrida would lead us to believe). Marx writes twice that money “haunts” the sphere of circulation⁴³ through its function as universal equivalent. The interesting husband-and-wife duo Monsieur le Capital and Madame la Terre “haunt” and “bewitch”⁴⁴ the world under the influence of the Trinity Formula in Book Three. Labor itself, due to its abstract immaterial quality, is “a mere specter,” claims Marx.⁴⁵ And the list continues: capital is an “animated monster”; the commodity “transcends sensuousness” and “evolves out of its wooden brain grotesque ideas,” soon to evolve into a living, talking creature (“If commodities could speak . . .,” “. . . lend them his tongue”); self-valorizing value has the monstrous ability to “[bring] forth living offspring, or at least lays golden eggs”; machinery is a “vast automaton,” a type of mechanical demonic monster, a lifeless machine with living appendages.⁴⁶ Yet perhaps the image of the vampire is the most sinister: “Capital is dead labour which, vampire-like, lives only by sucking living labour, and lives the more, the more labour it sucks.”⁴⁷ This vampire “will not let go ‘while there remains a single . . . drop of blood to be exploited.’”⁴⁸ Marx returns to the vampire theme in Book Three, describing usury in similar terms of “sucking dry” and “emasculat[ion].”⁴⁹ The theme of haunting is also evident in Marx’s other work, as in the *Communist Manifesto* when he writes about the “specter haunting Europe” and the “sorcerer.”⁵⁰ Yet

42. Marx, *Capital Volume 1*, pp. 138, 154.

43. Marx, *Capital Volume 1*, pp. 213, 226.

44. Marx, *Capital Volume 3*, p. 969.

45. Marx, *Capital Volume 3*, p. 954.

46. For these citations, see Marx, *Capital Volume 1*, pp. 302, 163, 176, 189, 255, 502, 503, 548.

47. Marx, *Capital Volume 1*, p. 342.

48. Marx, *Capital Volume 1*, p. 416.

49. Marx, *Capital Volume 3*, p. 731.

50. Karl Marx and Friedrich Engels, *The Communist Manifesto* (New York: Signet, 1998), pp. 49, 57.

perhaps the epitome of Marx's sinister monsters may be seen in a more reserved but prescient description of the type of "artificial life" that is postulated to explain the workings of individuals within a totality: "Each individual capital forms only a fraction of the total social capital, a fraction that has acquired independence and been endowed with individual life, so to speak."⁵¹ But why does he stop short by saying "so to speak"? Is this an indication of Marx's anxiety about self-aestheticization?

A third category (after the world of objects and the world of supernatural objects) within Marx's vitalist discourse is that of natural processes. As in the other categories, the text is overflowing with rich examples. Natural process imagery includes "fermentation," "crystalization," "precipitation," and plain old "alchemy" (by which simple commodity objects are transmuted into "the money crystal").⁵² Yet more fundamental to the text is the use of "congeal." Congealing is an incredibly powerful process in Marx since it involves both a change in category and a change in form. What appears on the one hand as an *activity* [category] in *humans* [form] congeals through the labor process into a *measure of value* [category] in an *object* [form]. He writes that "phantom-like," the "residue of the products of labor" congeals into "crystals" of a distinct "social substance."⁵³ Other naturalistic process-based imagery includes Marx's poetic allusion to the death cycle "go[ing] the way of all flesh," and the idea of consumption or extinguishment, as in the example of the labor process—"the process is extinguished in the product," and "labor uses up its material elements, its objects and its instruments. It consumes them, and is therefore a process of consumption."⁵⁴

As mentioned earlier, the theme of mystification is introduced in the "Postface to the Second Edition" of *Capital* through Marx's example of the "rational kernel" and the "mystical shell."⁵⁵ Because "mystification" is a near synonym for "naturalization" in this text, it is clear that any discussion of

51. Marx, *Capital Volume 2*, p. 427.

52. For citations see Marx, *Capital Volume 1*, pp. 292, 128, 181; Marx, *Capital Volume 2*, p. 489; Marx, *Capital Volume 1*, p. 229.

53. Marx, *Capital Volume 1*, p. 128.

54. Marx, *Capital Volume 2*, p. 496; Marx, *Capital Volume 1*, pp. 287, 290.

55. Marx, *Capital Volume 1*, p. 103.

mystification or hiddenness is directly bound up in the theme of nature and other vital objects. The famous Hegel headstand that Marx posits in the “Postface . . .” is based on the idea that inversion, or upside-downness, is linked directly to illusion, mystification, and misrecognition. Because Hegel (and idealists like him) was standing on his head, he couldn’t *see* the world as it was. A similar epistemological inversion is at work in Marx’s analysis of fetishism. For example, he writes that as the concept of labor is fetishized and thought to have value in and of itself, it is “inverted, so that it becomes its contrary.”⁵⁶ Elsewhere he describes the competition theory of value as being an “upside-down” expression,⁵⁷—even though, on the contrary, Marx prized the labor theory of value.

Hiddenness is as powerful a force of mystification (i.e., *naturalization*) as inversion is. Marx writes that truly to understand the workings of exchange, one must leave the marketplace and venture “into the hidden abode of production.”⁵⁸ He also writes that the mysteries of the money form will be resolved by revealing its origins, by showing that exchange “conceals a social relation.”⁵⁹ The faults of political economy are generally due to these types of illusions—for example, the “illusion that ground rent grows out of the soil, not out of society,” or the “certain deception” of the “illusory character” of the uninterrogated circuit of money capital.⁶⁰ All of these examples point to a single idea in Marx, what he calls the social hieroglyphic. The social hieroglyphic refers to something that does not announce on its surface what it *is* on the inside. He writes that “value, therefore, does not have its description branded on its forehead; it rather transforms every product of labour into a social hieroglyphic.”⁶¹ The social hieroglyphic is a characteristically “natural” object for Marx; it must be *denaturalized*, demystified. Yet the mystification of capital into natural processes is elaborate: “The further we trace out the valorization process of capital, the more is the capital relationship

56. Marx, *Capital Volume 1*, p. 677.

57. Marx, *Capital Volume 3*, p. 331.

58. Marx, *Capital Volume 1*, p. 279.

59. Marx, *Capital Volume 1*, pp. 139, 149.

60. Marx, *Capital Volume 1*, p. 176; Marx, *Capital Volume 2*, p. 141.

61. Marx, *Capital Volume 1*, p. 167.

mystified and the less are the secrets of its internal organization laid bare.”⁶² He describes capitalist analyses of the circuits of capital as “misrepresentation[s]” and those of surplus value as “mislead[ing]” the capitalist.⁶³ The Trinity Formula at the end of Book Three “completes the mystification of the capitalist mode of production”⁶⁴ by creating false links among the components of wealth and their sources.

These concepts of mystification and naturalization may be defined further, both more generally in the concept of “form of appearance” and more specifically in the fetish form.⁶⁵ Form of appearance refers to a typically Marx-

62. Marx, *Capital Volume 3*, p. 139.

63. Marx, *Capital Volume 3*, pp. 516, 236.

64. Marx, *Capital Volume 3*, p. 969.

65. Fetishism is the unfortunate epistemological outcome of the form of appearance. Fetishism is how the form of appearance *is thought through*. Fetishism is a failure to read the form; it is a failure to note that the form of appearance has taken place; it is the tendency to mistake the form of appearance for the real thing. Since *denaturalization* is Marx’s primary tool to combat fetishism, fetishism itself must be thought of as a type of *naturalization*. Nature runs parallel to fetish. Situated at the theoretical heart of *Capital*, the fetish has a special function for Marx. As *Capital* progresses so does the definition of the fetish. In Book One, readers are introduced to the fetish via grotesque, supernaturalistic imagery, yet by the end of Book Three the fetish has flowered into its “consummate form” (Marx, *Capital Volume 3*, p. 523), what Marx calls the automatic fetish.

Derrida has commented interestingly on the relationship between the fetish and the specter, shown previously to be integral to the category of (super)naturalistic monsters and ghosts. The spectral sits in somewhat of an antagonistic relation with the fetish form. On the money form, he writes that “Marx always described money, and more precisely the monetary sign, in the figure of appearance or simulacrum, more exactly of the ghost” (Derrida, *Specters of Marx*, p. 45). Like money, the specter has the ability to summon a remainder (a revenant, or a shadow). Derrida even hints at the commodity fetish’s ability to gaze (in a way similar to some of Benjamin’s observations). Derrida notes that “this spectral someone other looks at us [concerns us], we feel ourselves being looked at by it, outside of any synchrony, even before and beyond any look on our part” (p. 7). The fetish is figured in much the same way as the specter. Like the relationship of appearance to disappearance in the commodity fetish (i.e., value as the form of appearance of use-value, consumption as the using up, disappearance, or realization of value, etc.), the specter too has a unique position between disappearance and reappearance—

ian dialectical process in which objects or qualities transform into their opposites through the process of representation. In its simplest usage, form of appearance means representation, or a “mode of expression.”⁶⁶ For example, Marx writes that “exchange-value [is] the necessary mode of expression, or form of appearance, of value,” and later he writes that “use-value becomes the form of appearance of its opposite, value.”⁶⁷ Both use-value and exchange-value are negated and expressed as their mutual opposite, value. Form of appearance can mean simple “mirroring,” or it can mean a more poetic, allegorical transformation as in the case of “the sheep-like nature of the Christian” transforming into the “Lamb of God.”⁶⁸ Marx writes that “a change of form must occur”—that is, a “metamorphosis”—before commodities are able to be sold, “capital is always involved in this movement of transition, this metamorphosis of form.”⁶⁹ Fundamentally, it is a changing of form via some type of imaginary or illusory representation, like the waterfall used for power that can have no “price” except through an “irrational expression concealing a real economic relationship.”⁷⁰ Finally, form of appearance in its most advanced usage gestures toward what one would today call a theory of ideology: “What is true of all forms of appearance and their hidden background is also true of the form of appearance ‘value and price of labour’, of ‘wages’, as contrasted with the essential relation manifested in it, namely the value and price of labor power. The forms of appearance are reproduced directly and *spontaneously*, as current and usual *modes of thought*.”⁷¹ “Spontaneity”—a near synonym for “natural” in Marx—combines with the

it is an economy. In relation to the specter, Derrida writes that “there is something disappeared, departed in the apparition itself as reapparition of the departed” (p. 6). In a manner unappealing to vulgar Marxists, Derrida in fact *privileges* the fetish form, since it is more helpful to deconstruction intact than demystified.

66. Marx, *Capital Volume 1*, p. 127.

67. Marx, *Capital Volume 1*, pp. 128, 148.

68. Marx, *Capital Volume 1*, pp. 144, 143.

69. Marx, *Capital Volume 1*, pp. 203, 260; Marx, *Capital Volume 3*, p. 379.

70. Marx, *Capital Volume 3*, p. 787.

71. Marx, *Capital Volume 1*, p. 682, emphasis mine.

misrecognition inherent in the wage system to produce an affect (the “mode of thought”). To simplify the formula: natural misrecognition = ideology. For this reason I argue that form of appearance is an incredibly powerful moment in Marx’s theorization of vital forms.

After all of its vital objects and processes, supernatural monsters, transmutations and mystifications—after all of this, is *Capital* still simply a work of economics? Or is it a much broader analysis, one that reveals how modern life is an aesthetic space through and through? As Eisenstein was able to see, and I hope the analysis in this chapter also shows, *Capital* is an aesthetic object. The confluence of different discourses in *Capital*, both vitalistic and economic, proves this. The use of vitalistic imagery, no matter how marginalized within the text, quite literally *aestheticizes capitalism*. It turns capitalism into media. Perhaps then the conventional wisdom on *Capital*, that Marx’s goal was to denaturalize the apparatus of capitalism, can be rethought. The existence in the text of vital forms allows for both an intuitive and estranged capitalistic apparatus.

Emergence of Artificial Life Forms (Matter Becoming Life)

Man has lost his *soul*; in return, however, he gains his *body*.

—GEORG VON LUKÁCS, “Thoughts Toward an Aesthetic of the Cinema”

The vital quality of pure matter has long haunted the modern era. Be it the monster in Shelley’s *Frankenstein*, the commodity in Marx’s *Capital*, or the murdering robot in Čapek’s *R.U.R.*, the emergence of autonomous vital forms appears as a distinct trend in the last two hundred years of contemplative thought.

Much work has been done on this subject in the field of epistemology and cognitive science. During a 1959 meeting organized by the New York University Institute of Philosophy entitled “The Dimensions of Mind,” Norbert Wiener and others pondered the epistemological condition of mind in the context of the machine. Later, writers such as Marvin Minsky and Daniel Dennett have considered the theoretical possibilities and limits of computerized thought.

Several theories of life are at play in this intellectual milieu. In what might be dubbed the “computers can never do what our brains can do” ideology, Hubert Dreyfus argues that there are theoretical limits to any type of artifi-

cial intelligence.⁷² In a similar vein, Leopoldseder recounts that “[i]n a personal interview, the biophysician and cybernetics researcher Heinz von Foerster—one of the fathers of constructivism—answered the question of whether there is a relation between the human brain and the computer with a ‘yes and no.’ Then he added: ‘No computer is a brain, but all brains are computers.’”⁷³ This debate is ongoing, with one camp claiming that computers will someday perfectly model the workings of the human brain and the other camp claiming that the *je ne sais quoi* of human thought is fundamentally different than the hard, rigid world of computer code.

Yet this book has very little to say about questions epistemological. Protocol is not a theory of mind. Nor, following Jonathan Crary and Sanford Kwinter in their forward to the fascinating collection *Incorporations*, is protocol a theory of the body. For, as they write, “Our topic is the problem of life itself, understood as a complex, labile, overtone structure, neither dependent upon, nor reducible to, an organic substrate or historical object—in short, to what contemporary habit too knowingly calls ‘the body.’”⁷⁴ Instead protocological life is considered here as “the forces—aesthetic, technical, political, sexual—with which things combine in order to form novel aggregates of pattern and behavior.”⁷⁵ Indeed, protocol is a theory of the confluence of life and matter (and ultimately we will see that protocol shows how life *is* matter).

As an introduction to the emergence of autonomous life forms in the material realm, let me first consider the theory of life that is known as the “anti-entropic” position. The anti-entropic position states, simply, that life is precisely that force *that resists entropy*. Entropy is the physical principle derived from thermodynamics that states that, in any given system, things will tend to “fall apart” or tend toward disorder. Moreover, entropy means that

72. This might also be dubbed the “computers don’t know shit” ideology. See Stewart Brand, “SPACEWAR: Fanatic Life and Symbolic Death among the Computer Bums,” *Rolling Stone*, December 7, 1972, p. 58.

73. Leopoldseder, “Forward,” p. 6.

74. Jonathan Crary and Sanford Kwinter, “Forward,” *Incorporations* (New York: Zone, 1992), p. 13.

75. Crary and Kwinter, “Forward,” p. 13.

information, defined as any nonrandom measurement or quality, has a tendency to be forgotten. This physical principle is seen throughout nature: When something falls apart, the information about its organization is in essence forgotten and chaotic arrangement sets in in the form of decay.

Since living animals tend to resist the entropic force, they are considered to violate this law of thermodynamics. Living animals don't fall apart during their life spans, and furthermore they resist informational disorder after death by propagating genetic information to their progeny. This defines their identity as vital forms. Genes and memes (themselves also genes, but in the realm of culture) are two ways of moving against the entropic force, by conserving information, even augmenting it, from living being to living being.

Flusser paraphrases this position well:

Like no other known living creature, we pass on not only inherited but also acquired information to future generations. In doing so, we negate nature twice: the second law of thermodynamics states that in nature all information has a propensity to be forgotten. Living creatures negate this principle, since they store and pass on genetic information [genes]. And Mendel's law states that acquired information cannot be transmitted from one organism to the next. Our species defies this law, too, for it stores acquired information [memes] in a cultural memory accessible to successive generations.⁷⁶

Thus, living beings are characterized as anti-entropic, vitality being the opposite of entropy, the capacity to resist entropy.

Peter Weibel extends this position by claiming that living forms are defined in terms of their "viability," their ability to function independently in the world: He defines a living organism as "a system characterized by its propensity to react relatively independently to any number of inputs . . . [V]iability denotes the possession of lifelike properties with the development of lifelike behavior."⁷⁷

76. Flusser, "Memories," p. 202.

77. Peter Weibel, "The World as Interface: Toward the Construction of Context-Controlled Event-Worlds," in *Electronic Culture*, ed. Timothy Druckrey (New York: Aperture, 1996), pp. 348, 349.

Deleuze also agrees with this position by posing the rhetorical question “Is not life this capacity to resist force?”⁷⁸—a capacity borne from the power of life forms to resist the imposition of biopolitical power, a type of macro-vital control that I’ve already discussed in more detail.

The mathematician Norbert Wiener states this position interestingly when he writes about the ability of life itself to resist the decaying forces of the universe at large:

As entropy increases, the universe, and all closed systems in the universe, tend naturally to deteriorate and lose their distinctiveness . . . But while the universe as a whole, if indeed there is a whole universe, tends to run down, there are local enclaves whose direction seems opposed to that of the universe at large and in which there is a limited and temporary tendency for organization to increase. *Life finds its home in some of these enclaves.*⁷⁹

Wiener’s position is, thus, what one might today call Deleuzian. Wiener sees entropy as a gradual procession toward the Plane of Immanence, Deleuze’s term for the undifferentiated, contingent state matter finds itself in when it has yet to organize itself in any identifiable way. Life, then, is a type of stratification within that Plane. It is, quite literally, an *organization*, a set of “patterns that perpetuate themselves.”⁸⁰

What makes Wiener’s theory so radical, however, is that he recognized that machines also resist entropy. “The machine, like the living organism, is,” Wiener writes, “a device which locally and temporarily seems to resist the general tendency for the increase of entropy. . . . it can produce around it a local zone of organization in a world whose general tendency is to run down.”⁸¹

78. Deleuze, *Foucault*, p. 93.

79. Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society* (New York: Da Capo, 1950), p. 12, emphasis mine. Wiener also describes life as a “local enclave” resisting environmental decay on page 95.

80. Wiener, *The Human Use of Human Beings*, p. 96.

81. Wiener, *The Human Use of Human Beings*, p. 34. Charles Petzold writes, as do computer hardware scientists at large, that the capacity for machines to preserve information derives from the “flip-flop” switch, a type of logical circuit that saves state from moment to moment:

It's not simply that machines are like people, or that people are like machines, but that *both entities are like something else*, what Wiener calls "communicative organisms," or what today might be called "information organisms." These are the same organisms that live inside protocol.

The gulf separating matter and life was further closed by Wiener with his theory of dynamic systems, known as cybernetics. The theory of cybernetics began with the simple idea of *feedback*, which he describes as "the property of being able to adjust future conduct by past performance."⁸²

Yet beyond this Wiener recognized that, due to what he saw as a special isomorphism between electronic computers and the human nervous system, it would be very easy to insert "artificial sense organs" as feedback mechanisms,⁸³ rather than relying on one's eyes and ears. Thus, it is not out of some science fiction urge that Wiener merges man and machine, but simply that if one views the world in terms of information (or in Wiener's vocabulary, in terms of "command" and "control"—but these words are nearly synonymous with information for my purposes), then there is little instrumental difference between man and machine since both are able to affect dynamic systems via feedback loops. In this way the cybernetic system of man and machine is born.⁸⁴ Its virtues are balance, self-regulation, circularity, and control. In a word, protocol.

"[a] flip-flop circuit *retains information*. It 'remembers.' . . . A flip-flop is very much like a seesaw. A seesaw has two stable states, never staying long in that precarious middle position. . . . flip-flops are essential tools. They add memory to a circuit to give it a history of what's gone on before." See Petzold, *Code*, p. 161.

82. Wiener, *The Human Use of Human Beings*, p. 33. Wiener also writes that the "control of a machine on the basis of its *actual* performance rather than its *expected* performance is known as *feedback*" (p. 24).

83. Wiener, *Cybernetics*, p. 26.

84. Many others have followed in Wiener's footsteps. In 1960 J. C. R. Licklider, an early theorist and researcher of computer networks, wrote about what he called the "man-machine symbiosis." Marshall McLuhan also claimed that technology itself is nothing but an extension of man's nervous system. Computer pioneer Douglas Engelbart considered technology to be simply an augmentation of the human faculties. For relevant texts by Licklider and Engelbart, see Randall Packer and Ken Jordan, *Multimedia: From Wagner to Virtual Reality* (New York: Norton, 2001). Other theorists such as Donna Haraway have quite literally fused human and

Wiener's prose is tinged by anxiety over what he considered to be the vast potential for his scientific work to contribute to the "concentration of power . . . in the hands of the most unscrupulous."⁸⁵ Writing in the shadow of World War II and the atomic bomb, Wiener exhibits a grave concern, not only with the bomb but also with more general social exploitation, be it in the form of a recently defeated Nazism or a once more bullish American capitalism (he does not tell readers which). He does say that upon formulating his theory of cybernetics, his first instinct was to warn organized labor, noting: "I did manage to make contact with one or two persons high up in the C.I.O., and from them I received a very intelligent and sympathetic hearing."⁸⁶

Yet I would argue that the proximity between man and machine in late-twentieth-century life has more utopian possibilities in Wiener's thought than it has derisive possibilities. Wiener is important because he valued the contingency of matter, be it man or machine. He recognized that material reality is the *most* important thing and that, contrary to a more static Newtonian view of matter, it *can change*.⁸⁷ The self-determinism of material systems is therefore the essence of cybernetics, and it is a positive essence, one that also reflects the positive potential of protocological organization.

Artificial Life

I personally believe that reproducing programs are living beings in the information environment.

—FREDERICK COHEN, *A Short Course on Computer Viruses*

Pseudo-artificial entities such as robots have been in existence for many years already.⁸⁸ The emergence of "artificial life" proper happens as computers shift

machine into what she calls the cyborg. See Donna Haraway, *Simians, Cyborgs and Women* (New York: Routledge, 1991).

85. Haraway, *Simians, Cyborgs and Women*, p. 29.

86. Haraway, *Simians, Cyborgs and Women*, p. 28.

87. For more on the "contingency of events" see Wiener, *The Human Use of Human Beings*, p. 8. Wiener's interest in "possibility" and "distribution," inspired by Gibbs's work connecting the fields of physics and statistics, is also proto-protocological (pp. 12, 8).

88. The coinage "robot" is attributed to the writer Karel Čapek and derives from a Czech word meaning "serf." For more on robots and other automata, see Julien Offray de la Mettrie,

from being primarily linear calculation machines to being clusters of parallel, distributed submachines.

In computer science, this shift is characterized by the change from “procedural” (or linear) programming to so-called object-oriented programming. In procedural programming, one inputs data and then operates on that data in a linear manner. Loops may occur, but in general a series of commands are read, interpreted, and executed as a consecutive chain of events. Object-oriented programming, on the other hand, treats all code as a series of simultaneously generated entities, with each entity possessing its own qualities and actions. Object-oriented programming was first popularized by the C++ programming language.⁸⁹ Since then nearly all of today’s programming languages are able to function in such a capacity. The Java programming language, created by Sun Microsystems, is entirely object-oriented.

It is possible to map this shift historically. Sherry Turkle writes that this shift—from procedural to object-oriented—follows the shift from the modern to the postmodern eras. In what she calls “the modernist computational aesthetic” the computer was viewed as a “giant calculator,” and programming it “was a cut-and-dried technical activity whose rules were crystal clear.”⁹⁰ However, in today’s multifaceted, distributed environments, “computational models of the mind often embrace a postmodern aesthetic of complexity and decentering. Mainstream computer researchers no longer aspire to program intelligence into computers but expect intelligence to emerge from the interactions of small subprograms.”⁹¹ This shift, from centralized

Machine Man and Other Writings (London: Cambridge University Press, 1996); Villiers de L’Isle Adam, *L’Eve future* (Paris: Fasquelle, 1921); Raymond Ballour, “Ideal Hadaly,” *Camera Obscura* no. 15 (Fall 1986); Annette Michelson, “On the Eve of the Future: The Reasonable Facsimile and the Philosophical Toy,” *October* 29 (1984); Fritz Lang’s *Metropolis* and the False Maria; Isaac Asimov’s three rules for robots; Jasia Reichardt, *Robots* (London: Thames & Hudson, 1978); John Cohn, *Human Robots in Myth and Science* (London: Allen & Unwin, 1976).

89. C++ (pronounced “see-plus-plus”) was developed by Bjarne Stroustrup in 1980. Stroustrup’s language was built on the preexisting C language written a decade earlier by Brian Kernighan and Dennis Ritchie (who had previously worked on a lesser version called B).

90. Sherry Turkle, “Who Am We?,” *Wired*, January 1996, p. 149.

91. Turkle, “Who Am We?,” p. 149.

procedural code to distributed object-oriented code, is the most important shift historically for the emergence of artificial life.

In one of the most celebrated instances of artificial life research, the computer scientist Tom Ray created a virtual world called *Tierra* in which living “digital organisms” self-replicate and evolve according to Darwinian rules.⁹² Ray writes:

Life on Earth is the product of evolution by natural selection operating in the medium of carbon chemistry. However, in theory, the process of evolution is neither limited to occurring [sic] on the Earth, nor in carbon chemistry. Just as it may occur on other planets, it may also operate in other media, such as the medium of digital computation. . . .

The Tierra C source code creates a virtual computer and its Darwinian operating system, whose architecture has been designed in such a way that the executable machine codes are evolvable. This means that the machine code can be mutated (by flipping bits at random) or recombined (by swapping segments of code between algorithms), and the resulting code remains functional enough of the time for natural (or presumably artificial) selection to be able to improve the code over time.⁹³

The natural resources in *Tierra* are not food and shelter but CPU time and memory space. Evolution appears in fast motion as Ray’s digital organisms split, recombine, and mutate as if they were the organic code of DNA.

The ecologically minded Ray has gone so far as to advocate the institution on the Net of a wildlife preserve for digital organisms. He writes: “I proposed to create a very large, complex and inter-connected region of cyberspace that will be inoculated with digital organisms which will be allowed to evolve freely through natural selection”⁹⁴—the goal of which is to model the

92. For other examples of artificial life computer systems, see Craig Reynolds’s “boids” and the flocking algorithm that governs their behavior, Larry Yaeger’s “Polyworld,” Myron Krüger’s “Critter,” John Conway’s “Game of Life,” and others.

93. Tom Ray, “What Tierra Is,” available online at <http://www.hip.atr.co.jp/~ray/tierra/whatis.html>.

94. Tom Ray, “Beyond Tierra: Towards the Digital Wildlife Reserve,” available online at http://www1.univap.br/~pedrob/PAPERS/FSP_96/APRIL_07/tom_ray/node5.html.

spontaneous emergence of biodiversity, a condition believed by many scientists to be the true state of distribution of genetic information in a Nature that is unencumbered by human intervention.

Yet in the end, the surprise is not really that *Tierra* acts like the world of living beings, but instead that the world of living beings acts like the computerized space of *Tierra*—this is the ontological rub guiding the emergence of nonorganic life.

Life as Medium (Life Becoming Matter)

I assert that, further to the anti-entropic theory of life (which by itself has little to say about protocol), life forms, both artificial and organic, exist in any space where material forces are *actively aestheticized*, resulting in a type of sculpted materiality, a materiality in which vital agents are managed, organized, affected, and otherwise made aesthetically active. (Thus was the goal of my earlier analysis of Marx.) For my purposes, the same protocological forces that regulate data flows within contingent environments such as distributed networks are the same forces that regulate matter itself.

In his introduction to Branden Hookway's intriguing pamphlet *Pandemonium: The Rise of Predatory Locales in the Postwar Period*, Kwinter suggests that the nineteenth century saw the emergence of a new phenomenon of "distributed management" appearing at the intersection of materialist philosophy and the science of thermodynamics. This new form of distributed management condenses into the form of the *demon*, an autonomous agent that is immanent to a material milieu:

The demons of *Pandemonium* descend primarily from the demons of James Clerk-Maxwell's nineteenth-century thought experiments with heat and gases, and the freshly discovered rule-based behaviors that determine them. It might be said that materialism found far deeper and more reliable apologists in the nineteenth-century thermodynamicists than it did in Marx or Engels . . . Marx saw social life as buffeted, driven and shaped by irresistible but logically ordered economic forces whose end product was assumed to be inevitable: the "catastrophic" leap to democratic equilibrium. Heat scientists likewise formulated the mysterious "second law": all closed systems lose order, all decay toward entropy. Yet for neither Marx nor Clerk-Maxwell was this simply a mechanical or energetic relation; something new had clearly emerged, *a system of distributed management that could not be dissociated from the material*

milieus whose particles and behavioral quirks were being managed. This was the birth of information science.⁹⁵

The “information age”—a term irreverently tossed to and fro by many critics of contemporary life—is not simply that moment when computers come to dominate, but is instead that moment in history when matter itself is understood in terms of information or code. At this historical moment, protocol becomes a controlling force in social life.

Kittler documents this passage well when he writes about the transformation from a “kingdom of sense” in the year 1800 to a “kingdom of pattern” in 1900.⁹⁶ But what has been overlooked is that the transformation of matter into code is not only a passage from the qualitative to the quantitative *but also a passage from the non-aesthetic to the aesthetic—the passage from non-media to media.*

So, in 1953, when Watson and Crick discovered DNA (perhaps not anticipating its subsequent ascendance to the supreme definition of life itself fifty years later), they prove not simply that life is an informatic object (that much had been clear for decades with the Bertillon system of criminal phrenology, the quantification of human movement by Muybridge, and so on) but rather that life is an aesthetic object; it is a *double helix*, an elegant, hyper-Platonic form that rises like a ladder into the heights of aesthetic purity.

Life was no longer a “pair of ragged claws / Scuttling across the floors of silent seas” (Eliot), it was a code borne from pure mathematics, an object of aesthetic beauty, a double helix! This historical moment—when life is defined no longer as essence, but as code—is the moment when life *becomes a medium*.⁹⁷

95. Sanford Kwinter, “Introduction: War in Peace,” in Branden Hookway, *Pandemonium: The Rise of Predatory Locales in the Postwar Period* (Princeton: Princeton Architectural Press, 1999), pp. 9–10, emphasis mine.

96. See Friedrich Kittler, *Discourse Networks, 1800/1900*, trans. Michael Metteer and Chris Cullens (Stanford: Stanford University Press, 1990).

97. Many contemporary artists consider life to be a medium in quite literal ways. In particular, see the work of Eduardo Kac, CAE, Biotech Hobbyist Magazine (Natalie Jeremijenko and Heath Bunting), Orlan, and Stelarc.

This historical shift was demonstrated in the winter of 1995 when Leonard Adleman of the University of Southern California created a new computer called the TT-100. What was unusual about this new computer was not simply that it eschewed Microsoft's recently released Windows 95 operating system, but that it required *no* operating system at all. Adleman's computer was a DNA computer, an organic computation machine contained in less than a drop of fluid.

DNA computing works by translating the binary code of ones and zeros into the nonbinary but equally quantitative code of DNA. Each strand of DNA may be correlated with a computational problem, and since millions of strands of DNA can be amassed in a relatively small space, exposing these strands to chemical reactions causes an exponentially large number of computations to occur at the same moment.

As one journalist put it, the advantage of DNA computing is that "chemical reactions occur very fast and in parallel, so that if the DNA molecules are synthesized with a chemical structure that represents numerical information, a vast amount of number-crunching is done as the reaction proceeds."⁹⁸

In Adleman's machine *life had become a medium*. At that moment, life itself formed the building blocks of the basic calculations of computer science.

This moment was further demonstrated in the summer of 1995 when the Max Planck Institute announced its success in creating a two-way communication link between a living neuron and a silicon chip. As *The New York Times* wrote, "The accomplishment announced Monday [August 21] has thus established a signaling channel between a nerve cell and a silicon chip that works in both directions."⁹⁹ The connection between human neuron and silicon chip was a physical reinforcement of a larger trend linking organic and artificial life, a trend perhaps most associated with the name Donna Haraway who as early as 1984 had written about the "hybrid of machine and organism."¹⁰⁰

98. Gina Kolata, "A Vat of DNA May Become Fast Computer Of the Future," *The New York Times*, April 11, 1995, p. C1.

99. *The New York Times*, cited in Timothy Druckrey, "Wild Nature, Free Radicals, and The Nerve Sell . . .," DEAF95 Symposium, November 24, 1995, available online at <http://www.v2.nl/DEAF/persona/druckrey-txt.html>.

100. See Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," *Simians, Cyborgs, and Women* (New York: Routledge, 1991), p. 149.

Yet this shift is much older than that. Malraux's concept of the "imaginary museum" showed how museums aestheticize material objects twice over, creating a social space within the institution that is as thick with its own affective power as any artwork within its walls.

The Zone Improvement Plan (ZIP), created by Robert Moon in 1963, helped convert the older letter-based semantics of postal addresses into new number-based zip codes (not unlike the Internet's IP addresses). This move, plus the concurrent shift in the telephone system from word-based exchanges to the more common seven-digit telephone *number*, helped usher in a new era of informatization of personal lives. One's lived experience was no longer tied to material realities, but instead was understood in terms of numbers—a telephone number, a zip code, a social security number, an IP address, and so on.

The science of measuring the human body and deriving digital signatures from it is called biometrics. What used to stand for identity—external objects like an ID card or key, or social relations like a handshake or an interpersonal relationship, or an intangible like a password that is memorized or digitized—has been replaced in recent decades by biometric examinations such as identity checks through eye scans, blood tests, fingerprinting, etc.

Criticism of biometrics has thus far focused largely on privacy, for physical traits are considered to be so intimately connected to one's identity that the measuring and tracking of them is an infringement on privacy.

However, I would like to point out instead that biometrics does something much more important. It considers living human bodies not in their immaterial essences, or souls, or what have you, but in terms of quantifiable, recordable, enumerable, and encodable characteristics. It considers life as an aesthetic object. It is the natural evolution of Marx's theory of second nature discussed earlier.

Biometrics is important, therefore, not because it infringes on privacy, but because it has redefined what counts as proof of the true identity of material life forms. Authenticity (identity) is once again inside the body-object, yet it appears now in sequences, samples, and scans.

This quantification of living forms has reached an interesting hypertrophy in the computer technique of "collaborative filtering." Collaborative filtering, also called suggestive filtering and included in the growing field of "intelligent agents," allows one to predict new characteristics (particularly one's so-called desires) based on survey data. A user answers a series of questions

Table 3.1
Control Matrix

Era	Machine	Energy mode	Disciplinary mode	Control diagram	Virtue
Feudal/early modern	Pendula, levers, pulleys	Slave, vassal	Tithe, feudal, tribute	Violence	Loyalty, allegiance, secrecy
Modern	Oil, steam, nuclear	Wage labor	Efficiency	Bureaucracy	Presence, centralization, efficiency
Postmodern, Empire	Computers	Immaterial labor, information	Debugging	Protocol	Fidelity, pattern, algorithm
The future	Bioinformatics	Life	Therapy	Physics	Openness

about his or her likes and dislikes, thus setting up a personal “profile.” The profile is entered into a pool of other profiles supplied by other users. Then, statistical algorithms suggest other likes and dislikes of the user, based on the similarity of his or her profile to other users’ profiles in the pool.

As a representative of industry pioneer (and Microsoft casualty) Firefly described in email correspondence: “A user’s ratings are compared to a database full of other members’ ratings. A search is done for the users that rated selections the same way as this user, and then the filter will use the other ratings of this group to build a profile of that person’s tastes.”

What makes this technique so different from other survey-based predictive techniques is the use of powerful algorithms to determine and at the same time inflect the identity of the user. However because collaborative filtering works through a process of interpellation (selecting data *interior* rather than exterior to a given set), no improvement in the overall data pool is possible. Thus, collaborative filtering ensures structural homogeneity rather than heterogeneity. While any given user may experience a broadening of his or her personal tastes, the pool at large becomes less and less internally diverse.

Collaborative filtering is therefore an extreme example of the protocological organization of real human people. Personal identity is formed only on certain hegemonic patterns. In this massive algorithmic collaboration, the user is always suggested to be like someone else, who, in order for the system to work, is already like the user to begin with! Collaborative filtering is a

Active threat (resistance)	Passive threat (delinquency)	Political mode	Stratagem	Personal crisis
Armed revolt, sedition	Betrayal, blasphemy	Revolution	Land	Abandonment
Sabotage, treason	Red tape, entropy	Disruption	Territory, deterrence	Pain, emptiness
Mutation, terrorism	Randomness, noise	Disturbance	Security, containment	Terror
Irrationality	Silence, nonexistence, irresponsiveness	Hypertrophy	Peace	Contagion, eruption

synchronic logic injected into a social relation. That is to say, like the broad definition of protocol I use, collaborative filtering is a set of rules based on a pool of user dispositions that affects each member of the pool.

Part I of this book is drawing to a close. I have so far described how protocol works as a physical technology, as a formal technology, and as a political technology. By way of conclusion I offer the control matrix shown in table 3.1.

The matrix describes protocol's successes, its failures, and its future forms. Thus far I have only considered the successes. Yet in parts II and III I look at its failures and possible future forms.