

Digital Humanity:
The Novel and the Computer In the Information Age

BY

Madeleine Monson-Rosen
B.A., University of Minnesota, 2003
M.A., Fordham University, 2005

THESIS

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Defense Committee:

Joseph Tabbi, Chair and Advisor
Madhu Dubey
Lisa Freeman
Anna Kornbluh
Patrick Jagoda, University of Chicago

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Summary

This dissertation charts the intersections of science and fiction in the early cybernetic period, from the late 1950s through the mid 1970s. Science, I show, reveals in this period the indelible influence of the history of text, of print and writing. The novels that this project investigates constitute interventions into the contemporary scientific discourse, but those interventions also recognize the shared textual ground on which the discourses of literature and science are situated. Indeed, the discourses of literature and science of this period are mutually intelligible because of this shared ground, what science historian Lily E. Kay denominated a “scriptural” discourse.

Each chapter investigates a particular novel, and each novel represents an engagement with a different aspect of cybernetic-inflected science. These engagements include the binary code and packet switching technologies of early computer networks, the discourse of the computer virus and its indebtedness to preceding discourses of biological and technological contagion, and finally, arguments in the late 1960s and early 1970s about the influences and effects of technologically mediated images.

Each chapter includes close analysis of a central literary text as well as close reading of contemporary cultural texts. Yet while the methodology of this project is relatively straightforward, its intervention is unique. *Digital Humanity* constitutes an account of both postmodernist fiction and the history of technology. This project’s reading of three key novels of the postmodern period identifies a unique constitution of the human within the developing digital media landscape. Each novel recognizes the ways in which the human is constituted materially by permeations of labor, property, and material exchange. They therefore correct both a dominant cybernetic discourse that minimizes material considerations of life, whether human or

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technological, in favor of attention to the emergence of digital life and a discourse in literature that imagines the cybernetic as something to be resisted.

Enthusiasm for such emergent digital life, I argue, effaces and obscures the material conditions necessary for the construction of the technological networks on which fantasies of digital emergence depend. These novels, however, locate the human within the digital, embracing technology, but always representing technologies as products of a great deal of human labor.

Chapter one explores the “rise” of the computer as a technology and an image. Each subsequent chapter then investigates a particular iteration of that image. Chapter two traces the invention of networked computer communication and the ways in which the computer network overlays existing communication networks. This extension of computer networks includes the ways in which networked computer technology permeates literary language, offering a wellspring of metaphor, image, and device. *The Crying of Lot 49* historicizes such networks, as well as the speculative economics such networks enable. Chapter three considers the computer virus, a phrase coined first in 1969. This coinage invoked discourses of both technology and infection, and this novel mobilizes the racialized discourses of contagion and disease. *Mumbo Jumbo* situates the virus, both biological and technological, in a present permeated with political urgency. Chapter four takes up the technological mediation of images and the ways in which such mediation has been mistakenly represented as spontaneous. *The Infernal Desire Machines of Doctor Hoffman*, the chapter’s primary text, insists on the labor necessary for such mediation. This dissertation concludes with a coda, a short comment locating the unique usage of the human within this project and within the novels it considers.

1. The Rise of the Network: Computers, Information, Literature.

“The Network is an old media embedded in a new environment.”

--W. Daniel Hillis¹

This project argues that despite reports to the contrary, literature and science have carried on a meaningful and mutually beneficial relationship, in which abides a vital zone of exchange for concepts, ideas, and forms that not only shape scientific practice, but enable larger sociocultural negotiations. The novels read in this project situate the technoscientific discourse of the 1950s, 1960s, and 1970s materially and historically, incorporating its forms, but more importantly revealing a depth of engagement with the material effects of the shift to information thinking characterized by cybernetics, and in the fields of computers and genetics. In *Who Wrote the Book of Life*, science historian Lily E. Kay reveals the ways in which the technoscience of the fifties, sixties, and seventies was “reconfigured” as a “scriptural technology”: “Information theory, cybernetics, systems theory, systems analyses, electronic computers, and simulation technologies fundamentally altered the representations of animate and inanimate phenomena” (5). The texts considered here reckon with the ways in which information reconfigured computer and genetic science as occupied with codes, texts, and communication.

The recursivity, self-conscious textuality, and preoccupation with forms and modes of communication characteristic of postmodernist literature, therefore, take on a profound new resonance when considered in conversation with this contemporaneous scientific discourse and practice. While shared forms such as the machine, the network, and the virus are key to this literature-science exchange, and a number of thinkers, including Gilles Deleuze and Felix Guattari in *Anti-Oedipus* and Michael Hardt and Antonio Negri in *Multitude*, as well as literary critics John Johnston in *The Allure of Machinic Life* and David Porush in *The Soft Machine*:

Cybernetic Fiction, have produced cybernetics-influenced accounts of literature, accounts which I discuss at length in later chapters, this project argues that the engagement extends more deeply than shared forms. The novels considered here work to situate those forms within both historical context and immediate circumstances.

Each chapter focuses on a single such novel, and investigates and elucidates the ways in which the text negotiates the practice of contemporary technoscience. In broad strokes, those practices include the popularization of cybernetics within computer and genetic science. As Kay demonstrates, both genetics and computers become categories of information science, converging on, and dominated by, a scriptural modality. Cybernetics is an undeniable socio-cultural and discursive influence on these texts. Porush argues that cybernetic fictions adopt the forms of cybernetics in order to resist the influence of cybernetics, instead emphasizing something oppositionally “human” (I discuss this opposition in chapter four). Yet these texts reject such oppositions, rendering the false dichotomies of biological and technological, human and machine, digital and textual, meaningless.

Kay’s history reveals that the turn toward information in science transformed scientific practice into a branch of information. The term “information science,” a synonym for cybernetics’ representation of all systems as structures of communication and control, testifies to this transformation, yet it also testifies to a transition by which information expanded out of the humanistic realm and into the scientific. In *The Information*, James Gleick identifies “the raw material” of information science: “letters and messages, sounds and images, news and instructions, figures and facts, signals and signs” (7). The texts considered here capitalize on that material, but they refuse to recognize its rawness as, as Gleick does, an illusory, spontaneously occurring resource. Thomas Pynchon, Ishmael Reed, and Angela Carter take up this material of

text and tech, and confer on it a history and existence outside the virtual spaces of communications and media theory.

This turn toward information coincides with a moment that Fredric Jameson identifies as a “vaster crisis in the sciences in general” (*Prison-House* 14). This moment is, in fact, a crisis of representation in science, in which the structures of the physical and biological fields seemed to be breaking down in the face of cybernetics, chaos and complexity theory, and, eventually, quantum mechanics. Thomas Kuhn’s *The Structure of Scientific Revolutions* is the most significant hallmark of this crisis, a text which itself takes up the problem of representation in scientific practice. This crisis of representation in science is in some ways mitigated by the incorporation of the concepts of printing, text, and scripture. In capitalizing on these concepts, these novels render scientific discourse and what C.P. Snow disparaged as “literary intellectual” discourse mutually intelligible (14). That this shared discourse arrived in a moment of political crisis, with which its esoteric concerns seemed to have little in common, is perhaps one reason for the widespread opinion of critics, most notably Jameson, but also Porush, that postmodern fiction was symptomatic of a fetishistic attitude toward technology, and a “degraded” attitude toward culture (Jameson, *Postmodernism* 2). Critics such as Porush and Johnston have argued that postmodernism’s humanistic value consists in its resistance to the technologizing of texts. I argue, however, that these texts actively embrace the technologies on which they capitalize.

Put another way, these texts do not resolve science’s crisis of representation; they historicize it. They use the novel’s own recursive tendencies to intervene in the scriptural discourse of information. And in an age when computer technology and genetic science seemed to be making science fictions such as virtual realities, sentient computers, cyborgs, and human-

computer viruses real, these texts insist that even as the world seems to depend more and more on virtual environments, the materialities of work, sex, and property remain.

It is with respect to these materialities that this project differentiates itself from other accounts of postmodernist literature, which, after Jameson, have been polarized and polarizing. In addition, however, this project adds a necessary dimension to the discourse of materialism that has been revived in contemporary media theory. Denominated a “New Materialism,”² this discourse emphasizes the ontologies of virtual objects, such as media networks. The texts considered in this project, however, demonstrate that the ostensibly spontaneous emergence of complex systems within digital media networks is in fact dependent on a great deal of human labor. The scientific revelation that these texts perform is a preemptive critique of these discourses. Such pre-emption answers a narrative that originates in the sciences, but is readily adopted in the humanities. This narrative of the emergence of life out of the “raw” material of technological networks effaces and elides the labor necessary for both the structure and function of media systems. Even when intelligence seems about to appear spontaneously as part of a technological emergence of machinic life that seems to mirror the biological emergence of organic life, these texts reveal that that spontaneity is merely apparent, that in fact the cybernetic emerges only within a nexus of specific labor practices, practices that Hardt and Negri have recently identified as “immaterial” but which are evident even in the period considered here, the “dawn of computation and cyberspace” (Gleick 8).

The materials that Gleick identifies as “raw”: “letters and messages, sounds and images, news and instructions, figures and facts, signals and signs” are products and tools as much as they are materials. Indeed, they are immaterial materials whose production and exchange is predicated on systems inherited from old structures: financial speculation, slave labor, and

women's work. Hardt and Negri's characterization of "immaterial labor" includes a broad range of labor classifications, including those Alan Liu identifies as "knowledge work"³ as well as labor conventionally performed by women. Immaterial labor, according to Hardt and Negri, "creates immaterial products, such as knowledge, information, communication, a relationship, or an emotional response" (108). This diffusion of the relationship between labor and product is rarely recognized as originating as early as the novels here mark it. In that capacity, they offer extraordinary contributions to the history of our present age of information. Hardt and Negri's historical template is somewhat broader, but their characterization of labor follows the *Grundrisse*, "This example of labour shows strikingly how even the most abstract categories, despite their validity—precisely because of their abstractness—for all epochs, are nevertheless, in the specific character of this abstraction, themselves likewise a product of historic relations, and possess their full validity only for and within those relations" (Marx 105). Yet the historic relations that have produced technological and biological information networks are often obscured in a narrative of emergent intelligence. W. Daniel Hillis describes the future of artificial intelligence as analogous to the evolution of biological life. This analogy is explored at greater length in chapter three, but here I want to call attention to the way in which Hillis describes emergence, "if an intelligence were ever to be created, it would be by an emergent process—that is, by a process in which the complex behavior emerges as a consequence of billions of tiny local interactions" (*Pattern* 138). While the emergences of life and intelligence are themselves extraordinary spontaneous events in evolutionary history, the emergence of digital life cannot be seen to be spontaneous in any meaningful way. Those "billions of tiny local interactions" are themselves the consequence of a great deal of such immaterial labor. Each of these novels, then, documents the materialities of digital and network media production, and documents those

materialities even as the discourse of cybernetics, emergence, and the turn toward information obscure them.

It is therefore not surprising that Raymond Williams' critique of Marshall McLuhan's techno-prophecy, particularly in *Television*, published in 1972, is not only relevant to the novels considered in this project, but also to the post-McLuhan rhetorics of New Materialism and the Digital Humanities. Williams recognized this tendency to obscure the production of media technologies, an obscuring that, within New Materialism, substitutes ontology for production. Williams' responses to McLuhan offer a cogent critique that does not confuse, as McLuhan and his followers have done, medium and message. In McLuhan's universe of media studies, technologies bear the responsibility for instilling ideology, in Williams words, "as if there had never been masters, employers, judges, priests" (135). The "direct and functioning ideology" contained in McLuhan's aphorisms, Williams argues, obscures technology's dependence on practices, which tend, in media discourse, to be "subsumed by an arbitrarily assigned psychic function" (130). Yet each of these novels emphasizes the practices of production, circulation, and consumption of media forms within an economic system that is increasingly information-based. Indeed these novels mark the emergence of that information-based economy, and the ways in which that emergence affected what Hardt and Negri label "the contours of contemporary reality" (140). In chapter two, I discuss at more length McLuhan's legacy in the fields of media studies and print culture.

It should be clear, now, that the materiality and history with which this project is concerned belong to an older, Marxist order, that offers some remediation to the discourses of New Materialism and Digital Humanities. Each of these novels emerges out of the "scriptural" cybernetic moment, yet each also refuses to allow the discourse of cybernetics—of networks,

viral media, and emergent intelligence—to obscure the conditions that enable such technologies. Those conditions include effaced intellectual labor and an economy that depends on speculation in *The Crying of Lot 49*, a secret communications technology, a “grapevine telegraph,” produced within the slave economy and presaging computer networks in *Mumbo Jumbo*, and the reduction of the erotic and reproductive labor of women to automation within a media system in *The Infernal Desire Machines of Doctor Hoffman*.

The network enables all of these. Although research into networks begins as early as the nineteenth century, the importance of the network as a form intensifies with the publication of McLuhan’s *The Gutenberg Galaxy* in 1962, Paul Baran’s *On Distributed Communications* memoranda in 1964, and Stanley Milgram’s “Small World Problem” in 1967. Each of these texts describes a network, a form that is at once biological, technological, and social. Yet the recognition of the network as a form occurs not only within the realms of social science and communication theory, and, moreover, the network is not simply isomorphic, as Hardt and Negri argue in *Multitude*: “Today,” they write, “we see networks everywhere we look [...]. It is not that networks were not around before or that the structure of the brain has changed. It is that network has become a common form that tends to define our ways of understanding the world and acting in it” (142). While the rise of the network is often identified as beginning “today,” or, as Mark C. Taylor argues, “with the collapse of the Berlin Wall” in 1989 (14), in identifying literary interest in network technology as early as the 1960s, this project offers to literary history a degree of specificity about the network as form that it currently lacks, even as research in the Digital Humanities uses social network theory to unearth the origins of texts as ancient as the *Iliad* and *Beowulf*.⁴ Indeed, these novels offer to that practice—the application of physical and mathematical models to literature—a history of reciprocal intervention, that is, the literary—and

so, formal, social, narrative and analytical—reckoning with such scientific practices as mathematical modeling, computing, and the coding and decoding of information in various media.

The network is the legacy of the cybernetics movement, which, according to David Porush, worked to render “metaphysically indistinguishable” the “governor,” from which cybernetics takes its name,⁵ and the animal or machine body:

A governor is a servo-mechanism, a controlling device that mediates the feedback loop of information between sender and receiver; a servo-mechanism could be a thermostat (mediating between room temperature and oil burner), or a cruise control on your auto (mediating between accelerator and engine speed), or a literary text (mediating between a reader and her own knowledge), or an observer of an electron (mediating between the electron’s position and momentum and his knowledge about that electron). From the point of view of cybernetics, all of the above obey the same laws and therefore are metaphysically indistinguishable.

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It is under the influence of cybernetics that Richard Dawkins characterizes animal bodies as “survival machines” for housing and transporting genes: “we, like all other animals, are machines created by our genes” (2). For Dawkins, bodies are “gigantic lumbering robots” whose actions reflect the “programming” of “four thousand million” year-old genes (19).

Dawkins’ machine and robot bodies are not just convenient images for explaining the mechanisms of genetics, however. They reflect an understanding, new in the late 1960s, of the ways in which computing offered a universal conceptual language for explaining the world. Dawkins calls genes “replicators,” undoubtedly a direct response to John Von Neumann, an

inventor of modern computing, who coined “self replicating automata” in order to describe the shared characteristics of computer and genetic programming:

Analog and digital computers are the most important kinds of artificial automata, but other man-made systems for the communication and processing of information are also included, for example, telephone and radio systems. Natural automata include nervous systems, self-reproductive and self repairing systems, and the evolutionary and adaptive aspects of organisms. (21)

Chapter three explores Dawkins and Von Neumann’s equivalent accounts of replicators and the ways in which that equivalence is understood in the 1960s and 1970s. Kay describes this mode as “scriptural”: the information sciences of genetics and computers are apprehended across the fields of science and technology by means of print and writing.

Taylor is representative of the current discourse of Digital Humanities, in which technological theories and quantitative analysis replace investigation of historical and material circumstances:

The calculated displacement of the communist revolution by the information revolution suggests one of the distinctive features of emerging network culture. The social and economic problems Marx and Engels detected and the cures they prescribed reflect an industrial society and its corresponding form of capitalism, which are passing away in the moment of complexity. One of the most revealing symptoms of the changes currently occurring is the virtual disappearance of Marx and Marxism as relevant voices in cultural analysis. Other than in certain corners of the university where the news of 1989 does not seem to have arrived, Marx has

become irrelevant. As mechanical processes of production give way to electronic processes of reproduction, new modes of interpretation are required. (100)

Taylor is not the only current figure who assumes that the “information revolution” is self-generating and self-perpetuating. However, it is only from a position of privilege that he can argue that electronic reproduction has replaced mechanical production and somehow resolved the conditions and practices necessary for producing and operating media networks.

The current discourses of the Digital Humanities, and conversations around literature and technology generally, have tended to elide questions of labor and concerns about the material conditions in which bodies are produced and reproduced in favor of a rhetoric of emergence. Liu, whose questioning of Digital Humanities’ practices has been among the most pointed,⁶ imports what is essentially a fantasy of the emergence of network intelligence in *Local Transcendence*. Liu suggests that the network has overwritten the individual as the model of sociality: “We are all nodes sending ‘packets’ to other nodes [...] in a call for instantaneous, transient connectivity” (2). But the truth is, for Liu to send a packet, through the net or through the mail, an awful lot of people have to go to work. Information’s drive for liberation,⁷ posthuman machine learning, and cyborg consciousness don’t happen in a vacuum. These novels consider the networks, but they also represent the laboring bodies that constitute them.

In their introduction to *New Materialism*, “Machinology,” Milla Tiainen and Jussi Parikka narrate a turn in media studies toward the “material,” but in this case that material is a Deleuzian “assemblage”: “a network of concrete, material, physical and physiological apparatuses and their interconnections.”⁸ It is unfortunately impossible to see labor here as anything other than a “physiological apparatus,” a term that suggests precisely the lack of

volition highlighted in Carter's "desire machines," whose coercion is masked behind enforced heterosexual desire.

Tiainen and Parikka, like Taylor, ignore the fact that technological networks only *reveal* human connections. Behind the emergent intelligence of such networks are networks determined by the flows of real and specular capital. In *Mumbo Jumbo*, recognition of the relationship between capital and information appears as a conspiracy to keep radios away from the poor, and especially African Americans, whose creation of Jazz appears as a viral threat to the status quo. *The Crying of Lot 49* addresses precisely Taylor's point, suggesting that the distinctions between industrial wage slavery and southern chattel slavery are insignificant. Both lead, "inevitably, to Marxism." The solution to this unrest is a capitalist emphasis on speculation, all too familiar to twenty-first century readers, in this case, "in California real estate" (*Crying* 37). Here, information economics enables the generating of vast amounts of apparent wealth without the need for any labor at all. While this scheme of capital accumulation by speculation may strike my readers as astonishingly prescient, In *Practicing New Historicism*, Catherine Gallagher and Stephen Greenblatt identify the "speculative mentality" as "basic to capitalism" as well as to the novel form (168). The novel's intervention into speculative economics predates postmodernism—and predates the financial speculation characteristic of postmodernity. While prescience is indeed commonly attributed to the texts considered here, as in Emily Apter's reading of *The Crying of Lot 49*, discussed in chapter two, a historically-informed analysis of these texts reveals that they are not so much prescient as they are perceptive, as the novel has always been.

In some incarnations, a theory of media's materiality has also recognized the way in which texts are one part of a complex media system. In "The Materiality of Communication," K.

Ludwig Pfeiffer situates the field of contemporary media theory, “It is concerned with potentials and pressures of stylization residing in techniques, technologies, materials, procedures, and ‘media’” (6). Media theory enables a discussion of technologies as forms, and it incorporates analysis of the production and circulation (“procedures”) of those forms (“stylizations”). Each chapter negotiates with media theory, particularly the work of Friedrich Kittler, whose readings of Pynchon stress a degree of historical “accuracy” not often observed in criticism of postmodern fiction. Yet often the vocabulary of media theory assigns an ontological account, “procedures” and “stylizations,” where a historicist account, such as that offered by the novels themselves, takes pains to delineate the practices that production and circulation necessitate. When Angela Carter’s mad technologist Doctor Hoffman defends his effort to create a “regime of total liberation” (*Infernal* 38), the ideological emptiness of that liberation is revealed. Media theories, even those that stress materiality, don’t necessarily include the practices that media systems depend on. Carter, Pynchon and Reed, however, do.

Furthermore, these novels reckon not only with the technologies themselves, but with the practices that accounts of technology informed by a theory of media rather than a theory of history mask. They demand, therefore, an alternative account of postmodernist literature, not only as individual instances of resistance to the commodifying tendencies of postmodernity, but as signals that the whole of postmodernist fiction has been, in Hardt and Negri’s characterization of Marx’s method, “molded to the contours of contemporary reality” in a manner that critics have, as yet, failed to recognize (140). It is the purpose of this project, therefore, to address that failure, and to begin building an archive of the novel’s engagement in technologies of information and communication.

While Alan Liu implicitly links the origins of the concept “knowledge work” with the beginnings of computer networks, neither *Multitude* nor *The Laws of Cool* is particularly concerned with historicizing the changes in labor they describe. For Liu, knowledge work outside the academy comes as something of an afterthought, and although he later makes an explicit association between computer science and *The Crying of Lot 49*⁹, he locates the rise of the insidious concept “teamwork” in the “new corporatism” of the 1970s (*The Laws of Cool* 35). Yet when Pynchon’s protagonist wants to get under the skin of a distrustful colleague she asks if such high tech work isn’t “all teamwork now” (*Crying* 67). Indeed, the characteristics of labor described by both Liu and Hardt and Negri reveal themselves in each of this project’s primary texts.

Methodologically, this project owes much more to Kay’s historical analysis than to Deleuze and Guattari’s interpretation of cybernetics as a kind of formalism, or Porush’s identification of a “cybernetic” novel appearing in this historical period—particularly since he argues that the cybernetic novel evinces “a definite hostility toward technology” (381). On the contrary, these novels reveal an *affinity* with the technologies that enable them, and, furthermore, they indicate that the novel as a form has itself always been deeply and explicitly engaged with the technologies that enable it. The effort in this project, then, adopts Gallagher and Greenblatt’s approach to cultural texts: it “locate[s] inventive energies more deeply interfused within [culture]” (12). “Inventive energies” is a particularly apt characterization here: each of these novels experiments with energy in its thermodynamic and metaphoric senses, and each of these novels marks specific inventions, technologies that, in turn, enable formal innovations. While these novels adapt such innovations into literary systems—Pynchon’s use of binary code and

computer memory as metaphors are clear examples—they do not simply use new concepts as metaphors and devices. They deliberately locate the emergence of these terms.

It's therefore important to distinguish this project from the New Historicism of Gallagher and Greenblatt. These books are *themselves* historicist, and are themselves concerned with the material dimensions of technological innovation. New Historicism's emphasis on culture is therefore a helpful but insufficient category of analysis for the texts considered here. New Materialism, a field in which the "material" represents the ontological rather than the social origins of objects is also a relevant, but insufficient disciplinary discourse. While postmodern fictions have often been seen to presage New Materialist principles, these novels confront their readers with the circumstances of what can only be called the industrial productions of new media technology: those industries include the "galactronics" workers in *The Crying of Lot 49*, workers who forfeit any proprietary claim to the products of their intellectual labor; the couples in *The Infernal Desire Machines of Doctor Hoffman* whose sexual intercourse generates media, but who, because their labor is literally eroticized, fail to recognize it as labor; and the slave foundations of contemporary information capitalism in *Mumbo Jumbo*.

The elision of labor marked in these texts reflects particularly masculinist and imperialist approaches to technology production. Pynchon's female protagonist, who processes the plot of the novel as "zeroes and ones" (*Crying* 150), may herself reflect the prevalence of female "computers" and computer operators in this "dawn" of digital information.¹⁰ Reed and Carter also both recognize the ways in which cybernetic technoscience informs rhetorics of liberation whose consequences are unforeseen in part due to the invisibility of the populations whose exploited labor facilitates production and distribution of media, both the technologies that enable media production and distribution, and the information contained in forms of communication. In

Mumbo Jumbo, as I discuss in chapter three, Reed realizes Norbert Weiner’s unfavorable comparison between automated production and slave labor, reimagining a “scary computer” genre of fiction as an allegory of racial resistance, while in *The Infernal Desire Machines of Doctor Hoffman*, such cybernetic automata, informed by an eroticized fantasy of technologically mediated heterosexual intercourse, represent the exploited and effaced reproductive and affective labor of women.

The fantasy of an emergence of technological life serves to obscure the vast amounts of under-remunerated and exploited labor necessary for the production of the information that, in the period in which these novels originate, was just beginning to transform into a currency. While *The Crying of Lot 49*, I argue in chapter two, charts the beginnings of that transformation and the disaffections it inspires among those who had traditionally considered such information an individual intellectual property, Carter’s *The Infernal Desire Machines of Doctor Hoffman* associates that exploitation with the history of exploitation of women’s work.

Hardt and Negri’s idiom has a necessarily more grand historical scope than Liu’s. “In general,” they write,

the hegemony of immaterial labor tends to transform the organization of production from the linear relationships of the assembly line to the innumerable and indeterminate relationships of distributed networks. Information, communication, and cooperation become the norms of production, and the network becomes its dominant form of organization. (113)

Reed’s hegemony-resistant virus—communicated both via a new mass medium and via underground socialities convened under pressure of slavery and racism, socialities that themselves represented spaces permeated with disease, according to rhetorics of hygiene that

originate in the 1920s—anticipates the ways in which Hardt and Negri identify the network as both an effect of exploitation and a new locus of resistance. Additionally, their inclusion of “women’s work” within the classification of “immaterial labor” echoes Angela Carter’s association of media and communication with “affective” labor, although for her affective is, explicitly, erotic.

So while critics such as Liu and Apter assign the character of prescience and prophecy to writers such as Pynchon, I argue here that no gulf separates them from the science that permeates their work. Among other things, they reveal the truth of Kay’s assertion that technoscience and textuality are inextricably interrelated. In other words, these novels situate what Kay describes as the “gestalt switch to information thinking” historically (xv), beyond the technoscientific communities she identifies, and within the larger “invisible colleges” of the arts and sciences. Additionally, while Kay exhaustively reveals the ways in which that gestalt switch depends on discourses and practices inherited from print and writing, these novels vitalize that articulation, making such connections within their contemporary moment.

In reading three novels published in this period of the network’s emergence and the intensification of scientific interest in the form, *Digital Humanity* demonstrates that the network, as both a concept and a specific technology, encompasses, and effectively closes, the “gulf of mutual incomprehension” declared by C. P. Snow in *The Two Cultures* (4). These novels offer an occasion for reconsidering postmodernism as a precipitate of science’s “information revolution” in the 1950s, 1960s, and 1970s, proving not only that literature has been concerned with and conversant in the discourse of science and technology in the period Snow identified as rife with “incomprehension,” but also that literature has remained invested in situating the practices associated with science and technology in a historically and materially urgent way. This

historical and material urgency constitutes a narrative that counters Snow's, but this project also produces a historical account complementary to a new disciplinary discourse of the digital within the humanities.

This project argues, then, that at the very least in the novels considered here—but I suspect in fiction of this period more generally—the features of postmodernism: recursivity, self-consciousness, concern with media including and beyond print, are the effects of Kay's "gestalt switch." That switch, furthermore, occurs at about the same moment Snow observes the "gulf" of incomprehension. Most significantly, the texts considered here refuse to passively internalize the turn, in science, toward information. Instead, they explicitly negotiate with the consequences of the informational turn for labor, property, and bodily materiality.

Within the zone of exchange I identify, these novels reckon with the consequences of the gestalt switch to information. Their negotiation of technoscience's print heritage, and its history of exploitation, suggests that there are more profound concerns within the zone of interconnection than have previously been identified. Additionally, this reckoning should inflect the contemporary conversation around the growing field of Digital Humanities. These texts offer a history of the deep interrelation between literature and technology, as well as a metacommentary that argues that the novel, as a form, has itself always been negotiating with the means by which both its forms and content are produced.

The texts considered here recognize that literature, and particularly the novel, has a privileged relationship to the technologies that enable its production and distribution. The novel has always been concerned with its enabling technologies. While an idealization of technology may amount to a kind of capitalist commodity-worship, and it is certainly evident that a great number of theorists within the Digital Humanities approach technology with undue reverence,

this is a too-limited view, from both aesthetic and historical perspectives. This degree of reverence the Digital Humanities has for data and the technologies that extract data may be off-putting to humanists who value analysis, yet this project demonstrates, quite clearly I think, that the novel has always been engaged in a practice of analysis of information technologies. And moreover, these novels demonstrate that literature itself is important to the whole history of information technology in the English-speaking world, from Johnson's dictionary to Angela Carter's empire of images and beyond.

Yet these texts are also extraordinary among the postmodern crowd. They use technological innovation, particularly that associated with information sciences in both biology and technology, as occasions for accounts of the historical circumstances within which such innovations are inset. Even in the positive, celebratory accounts of postmodernism, this important work of situation, contextualization, and interpretation has for the most part been ignored. Considering the novel and the computer, and the associated fields of information and cybernetics, together has, I think, the potential to reconfigure the conventional critical approach to postmodernism, whether represented by Linda Hutcheon or Fredric Jameson.

Postmodernism's approach to history is typically represented as a revision, a rewriting. For Linda Hutcheon, this revision is liberatory. Postmodern historiography accounts for the "multiplicity and dispersion of truth(s), truth(s) relative to the specificity of place and culture" (108). For Jameson, this revision incorporates "schlock and kitsch" into the "very substance" of narrative (*Postmodernism* 2–3). It is easy to see why both accounts of postmodernism have raised objections. Hence, the materialist accounts offered by the texts themselves, considered along with the scientific discourses they engage in, enable a situated approach to these fictions that has not been explored. These texts suggest an alternative understanding of postmodernism

that demands to be seen as part of an effort to situate the novel itself within a media system still dominated, but not limited, by print.

Indeed, it is another assertion of this project that the “scriptural” modality identified by Kay continues to dominate the discourse of information. This scriptural modality also suggests that the concerns voiced by Liu about “instantaneous, transient connectivity” might have more resonance in print’s proliferation than in its demise. Prompted by Elizabeth Eisenstein’s *The Printing Press as an Agent of Change*, and responses to it such as Adrian Johns’ *The Nature of the Book*, this project considers the ways in which new technologies of communication proved to be catalysts for literary reconfigurations. The computer is of course vastly different from the printing press, not the least because communication is a secondary adaptation of the dominant computer architecture (even though networked communication has roots extending at least to Charles Babbage in the nineteenth century¹¹). Yet the computer, and the effects computer technology provokes, are themselves the catalyst for the attempts to understand the influence of the printing press on information. Eisenstein describes the ways in which McLuhan’s predictions about technologically mediated communication were the inspiration for her to begin her exhaustive study, “McLuhan’s book itself seemed to testify to the special problems posed by print culture rather than those produced by newer media. It provided additional evidence of how overload could lead to incoherence” (x). For Eisenstein, the problem with the age of information is print’s proliferation, not the effect of changing technologies of mediation and communication as McLuhan argued.

A historical analysis of postmodern texts, as I at least begin here, reveals that the movement is in fact a direct response to the rise of information. The texts considered here recognize that the novel has always negotiated with itself as an information system. Postmodern

fiction's referentiality and recursivity are acts of recognition. At the same time, each novel considered here negotiates with the present in which it is composed. This practice is both revelatory and historically situated in a manner suggested by Diana Crane at the conclusion of *Invisible Colleges*,

New movements in one domain are frequently mirrored by new developments in another. In the same way that numerous and distinct research areas in science are held together by similarities in conceptual orientations and by personal associations, different cultural institutions can also be seen as having similar "world views" during the same period and as having interacting memberships. [...] society must be reconceptualized as a complex network of groups of interacting individuals whose membership and communication patterns are seldom confined to one such group alone. (142)

These novels "reconceptualize" the notion of two discrete cultures, testifying to the interacting memberships and networked communications of the fields of literature and science.

That those fields are separated by a "gulf" of incomprehension is an unfortunate commonplace in the discourse of Digital Humanities. This commonplace, evidenced by N. Katherine Hayles observation of an apparently recent paradigm shift, "the humanities and qualitative social sciences are only now facing a paradigm shift in which digital research and publication can no longer be ignored" (*How We Think* 1). My reading of *The Crying of Lot 49* proves, I hope, that the digital has been far from ignored by the humanities, perhaps best proved by Pynchon's critique of McLuhan's faux-visionary pose, and that pose's fuelling of the information economy's dependence on speculation.

Yet this project is not intended to be a counternarrative as much as a complementary narrative: that these novels offer a history, and that the scriptural techniques mobilized by both literature and information are key and evident. Even in the midst of assigning the character of a sea change to the shift to digital media studies, Hayles can't help but discuss digital media in the terms of print, "Digital networks influence print books, and print traditions inform the way in which the materiality of digital objects is understood and theorized" (*How We Think* 32). Indeed they do. The "technogenetic intervention" Hayles urges has, in fact, already taken place. This project begins, I hope, to describe it.

¹ Hillis, "Edge 331"

² Tiainen and Parikka, "Machinology"; Coole and Frost, *New Materialisms*; Alaimo, *Material Feminisms*

³ Hardt and Negri 108ff, also passim. Liu "knowledge work" 23ff.

⁴ The study, by physicists Pádraig Mac Carron and Ralph Kenna, used social network theory in order to adduce the historical accuracy of ancient epic: Carron, Pádraig Mac, and Ralph Kenna. "Universal Properties of Mythological Networks." *EPL (Europhysics Letters)* 99, no. 2 (July 1, 2012).

⁵ From the *OED*: "Machinery. A self-acting contrivance for regulating the passage of gas, steam, water, etc., esp. the supply of any one of these to a machine, in order to ensure an even and regular motion." Cybernetics takes its name from the same ancient Greek root, *κυβερνήτης*, steersman or pilot.

⁶ Liu, Alan. "The Meaning of the Digital Humanities." *PMLA* 128, no. 2 (March 2013): 409–423.

⁷ For a discussion of the aphorism "information wants to be free," the importance of which can't be overstated, within the discourse of property law, as well as solid documentation of the first appearances of the statement, attributed to *Whole Earth Catalog* founder Stewart Brand, see Wagner, R. Polk. "Information Wants to Be Free: Intellectual Property and the Mythologies of Control." *Columbia Law Review* (2003): 995–1034.

⁸ Tiainen and Parikka, "Machinology."

⁹ Liu, *Cool*, 135–136.

¹⁰ For a discussion of the slow exodus of women from the field of computing, see Misa, Thomas J. *Gender Codes: Women and Men in the Computing Professions*. Oxford: Wiley-Blackwell, 2010. See also Hayles, N. Katherine. *My Mother Was a Computer: Digital Subjects and Literary Texts*. 1st ed. University Of Chicago Press, 2005.

¹¹ See Dyson, *Darwin Among The Machines* (42).

2. The Structure of Scientific Revelations: Communicating Technologies in *The Crying of Lot 49*

In *The Crying of Lot 49*, protagonist Oedipa Maas finds herself, drunk, in a motel bathroom while a can of hairspray propels itself around the cramped space with its own violently escaping pressure: “The can knew where it was going, she sensed, or something fast enough, God or a digital machine, might have computed in advance the complex web of its travel” (*Crying* 25). This image contrasts the dangerous randomness of the can’s propulsion (an image of Thomas Pynchon’s favorite scientific concept, entropy) with the precise calculation required for sending a digital message through the “complex web” of a computer network.

Published in 1965, *The Crying of Lot 49* presents a remarkably contemporary account of the emergence of the digital communications network. It reveals, furthermore, the degree to which the period of its composition and publication is also the period of the emergence of a networked vision of communication itself, a period in which computer networks, as well as social and neural networks, became new paradigms for understanding communications, whether between persons, between cells, or between increasingly complex machines.

Key features of the novel, such as its focus on the mail, the image of the galaxy as a figure for networked communication, and the evocation of digital computers in metaphors and literary devices, signal its connection to what science historian Lily E. Kay identifies as the “communication technosciences (cybernetics, information, and computers)” (xv), which, in the post World War II period, intersect with cryptanalysis and linguistics and produce what Kay identifies as a technoscientific “poetics” characterized by the treatment of science as information processing dependent on the “scriptural” technologies of writing and print.

A reading of *The Crying of Lot 49* that situates the novel historically, I believe, will demonstrate that it reveals the ways in which print and associated information technologies such as postal communication confer the terms through which information science represents itself in the period of the novel's composition and publication. In marking the emergence of technologies of new media, such as networked computer communication, *The Crying of Lot 49* articulates the new, networked technologies with the history of print media on which such technologies depend, while simultaneously adopting the vocabulary of "information technoscience" into the form of the novel. Furthermore, *The Crying of Lot 49* adopts a position—counterintuitive for those critics who associate it with commoditizing and ahistorical practices—in which the emergence of new technologies of communication and mediation is historicized, and is marked in the materialist register, representing material consequences, such as those for labor and property, in a period that is, according to James Gleick, "the first dawn of computation and cyberspace" (8). *The Crying of Lot 49* connects literature and information science, enacting both a history of the economics of information and media technology, and a historiography of information and the contests over its control.

The Crying of Lot 49 figures communication networks in two different ways: with the mail and the galaxy. The thematization of mail, mail delivery, and competition over control of mail routes represents, I argue, competition for control of the emerging computer communications networks and electronic media systems. The galaxy is invoked in the "Galactronics" division of a fictional defense multinational. In addition, computer technology appears throughout the text in potent images for memory and communication and in satiric commentaries on labor and love. The mail and the galaxy are not, however, images conjured by

Pynchon out of immature obsessions with philately or astronomy. In fact, they are terms that appear in this period throughout information science and media theory.

Paul Baran's "Postman Analogy," published as a Rand corporation memorandum in 1964, suggests that Pynchon's interest in the mail is part of a larger effort to represent the future of digital communications by means of analogy with the oldest continuously extant communications technology:

The switching process in any store-and-forward system is analogous to a postman sorting mail. A postman sits at each switching node. Messages arrive simultaneously from all links. The postman records bulletins describing the traffic loading status for each of the outgoing links. With proper status information, the postman is able to determine the best direction to send out any letters. So far, this mechanism is general and applicable to all store-and-forward communication systems. (25)

Oliver Harris refers to Pynchon's invocation of the letter as an ironic interest in a mundane and ancient communications technology "*in the very moment of its redundancy*" (165). But Baran's and his colleague Donald Davies' dependence on the mail for illustrating the communications network, and, importantly, its distinction from the circuit-switched, centralized, telephone network, make Pynchon's exploration of the mail a good faith attempt to explain the way new technologies overlay and articulate with old media. "Hardly any information technology goes obsolete," writes Gleick (12). *The Crying of Lot 49* describes, not the obsolescence of a particular communications technology, but the terms in which an old technology is resituated in a new media environment.

The galaxy also appears across discourses as a figure for the media environment after 1960, likely because of the launch of communications satellites including *Courier 1-B* in 1960, which used a store-and-forward tape recording system, and *Telstar* in 1962, the first privately produced communications satellite, jointly built by AT&T's Bell Labs, NASA, and the British General Post Office.¹ Pynchon's Galactronics laborers suggest the anonymous researchers and engineers of a U.S. military-industrial multinational, while Marshall McLuhan's *Gutenberg Galaxy* describes the media environment constructed by print technology. J.C.R. Licklider's "Intergalactic Network" convened the social network, by means of communications technologies, that eventually created the internet.

Building on Claude Shannon's "Mathematical Theory of Information" (1948) and the development of the first stored-program digital computer (1953), as early as 1962 several researchers working within different disciplines conceived technologies that would enable digital messages to be routed through networked computers, and they began to reckon with the possibilities that a computer network enabled. McLuhan offered his vision of the "global village" and coined "surfing" as a verb for engaging with technology. Licklider, who led the Defense Department's ARPA information processing division from 1962 to 1964, conceived the conceptual framework of the ARPANET, the internet's precursor. At least three researchers, working independently, developed a theory in which messages could be routed in discrete blocks through a computer network. In the early 1960s, two of these researchers, Baran at Rand and Donald Davies of Britain's National Physical Lab, used the postal mail to describe digital message processing. Finally, beginning in 1964, Stanley Milgram, famous for his Harvard obedience experiments, also used the mail to make the first studies of human social networks.

While earlier communications networks such as the postal and telegraph systems relied on extant spatial and geographical organization, such as the system of inter and intra-state roads and highways used in mail delivery, or the use of telephone circuit switching hubs located in major cities, the internet relies on, and mirrors, networks constructed by interpersonal connections, initially between computer scientists and engineers. But the cultural, social and scientific emphasis on connections also emerges as a thematic of paranoia and conspiracy characteristic of political and literary discourse of the 1960s, paranoia about both secret networks and computers exercising control over human actions. Timothy Melley describes this paranoia as “agency panic,” which “usually involves a secondary sense that controlling organizations are themselves agents—rational, motivated entities with the will and the means to carry out complex plans” (12–13). *The Crying of Lot 49*, like the historical study contemporary with it, Richard Hofstadter’s “The Paranoid Style in American Politics,” represents paranoia not only as a condition of the 1960s, but as a historical characteristic of American discourse, associated with communication at least since S.F.B. Morse invented the single-wire telegraph.

The plot of *The Crying of Lot 49* centers on the pursuit of a secret and vast communications network, with “an 800 year tradition of postal fraud” (*Crying* 79). Oedipa calls this group the “Tristero system” and imagines its composition: “code, constellations, shadowlegates” (*Crying* 150). She has traveled to the fictional Southern California town of San Narciso in order to execute the will of her former lover, magnate Pierce Inverarity, whose interests proliferate throughout San Narciso and throughout the novel itself. It is Inverarity’s stamp collection that is to be auctioned, “cried,” in auctioneer’s jargon, as Lot 49. Just as Inverarity seems to have his hand in every business venture Oedipa encounters, so the Tristero seems to “bloom” around her as she follows the traces left by his estate. Oedipa learns to

recognize the Tristero by the acronym WASTE and a symbol, “a loop, triangle and trapezoid” (*Crying* 38), a horn with a muted bell.

Oedipa encounters the Tristero in a bar called the Scope, “a haunt for electronics assembly people from Yoyodyne. The green neon sign outside ingeniously depicted the face of an oscilloscope tube, over which flowed an ever-changing dance of Lissajous figures” (*Crying* 34). The first appearance of this shadowy network takes place under the sign of one of the first personal computer interfaces: the oscilloscope tube “monitor.” Scope patron Mike Fallopian, a laborer in the “Galactronics” division of fictional multinational Yoyodyne and spare-time historian of the mails, explains this first appearance of the Tristero, after a late-night mail call “just like in the army” (*Crying* 37). Fallopian tells her, “We use Yoyodyne’s inter-office delivery. On the sly” (*Crying* 38). Pynchon’s Galactronics engineers participate in an ancient conspiracy, perpetuated by a global network determined to undermine state monopolies of mail delivery.

The Crying of Lot 49 evokes Licklider’s Intergalactic network in its galactronics worker’s network, the hub of which is represented by an early computer interface. Technologies associated with computers also provide elaborate and evocative metaphors and literary devices. These devices situate the text within the specific temporality of the computer network’s emergence, using a language that had only very recently become available. The message routed through a computer network in the hairspray episode above, or Oedipa’s vision of her search as binary code, “like walking among matrices of a great digital computer, the zeroes and ones twinned above” (*Crying* 150) are not, in 1965, images with universal resonance, but very recent additions to the lexicon of literary representation.

The image of the hairspray can both parodies the second law of thermodynamics and represents the “packet switching” technology that makes internet communication possible. It makes a metaphor out of a technology that has only recently emerged, and it enacts that technology, embodies it. Entropy, the byproduct of the second law of thermodynamics as well as a standard measure in scientific theories of communication, is also emblematic of the “gulf of mutual incomprehension” (4) between the “two cultures” of literature and science invoked by C.P. Snow in 1959: “Once or twice,” among a group Snow pejoratively labels “literary intellectuals,” “I have been provoked and have asked the company how many of them could describe the Second Law of Thermodynamics. The response was cold: it was also negative. Yet I was asking something which is the scientific equivalent of: *Have you read a work of Shakespeare’s?*” (14–15). Snow asserts that a lack of imagination, a symptom of a failure to understand science, afflicts literary intellectuals on both sides of the Atlantic.

The Second Law of Thermodynamics has occupied Pynchon’s imagination at least since his early short story “Entropy,” which appeared in *The Best American Short Stories* in 1961 (Royster). In his introduction to *Slow Learner*, his collected early stories, Pynchon described the way in which this fundamental scientific principal began to enter his literary imagination:

entropy got picked up on by some communication theorists and given the cosmic moral twist it continues to enjoy in current usage. I happened to read Norbert Wiener’s *The Human Use of Human Beings* (a rewrite for the interested layman of his more technical *Cybernetics*) at about the same time as *The Education of Henry Adams*, and the “theme” of the story is mostly derivative of what these two men had to say. . . . Adams’s sense of power out of control, coupled with Wiener’s

spectacle of universal heat-death and mathematical stillness, seemed to me just the ticket. (*Slow Learner* 13)

The “communication theorist” to whom Pynchon refers is Claude Shannon. Shannon popularized the term “bit,” short for “binary digit” (1), and conferred the “cosmic moral twist” on entropy. No longer just a term for the changes undergone by a heat engine, information entropy, or “Shannon’s entropy” bridged the gulf between thermodynamic energy and print culture by making communication open to scientific analysis.

Oedipa remains confused by the dual definition of entropy: “She did gather that there were two distinct kinds of this entropy. One having to do with heat-engines, the other to do with communication. The equation for one, back in the 30’s, had looked very like the equation for the other. It was a coincidence. The two fields were entirely unconnected, except at one point” (*Crying* 84). In the terms of thermodynamics, entropy measures waste. In the terms of information theory, entropy measures communication. WASTE, the acronym Oedipa associates with the mail conspiracy she attempts to uncover, is Pynchon’s pun on this confusing connection. Later, Pynchon offers a definition that links the scientific and the literary: “Entropy is a figure of speech, then’ sighed Nefastis, ‘a metaphor. It connects the world of thermodynamics to the world of information flow’” (*Crying* 85). In staging entropy, the hairspray can episode reverses the metaphor John Nefastis explains. Rather than information acting as a metaphor for energy, a heat engine (the hairspray can) acts as a metaphor for information (the “complex web” through which the message travels).

Pynchon puns, but in using the galaxy as a figure for networked communications, *The Crying of Lot 49* highlights the ways in the laborers who produce electronic communications technologies have no proprietary claim on their work. The laborers of the Galactronics division

of the fictional multinational Yoyodyne assemble electronic communications equipment, but they also constitute the conspiracy that Oedipa pursues throughout the book. As the Galactronics workers' historical antecedents conceive their mail conspiracy based on a sense of dispossession by new structures of information and communication, such as the Pony Express riders' disappearance after the telegraph, the Galactronics workers' corporate loyalty depends on their perceived threat by other military-industrial contractors.

When Oedipa visits Yoyodyne on a stockholders' tour, the other visitors hold a "Yoyodyne songfest" (65). The shareholders sing an anthem lamenting Yoyodyne's subordination to other big defense contractors, "Bendix guides the warheads in./Avco builds them nice./Douglas, North American." The anthem concludes,

Yoyodyne, Yoyodyne
Contracts flee thee yet.
DOD has shafted Thee,
Out of spite, I'll bet. (*Crying* 66)

Both the Galactronics workers and shareholders feel dispossessed by the bigger corporations. Additionally, Douglas Aircraft founded the Rand corporation, where Baran was working when he developed his packet switching technology, in partnership with the U.S. government. Baran's efforts to create a communications network were thwarted by AT&T, which worked to sabotage any threat to their communications monopoly. Baran called it a "deadly environment of heavy handed opposition that blocked technical innovation in communication outside of AT&T's domain" (O'Neill 21). It is not hard to see, in Baran's oppositional environment, the conspiratorial machinations of the Tristero, or in his "distributed adaptive message switching" network, the shape of a galaxy (Hafner and Lyon 66).

Pynchon's Galactronics division resonates with other uses of the galaxy from the same period as the novel. A sector of interstellar space constituted by a grouping of stars, the galaxy figures the network, both as a visual image and as an environment in which interpersonal communications are mediated by print, broadcast, or digital technologies. In *The Gutenberg Galaxy*, published in 1962, Marshall McLuhan inaugurated the field of media studies. He adopts the galaxy as a term for the "constellation of events" that constitutes the long period of print's dominance among communications technologies (N.pag).

Primarily interested in the psychological effects wrought by shifting media technologies, McLuhan is often hailed as a herald of the internet both because of his coining of the term "surf" as a verb for engaging with media, Heidegger: "surf-boards along the electronic wave as triumphantly as Descartes rode the mechanical wave" (331), and because of his creation of the "global village" that would replace print with "speech, drum, and ear technologies" (8). McLuhan's theory of media depends on physiological effects: print causes interiority and individualism, while oral and aural media stimulate collectivity and tribal connection. The new media, McLuhan argued, would create a globally "tribal" oral culture in which collective closeness replaced solitude and individualism.

McLuhan and Pynchon converge at multiple points, not the least the hint of parody of McLuhan suggested by "Galactronics." *The Crying of Lot 49* rejects McLuhan's assertion that "electric technologies" will recreate such tribal culture (31) in the character of Oedipa's estranged, acid-dripping, disc-jockey husband, who becomes a tribe unto himself. Wendell "Mucho" Maas endorses a utopian, McLuhan-esque communalism when he extols the human connections made possible by radio broadcasting, "You're an antenna, sending your pattern out across a million lives a night, and they're your lives too," Mucho tells her (*Crying* 118). But

Mucho's personality eventually disappears. He stops being an individual. "Behind his back" Mucho's boss tells Oedipa, "they're calling him the Brothers *N*" (*Crying* 115). When Oedipa confronts him, telling him that he is "coming on like a whole roomful of people," Mucho agrees, "right. Everybody is" (*Crying* 117). The conversion of the individual voice to electricity transmitted across waves and wires eventually converts persons into an unindividuated collective. It is a vision of McLuhan's future in which identity completely disappears.

Paradoxically, though, despite its rejection of print, *The Gutenberg Galaxy* helped create the field of print culture. In *The Printing Press As an Agent of Change*, Elizabeth Eisenstein responds directly to McLuhan's vision of a tribal future. Eisenstein argues that McLuhan's observation of the impending death of print says more about print's proliferation than its demise, "McLuhan's book itself seemed to testify to the special problems posed by print culture rather than those produced by newer media" (x). McLuhan's assertions inform Eisenstein's study of the effects of the introduction of the printing press on literary culture in the fifteenth century.

The chaotic format of the *Gutenberg Galaxy* probably owes less to the impact of new media than to the old fashioned difficulty of trying to organize material gleaned from wide-ranging reading—evaded in this instance by an old-fashioned tactic, by resorting to scissors and paste. When its author argues that typography has become obsolescent and that an "electric age" has outmoded the "technology of literacy" he is himself (in my view, at least) failing to take full note of what is under his own eyes and that of the reader he addresses. (17)

The *Gutenberg Galaxy*'s dependence on print, both in the form of metaphors for describing communication or in the essentially identical modalities of composition of print and electronic texts, supports Eisenstein's assessment, an assessment of the state of information that led her to

undertake her own massive print history. Kay's assertion that "information technoscience" is conceived as a "scriptural" technology also suggests that histories such as Eisenstein's resonate in the technologies of communication beyond the printing press (16).

The Crying of Lot 49's paranoid history includes a scene that repeats itself in disparate temporalities. The scene always depicts a massacre, with only a courier left as a witness. This conflation of messenger and witness, a Horatian solitary informant, crystallizes the two axes of computer communication: space and time. W. Daniel Hillis explains, "communication and storage are just two aspects of the same thing: communication sends a message from one place to another; storage 'sends' a message from one time to another" (*Pattern* 91). Pynchon's paranoia, while characteristic of the style of the period, also reflects an attempt to reconcile the possibilities for posterity and computer autonomy raised by the indelibility of computer memory, an indelibility that succeeds Eisenstein's own assertions about the ways in which printing changed structures of knowledge. For her, "it was recall rather more than oblivion which presented the unprecedented threat" (x). If computer memory preserves everything, than recall is a much more evident threat than oblivion.

Eisenstein's reading of McLuhan implicitly revives a distinction between medium and message essential for theoretical approaches to information such as that originated by Shannon. *The Crying of Lot 49* suggests an awareness that, far from being supplanted in the media system, print will confer a form on information science, even as it expands to include genetics and the vocabulary of DNA within its purview. N. Katherine Hayles uses print to explain Shannon's information theory,

The theory makes a strong distinction between message and signal. Lacan to the contrary, a message does not always arrive at its destination. In information

theoretic terms, no message is ever sent. What is sent is a signal. Only when the message is encoded in a signal for transmission through a medium—for example, when ink is printed paper or when electrical pulses are sent racing along telegraph wires—does it assume material form. The very definition of “information,” then, encodes the distinction between materiality and information that was also becoming important to molecular biology during this period. (*Posthuman* 18)

While information has no materiality, Pynchon, like Eisenstein, understands that media has multiple material dimensions, including the labor of those involved in producing media technologies, and the imperfect embodiments of information offered by the media themselves, whether printed books, postage stamps, or radio broadcasts. Even bathroom walls and tattooed skin function as communications technologies in this text. Pynchon incorporates an understanding of Shannon’s approach to information, representing media technologies as embodiments.

In *The Crying of Lot 49*, a printing error produces an alternate system of communication. In the late 1950s, printing errors became the key for understanding genetic mutations, mutations that produce differences between organisms and, eventually, species. In 1958, a group of mathematicians working at the Jet Propulsion Lab in Pasadena took up the problem of the nascent DNA code and approached it “like a classic problem in Shannon coding theory.... They constructed a *dictionary* of codes. They considered the problem of *misprints*” (Gleick 297). Genetic “misprints” are of course the source of gene mutation, and of genetic difference.

In *The Crying of Lot 49* misprinted text, in books and in postage stamps, produces a mutation in the world Oedipa perceives, and presents the novel’s fundamental problematic: has Oedipa stumbled onto a vast conspiracy, or have a few misprinted texts and stamps led her to a

paranoid hallucination of the Tristero system? An early appearance of the Tristero occurs when Oedipa receives a letter from Mucho with a suspicious cancellation, “REPORT ALL OBSCENE MAIL TO YOUR POTSMMASTER.” A printing error, the transposition of the first S and T in the word “postmaster,” becomes a new object, a title that never existed. When Oedipa asks Metzger to define “potsmaster” he does, “‘Guy in the scullery,’ replied Metzger authoritatively from the bathroom, ‘in charge of all the heavy stuff, canner kettles, gunboats, Dutch ovens...’” (*Crying* 33). The misprinted “postmaster” creates a “potsmaster,” in an abbreviated representation of the way genetic mutation eventually creates a new species. A microcosm for the rise of the Tristero itself, in this episode a tiny mistake produces a whole fiction, a paranoid turn in which chaos becomes coherence. The word “potsmaster” shifts from printing error to precipitating a new world. Yet it also functions as a sign with which the members of the Tristero communicate, and a mutation that might have created a whole, alternate, communications system.

After this first appearance, the Tristero proliferates around Oedipa, appearing more and more as she pursues traces of its existence. She encounters the Tristero both in her peripatetic search through northern California, and in historical research in which she finds episodes that repeat the same events in different locations. She repeatedly confronts a scene of murdered soldiers with the solitary courier-witness. In her first encounter with the Tristero’s historical persistence, the scene originates during World War II. She and her co-executor, the lawyer Metzger, visit one of Inverarity’s properties, a faux-Italian housing development called Fangoso Lagoons, whose landscape décor features human bones, belonging to GIs killed in a raid on an Italian lakeside, and then illegally sold, eventually, to the Beaconsfield Cigarette company for use in cigarette filters, before being repurposed as underwater ornamentation in the development’s man-made lake. A beatnik teen, one of a group sharing Oedipa and Metzger’s San

Narciso motel, alerts them to the familiarity of this story, “‘You know, blokes,’ remarks one of the girls, ... ‘this all has the most bizarre resemblance to that ill, ill Jacobean revenge play we went to last week’” (*Crying* 48). The play repeats many of the themes of the book, within the revenge tragedy formula, and begins to suggest to Oedipa the uncanniness of the Tristero’s emergence.

The plot of the “ill, ill Jacobean revenge play,” *The Courier’s Tragedy* by the fictional Richard Wharfinger, hinges on messages sent through couriers of varying reliability, and features usurped inheritances and elaborate plots for vengeance. In the play, a brigade of soldiers suffers a fate similar to that of the GIs, but in this case, charcoal made from human bones becomes, not cigarette filters, but ink.² The play’s villain, Angelo, writes a message that is first “sarcastic, blatantly a pack of lies” (*Crying* 56). Later, the same text transforms and “is no longer the lying document Niccolò read us excerpts from at all, but now, miraculously, a long confession by Angelo of all his crimes” (*Crying* 57). The manuscript history of *The Courier’s Tragedy* mirrors the play itself. When Oedipa pursues the actor and director Randolph Driblette, looking for the source of the play, he wonders “why [...] is everybody so interested in texts?” (*Crying* 61). Eventually, like the message that is both “a pack of lies” and a confession, performed and printed versions of the text of *The Courier’s Tragedy*, which contradict each other, become essential in Oedipa’s pursuit of the Tristero. While she hopes these texts will offer proof of the Tristero’s influence, her search for texts only leads her to a history of corruption, of texts and of codes, that forecloses the possibility of an authoritative history, but produces interesting mutations.

This history of corruption also revises a fundamental tenet of Eisenstein’s history of print: that print confers fixity on information, lending authority to printed text over other, older modes of transmitting and storing information, such as McLuhan’s tribal oral cultures. Print

cultures constituted via piracy and counterfeit undermine Eisenstein's claims that knowledge encoded and stored in print attains a status of concrete truth. As Adrian Johns' emending of Eisenstein shows, error and corruption themselves persist in print cultures,³ and these errors signal the ways in which media's material forms reorder the information economies within which books, letters, and bits are exchanged.

Timothy Melley's brief discussion of *The Crying of Lot 49* connects the novel's pervasive paranoia with information systems "a subterranean postal system—glimpsed through unsettling 'chance' events and uncanny patterns—appeared to be sorting and distributing information to the members of an immense secret society." Connecting Pynchon's secret post to Poe's purloined letter, Melley suggests that the media systems in these novels are "nonfunctional signifiers" (85), significant not for the specific information they transmit, but for the ways in which information systems organize the persons who use them. While this nonfunctional function of organizing social and economic relations seems insignificant to Melley, it is a highly significant fact of the history of print, for Johns, who identifies the ways in which books produce and are the products of complex interactions.

In fact, unlike any existing history of the internet, or even of computers more generally, Pynchon's novel offers a substantive reading of the labor and economics of the computer revolution, in part by contextualizing that account within the history of the mail. Contests over control of media systems, what Friedrich Kittler identifies to as the "competition of diverse technologies for their own or our future" ("Media and Drugs" 159), structure political and even martial conflicts. Fallopian's paranoid history of the mail argues that the American Civil War was caused by the postal reform movement: "He found it beyond simple coincidence that in of all years 1861 the federal government should have set out on a vigorous suppression of those

independent mail routes still surviving the various Acts of '45, '47, '51, and '55, Acts all designed to drive any private competition into financial ruin" (*Crying* 39).

Later, after consulting Genghis Cohen, "the most eminent philatelist in the L.A. area" retained by the estate to "inventory and appraise Inverarity's stamp collection" (*Crying* 75), Oedipa learns of the Tristero's history of undermining the legitimate postal service. Cohen shows her a "U.S. commemorative stamp, the Pony Express issue of 1940, 3¢ henna brown. Cancelled" (*Crying* 77). When Oedipa examines the cancellation she discovers the WASTE symbol, the muted horn. Oedipa learns from Cohen the European counterpart to "the U.S. part of the story" identified by Kittler ("Universities" 247): the story of the rise of a postal monopoly and the antagonism between the holder of the monopoly and its competitor, driven underground. Cohen shows her an antique German stamp, showing the legend "*Thurn und Taxis*":

"They were" she remembered from the Wharfinger play, "some kind of private couriers, right?"

"From about 1300, until Bismarck bought them out in 1867, Miz Maas, they were *the* European mail service. This is one of their very few adhesive stamps. But look in the corners."

Decorating each corner of the stamp, Oedipa saw a horn with a single loop in it.

Almost like the WASTE symbol. (*Crying* 77)

The WASTE symbol is the symbol of the Tristero's hostility to the state postal monopoly. It represents "an 800 year tradition of postal fraud" (*Crying* 79).

Even the implicit opposition between a notion of authenticity and simulacrum is invoked in the landscape of communications networks. Simulacrum, however, is replaced by the genetic mutation precipitated by "misprints."

After her discovery of the fraudulent stamps, Cohen assures her,

“the hatching, number of perforations, way the paper has aged—it’s obviously a counterfeit. Not just an error.”

“Then it isn’t worth anything.”

Cohen smiled, blew his nose. “You’d be amazed how much you can sell an honest forgery for. Some collectors specialize in them. The question is, who did these?

They’re atrocious. ... Why put in a deliberate mistake? (*Crying* 78)

The Tristero stamps are not frauds. The “deliberate mistake” is a sign in an alternate system, like Bortz’s “pirated” play or the “potsmaster” cancellation. It is a signature, a hack of the postal system. Cohen understands what Bortz does not, that pirated communication and illegitimate media threaten legitimate media sources not because they are ineffective, but because they communicate effectively. The “deadly environment of heavy handed opposition” that met Paul Baran’s attempts to construct a communications network suggests that the contests for control of media remained as serious in the early 1960s, if not as deadly as Pynchon describes their 1860s counterparts. Furthermore, Pynchon’s emphasis on the very functionality of the Tristero’s communication system suggests that the subject of *The Crying of Lot 49* is the displacement of one widespread, ubiquitous, and official system of communication by another.

These signifiers, then, are hardly nonfunctional. Instead, Pynchon depicts media technologies as indexes of what Johns describes as the “social and technical processes” that produce them (*The Nature of the Book* 3): the intellectual labor, the social interactions, the control of the system. Like Baran’s postman’s bulletin, or like the postcards that Stanley Milgram’s experiment used to identify each node in the social network that passed along his

messages, the mail offers Pynchon a networked structure for revealing the processes that produce technologies of information.

At first, Oedipa mistakenly thinks that she will be able to find an uncorrupted original text, a source for fixed knowledge of whether the Tristero exists or is imaginary. Yet the history of print that Oedipa enters is one of corrupt copies and pirated versions. She eventually learns to account for corruption, modulating her speech in order to cancel the interfering noise. In a radio interview, she is introduced as “Mrs. Edna Mosh,”

“‘Edna Mosh?’ Oedipa said.

‘It’ll come out the right way,’ Mucho said. ‘I was allowing for the distortion on these rigs, and then when they put it on tape’” (*Crying* 114).

Although distortion appears to be a problem associated with radio broadcast, Oedipa’s pursuit of *The Courier’s Tragedy* manuscript reveals that it, like the text of the message in the play itself, has multiple iterations and multiple distortions. After tracking down the editor of the play’s scholarly edition, Emory Bortz, she discovers she has read an illegitimate version of the play. Bortz exclaims, “‘I’ve been pirated, me and Wharfinger, we’ve been bowdlerized in reverse or something.’ He flipped to the front to see who’d re-edited his edition of Wharfinger. ‘Ashamed even to sign it. Damn.’ ... He looked at the sun through a page or two. ‘Offset.’ Brought his nose close to the text. ‘Misprints. Gah. Corrupt’” (124-125). But like the distortion of Oedipa’s name, the misprinted manuscript is not really an error. It becomes, to Oedipa, a sign in an alternate system that testifies to the existence of the Tristero.

The line in question, part of a eulogy for murdered courier Niccolò, whose final words “may be the shortest line ever written in blank verse: ‘T-t-t-t-t...’” (*Crying* 57) reads, in Oedipa’s pirated version, thus, “*No hallowed skein of stars can ward, I trow,/Who’s once been set his tryst*

with Trystero” (*Crying* 58). Unsurprisingly, in Bortz’s version, the reference to the Tristero is missing, although both include the “hallowed skein of stars,” the galaxy as a sign for the network. Later, Oedipa confronts Driblette, who insists that the meaning of the play cannot be found in a reading of the authentic manuscript. Driblette describes himself as “the projector at the planetarium” (*Crying* 62). This image of the projected galaxy haunts Oedipa throughout the course of the novel. Driblette’s assertion leads Oedipa to write into her memo book “*Shall I project a world?*” (*Crying* 64), something Metzger’s misunderstanding, and Mucho’s misprinted cancellation, enables Oedipa to do, to project a world in which there is a secret, rival communications network, an “order beyond the visible” (Bersani 100).

The extent of this connection, the networked nature of sociality itself, prompts Leo Bersani’s reading in “Pynchon, Paranoia, and Literature.” Bersani sees in Pynchon’s thematics of paranoia a negotiation with the communicative aspect of literary form itself. Bersani argues that Pynchon’s paranoia is not in fact a pathology but a figure for literature: “Paranoia repeats phenomena as design” (100). Paranoia, then, is a way of seeing plot as a symptom, “In making literature continuous with both the creation and suspicions of order in other areas of life ... Pynchon both denies literature its status as privileged form-maker *and* insists on its inescapable complicity with the most sinister plot-making activities and strategies of control” (107).

Bersani’s reading identifies a fundamentally literary quality in paranoia: plotting is essential to both paranoid delusion and narrative. He notes that Pynchon’s protagonists do not really suffer from paranoia in the clinical sense; rather, their paranoid suspicions are usually confirmed, such as in the repetition of the tableau of massacred soldiers in 14th-century Italy, 19th-century America, and World War II Italy. The revenge plot of *The Courier’s Tragedy* displays the thematization of a narrative event, the murdered soldiers, as a paranoid symptom.

At Fangoso Lagoons, Oedipa encounters a historical marker that repeats the events of *The Courier's Tragedy* in a third time and place. Oedipa sees in this repetition the presence of the conspiratorial plot and evidence of the Tristero.

On this site, it read, in 1853, a dozen Wells, Fargo men battled gallantly with a band of masked marauders in mysterious black uniforms. We owe this description to a post rider, the only witness to the massacre, who died shortly after. The only other clue was a cross, traced by one of the victims in the dust. To this day the identities of the slayers remain shrouded in mystery.

But Oedipa wonders, “a cross? or an initial T? The same stuttered by Niccolò in *The Courier's Tragedy*” (*Crying* 71). Later, she interviews the aged Mr. Thoth about his grandfather, who “rode for the Pony Express, back in the gold rush days.” Mr. Thoth remembers mysterious

Indians who wore black feathers, the Indians who weren't Indians. My grandfather told me. The feathers were white, but those false Indians were supposed to burn bones and stir the boneblack with their feathers to get them black. It made them invisible at night. That was how the old man, bless him, know they weren't Indians. No Indian ever attacked at night. If he got killed his soul would wander in the dark forever. (*Crying* 73–74)

The temporal persistence of the Tristero massacre highlights Pynchon's utilization of narrative, and the paranoia associated with it, as itself a cybernetic system for organizing information. The old man's name, Thoth, is adopted from the ancient Egyptian scribal deity, and echoes Pynchon's invoking of hieroglyphics as a kind of ancient cipher with mystical resonance. Hieroglyphics appear throughout the 1960s and 1970s as a symbol for encoded communication itself, a hidden order beyond the visible signifiers of letters and lines.

According to Freud, paranoia is “the reflex of seeing other orders beyond the visible,” but, Bersani argues, “other orders beyond the visible” is a truth of literature as well (100). In Pynchon’s paranoia, Bersani sees a cybernetic impulse: the protagonist is not really an individual character, but, in a deliberately Pynchonian term, an “‘interface’ between himself and the world” (114). Pynchon, he argues, presents an account of information as an object of scientific study and institutional control. This account of information control is, in quite a strict sense, cybernetics. Chaos, in Bersani’s account of Pynchon represents, “a momentary malfunctioning of the cybernetic machine” (104).

Bersani’s persuasive reading of Pynchon emphasizes formal technique over historical detail, yet the account itself reveals the ways in which the discussion of information technologies, from the printing press to the computer network, must be historically embedded in order to be intelligible. The history of printing can itself be seen as a history of the cybernetic, a history of contests over the control of information, and of the extension of human capacities for communicating information in space and in time. These contests over control and the consequences for human capacities are the very subject of Wiener’s *Cybernetics*. *The Crying of Lot 49* presents an explicit account of the history of information as part of its plot, as, in a sense, a gloss on the ways in which print culture gives a history to cybernetics. Throughout Pynchon’s oeuvre, paranoia connects the cybernetic principles of command and control to literary techniques of plot, repetition, and character.

A standard account in Pynchon criticism identifies Pynchon’s interest in paranoia, conspiracies, and plots as symptomatic of a countercultural perspective on the politics of the mid 1960s that becomes, eventually, part of the dominant narrative of the 1960s and the Cold War. Emily Apter’s “On Oneworldedness: Or Paranoia as a World System” is the most recent example

of this approach. Her analysis categorizes *The Crying of Lot 49* as “prophetic realism” (385) and argues that it establishes a “brand” of American literature that became commodified in postmodernism. Apter, echoing a frequent claim that Pynchon’s work is prescient in its vision of a networked, surveilled, postmodern world, accuses Pynchon of packaging paranoia for export. Pynchon’s fictions, she argues,

enshrine paranoia as the preferred trope of national allegory. Pynchon remains the catalyst; his invention of a literature of conspiracy steeped in the ethos of CIA operatives, McCarthyism, cybernetics, and hallucinogenic drugs takes paranoia beyond Cold War spy fiction and into the realm of a new literarity. The interior monologues of Oedipa Maas, Pynchon’s addled protagonist in *The Crying of Lot 49*, invariably construct paranoia as a world system. (367)

Paranoia becomes an American brand, identifiable as “oneworldedness”:

“oneworldedness might be described as a relatively intractable literary monoculture that travels through the world, absorbing difference” (374). For Apter, Pynchon’s paranoia is the “cognitive” counterpart of Immanuel Wallerstein’s modern world-system, “one but unequal” (365). Rather than historicize, Apter points to Pynchon’s prescience, and argues that his use of paranoia disavows politics and reinforces the hegemonic values of the “the military-industrial-academic complex ... governed by patterns of legal and illegal corporate relationality” (384). Pynchon’s paranoia is, in Apter’s view, insufficiently radical to counteract the “monocultural” force of American letters.

But what reads, to Apter at least, as prescience is in fact a sharp sense of the patterns of “relationality” already taking shape in the 1960s, and which are quite evident in the text’s emphasis on changing economics of intellectual labor and its association of information

economics with robber-baron accumulation. Paranoia, and literature, *The Crying of Lot 49* indicates, point to “orders beyond the visible” not to enact a further mystification, but to bridge the distance between what I earlier distinguished as the work’s historicity and its historiography. While its plot points to those invisible orders in an attempt to identify the persistence of networks and of mediation throughout history, its historicity, its incorporating of the emergence of particular technologies into the lexicon of literary representation, is decidedly historically specific.

It might seem incongruous to assign to this founding text of American postmodernism, a genre in which, according to Fredric Jameson, technology is “a figure for something else” (*Postmodernism* 35), a profoundly materialist view of history. Pynchon represents one of the most significant innovations of the twentieth century through narratives that depict those whose labor and proprietary interest goes unremarked in available historical accounts. Jameson’s famous rejection of postmodernism as “schlock,” a “degraded” bricolage (*Postmodernism* 2) in which access to history is lost, minimizes the ways in postmodern literature marks material history, including the expansion of cybernetic technologies of information through the 1960s. For Bersani, Pynchon enacts literature as an information system and an instrument of control:

Paranoia is a necessary product of all information systems. ... Information control is the contemporary version of God’s eternal knowledge of each individual’s ultimate damnation or salvation, and both theology and computer technology naturally produce fears about how we are hooked into the System, about the connections it has in store for us. (103)

This response, a theological panic over what might be controlling human action, an epistemological panic over the very real discoveries of how close we all are, and a political panic

that encompasses fear about secret plots, makes Pynchon's postmodern forms less "schlock" than meticulously historicist responses to scientific, political, and economic events.

What Apter describes as "prophetic realism" conflates an overused attribution of prescience to Pynchon with a tonality associated with prophetic text. The book promises Oedipa "all manner of revelations. Hardly about Pierce Inverarity, or herself; but about what remained yet had somehow, before this, stayed away" (10). What is that has remained and stayed away is, of course, the network. Later, Pynchon invokes Job and Biblical prophecy as Oedipa ruminates on a housing tract/highway/circuit's "intent to communicate." Oedipa's observation becomes, "an odd, religious instant. As if, on some other frequency, or out of the eye of some whirlwind rotating too slow for her heated skin to even feel the centrifugal coolness of, words were being spoken" (*Crying* 14). Bersani's identifying of the closeness of theology and computer communication is even closer than first appears: "Whirlwind" was the name given to a scientific computer developed in the 1950s to run a wind tunnel and radar program for the U.S. Air Force. Later, Oedipa remembers this "slow whirlwind" when she looks at a motel sign featuring a nymph and an "artificial windstorm" designed to blow her chiton in a revealing and inviting manner (*Crying* 16).

Pynchon's paranoia is neither the purely formal flourish suggested by Apter, nor a purely Freudian figure for literary narrative. *The Crying of Lot 49* also documents a strain of paranoid political rhetoric identified in Richard Hofstadter's essay "The Paranoid Style in American Politics," published in *Harpers* in 1964. Hofstadter's historical account of paranoia as a style of mind" (not paranoia in a "clinical sense") (3) resonates in Bersani's tropological account of parania in Pynchon's fiction, associating repetition with plotting and opposing coherence and meaning to meaninglessness and chaos. For Hofstadter, "the paranoid mentality is far more

coherent than the real world, since it leaves no room for mistakes, failures, or ambiguities” (36). Paranoia comprehends “reality in one overreaching, consistent theory” (37). Pynchon shares this sense of paranoia as a program stored within American political discourse. Its retrieval in *The Crying of Lot 49*’s period both evokes Hofstadter’s history and identifies the specific sources of paranoid thinking in its contemporary age: the John Birch Society’s fears that Eisenhower was a communist stooge, AT&T’s paranoid protectiveness of their monopoly, and public fears about the ways in which computers will change society.

In Hofstadter’s essay, the connection between technology and conspiracy is mostly implicit, but scientists working on computer communications saw a connection between computers and the paranoid rhetoric Hofstadter identified. Technology is associated with paranoia, and with Hofstadter’s book, by the attendees of the 1965 Rand symposium on computing. This annual meeting invited distinguished members of the computing establishment, in both academia and industry, and including Baran and Licklider, to tackle broad theoretical problems among a dozen or so colleagues. The transcripts of the 1965 symposium reveal that Hofstadter’s book struck a nerve with the computer scientists.

The group has a lengthy discussion of the ways in which Hofstadter’s essay converges with the degree of paranoia they observe directed at computers. Of Hofstadter’s essay Joseph Weizenbaum, inventor of a natural-language processing computer program called ELIZA, after the character in *Pygmalion* says, “One of the things this guy said is that there are people who view history as a series of conspiracies” (131). Weizenbaum makes the connection between computers and conspiracies, “There now seem to be people who ... claim that the computer scientist wants to take over the world” notes (132). In his account of Morse, Hofstadter does not associate technology and paranoid rhetoric, but when he turns to its modern incarnation, the

media is a primary target. As in McLuhan's earlier formulation, conspiracy hunters see "effects of the mass media" that wreak "important changes" on the American populace (24). The contemporary paranoia of the 1960s associates the Eisenhower administration—the administration responsible for the ARPANET as well as the network of interstate highways—with Communist conspiracy (28).

As the discussion goes on, the computer scientists assign this paranoia to a source much like Snow's, indeed even using the same language. Harvard computer scientist A.G. Oettinger argues that the source of mistrust of computers is "intellectual anti-intellectualism. It is a reflection of the alienation of the humanist and liberally educated who tend to be the ivy league English major types who inhabit places like *Life* magazine. This type of person has a fear of technology." While Oettinger goes on to suggest, "if you were to look at the man in the street—the masses, if you will—that this is not nearly as prevalent as the literary journals would have you believe" (138).

Networks figure prominently in Hofstadter's study of cold-war paranoia as an extension of a history of conspiracy theories. These theories, perpetuated by groups like the John Birch society, identify secret networks as threats to American institutions. *The Crying of Lot 49* burlesques the Birchers with the Peter Pinguid society, to which Oedipa is introduced by Galactronics worker, amateur mail historian, and ardent Pinguid-ist Fallopian. The Pinguids identify themselves as far to the right of the Birchers, calling them "left-leaning" (*Crying* 36) because their opposition is only to perceived communist plots, not the industrial capitalism that produces communism. The Pinguids, late capitalists ahead of their time, or primitive accumulators resurgent, only support capital accumulation, not circulation. But like their models

the Birchers, they see themselves as a small minority resisting a force that has already taken control.

According to Hofstadter, the representation of the powerful and influential as an embattled minority is characteristic of paranoid political rhetoric: “The distinguishing thing about the paranoid style is not that its exponents see conspiracies or plots here and there in history, but that they regard a ‘vast’ or ‘gigantic’ conspiracy as the *motive force* in historical events” (29). Pynchon’s Peter Pinguid is a hero to his followers because he was the first U.S. citizen to mount military opposition against Russia. In 1864, “Off the coast of what is now Carmel-by-the-Sea, or what is now Pismo Beach” the Confederate Man-of-War “Disgruntled” and a Russian ship traded useless, out of range cannon fire (*Crying* 35–36). Pinguid, himself disgruntled, seeing no difference between industrial wage-slavery and southern chattel slavery, and opposed to industrial capitalism because it leads, “inevitably, to Marxism. Underneath both are part of the same creeping horror,” settles in southern California and amasses wealth “Speculating in California real estate” (*Crying* 37). In this precursor to the political economy of the information age, the circulation of information supports gross accumulation by means of speculation.

The connection of communications networks to conspiracies glosses Hofstadter’s account of the history of conspiracy panic. S.F.B. Morse, the inventor of the telegraph, Hofstadter writes, was also the author of *Foreign Conspiracies against the Liberties of the United States*, which, in 1835, identified a Jesuit plot to overthrow American democracy (19). Morse’s authority, like that of Pynchon’s disgruntled laborers, seems to come from a degree of technical expertise with networks themselves. And *The Crying of Lot 49*’s emphasis on labor and economics suggests Apter’s reading of paranoia as cultural commodity is incomplete. *The Crying of Lot 49* glosses

Hofstadter's history by suggesting that new media resituates old economies in a new environment.

While *The Crying of Lot 49* is concerned with thematics of paranoia and conspiracy, the devices the text employs also refer to verifiable social and technical processes, giving Oedipa's revelations a decidedly material resonance that supports the novel's historicizing project. Oedipa is met with one such mundane revelation upon her return to The Scope, the site of her first meeting with the Tristero, "not only because of the encounter with Stanley Koteks, but also because of other revelations; because it seemed that a pattern was beginning to emerge, having to do with the mail and how it was delivered" (*Crying* 71).

Oedipa's revelations, therefore, are much like the "reapplication" of existing technologies described by Lawrence Roberts, contemporary of Licklider and collaborator on the ARPANET project. Roberts, like Paul Baran and Donald Davies, identifies digital network technology with the mail: "Packet switching technology was not really an invention, but a reapplication of the basic dynamic-allocation techniques used for over a century by the mail, telegraph, and torn paper tape switching systems" (Roberts N.pag). Oedipa recognizes communication in new registers, via new, sometimes incongruous media, such as the bathroom walls or the tattooed skin that make media embodied.

In this period, the complex set of social processes constituted *by* media forms, books or otherwise, is persistently figured as a galaxy. Pynchon, McLuhan, and Licklider all use this evocative visual image as a sign for a media system. Pynchon parodies McLuhan's Gutenberg Galaxy with the fictive Galactronics industry. Representations of the galaxy, including the play's "hallowed skein of stars" and Oedipa's projected world, also evoke J.C.R. Licklider's "Intergalactic Computer Network." All use the image of the galaxy to figure communications

systems. McLuhan identifies the “galaxy” as a way to describe an environment created by media, while Licklider suggests the galaxy as a visual representation of a network. More visionary than engineer, Licklider recognized that a computer could be, “not an interface, but an intermedium” (Aspray and Norberg 54). In a 1963 memorandum addressed to the Intergalactic Network, Licklider described his vision for a digital network:

It is evident that we have among us a collection of individual (personal and/or organizational) aspirations, efforts, activities, and projects. These have in common, I think, the characteristics that they are in some way connected with advancement of the art or technology of information processing, the advancement of intellectual capability (man, man-machine, or machine), and the approach to a theory of science. The individual parts are, at least to some extent, mutually interdependent. (“Memorandum” N.pag)

There is certainly a strong circumstantial case for Pynchon’s awareness of, if not connection with, the ARPANET and related projects due to his tenure at Boeing. As the short story “Entropy” further indicates, Pynchon’s interest in information processing encompasses both the art of narrative and the technology of networks.

Kittler defers to Pynchon’s accuracy regarding histories of communication and media, approaching Pynchon as something of a historian of technology itself. He observes that Pynchon’s work “builds almost exclusively upon documentary sources in a manner akin to historical novels of the type of *Salamambo* or *Antonius*, to which it adds, for the first time, schematics and differential equations, corporate contracts, and organizational graphs” (“Media and Drugs” 161). Kittler argues that Pynchon’s fictions are truly historical, not only because of their reliance on documentary sources, but also because Pynchon envisions national conflicts as

deriving from conflicts over media, that is, access to information. Kittler identifies *The Crying of Lot 49* as an accurate source “for the U.S. part of the story” of the rise of communications monopolies and the suppression of postal routes operated privately by guilds and universities throughout Europe in favor of centralized state control of communication and media beginning in the sixteenth century, and precipitated by Gutenberg’s innovation. (“Universities” 247).

Pynchon’s relatively accurate representation of this history of mail corresponds with his rendering of the conditions of labor and property within an information economy. An early encounter with Galactronics laborer Stanley Koteks emphasizes the ways in which the intellectual labor of invention is distanced from the products themselves, as well as how history distorts the conditions the media system produces. Koteks, whose name may be a humorous reference to Leonard Kleinrock, the author of *Communication Nets*, published 1961, which independently proposed a computer network technology comparable to Baran’s and Davies’, laments Yoyodyne’s policy toward intellectual property. “Koteks explained how every engineer, in signing the Yoyodyne contract, also signed away the patent rights to any inventions he might come up with.” Oedipa, in an attempt to goad him, responds, “I didn’t think people invented anymore. ...Isn’t it all teamwork now?” (*Crying* 67). Koteks responds with predictable hostility to the notion that invention always takes place by means of teamwork. Fallopian later elaborates,

In school they got brainwashed, like all of us, into believing the Myth of the American Inventor—Morse and his telegraph, Bell and his telephone, Edison and his lightbulb, Tom Swift and his this or that. Only one man per invention. Then when they grew up they found they had to sign over all their rights to a monster like Yoyodyne; got stuck on some “project” or “task force” or “team” and started being ground into anonymity. (*Crying* 70)

The Myth of the American Inventor is of course a myth. As social scientist Diana Crane has shown, scientific discovery and invention takes place in “invisible colleges,” social networks of mutual influence that connect persons with no direct interaction.

Both in Crane’s invisible colleges, and in Melley’s subterranean systems, information organizes groups into networks. This causal order, in which individual agency is mediated by technology, informs many of the histories of the internet that cover the same period as *The Crying of Lot 49*.⁴ For Melley, the apparent coincidence of being organized by something other than individual choice smacks of the paranoia that pervades the literary and political discourse of the 1960s. These histories describe the emergence of the early internet technologies as an invisible college in which packet switching and networks occurred simultaneously to different researchers: “New ideas emerge simultaneously but independently. And so they did when the time was ripe for inventing a new way of transmitting information...Paul Baran and Donald Davies—completely unknown to each other and working continents apart from different goals—arrived at virtually the same revolutionary idea for a new kind of communications network” (Hafner and Lyon 53). Despite attempts on the level of a conspiracy, from corporations like AT&T, to suppress research in networked communication, computer scientists themselves assign paranoia about computers to the overactive imaginations of humanists and “English majors.”

Pynchon, an English major, ridicules the kind of paranoia invoked by Weizenbaum and Oettinger: “In the early ‘60’s a Yoyodyne executive living near L.A. and located someplace in the corporate root-system above supervisor but below vice-president, found himself, at age 39, automated out of a job” (*Crying* 91). Replaced by a computer, the IBM 7094, the executive attempts and fails suicide. “You know how long it would’ve taken the IBM 7094?” his efficiency-expert nemesis asks him, “Twelve microseconds. No wonder you were replaced”

(*Crying* 93). The conclusion that the computer would have made the decision to commit suicide in “twelve microseconds” is absurd, and responds directly to the computer paranoia that sets scientists against humanists. Indeed, paranoid discourse itself, shared across disciplines, links the computer to the novel.

This discursive link resonates in Crane’s account of the ways in which technological forms arise simultaneously in disparate locations, suggesting that the kind of implicit exchange that facilitates the unintentional sharing of ideas among groups of scientists might also be responsible for broader exchanges across fields:

New movements in one domain are frequently mirrored by new developments in another. In the same way that numerous and distinct research areas in science are held together by similarities in conceptual orientations and by personal associations, different cultural institutions can also be seen as having similar “world views” during the same period and as having interacting memberships. [...] society must be reconceptualized as a complex network of groups of interacting individuals whose membership and communication patterns are seldom confined to one such group alone. (142)

Invisible Colleges, like Stanley Milgram’s research into social networks, demonstrates that individuals are often closer to each other than they think. This surprising connection organizes human sociality, but, as Hofstadter’s study of conspiracy theory shows, it also gives rise to the paranoia that events that seem random may in fact be the product of conspiracies, when they are produced, in fact, by networks.

As Lawrence Roberts observes, computer networks, like social networks, were not really invented so much as revealed. This age of the “dawn of computation and cyberspace,” also sees

the emergence of the social network. Milgram's "Small-World Problem" used the mail to identify links between persons. The experiment replaced Baran's theoretical postman's "bulletin" with pre-addressed postcards that accompanied a letter addressed to the study's intended target, a businessman in New York. Milgram's experiment started letters in Omaha and Kansas City, asking people chosen at random to try to get those letters to their target. Each time the letters passed from person to person, a postcard was sent to the experimenters. In this way, Milgram also had an index of each "node" in which the letter was switched. These postcards enabled the experimenters to determine the average number of persons that separated any two people in the U.S. They used the mail to map a communications network.

Oedipa herself maps technology onto a physical space in a way that reveals the persistence of the network. She looks down from above a housing development, "a vast sprawl of houses which had all grown up together, like a well-tended crop" and she remembers "the time she'd opened a transistor radio to replace a battery and seen her first printed circuit." The two structures merge in her memory:

The ordered swirl of houses and streets, from this high angle, sprang at her now with the same unexpected, astonishing clarity as the circuit card had. Though she knew even less about radios than about Southern Californians, there were to both outward patterns a hieroglyphic sense of concealed meaning, of an intent to communicate. (*Crying* 14)

The "intent to communicate" invokes a persistent impulse responsible also for the invention of the printing press and the mail. The code, hieroglyphic or binary, and the network, electronic or geographic, permeates representation itself.

Further revelations do follow for Oedipa, and they do, to some extent, originate from the center of the whirlwind. But *The Crying of Lot 49* structures its scientific metaphors to evoke precise and specific images. These images, like that of the printed circuit/housing tract, do much to illuminate Oedipa's quest. Near its conclusion, she imagines that her search is

like walking among matrices of a great digital computer, the zeroes and ones
twinned above, hanging like balanced mobiles right and left, ahead, thick, maybe
endless. Behind the hieroglyphic streets would either be a transcendent meaning,
or only the earth. [...] The bones of the GI's at the bottom of Lake Inverarity were
either there for a reason that mattered to the world, or for skin divers and cigarette
smokers. Ones and zeroes. (*Crying* 150)

The oppositions Oedipa imagines suggest that if the Tristero does not exist, the bones in Lake Inverarity do not matter. But the "reason that mattered to the world" is the distinction between order and randomness, between plot and chaos. The reason that matters in the world is connection, in a technical sense, and the answer is clear: whether the Tristero exists or not, networks are a fact of human social organization, and computers only reveal that connection.

The Crying of Lot 49 emphasizes historical continuities between communications technologies such as writing, print, and mail, at the same time that it narrates conflicts over control of media as a persistent political problem throughout history. The novel's interest in the mail presents information technology as a historiographic problem. Numerous critics have offered many interpretations of the Tristero. Frank Palmeri asserts that the Tristero points to "another mode of meaning outside these shaping paradigms" of discourse, scientific study, and literary convention (980). For Hayles, "*The Crying of Lot 49* works by overlaying a physically immediate reality...onto another, more abstract series of junctions, crossings, and divergences

grouped under the signifier ‘Tristero’” (“Metaphor” 100). Yet among those Pynchon scholars who recognize that the novel narrates intersections between literary and scientific practices of encoding information, none recognizes the ways in which *The Crying of Lot 49* historically embeds those intersections, recording them in a narrative that refuses to separate technological innovation from the material circumstances that enable it. In this way, the Tristero makes *The Crying of Lot 49*’s emphasis on information technologies a historiographic as well as historicist narrative.

Late in the novel Oedipa encounters an old sailor with a post horn tattooed on the back of his hand, and she imagines his bed filled with “the insatiable stuffing of a mattress that could keep vestiges of every nightmare sweat, helpless overflowing bladder, viciously, tearfully consummated wet dream, like the memory bank to a computer of the lost” (*Crying* 103). The incongruous opposition, the constellation of the wretched disorder of the flophouse with the example of perfectly ordered computer memory, renders the interconnection between the material conditions of history, the influence exerted by print on an economy driven by information, and the rise of computer network, indelible. This interconnection of apparently disparate realms is not a pastiche but a history, connecting the technical and the textual.

These references—the galaxy, the oscilloscope, the computer, binary code—situate *The Crying of Lot 49* within the media discourse of the 1960s, a discourse that extends much more broadly than one field. By invoking a secret, nearly ubiquitous, conspiratorial mail network, *The Crying of Lot 49* marks the emergence of the computer network and reveals the history of print’s resituation in an electronic age that is vivid and resonant. The novel points to the “orders beyond the visible,” the persistence of connections and the persistence of technologies that connect. Its imagery anchors those technologies in the material conditions of the economics of information.

The Crying of Lot 49 carves out a place for the literary, and argues that every age has been an age of information.

¹See NASA, *Significant Achievements in Space Communication and Navigation 1958-1962*.

² The plot of *The Courier's Tragedy* adopts some of the story of St. Gennaro, of Naples, whose blood miraculously liquefies on the day his sainthood is celebrated. See Mitov, Michel. *Sensitive Matter: Foams, Gels, Liquid Crystals, and Other Miracles*. Translated by Giselle Weiss. Harvard University Press, 2012.

³ See Johns, *The Nature of the Book and Piracy*.

⁴ Banks, *On the Way to the Web the Secret History of the Internet and Its Founders*; Castells, *The Internet Galaxy*; Hafner and Lyon, *Where Wizards Stay Up Late*; Naughton, *A Brief History of the Future*; Salus, *Casting the Net*.

3. Messenger Bug: *Mumbo Jumbo's* Media Virus

Published in 1972, Ishmael Reed's novel *Mumbo Jumbo* arrived in the midst of what Lily E. Kay describes as a "gestalt switch to information thinking" (xv). Just as the application of Claude Shannon's "Mathematical Theory of Communication" to digital systems resulted in networked computer communication, so the application of Shannon's theory to biological systems resulted in a theory of genetics as information science: "It is within this information discourse that the genetic code was constituted as an object of study and a scriptural technology, and the genome textualized as a latter-day Book of Life" (3). Richard Dawkins, whose 1976 *The Selfish Gene* is representative of Kay's gestalt switch, explains genetics both in terms of print and in terms of computer programming, and coins the term "meme" to describe a media virus. For Dawkins, viruses reveal something essential about genetics and about evolution. Indeed, the distinction between gene and virus is somewhat arbitrary, "We are gigantic colonies of symbiotic genes," not single unified organisms. Viruses, Dawkins suggests, "have evolved from 'rebel' genes who escaped, and now travel from body to body directly through the air, rather than via the more conventional vehicles—sperms and eggs. If this is true, we might just as well regard ourselves as colonies of viruses!" (182).

Mumbo Jumbo centers on "Jes Grew," a "*psychic epidemic*" (5) whose rebel genes travel from human body to human body, and a media virus that "tied up the tubes," that is, the vacuum tubes of 1920s radios (154). Reed develops what Dawkins implies, making the viral rebel genes of Jes Grew into a contagious form of social rebellion, the jazz music and dancing that emerge from African-American culture: "if the Jazz Age is year for year the Essences and Symptoms of the times, then Jes Grew is the germ" (20).¹

Readings of *Mumbo Jumbo*, the most notable by Henry Louis Gates and Madhu Dubey, have tended to highlight the novel's postmodernism, arguing that Reed's emphasis on text, writing, print, and communication offer a revisionist history of the African-American literary tradition. In *The Signifyin(g) Monkey*, Gates argues that Reed signifies on the canonical literature of the Harlem Renaissance: "*Mumbo Jumbo* seems to be concerned to critique and to revise the modes of representation fundamental to the canonical texts that comprise the tradition of the Afro-American novel" (217). For Dubey, the search for Jes Grew's missing text enables an authentic, if absent, site of origin for black American literature, distinguished from the economics of print culture that vitiate the western literary tradition (53). These readings have produced a large body of scholarship on the novel, most of which investigates the ways in which *Mumbo Jumbo* incorporates and resignifies literature, including the canonical literature of the Harlem Renaissance, the detective novel, and science fiction.

Yet Reed's allusive text, I argue, has a hitherto unrecognized referential palette. Although Reed's incorporation of both canonical and generic literary forms is undeniable, *Mumbo Jumbo*'s emphasis on textuality and print, on codes and ciphers, on communications networks, and on a media virus that spreads through human social networks and the technologies that connect them reveals an unmistakable intervention into the potent, historically current discourse of information science—including both genetic science and computer technology. The key themes of Reed's text: viral contagion, media networks, and linguistic and alphabetic codes, are also the key themes of the discourse of information technoscience through the late 1960s and early 1970s, the period of *Mumbo Jumbo*'s composition and publication.

Kay identifies a historically specific "poetics of technoscience" (152), emerging after the publication of the *Mathematical Theory of Communication* in 1948, and the discovery of DNA in

1953. In *Who Wrote the Book of Life?*, she describes a “large-scale scientific and cultural shift in representation—the information discourse” (16). This shift characterized “communication technoscience (cybernetics, information, and computers)” (xv), as “scriptural,” that is, fundamentally determined by a history of print and writing. In the 1960s the genome becomes, according to Kay’s history, a “Book of Life,” the sourcebook for the DNA code: an ur-text, “a language much older than hieroglyphics.”² In accounts of the new sciences of DNA coding and decoding, genetics emerges as a language, a script, and an information science dependent on textual modalities. In studies like *The Language of Life* (1966) and *The Book of Life* (1967) (Kay 17), science assimilates genetics into an information system that depends on print culture. This emerging scriptural vocabulary does not simply include the information technologies identified by histories of print culture, such as Elizabeth Eisenstein’s *The Printing Press as an Agent of Change*, which begins its history of technologies of information and communication as a response to Marshall McLuhan’s anxieties about the new media of the 1950s and 1960s,³ but also associates the sciences of DNA coding and print culture with the emergence of cybernetics and computers.

In addition to being a book of life, DNA also became, in the late 1960s, “a cellular computer program” (Kay 16). At the very moment in which “cybernetics, information, and computers” merge and emerge into a shared scientific discourse and practice, the computer virus appears as a science fictional concept, borrowed from genetics,⁴ but based on the cybernetic notion of the “self-replicating automaton,” which John Von Neumann described as an engine for reproducing information, whether genetic or digital:

Analog and digital computers are the most important kinds of artificial automata, but other man-made systems for the communication and processing of information

are also included, for example, telephone and radio systems. Natural automata include nervous systems, self-reproductive and self repairing systems, and the evolutionary and adaptive aspects of organisms. (21)

In this cybernetic welter, in which, David Porush writes, “*scientific* developments have conspired to give literature the power to contest science’s supremacy” (373), genetics and computers both become increasingly intelligible by means of a discourse of print and writing. This history, “older than hieroglyphics,” becomes, by means of the scriptural metaphor, intelligible through the history and the mechanics of human communication. In emphasizing the means and mechanisms of communication, *Mumbo Jumbo* intervenes, not only in the tradition of the “Afro-American novel” but in the contemporary discourse and practice of information technoscience, characterized by genetic and computer code and by the concept that traverses both information systems: the virus. In insisting on the historical centrality, and the materiality, of both human and machine bodies, *Mumbo Jumbo* makes its version of science neither speculative nor futurist. Rather, this novel’s insistence that scientific and technological discourses, with their dependence on a hieroglyphic language of print and writing, are themselves Afrocentric, and its emphasis on a cybernetic embodiment made familiar to African Americans by racist political and economic structures, make this novel’s radical politics both urgent and entirely consonant with its contemporary discourse of media theory and information technoscience.

Mumbo Jumbo achieves this consonance by means of a virus, spread through both biological and technological connection. This virus, Jes Grew, which Reed describes as an “anti-plague” whose effects are beneficial rather than harmful (6), is also a media virus, a meme that is incubated and communicated by technologies of communication: networks comprised of humans

and communication devices. Indeed, Jes Grew makes a cybernetic association between humans and machines that counters the “talking android” (17) conceived by Jes Grew’s nemeses, the Wallflower Order, with the “radiolas and Dictaphones” of a widespread, jazz-age communications network (64). It is, therefore, neither accidental, nor coincidentally prescient that *Mumbo Jumbo* engages with the scriptural technoscientific discourse emerging in the fields of technology and biology in the 1960s and 1970s, despite *Mumbo Jumbo*’s frequent characterization as both metafictional and futurist. Rather, *Mumbo Jumbo* is quite precisely materialist and historical, and it intervenes explicitly in a discourse in which the stakes for literature and for politics—particularly the biopolitics of race—are quite high.

Mumbo Jumbo presents an Afrocentric history of communications technologies, from Egyptian hieroglyphics, which Reed reintegrates into an African and diasporic history, through “Booker T. Washington’s Grapevine Telegraph” (13), to those “radiolas and Dictaphones.” The viral code that communications technologies and human contagion transmits is Jes Grew, a remnant of ancient African polytheistic and ecstatic ritual practice. In *Mumbo Jumbo*’s 1920s Harlem, Jes Grew threatens a pandemic.

Jes Grew infection constitutes a social and political challenge to the system of bureaucratic monotheism that dominates the U.S. and Europe. “Atonism,” Reed’s label for this repressive monotheism, is supported by a militant administrative wing, the Wallflower Order, “those to whom no 1 ever asked, ‘May I have this 1?’” (132). *Mumbo Jumbo* narrates the epidemic spread of Jes Grew, characterized initially by a “rash” (22). An epidemic transmitted virally both through personal contact and via the radio, Jes Grew is “The stumper of *Psychic Epidemiologist*” (208). The spaces that facilitate music and dancing become the hot zones of Jes Grew infection.

People were doing “stupid sensual things,” were in a state of “uncontrollable frenzy,” were wriggling like fish, doing something called the “Eagle Rock” and the “Sassy Bump”; were cutting a mean “Mooche,” and “lusting after relevance.” We decoded this coon mumbo jumbo. We knew that something was Jes Grewing just like the 1890s flair-up. We thought the local infestation area was Place Congo so we put our antipathetic substances to work on it, to try to drive it out. (4)

Reed’s protagonist, Papa LaBas, an “astrodetective” and Hoodoo doctor, embodies the virus as a form of biological communication with his ancestors and descendants, carrying Jes Grew “like most other folk carry genes” (23). LaBas and the other Jes Grew Carriers pit themselves against the Wallflower Order, which wants to destroy Jes Grew. Jes Grew’s book of life, the codex of its genetic code—the virus is “seeking its text” (6)—is an anthology, composed in hieroglyphics. It is the “book of Thoth,” the ancient Egyptian scribe-deity: “A Book of Litanies... the 1st anthology by the 1st choreographer” (164). Jes Grew overwrites Biblical scripture with a hieroglyphic text that creates a specifically Afrocentric wellspring for an African-American cultural heritage.

Mumbo Jumbo, in fact, triangulates the viral character of jazz music and dancing in the 1920s, the analogous emergence of a cybernetic, transdisciplinary information theory in the 1960s and 1970s, and the scriptural symbolism of hieroglyphics. Perhaps anticipating Jaques Derrida’s resignification of the hieroglyph in *Of Grammatology*⁵, the hieroglyphic represents, for Reed, an Afrocentric tradition of communications technology, a non-Eurocentric print culture.

Reed recuperates hieroglyphics from information theory with a narrative of their Egyptian, that is African, origin. By the early 1970s, hieroglyphics are an overdetermined symbol for communication itself. Hieroglyphics function in this period as an almost universal

sign for the codes and cryptograms that structure communication technoscience, for instance Oedipa Maas's vision of the printed circuit in *The Crying of Lot 49*, which has "a hieroglyphic sense of concealed meaning, of an intent to communicate" (*Crying* 14). Within the discourse of information, hieroglyphics represent an ur-code, an ancient and shared linguistic and genetic system. In an extended comparison, Kay identifies the way in which the Tobacco Mosaic Virus became the Rosetta stone for DNA in 1960-61: "the RNA 'hieroglyphs' of a sequence could be matched with the known 'Greek' protein text; and amino acid replacement analysis could be fancied as cryptanalytic substitution... The Rosetta stone added another potent semiotic prop—images of ancient secret texts—to the representation of the genetic code as a scriptural technology" (190). Kay identifies this as the "notion of biowriting" which, "was authorized in the 1960s and 1970s by invoking the rules of language and the game of life, with all their aporias, circularities, and loss of referentiality, until, as Derrida observed, their 'own historically metaphysical character is also exposed'" (297). Reed's "authorization" is, here, unique in its incorporation of the hieroglyphic as a contemporary, scientific system of "biowriting," as well as a communications technology. The metaphysics Reed attributes to hieroglyphics are distinct from Derrida's, however. In *Mumbo Jumbo*, they originate from "extra-terrestrial phenomenon" of "African myths" (Beauford 15). This extraterrestrial source for communications technologies invokes yet another strain of contemporary discourse: narratives of extraterrestrial microbial threat.

While Kay's recent history of the genetic code aligns DNA with hieroglyphics, a special issue of *Scientific American* magazine, published in September of 1972 and dedicated to communication, also treats hieroglyphics as a universally recognizable symbol of communication by code. The editors selected an illustration of ancient Egyptian hieroglyphic

text to symbolize the varied valences of communication by code. A feature, by art historian E.H. Gombrich, on “The Visual Image,” explains the cover art. The hieroglyphics illustrate the “two independent channels” of “language and image” (86). In the hieroglyphic writing, “the name of the god Osiris was written as a rebus with a picture of a throne (*‘usr*) and a picture of an eye (*‘iri*) to which was adjoined a picture of the divine scepter to indicate the name of a god” (93). The rebus provides the redundancy necessary to overcome any distorting noise conferred by the medium, and Gombrich offers a pop culture response to contemporary media-theory dogma: “Contrary to the famous slogan, we easily distinguish the medium from the message” (91). In this context, while the hieroglyph insists on a semantic detour away from phonetic meaning, that detour then incorporates a riddle that depends on context, phonetic sense, and visual play.

This Osiris rebus resonates in *Mumbo Jumbo*’s alternative scripture, a revision of the Old Testament in which ecstatic pantheism is overthrown by a fascistic and avaricious monotheism. In *Mumbo Jumbo*’s quasi-Biblical account of history, the opposition between “Jes Grew Carriers” such as Papa LaBas and the Wallflowers originates with Jes Grew’s text in ancient Egypt. Papa LaBas explains the origins of the virus: “Well if you must know, it all began 1000s of years ago in Egypt” (162). Osiris is the “human seed” and “germ” of the condition “choreomania” (168). His conservative brother, Set, who regards Osiris as a “recipient of a far-out education,” is “the deity of the modern clerk, always tabulating, and perhaps invented taxes” (162). Osiris and Set represent opposed positions on information science itself: will increasingly complex machines limit themselves to tabulation and calculating? Or will they follow Osiris and enrich the human capacity for communication?

Later, Moses (in this story, a descendant of Set) steals the “sounds of the spirits” from Jethro, who has preserved the Osirian “old songs” (176). This tale narrates the origin of the

“struggle between secret societies” that, according to Reed, underlies every historical conflict (18). This ancient conspiracy to steal sacred texts, sacred technologies, is the basis of the epic clash that the book relates, between the Templar-esque knights of the Wallflower Order, and the followers of Osiris, carriers who preserve and transmit Jes Grew, linked, at one point, to the Masonic order: “The fraternity of the Free Masons was founded in Egypt” (186). Just as the Biblical conflict between Moses and Jethro is a contest for control of the media technology of the “old songs,” the modern incarnation of this epic battle is a contest for control of contemporary media technologies. Hieroglyphics convey the kinetic possibilities of writing and print, in a way perhaps even more closely aligned with a genetic alphabet than an English one. In the hieroglyphic text of the anthology, the characters themselves can be seen to dance: “the 1st anthology by the 1st choreographer” (164).

Hieroglyphics and the virus represent two tropes that *Mumbo Jumbo* shares with the information discourse contemporary with its composition and publication.⁶ For Reed, however, hieroglyphics suggest a uniquely African and African-American scriptural history. Hieroglyphics are the “coon mumbo jumbo” that the Wallflowers must “decode” in order to halt Jes Grew (4). That “mumbo jumbo” is the hieroglyphics that represent Jes Grew’s genetic code, the genetic programming of the virus. When Gates describes Papa LaBas as “a decoder, as a sign reader, the man who cracked *de* code, by using his two heads” (234), he is reiterating Reed’s association between genetic and linguistic code and the mathematical theory of information that brought communication itself into the technoscientific and cybernetic realm.⁷ The Jes Grew code that Papa LaBas carries in his body “like other folk carry genes” (23) resonates, then, in contemporary accounts that develop the virus as part of a system of communication. Just as the Tobacco Mosaic Virus is a “Rosetta Stone” for decoding DNA itself, Jes Grew represents an

informational wellspring, the “old songs” as well as a new “Loa,” a Hoodoo deity that inhabits the circuits of the radio, transmitted along with jazz and revolutionary politics from Haiti and the south towards Harlem and the north.

Mumbo Jumbo's pantheon includes this radio Loa, “this particular Loa has a Yellow Back to symbolize its electric circuitry. We are always careful not to come too close to it. It's a very mean high powered Loa” (151). Reed's description even suggests ARPANET creator J.C.R. Licklider's evocative characterization of technology in the 1962 paper “The System System” “Our present image of technology is a montage. In it, we see the rocket's trail of fire, the mushroom cloud, the streak of lightning that portrays electronics' might” (2). The yellow streak of lightning that distinguishes the radio Loa adds to Jes Grew a galvanic sense of animating spiritual energy. The Loa is a perfect analog for the media virus: rogue information that can inhabit a human body or a media device. Bodies are machines, for Jes Grew and the Loa, just as they are for Richard Dawkins' selfish genes and memes: carriers and transmitters of information.

Jes Grew's viral character, which Michael E. Chaney identifies in “Slave Cyborgs and the Black Infovirus,” as a prescient, “subtle interlacing of technologies more contiguous with the 1990s than the 1970s” (262), underestimates Reed's engagement with dominant discourses in information science in the 1970s, particularly the scriptural, hieroglyphic, and viral characterizations of information. Furthermore, the racialized rhetoric of jazz music and dancing in the 1920s—Reed quotes J.A. Rogers, from an essay in *The New Negro*, “It is just the epidemic contagiousness of jazz that makes it, like measles, sweep the block” (64)—testifies to its own viral character. In between the coining of the terms “computer virus” in 1969, and “meme,” in 1976, *Mumbo Jumbo* creates a typology in which the mass production of the radio and radio's role in the viral popularity of jazz function as antitypes for the computer and the media virus.

In *Media Virus!*, Douglas Rushkoff explains that the language of epidemic and contagion is not metaphorical, but rather an instance of viral transmission in alternate media:

This term is not being used as a metaphor. These media events are not *like* viruses. They *are* viruses....The attacking virus uses its protective and sticky protein casing to latch onto a healthy cell and then inject its own genetic code, essentially genes, inside. The virus code mixes with the cell's own genes, and, if victorious, it permanently alters the way the cell functions and reproduces. A particularly virulent strain will transform the host cell into a factory that replicates the virus....

Media viruses spread through the datasphere the same way biological ones spread through the body or a community. But instead of traveling along an organic circulatory system, a media virus travels through the networks of mediaspace. (9–10)

Jes Grew's "interlacing of technologies" is, then, quite significantly more contemporary than Chaney observes. Dawkins' characterization of the meme is also both physical and spiritual. Like the Hoodoo Loa, the meme moves from body to body:

When you plant a fertile meme in my mind you literally parasitize my brain, turning it into a vehicle for the meme's propagation in just the way a virus may parasitize the genetic mechanism of a host cell. And this isn't just a way of talking—the meme for, say belief in life after death is actually realized physically, millions of times over, as a structure in the nervous system of individual men the world over. (192)

And indeed, after failing to find its text after an 1890s outbreak, Jes Grew is “driven back into its Cell” (211).

Punning aside, Jes Grew’s viral character is quite contemporary with 1920s racial rhetorics, as well as with what Nancy Tomes describes as the origins of “The Gospel of Germs,” rhetorics of contagion and hygiene that follow the discovery and popularization of the germ theory of disease in the middle and late nineteenth century. These rhetorics also see their antitypes fulfilled in the late 1960s, leading to the normalization of the scriptural information discourse in the 1970s. These antitypes include the emergence of the computer virus as a digital self-replicating automaton in Von Neumann’s 1966 work, in the first appearance of the term “computer virus” in the 1969 science fiction story by David Gerrold, “When Harlie Was One,” and in the “killer virus” genre, also originated in 1969 with Michael Crichton’s novel *The Andromeda Strain*, and they continue in Jes Grew, a virus that jumps from technological to biological species. The novel’s 1920s setting, yet precise historical calibration to the information discourse of the 1970s, suggests an analogous version of the contemporary “knowledge-power nexus ... within which molecular biology reconfigured itself as information science and represented its objects in terms of electronic communications systems” (Kay 129). In fact, the three moments in which the novel sets its outbreaks reflect particular, historically situated iterations of that nexus, moments when discourses of biological contagion and technological innovation respond to racist rhetorics.

In *The Gospel of Germs*, Tomes outlines the ways in which fears of microbial contagion take on a racialized character, in the period Reed identifies with Jes Grew’s previous outbreak, “the 1890s flair-up” associated with Ragtime, and the current one, in the 1920s, which Gates identifies as “the first full scale, patronized attempts to capture the essence of Jes Grew” (224).

The decades 1890s, 1920s, 1970s, are important in that they represent significant, indeed paradigmatic, shifts in the understanding of the key concepts of Reed's scientific intervention. The 1890s represent the first attempts to implement germ-theory based public health practices, the 1920s represent the beginnings of a widespread radio-based media network, and the 1970s signal the charged coalescence of cybernetics through genetics, information, and computers. The novel's history in fact mirrors a social history of the virus: from miasmatic pathogen to racialized contagion to media virus simultaneously genetic and memetic.

Tomes' account offers context for the "1890s outbreak" of Jes Grew:

Going out to play in the Progressive-era city involved further risky contacts. As Victorian dictates about class- and gender-specific activities weakened, commercialized forms of entertainment drew Americans of diverse backgrounds into convivial new associations. Young people in particular flocked to plays, cabarets, amusement parks, penny arcades, and dance halls. (110)

The dance halls and convivial associations are the spaces of infection, and Reed's Jes Grew finds, in those spaces, fertile ground for contagious spreading.

Gates, in a somewhat circular account, suggests that the novel's setting in the 1920s recognizes "the first full-scale patronized attempt to capture the essence of Jes Grew." *Mumbo Jumbo* makes the relationship of period to media technology decidedly more problematic than Gates acknowledges, however, for, in addition to linking key moments in the evolution of social and technological networks and in the history of disease, *Mumbo Jumbo* identifies Jes Grew as a media virus associated with culturally current theories of media technology in addition to its complementary histories. While the novel's villain, Hinkle Von Vampton, is undoubtedly named for the Harlem Renaissance patron Carl Van Vechten, the name has additional significance.

Gates connects Von Vampton's first name to "the German *hinken* ('to limp')," suggesting "the German engraver Hermann Knackfuss, whose name translates as 'a person with a clubfoot'" (224). "Hinkle" more likely, I think, points to Dr. Lawrence E. Hinkle, according to Alvin Toffler in the hugely popular *Future Shock* (1970), a pioneer in the field of "human ecology" and in the relation of environment to disease (327), and a researcher in brainwashing and psychological warfare.⁸ Indeed, Hinkle Von Vampton's strategy involves creating a "Talking Android," a "Human Vaccine who will make Jes Grew seem harmful" (137). Failing in the creation of the android, Von Vampton attempts to brainwash the innocent Woodrow Wilson Jefferson, raised in the remote town of "Rē'-mōte" Mississippi on the writings of Marx and Engels, into a mole for the Wallflowers among the Jes Grew Carriers in Harlem.

This paranoia about brainwashing, moles, and secret societies leads Timothy Melley to associate Reed with Toffler, Marshall McLuhan, and the paranoid style such misunderstandings and misapplications of science produce. Melley categorizes them as symptomatic of a cold-war, paranoid, "agency panic" which "usually involves a secondary sense that controlling organizations are themselves agents—rational, motivated entities with the will and the means to carry out complex plans" (12–13). *Mumbo Jumbo* is part of the literature of postmodern paranoia: "Reed's 'Atonist' culture industry" is just one of many secret conspiracies conceived by the paranoid protagonists of literature of this period: "These organizations are sometimes concrete agencies, like DeLillo's CIA or Heller's corporatized Army, but they are just as often more diffuse structures—Pynchon's 'Them,' Burroughs's 'junk virus,' Atwood's 'men'" (13).

In Melley's summary, *Mumbo Jumbo* involves a "pliant" subject who "wanders" through the fiction (52). Yet Reed's Atonists are by no means "diffuse." They are, rather, a highly structured bureaucratic organization:

The headquarters of the Wallflower Order, backbone of the Atonists is, due to the Jes Grew contagion, bustling with activity. Aides run about like ants scurrying across a white telephone. They use a new invention Television to scan the U.S. for Jes Grew activity at this moment stirring Chicago. (63)

Unlike those between “Pynchon’s ‘Them’” and its opposition, the battle lines between Jes Grew and the Atonists are clearly drawn. Each side also has a complement of technological aids. The Atonists use television, but Jes Grew has taken over the radio. Digital technologies seem to be on the side of Jes Grew, “creatures whose mothers were scared by computers” side with the Atonists (63). Melley’s agency panic suggests that paranoia is itself a diffuse and pervasive condition, yet Reed’s history highlights the ways in which, for African Americans, history really was a conspiracy. Reed’s revisionism is then not so much centered on realizing a pervasive and diffuse paranoia, but rather mobilizing a “conspiracy theory of society”⁹ in a situation in which the history of American slavery complicates the dismissal of historical conspiracy as only theory.

In addition to the biological bodies of those infected by Jes Grew, radio becomes a contested, machinic embodiment of the virus. Echoing the paranoia about brainwashing and contagion, *Mumbo Jumbo* casts radio as a tool of biopower caught in a struggle for the control of media technologies and the control of information. This representation of the radio is itself historical. Lee De Forest appears as a character in *Mumbo Jumbo*. De Forest’s invention of the audion “laid the foundation for the modern electronics industry” (Lewis 2), but he was also a charlatan and swindler eventually prosecuted for fraud. In *Mumbo Jumbo* he laments the perversion of radio into a network communicating popular music:

The morning began with Dr. Lee De Forest, inventor of the 3-element vacuum tube which helped make big-time radio possible, collapsing before a crowded

press room after he pleaded concerning his new invention, now in the grips of Jes Grew.

“What have you done to my child? You have sent him out on the street in rags of ragtime to collect money from all and sundry.

You have made him a laughing stock of intelligence, surely a stench in the nostrils of the ionosphere” (94).

While biographers do not record a public, racially motivated denunciation, De Forest’s checkered career and life included public attacks on the radio’s commercialization almost certainly motivated by a failure to maintain a monopoly on the technology. Additionally, De Forest’s audion was a predecessor of the vacuum tube, itself a predecessor of the transistor, which eventually enabled microcomputing.¹⁰

The Wallflowers therefore attempt to contain Jes Grew not only by quarantining the infected, but by limiting access to the technologies that spread Jes Grew. *Mumbo Jumbo* casts the Great Depression as an effect of conspiratorial plotting to keep technology out of the hands of working people and therefore keep them from catching and spreading Jes Grew. In so doing, *Mumbo Jumbo* positions the media conflict at the center of the book not only along racial lines, but also as a conspiracy against the working class. Two of the story’s villains, the Wallflower “Hierophant” and a leader of the order, tycoon industrialist Walter Mellon, plot to halt Jes Grew by restricting access to media technologies.

This is the way I look at it. Jes Grew tied up the tubes causing Dr. Lee De Forest to cop a plea at the press conference.

That is correct, Mr. Walter Mellon.

At the rate of radio sales, 600,000,000 dollars' worth will be sold by 1929, correct?

That is true, Mr. Walter Mellon.

Suppose people don't have the money to buy radios. It will be an interesting precaution against this Jes Grew thing. Isn't that so?

Reed offers an alternate explanation for the Great Depression, in which the wealthy consolidate power in order to control the "liquidity of Jes Grew" that has "resulted in a hyperinflated situation" (154). The consequent depression has the incidental effect of eliminating the conditions that incubate and transmit Jes Grew, including widespread access to a communications network

Mumbo Jumbo's 1920s setting, with its emphasis on radio following from Reed's previous novel, *Yellow Back Radio Broke Down*, has led critics to characterize *Mumbo Jumbo* as a "pre-McLuhanite" novel that treats "radio as technology manqué" (Chaney 262). Yet radio is not simply a failed mass medium. In situating the radio at the intersection of media technology and property, *Mumbo Jumbo* makes radio a nexus of labor, culture, and technology: a set of alternate embodiments of the Jes Grew virus. Furthermore, multiple association with computers, including the assertion that the Wallflowers maintain a relatively anti-technology stance, within their ranks are "creatures whose mothers were scared by computers" (63), support the radio-computer analogy.

Both the 1890s and 1920s outbreaks of Jes Grew then represent moments when information science—as construed in the period of the novel's composition—intersected with the politics of race and class. This goes without saying, also, for the novel's period of composition, as well as its conclusion, dated in January 1971. The reconfiguration of genetics as information

science had significant consequences for understandings of race. For Chaney, the connection between race, radio, computers, and network culture is obvious; he labels Jes Grew a “disembodied infovirus” (272) that “randomly ‘downloads’ into people during interfaces with certain cultural events” (274). “Blackness,” he writes, “is transmitted and transformed by culture into a code that can be mimicked or reproduced” (280). Yet while the novel at times represents race as something fluid and contagious, Jes Grew is quite decidedly *not* random, nor is it disembodied. Rather, it appears to move between technological and biological bodies. Jes Grew embodies Von Neumann’s notion of a replicator, and Dawkins’ notion of the meme. Furthermore, the novel’s representation of race as something both genetic and memetic reflects discourse in the biology of race, as well as anxiety within the discipline of cybernetics about the implication of artificial intelligence emerging from a media network. In the introduction to the second edition of *Cybernetics*, published in 1965, Norbert Wiener raises questions about the ways in which computers might enable the return of a slave society, “Any labor that accepts the conditions of competition with slave labor accepts the condition of slave labor and is essentially slave labor” (27). Chaney recognizes the computer-radio association:

Reed’s use of the computer as a metonym for the power politics of slavocratic society may also reflect a commonplace recourse in proscience literature, which assuaged patriarchal anxieties regarding a technological revolution that was then unfolding alongside the Civil Rights and feminist movements by presaging the new age in technology in terms of a return to the age of slavery. (265)

This connection between race and cybernetic science extends beyond the economics of information, however. The emergence of genetics as an information science encouraged a resurgence of eugenicist thinking in the mid 1960s, of which perhaps the most high-profile was

Nobel-laureate physicist and semiconductor inventor William Shockley, who gave an inflammatory interview to *U.S. News and World Report* in 1965 in which he argued for a race-based eugenics.¹¹ However, the definitive response to such eugenicist rhetoric continues to be Luigi Cavalli-Sforza's work on diversity and interaction between human populations. From the 1970s, Cavalli-Sforza identified the historic and "diasporic" interrelation between races. In his definitive 1971 study, *The Genetics of Human Populations*, Cavalli-Sforza dismantles eugenicist arguments that form the basis for this new scientific racism and urges a material solution, "the most rapid way to equalize reproductive differences is to improve socioeconomic conditions" (799). Arguing for an "equalization of the environment" (802), Cavalli-Sforza echoes both Reed and Weiner's implicit assertions: that inequality of access to technologies and other resources is a basis for racial inequality, while genetic difference is not. And while Papa LaBas carries Jes Grew "like other folk carry genes," the virus does not require sexual reproduction. Contagion, in fact, works to accomplish the "equalization of the environment" Cavalli-Sforza urges. Papa LaBas urges seeking out the social spaces in which conviviality encourages contagion: "So don't ask me how to catch Jes Grew. Ask Louis Armstrong, Bessie Smith, your poets, your painters, your musicians" (152).

Reed's rhetoric of technological and biological contagion is itself a decidedly historically situated intervention. The information discourse of the 1970s inspires two trends in popular genre fiction, trends which Reed incorporates and manipulates in *Mumbo Jumbo*. The first of these, the "killer virus" novel, appears in the late 1960s and early 1970s as a response to the "ontological shift whereby the corporeal body is turned into an information system" (Dougherty 2). The second, which I designate the "scary computer" genre after Reed's suggestion about the Wallflower Order's fear of technology, includes such work as "When Harlie Was One," which

first identified the computer virus, and *A For Andromeda*, which combines the two genres by imagining both an alien microbial threat and a killer computer. All date from the mid or late 1960s, all engage the contemporary information discourse, and all are references for *Mumbo Jumbo*.

Stephen Dougherty's "The Biopolitics of the Killer Virus Novel" identifies the ways in which fears about the permeability of the body to viral code, either biological or technological, are predictably racialized in popular culture. In such novels as *The Hot Zone* by Richard Preston and *Ebola* by Dr. William Close, the killer virus is represented with an explicitly African origin, in which the integrity of the white body is compromised by viral code originating in some equatorial jungle. According to Dougherty, "saving the human from the code will ultimately demand the recuperation of an all-too-serviceable colonial-racist logic: the white West affirms its humanity by denying the full humanity of the nonwhites who most viscerally embody the threat of viral contagion" (5). Yet while Dougherty identifies the "ontological shift" to information discourse as the origin of the racialized "killer virus" plot, Reed acknowledges that the racialized rhetoric of the virus, biological and technological, has a deeper history than Dougherty and Chaney recognize. The threat of viral contagion has long been associated with African-Americans. According to Tomes, "As Charles P. Wertenbaker, a white doctor in the U.S. Public Health Service, explained in 1909, 'The negro is the disease reservoir of the South from which our supply of diseases is being constantly augmented'" (220). This notion of the killer virus emerges from early efforts to battle infectious microbes such as tuberculosis and cholera, and Reed makes reference to such early anti-infection efforts, "But can't you put it under 1 of them microscopes?" (4), yet suggests that western science continues to get contagion wrong. Whether

miasma or mania, Jes Grew posits conviviality and contagion, “equalization of environment,” as an antidote and a remedy rather than a pathology.

Associating Jes Grew with disease epidemics as well as “dance manias,” Reed invokes both medieval tarantism and J.A. Rogers’ description of jazz as an epidemic like the measles in *The New Negro* (1924). “The Wallflower Order,” Reed writes, “remembers the 10th-Century *tarantism* which nearly threatened the survival of the Church” (64). Indeed, tarantism offers yet another historical source for Jes Grew, another outbreak in which both the disease and the cure are figured as contagious and ecstatic: “In tarantism, the tarantella (music and dance) does not have the function of curing the tarantulee of her hysteria, but on the contrary, provides her with a means of behaving like a hysteric in public, in accordance with a model recognized by all, thereby freeing her from her inner misfortune” (Rouget 164). While Reed’s source for tarantism is likely the spiritualist writings of Madame Blavatsky, whom he notes in his partial bibliography, several of his sources on Haitian Voodoo evoke comparisons with tarantism. Additionally, its southern Italian origin and apparent relationship with “orgiastic and initiatory cults of classical antiquity” as well as “African analogues,” and “common Mediterranean homeland” certainly offer evidence, however folkloric, of a diasporic spread, and a northern-European repression, of a common, ecstatic spiritual heritage.¹² Reed’s reference to tarantism further represents the failure of the Wallflower’s power structure to recognize not only the benefits of Jes Grew, but the ways in which it represents a re-emergence of tendencies and technologies held in common, by those of African and European descent, through recorded history.

J.A. Rogers, whom Reed quotes briefly, also aligns jazz with this specific epidemic virulence. In his essay “Jazz at Home,” Rogers associates jazz both with the viral hot zones

where pathogens originate, and then with the memetic contagion that Reed's Wallflowers find so threatening: "And yet jazz in spite of it all is one part American and three parts American Negro, and was originally the nobody's child of the levee and the city slum. ...It is just the epidemic contagiousness of jazz that makes it, like the measles, sweep the block. But somebody had to have it first: that was the Negro" (216). Rogers' characterization of the "Negro" as the source of both viral epidemic—as for Wertenbaker a decade and a half earlier, the levee and the slum are, even in the early days of the germ theory, treated as miasmatic sources for contagious disease—and "dance mania," and his identification of the spaces of convivial association in which, in *Mumbo Jumbo*, Jes Grew threatens to cross the lines of race, class, and sex, certainly anticipates the identification of the media virus as a 1990s phenomenon. Indeed, the associations in *Mumbo Jumbo* between DNA code and ancient text, and between biological and technological virus, suggest a cybernetic sensibility less prescient than precisely contemporary.

Reed's history of the virus, then, is much more expansive than either Chaney or Dougherty's account, which ignore both the degree to which concepts of viral information are deeply historically embedded, and the degree to which contagion has worked, in literature, to reveal social and material connections, networks, that the conspiracies of the powerful obscure. In *Mumbo Jumbo* the powerful are the Wallflowers, conspirators in slavery, capitalism, institutional racism.

In "Narrative Networks," Caroline Levine's reading of Dickens' *Bleak House* offers an extraordinarily perceptive account of the ways in which disease reveals social networks. Indeed, the science of social networks is itself also contemporary with *Mumbo Jumbo*'s composition and publication. While Levine positions *Bleak House* in the context of 21st-century network theory and Victorian social mores, her examination of the way in which the novel as a genre represents

interlocking social networks echoes not only *Mumbo Jumbo* itself, but the discourse of the network contemporary with it. The ARPANET computer network was first brought online in 1969, after its conceptual creator and ARPA official J.C.R. Licklider imagined an “Intergalactic Network” connected by computer.¹³ Stanley Milgram, famous for the Harvard obedience experiments, embarked on his “small world” project in 1967. That project, the source of the “six degrees of separation” meme, was the first attempt to use social-scientific methods to identify real-world social networks.¹⁴ *Mumbo Jumbo* employs the Jes Grew virus in much the same way Milgram’s experiment used the U.S. Mail: to reveal networks. Levine’s reading of *Bleak House*, however, shows quite clearly the ways in which disease in the novel represents a formal mechanism that also, quite starkly, reveals such networks.

“*Bleak House*,” Levine writes, “relies heavily on the form of the network in a way that paves the way for recent narratives about political, technological, economic, and social networks” (517). Like *Mumbo Jumbo*, *Bleak House* reveals the fictivity of social distinctions, distinctions of class in the latter, class and race in the former, by narrating the ways in which disease, money, and information (in *Bleak House* represented as gossip) reveal social interconnection and interdependence. Levine writes, “*Bleak House* does for character what Marx did for commodities, casting narrative persons less as powerful or symbolic agents in their own right than as moments in which complex and invisible social forces cross. Characters are not centered subjects but points of social intersection” (519). Like both Jo and Jarndyce in *Bleak House*, Papa LaBas is in some sense invisible, marginalized, and yet also a supremely connected node. In *Mumbo Jumbo*, Papa LaBas connects a network that extends across the Black Atlantic diaspora. The network novel, Levine suggests, offers alternatives to conventional constructions

of authority and narrative power. This construction, evident in *Bleak House*'s detective-fiction forms, often depends on what is excluded. Levine argues,

conventional readings of detective fiction have missed the importance of the narrative middle by too strongly favoring the analysis of closure. The suspense of the middle occurs when a narrative clearly signals that it is holding something back. These moments might indicate that we are missing a crucial piece of information—like a secret—or they might deliberately prolong an uncertain process, keeping back a knowledge of the outcome. (521)

In *Mumbo Jumbo*, of course, what is held back is the text of Jes Grew itself. Gates also considers *Mumbo Jumbo* as a detective novel: “the solution of the novel’s central mystery would be for Jes Grew to find its text. This text, Papa LaBas’s allegorical narrative tells us, is in fact the vast and terrible Text of Blackness itself” (233). And while, elsewhere, Gates suggests that it is a failure that Jes Grew never unites with its text, for Levine, the network novel offers its alternate construction of power by emphasizing absence:

we may grasp the overwhelmingly complex webs of social interconnections in glimpses and hints, but the networks that connect rich and poor, city and world, the dead and the living are never fully present to consciousness. If the overlapping of social networks approaches a magnitude and a complexity so great that their wholeness defies full knowledge, the narrative form best suited to their elusiveness may be the narrative that suggests and withholds—that is, the narrative of suspense. (522)

For Reed, power is not revealed by representation. Papa LaBas’s ally, the Haitian rebel leader Benoit Battraville is “so bad that he isn’t mentioned in the index of one of the few books which

cite him” (150); Battraville is as powerful as his absence, and the same is true for Jes Grew. Indeed, Reed never completes the narrative that is framed by a college lecture delivered by Papa LaBas at Berkeley in January of 1971: “In 1920 Jes Grew swept through this country and whether they liked it or not Americans were confronted with the choices of whether to Eagle Rock or Buzzard Swoop, whether to join the contagion or quarantine it” (212). But Papa LaBas never finishes his story. The narrative remains one of suspense even after the novel ends.

Reed also quite deliberately categorizes *Mumbo Jumbo* as an “astrodetective” novel (64). Generic sources for *Mumbo Jumbo* seem to be equal parts detective fiction and science fiction. In a 1973 interview, Reed describes the book as a scientific detective novel that narrates “the way a Black scientist approaches a problem” (Beauford 12). In *Mumbo Jumbo* he suggests that “Science Fiction might be more revolutionary than any number of tracts, pamphlets, manifestoes of the political realm” (18). Both detective and science fiction genres have historically represented zones of exchange in which ideas are adopted from science into cultural forms, or sometimes vice versa—perhaps less the contest that David Porush describes, and more accurately a collapsing of distinctions, in *Mumbo Jumbo*’s specific historic moment, between science and literature, precipitated by the scriptural modality of the information discourse.

In *The Selfish Gene*, Dawkins uses an extended comparison with the plot of the science fiction novel *A For Andromeda* in order to explain the ways in which genetic information is communicated, and Michael Crichton, whose *Andromeda Strain* inaugurates the “killer virus” genre, proposes a scientific theory he calls “The Messenger Bug.” Attributed to the fictitious “communications engineer,” the Messenger Bug theory holds that the most probable way that an “advanced” extraterrestrial culture will contact Earth is by means of a biological agent. If another culture “wishes to have a sort of ‘coming-out party’ on a galactic scale,” according to Crichton’s

scientists, “They wish to spew out information, clues to their existence, in every direction. What is the best way to do this? Radio? Hardly. [...]. In short, you devise an organism to carry your message. The organism would be self-replicating, cheap, and could be produced in fantastic numbers” (223). Crichton’s messenger bug theory proposes that the alien communication mechanism, broadcasting microbes through space, “is like spewing out a billion brain cells, each capable of regrowing a complete brain under the proper circumstances” (224). For Crichton, like other killer virus authors, the relationship between information, code, and organism is something potentially terrifying.

A For Andromeda represents almost that same plot, except that instead of causing biological contagion, the extraterrestrial communiqué contains a program, which builds a computer, which then virally infects a human body, thereby taking on human form. The conclusion Dawkins draws from his reading of *A For Andromeda*, a television drama and popular novel published in 1962, reflects Reed’s “extraterrestrial” history of Jes Grew, and offers a case study of the ways in which information science refers to literature in an increasingly recursive development of the discourse of information as an inheritor of a print, and even narrative, tradition.

Dawkins describes *A For Andromeda* at length in order to illustrate genetics as a communications technology, in that it “controls” behavior, but doesn’t exert direct influence at any time.¹⁵ *The Selfish Gene* develops the “Andromeda Analogy” as a means of explaining the problem of communication within an evolutionary temporality, “genes are denizens of geological time: genes are forever” (34). In *A For Andromeda*, an alien civilization broadcasts a radio signal that carries, eventually, the plans with which to build a computer, which will in turn enable humans to synthesize DNA, which will, in turn, enable interstellar contact. Because the great

distance between Earth and the Andromedans inhibits communication, a long range conversation is pointless. Instead, the Andromedans broadcast a monologue, “more like letters than conversations,” or, as Dawkins points out, like whalesongs (53). The Andromedans, in Dawkins’s summary, “assembled everything they wanted to say into one huge unbroken message, and then they broadcast it out into space, over and over again, with a cycle time of several months. Their message was very different from that of whales, however. It consisted of coded instructions for the building and programming of a giant computer” (54). Of course it should go without saying that this computer is totally hostile to humans and threatens world domination.

Like the Andromedans, the genes can only do their best *in advance* by building a fast executive computer for themselves, and programming it in advance with rules and “advice” to cope with as many eventualities as they can “anticipate.” But life, like the game of chess, offers too many different eventualities for all of them to be anticipated. Like the chess programmer, the genes have to “instruct” their survival machines not in specifics, but in the general strategies and tricks of the living trade. (55)

Inasmuch as DNA constitutes a book, genes also represent a computer, with DNA as the program. The genes themselves “automate,” they execute predetermined programs in response to inputs.

Like *A For Andromeda*, the 1969 short story by David Gerrold, “When Harlie Was One,” represents the “scary computer” genre. While *A for Andromeda* depicts the potential for encoding technological instructions within biological material, a virus that leads to the production of a computer, in “Harlie” a rogue program results in a computer developing human

consciousness and emotions. That program, called VIRUS, represents the first appearance of that term associated with computers rather than organisms:

“Do you remember the VIRUS program?”

“Vaguely. Wasn’t it some kind of computer disease or malfunction?”

“Disease is closer. There was a science-fiction writer once who wrote a story about it—but the thing had been around a long time before that. It was a program that—well, you know what a virus is, don’t you? It’s pure DNA, a piece of renegade genetic information. It infects normal cells and forces it to produce more viruses—viral DNA chains—instead of its normal protein. Well, the VIRUS program does the same thing.” (154)

Harlie runs predictably amok. In this first instance of a computer virus tying up the “tubes” of networked communication, the origins of Jes Grew’s “infoviral” character appears.

The computer virus and the killer virus, two genres which *Mumbo Jumbo*’s Jes Grew consolidates, also meet in Michael Crichton’s *Andromeda Strain*, which originates the “killer virus” science fiction genre in 1969. Dougherty’s study of this genre demonstrates the ways in which it follows from the emergence of information discourse, “in the last fifty years, many life scientists have gone from thinking of the body as an organic and holistic unit, understood in functionalist terms, to thinking of the body as a technological communications system” (1). Such novels,

refuse any ontological distinction between the gene and the software program.

Given the terms provided, it is nearly impossible to distinguish between a human virus and a computer virus: both species of virus are codes that integrate

themselves into previously existing complex-coded structures, and then begin replicating themselves by rewriting to their own specifications. (9)

In the killer virus novel, “saving the human from the code will ultimately demand the recuperation of an all-too-serviceable colonial-racist logic: the white West affirms its humanity by denying the full humanity of the nonwhites who most viscerally embody the threat of viral contagion” (5).

In *The Andromeda Strain*, Crichton sets the killer virus paradigm. Additionally, he mobilizes the information discourse of the late 1960s and early 1970s, even to the point of inventing a “communications engineer” to comment on the mechanisms of his own viral outbreak. *The Andromeda Strain* proposes a scientific theory it calls “The Messenger Bug.” Attributed to the fictitious “communications engineer,” the Messenger Bug holds that the most probable way that an “advanced” extraterrestrial culture will contact Earth is by means of a biological agent. If another culture “wishes to have a sort of ‘coming-out party’ on a galactic scale,” according to Crichton’s scientists, “They wish to spew out information, clues to their existence, in every direction. What is the best way to do this? Radio? Hardly. [...]. In short, you devise an organism to carry your message. The organism would be self-replicating, cheap, and could be produced in fantastic numbers” (223). Crichton’s messenger theory proposes that the alien communication mechanism, broadcasting microbes through space, “is like spewing out a billion brain cells, each capable of regrowing a complete brain under the proper circumstances” (224). For Crichton, like other killer virus authors, the relationship between information, the code, and the organism is something potentially terrifying.

Dougherty describes his structural analysis of *The Andromeda Strain* thus, “the sequence of events is (1) emergence of a species-threatening plague crisis; (2) mobilization of the

medical/scientific community in response to the crisis; and (3) aversion of the crisis but with the caveat that it could easily happen again” (25 n.7). This structure, dependent as it is on the emergence of information discourse, also accurately reflects *Mumbo Jumbo*’s representation of the Jes Grew outbreak. The killer virus genre emerges, Dougherty argues, from a combination of information discourse and a paranoia that associates tropical hot zones, in Africa especially, with racialized fears of contagion: “Like medical/cultural discourse in the colonial era, contemporary killer virus novels represent brutal aggression against nonwhites as epidemiological defense in the name of an endangered humanity” (18).

Mumbo Jumbo follows the pattern Dougherty identifies, but with a reversed polarity in which the value of African origin, a common factor in almost all killer virus fiction, is upended, and African-American cultural forms such as “Cakewalking and ragtime” and jazz threaten the Atonists’ Eurocentric hegemony (208). *Mumbo Jumbo*, read in the context of killer virus fiction, does not represent the communicable biological threat as one of miscegenation, as might be expected, but rather as a threat of revolutionary science and rebellious genes. Although Jes Grew follows the geographical pattern identified by Dougherty, emerging in a tropical hot zone, and spread by nonwhite carriers, “J.G.C.s.” experience health and vitality. The message that this bug carries is the potentially viral African-American culture—music and dancing particularly—positioned as a threat to dominant, repressive, Eurocentric forms of expression. Yet the revolutionary possibilities that *Mumbo Jumbo* imagines depend not only on biological contagion, but on achieving control of media technologies. James Gleick’s description of the ways in which contagion and communication became synonymous in the 1960s is instructive:

The replication of DNA is a copying of information. The manufacture of proteins is a transfer of information: the sending of a message. Biologists could see this

clearly now, because the *message* was now well defined and abstracted from any particular substrate. If messages could be borne upon sound waves or electrical pulses, why not by chemical processes? (310).

The Jes Grew messenger bug uses the synonymy between biological and technological information in order to effect an identity between humans and machines, to efface the differences between biological and technological embodiment. This machinic embodiment represents what is perhaps *Mumbo Jumbo*'s most significant cybernetic intervention, and it also embodies oppositional theories of media. "Viruses are radical democrats, disdainful of social distinction" writes Terry Eagleton in *The English Novel* (160). As in *Bleak House*, the message the virus carries in *Mumbo Jumbo* is that social, political, and racial distinctions are illusory. The movement of jazz out from the "levee and the city slum" testifies to its radical lack of discrimination. Yet despite the ways in which the virus reveals how illusory social or racial distinction is, *Mumbo Jumbo* also incorporates a radically materialist politics in which economic inequality reinscribes racialized difference. Reed emphasizes embodiment as a way of figuring inequality beyond a racial binary, using machines as cybernetic figurations for both labor and property.

Chaney echoes Norbert Wiener's concerns about the ways in which technology, by licensing competition with machine labor, licenses slave labor, arguing that the topic of machinic life has graver resonances in African-American fiction because the notion of machinic life in bondage to human masters creates uncomfortable resonances with American slavery. The computer, he notes, "is a metonym for the power politics of slavocratic society" (265). Chaney also notes, "we should not fail to recognize the commodity affinities between antebellum slaves and modern computers" (272). Chaney's posthumanist reading of *Mumbo Jumbo* as a Haraway-

esque evocation of the cyborg, aligned with a nineteenth-century literary construction of the mulatto is persuasive, yet his description of Jes Grew as a “*disembodied* infovirus” (my emphasis) (272), whose operations are random, underestimates the precise historical situation in the novel. The machinic embodiments of Jes Grew reveal extraordinarily high stakes. Jes Grew is neither disembodied, nor random. *Mumbo Jumbo* in fact insists on representing the virus as always embodied, whether in the radio or in the marathon dancing couples. *Mumbo Jumbo* insists on the virus as embodied information.

While the forms of detective fiction employed in *Mumbo Jumbo* urge us to take seriously its networked nature and its technoscientific intervention, science fiction also represents a touchstone for scholarship on the novel. The connection between the virus and the computer that first emerges in science fiction in the years 1969-1971, along with *Mumbo Jumbo*, represent a reckoning with the emergence of a virus that can jump between biological and technological bodies. Cultural historian Jussi Parikka offers this account of the media virus as itself a marker of cultural exchange:

The digital virus is not solely an internal computer problem but a trace of cultural trends connected to consumer capitalism, digitality, and networking as the central cultural platforms of the late twentieth century. The virus is also an expression of the media ecology and the so-called biological diagram of the computer where the biological sciences are actively interfaced with computer science, often with a special emphasis on bottom-up emergence. (3)

While viruses reveal a history of cultural and material exchange, particular histories also emerge from analyses of viruses. Parikka argues that in literature and film of the 1980s, “‘viruses’ and ‘virality’ became central figures in the sense in which tuberculosis had been in the nineteenth

century” (8). Yet as Tomes has shown, “viruses” and “virality,” as well as tuberculosis in the nineteenth century, carry with them an explicitly racialized threat to Eurocentric power structures.

While conventional killer virus plots identify the virus with a racialized tropical hot zone, and while the scary computer plots of “Harlie” and *A For Andromeda* hint that the revolt of the machines will be a slave rebellion, critics loosely grouped under the Afrofuturist rubric have considered the ways in which Reed employs “sf protocols” in order to destabilize science fiction’s racist structures (Lavender 163). Alondra Nelson, who first convened the Afrofuturist working group, describes *Mumbo Jumbo* as “fertile ground” (6) for an account of the ways of the which “African-American thought” has over a century of experience utilized “sophisticated tools for the analysis of cyberculture” (3). Papa Labas’s assertion, “We will make our own future Text” (204) has proven to be a rallying cry for a subsequent theory of speculative narratives that imagine the overthrow of racist structures.

Afrofuturism, in J. Griffith Rollefson’s broad characterization, identifies a “uniquely African-American take on futuristic narratives of scientific and technological progress” (84). In *Mumbo Jumbo* Nelson identifies a “paradigm for an African diasporic technoculture” (8). Indeed. However, and despite Reed’s own occasional assertions to the contrary, it is essential, I argue, to understand *Mumbo Jumbo*’s interventions as scientific, rather than speculative and “futurist,” even though they share thematic content with contemporary science fiction. There is quite little that is speculative about *Mumbo Jumbo*.

Nelson’s reading of *Mumbo Jumbo* identifies the novel as prophetic, a “necromantic” effort to reanimate a past in order to make “readings about the future” (7). Reed’s “anachronistic use of technology in *Mumbo Jumbo* begs the question of what tools are valued by whom, and to

what ends. With his innovative novel as an exemplar, Ishmael Reed has supplied a paradigm for an African diasporic technoculture” (8). Although Reed himself sometimes encourages such distinctions, in its emphasis on necromancy, prophecy, and “tools” that may be spiritual rather than technological, Nelson’s reading reduplicates what Rollefson critiques as Afrofuturism’s tendency to “reify” Eurocentrist oppositions between “*black magic* and *white science*” (85). Rather, *Mumbo Jumbo* demonstrates that, especially after the emergence of the information discourse, *all* science is black science. Any “take” on scientific and technological progress includes, the novel argues, a history that is indelibly African and African American.

Jes Grew is “a signal” and “a telegram, a message” (132). In the novel, Papa LaBas’s sometimes-associate Abdul Hamid has obtained Jes Grew’s text and works to translate it: “I went through biochemistry philosophy math, I learned languages, I even learned the transliteration and translation of hieroglyphics, a skill which has come in handy recently” (37). In the terms defined by Lily Kay, and in this “dawn of computation and cyberspace” (Gleick 8), Reed’s text intervenes in the contemporary information discourse of “biochemistry philosophy math,” and associates this ancient linguistic code with the cutting edge of information research.

¹ “Jes Grew” is a reference to James Weldon Johnson’s scholarship on African-American music (Gates 221).

² George Wells Beadle, 1958 Nobel laureate in Physiology or Medicine, quoted in Kay 17.

³ “I felt symptoms of cultural crisis were being offered in the guise of diagnosis, McLuhan’s book itself seemed to testify to the special problems posed by print culture rather than those produced by newer media. It provided additional evidence of how overload could lead to incoherence” (Eisenstein x).

⁴ The computer virus first appears in the science fiction story *When Harlie Was One* by David Gerrold, published as a short fiction in 1969 and then as a novel in 1972. See also Parikka 7.

⁵ Derrida, *Of Grammatology*, 25ff.

⁶ Kay describes the print motif in information technoscience as tropological.

⁷ Shannon, Claude E, and Warren Weaver. *The Mathematical Theory of Communication*. University of Illinois Press, 1971.

⁸ Hinkle is quoted in a January 1969 *Time* article on P.O.W.s and brainwashing, “New Compassion for the Prisoner of War.”

⁹ See Popper, *Conjectures and Refutations* 165–166.

¹⁰ See Lewis, *Empire of the Air*.

¹¹ See Shurkin, *Broken Genius*, 193ff.

¹² Ernesto De Martino, 1961, quoted in Rouget 160.

¹³ See Hafner and Lyon, *Where Wizards Stay Up Late*, and Licklider, “Memorandum For Members and Affiliates of the Intergalactic Computer Network.”

¹⁴ See Milgram, “The Small World Problem.”

¹⁵ Dawkins cites the 1962 novel *A for Andromeda*, and so do I. The novel is based on a BBC teleplay that was first broadcast in 1961.

4. Vital Work: Machines, Bodies, and Viruses of the Mind in *The Infernal Desire Machines of Doctor Hoffman*

It should come as no surprise, now, when one of the central characters of Angela Carter's 1972 novel *The Infernal Desire Machines of Doctor Hoffman* avows, "The Doctor has invented a virus which causes a cancer of the mind, so that the cells of the imagination run wild. And we must—we *will!*—discover the antidote" (*Infernal* 22). Carter invokes the virus, as well as a cellular media system: the imagination, in her novel in which forces simultaneously militaristic and fantastical launch an assault on a post-colonial national bureaucracy.

Carter's virus, like Ishmael Reed's, owes a great deal to the overlapping fields of genetics and information and to the continued influence of the "scriptural" discourse identified by Lily E. Kay. While Ishmael Reed's Jes Grew contagion circulates ecstasy and freedom, Carter's "cancer" suggests a media spectacle, in which "lawless images" overwhelm the capital city of a fictional, unnamed, South American state (*Infernal* 12). These images, which the novel's protagonist observes, "were objects—perhaps personified ideas—which could think but did not exist" (*Infernal* 18), threaten to overthrow the city. Desiderio begins the novel as "a minor clerk in a government office," the Ministry of Trade (*Infernal* 15), but after Dr. Hoffman's media offensive begins, he accompanies his superior into a position in the hastily-created Ministry of Determination: "the Minister's computers decided my skill at crossword puzzles suggested a facility in the processes of analogical thought which might lead me to the Doctor where everyone else had failed. I think the Minister himself thought of me as a kind of ambient computer" (*Infernal* 40). Eventually, Desiderio leaves the Ministry and becomes a picaresque hero, following the illusions to their source: Dr. Hoffman's mountain fortress. There, he finds that the illusions that afflict the city are being generated and projected by massive computers, which, in

turn, are powered by the energy generated by innumerable couples engaged in sexual intercourse:

They were housed in a curving, narrow room some hundreds of yards long, an undulating tentacle extending into the very core of the mountain. All along the mirrored walls were three-tiered wire bunks. In the ceiling, above each tier of bunks, were copper extractors of a funnel type leading into an upper room where a good deal of invisible machinery roared with what sounded like rushing water but the noise of the machinery was almost drowned by the moans, grunts, screams, bellowings, and choked mutterings that arose from the occupants of those open coffins, for here were a hundred of the best-matched lovers in the world, twined in a hundred of the most fervent embraces passion could devise.

(Infernal 213–214)

From these hundred couples, Dr. Hoffman collects “secretions” whose “eroto-energy” powers his image-generators.

The Infernal Desire Machines of Doctor Hoffman, according to Cornel Bonca “gets away with shamelessly exploiting sci-fi B-movie conventions” (57). And in his *New York Times* review, William Hjortsberg complained, “The juxtaposition of the science-fiction elements (the Ministry's computers, Dr. Hoffman's dream transmitters, the Determination Police) with the purer and more potent aspects of fable seems harsh and discordant.”¹ Yet as with readings of *Mumbo Jumbo*, the attribution of these “elements” and “conventions” to science fiction ignores a more immediate, more substantive source: the emergence of the “historically specific” triad of “cybernetics, information theory, and computer science” identified by Kay (294), which was determined by a shared “poetics” of technoscience, and which adopted a vocabulary from a

tradition of writing and print. So while Carter's frequent practice of literary reference and allusion certainly included science fiction, *The Infernal Desire Machines of Doctor Hoffman* also incorporates the information technosciences that were, in the words of science journalist Jasia Reichardt in 1968, "part and parcel of contemporary sensibility" (17).

The three interrelated disciplines of cybernetics, information, and computers emerge as sources for *The Infernal Desire Machines of Doctor Hoffman* both because they are part of the sensibility of the late 1960s and early 1970s, and because Carter, like Pynchon and Reed, observes in these disciplines their "scriptural" inheritance. These disciplines, increasingly incorporated into the contemporary media system that is itself increasingly determined by technological and social networks, represent, for Carter, both an occasion for refiguring the media system, and an occasion for reinscribing material relations into that system. The discourse of cybernetics, information, and computers, Carter's logic suggests, runs the risk of effacing the material conditions of labor, as those disciplines restructure labor within an increasingly virtual, immaterial economy. *The Infernal Desire Machines of Doctor Hoffman*, therefore, invokes the information technosciences in order to correct this potential for effacement. Carter, rather than "shamelessly exploiting" the conventions of science, utilizes science to address the circumstances of exploitation.

Kay argues that scientific discourse had adopted a scriptural vocabulary by the mid 1950s. For Carter, Kay's triad resonates—more than for the authors considered in previous chapters, perhaps—with a literary history that itself, often through the mechanics of genre, displays a tradition of intervention into science. Foundational texts for *The Infernal Desire Machines of Doctor Hoffman* include that original of science fictions, *Gulliver's Travels*, as well as E.T.A. Hoffman's "The Sandman," a story that uncannily combines the folktale with

contemporary science in the figure of the automaton. As John Johnston notes, John Von Neumann adopted his sense of automata into cybernetics precisely because of its history as a “playful sideline activity associated more with toys than with scientific models. One thinks, for example, of Jaques Vaucanson’s mechanical duck” (35). Swift’s conflicting representations of technology—the information-technology innovating Lagadans, and the rustic Houyhnhnms—offer a precedent for Carter’s refusal to adjudicate between two falsely-opposed positions, pro- and anti-science. Additionally, Carter’s representation of the novel’s “war of dreams” as, in part, a war fought with viral agents that afflict the mind suggests the conflation of media technology and viruses familiar from Ishmael Reed’s *Mumbo Jumbo* as well as from the science fiction texts referenced both by Reed and by Carter. These texts include such “killer virus” and “killer computer” fictions as Fred Hoyle’s *A For Andromeda* (1961).

The automaton, both E.T.A. Hoffmann’s and Von Neumann’s, offers a somewhat unexpected avenue of reconciliation between the equally false opposition of nature and technology. Automata, whether biological or technological, allow Carter to represent reproduction, biological or technological, as labor. The “love pens,” furthermore, use sex to produce images, rather than to reproduce humans sexually, suggesting that oppositions between the real and the simulacral are themselves a symptom of the “ruse of capitalism” (Suleiman 109).

Finally, on both sides of Carter’s “war of dreams,” computers function as engines for producing and receiving media, for “decoding” images, and for converting energy into information. Carter also, like Pynchon and Reed, incorporates computers into the media system, and while this computer-media system makes war “literally a theater of war,” according to Friedrich Kittler, in which “everything takes place as if in the media that, from the drama to the computer, only process information” (“Media and Drugs” 159), Carter, following from the

contemporary, cybernetic, sensibility, suggests that “only” processing information in fact unites humans and machines. For Carter, the key connection between energy and information is work—in both a thermodynamic and a material sense.

Carter takes up the association of genetic and computer code, what Kay identifies as the “knowledge-power nexus [...] within which molecular biology reconfigured itself as information science and represented its objects in terms of electronic communications systems, including linguistic communication” (129). In *The Infernal Desire Machines of Doctor Hoffman*, this knowledge-power nexus includes political power as well as the manner and means by which biological reproduction occurs. That is to say, Carter incorporates both sex and labor into the cybernetic discourse of information and media reproduction.

In this sense, then, Carter’s *War of Dreams* refigures the Second World War as “literally” a war of illusion and representation. Dr. Hoffman’s technology, which taps the energy generated by heterosexual desire, appears, then, as itself a representation of Britain’s information-processing initiatives, including those of the first computer coders at Bletchley Park, the secret center of Britain’s World War II computer program. British cyberneticist Irving Good describes that environment, and, in so doing, evokes Dr. Hoffman’s love pens, not to mention an association of computer science and surrealism: “The mode of operation was for a cryptanalyst to sit at Colossus [Britain’s first digital computer] and issue instructions to a Wren [Women’s Royal Navy Service] for revised plugging, depending on what was printed on the automatic typewriter. At this stage there was a close synergy between man, woman, and machine” (164). The men and women engaged in reproducing code evoke Dr. Hoffman’s men and women producing energy. Good’s synergy is easily associated with the eroto-energy that powers Dr.

Hoffman's dream-projectors. Yet Carter observes that such synergy and energy are both covers for a particular kind of gendered labor.

The history of British computing proceeds from the situation Good describes at Bletchley Park, the center of British computer science during and after World War II. As in the U.S., women were integrated into the technological and scientific labor force during the war, performing tasks often characterized as clerical, but which were in fact highly technical.² Many of the activities at Bletchley remained classified by the Official Secrets Act until the 1970s.³ Kittler points to this secrecy, while also highlighting the closeness of humans and machines in the early cybernetic period: "the fact that information machines had already displaced agents at Bletchley Park in 1943 was hidden away in secret files" ("Media and Drugs" 171n). Kittler treats this "displacement" as a source of anxiety and paranoia. Yet for Carter the displacement of agents by machines refers not to a paranoid narrative of "scary" computers taking over, but rather offers an occasion for evaluating the way in which cybernetic technoscience understands its essential constituents, particularly information, reproduction, and, although often ignored, work.

Doctor Hoffman obscures work, representing labor as the fulfillment of desire. "Look!" he tells Desiderio as they view the "open coffins" of the love pens, "They are so engrossed in their vital work they do not even notice us!" (*Infernal* 214). While the "synergy between man, woman, and machine" that Good describes is also an instance in which the "vital work" of cryptanalysis served the Allied cause in World War II, in the War of Dreams the Doctor recognizes that the sexual activities of the couples in the love pens is a kind of labor of production, yet his media operation is dedicated to obscuring that fact. *The Infernal Desire*

Machines of Doctor Hoffman articulates the vital work of the synergistic codebreakers with the emerging networked media technology of the postwar cybernetic period.

The Infernal Desire Machines of Doctor Hoffman, then, is not simply a novel that adopts the forms of cybernetics, although it does mobilize key cybernetic themes. Rather, Carter situates cybernetic science within a historically specific moment of political and representational crisis. Furthermore, Carter locates cybernetics, information, and computers within a matrix of historical and material concerns, concerns that the discourses of such disciplines have tended to obscure and efface. This effacement and erasure serves a narrative, within information technoscience, of spontaneous emergence and machinic life and intelligence. However, Carter reveals that embedded within the discourse of machines and within the practices of information technology and cybernetics are a range of material relations, characterized by gendered and exploited labor. The liberatory rhetoric implicit in the cybernetics discourse of the 1960s and 1970s, a rhetoric inherited by the more recent discourses of New Materialism, continues to obscure the “real conditions of life” (Carter, *Sadeian Woman*, 5). Carter’s intervention into this discourse, therefore, reproaches that effacement of labor and material conditions, narrating the ways in which cybernetic technoscience, in the guise of a media system produced by interdependent humans and computers, produces an illusion of liberation while depending on exploitation.

“Inside the reality modifying machines,” Dr. Hoffman tells Desiderio, “we precipitate essence of being” (Carter, *Infernal* 210). The Doctor suggests he is creating life out of an alchemical combination of lovers’ secretions and media technology. The medium of Carter’s machinic life is actually the technology of the Doctor’s media itself. Dr. Hoffman goes on to describe his technologies,

Inside the reality modifying machines, in the medium of essential undifferentiation, these germinal molecules are agitated until, according to certain innate determinative tendencies, they form themselves into divergent sequences which act as what I call “transformation groups.” Eventually a multi-dimensional body is brought into being which operates only upon an uncertainty principle. These bodies appear on the screen...over there...expressed in a complex notation of blips and bleeps. It requires extreme persistence of vision to make sense of the code at this early stage. Nevertheless, those formless blobs are, as it were, the embryos of palpable appearances. (*Infernal* 211)

Dr. Hoffman’s computer-mediated bodies and embryos are not, in Carter’s version of a critique of cybernetics, to be feared or rejected as threatening to humans. Instead, those bodies and embryos, precipitated, however mechanically, by the chemistry of human reproduction, suggests their similarity to conventionally created humans. The problem with cybernetics, for Carter, is not its difference from other human practices, but its similarity, and the cybernetic connection with media is not in its illusoriness or its spectacularity, but rather its tendency to obscure the fact that a great deal of labor is required to produce either kind of body: human or machine.

The Infernal Desire Machines of Doctor Hoffman, therefore, uses cybernetics in order to highlight the similitude and the contingency of the labor of the creation of biological life and mechanical life. Both, *The Infernal Desire Machines of Doctor Hoffman* reveals, come under erasure in the discourse of cybernetics. However, it is not the society of the spectacle that effaces the labor of the creation of life, but rather, and rather predictably, the mechanics of capitalist and imperialist power. Indictment of media technologies, Carter suggests, finally, is as misguided as

the totalitarian regime of reason imposed by Dr. Hoffman's nemesis and opposite, the Minister of Determination.

The Minister also applies technology, defensively:

the Minister completed his computer bank and then instituted a program he called the Rectification of the Names. In spite of himself, he was forced to use philosophic—or, as he would probably prefer to call them, ideological weapons. He decided he could only keep a strict control of his actualities by adjusting their names to agree with them perfectly. (*Infernal* 193–194)

The Minister eventually “dismissed all his physicists and brought in a team of logical positivists from the School of Philosophy in the National University and set them to the task of fixing all the phenomena compiled by his computers in the solid concrete of a set of names that absolutely agreed with them” (*Infernal* 194). The Minister's attempt to fix the world logically, to make names agree with their objects is, of course, an equally improbable application of computer technology.

This opposition between two versions of technology: the Minister's use of technology for calculation and constraint, the Doctor's use of it for media spectacle, is one of a series of oppositions the novel invokes: freedom and slavery, reason and imagination, chaos and order, simplicity and complexity, but Carter refuses reconciliation. In a critique of the novel, Cornel Bonca notes, “Like one of its forerunners, *Gulliver's Travels*, the book's rage simply overwhelms the possibilities of a positive vision” (60–61). But it is quite difficult to see what such a “positive vision” might look like in a world such as this one.

Carter's indicts, not technology, but technology's incorporation into a regime of representation that effaces the material conditions that produce it. Part of this erasure is the

reconfiguring of labor as libidinal investment in a media spectacle. Carter therefore implicates the cybernetic touchstone of the emergence of machine intelligence from a media network in a capitalist regime that obscures the work necessary to produce, or reproduce, genetic or computer information. What is “infernal” about Dr. Hoffman’s desire machines is that the emergence of intelligent objects depends on slave labor: “Even if,” in Susan Rubin Suleiman’s words, “the slaves are willing love slaves” (108). In Dr. Hoffman’s machines, love and labor are the same thing.

One of the false oppositions Dr. Hoffman establishes, then, is the competition between human and machine labor.⁴ Carter refuses to privilege the human at the expense of the machine. Rather, she reveals the Swiftian hypocrisy of the notion that intelligence will emerge spontaneously without labor. Reichardt implicitly invokes this hypocrisy by citing an excerpt from *Gulliver’s Travels*, “The Word Machine,” as the preface to her volume, *Cybernetics, Art, and Ideas*, which records an exhibition of cybernetics-inspired art and science in London in 1969. Reichardt also suggests that she is aware of the way in which cybernetics runs the risk of erasing the labor of creating the technologies it depends upon, as it presents a kind of false autonomy.

“The Word Machine,” excerpted from Gulliver’s voyage to Laputa and Lagado, describes an effort to derive “philosophy, poetry, politics, law, mathematics, and theology, without the least assistance from genius or study” (9). The word machine

was composed of several bits of wood, about the bigness of a die, but some larger than others. They were all linked together by slender wires. These bits of wood were covered on every square with papers pasted on them, and on these papers

were written all the words of their language in their several moods, tenses, and declensions, but without any order. (9)

Even though the process of machine composition does not require any “genius or study,” it still depends on a great deal of manual work: “Six hours a day the young students were employed in this labour” (9). *Gulliver’s Travels* represents an important precursor for British cybernetics, at the very least, but like Reichardt, Carter invokes Swift as a precursor who is both sanguine and skeptical. Just as Swift’s word machine pretends to derive philosophy, poetry and law without the input of human “genius or study,” yet requires hours of physical labor to achieve that apparent spontaneity, Carter refuses to allow a fantasy of emergent intelligence obscure the labor necessary for producing cybernetic systems.

Carter’s position, which moves labor into the foreground, has often been mistaken as anti-technology, when it is, in fact, anti-capitalist and radically materialist. This misunderstanding allows argument about Carter’s position on technology without a real analysis of technology’s powerful, specific range of signification. Suleiman, in attempting to historicize and politicize *The Infernal Desire Machines of Doctor Hoffman*, falls into the opposition that the novel itself rejects. She begins by asserting “that Carter’s position is not ‘anti-technology.’” (111). Rather, it reflects a pessimism inherited from Guy Debord and Herbert Marcuse after the failure of the Situationist International and the protests of 1968:

Contemporary celebrations of technology by postmodernist theorists—such as Donna Haraway’s famous paean to the cyborg or, earlier, Jean-Francois Lyotard’s hopeful pages about computer information networks—have generally not been much concerned with the ways technology, even a potentially revolutionary one, can *fail* to change the status quo. Carter’s novel, perhaps because it was written not

long after the dissipation of the revolutionary euphoria produced in 1968, is closer in mood to the pessimism of Marcuse and Debord. But Carter's pessimism—or what one can take to be such—is not due to a disenchantment with technology; it is due, rather, to her sense (which I share, on the whole) that questions about technology cannot be divorced from questions about ideology and values. (111)

Obviously technology cannot be separated from “ideology and values.” In her essay on television, Carter writes, “cut all the stuff about mass media and communications theory, the exponents of which still seem to be reeling, stunned, before the magnitude of the task they have set themselves, which is no less than the interpretation of the world” (“Box” 412).

Technology is inseparable from, and media traverses, the world. Carter rejected the role of ideologue for herself, and she explicitly repudiated the ways in which myths, Roland Barthes's term for the production of such “ideology and values,” operate in culture whether the content of those myths is explicitly cultural or otherwise. “I'm in the demythologizing business” she wrote in 1983 (“Notes” 38). Carter's own political alignment leaned toward the vulgar Marxist, so although Suleiman suggests that we look in *The Infernal Desire Machines of Doctor Hoffman* for evidence of Carter's representation of the intersection between ideology and technology, a much more illuminating avenue for investigation is offered by the ways in which Carter represents technology *as itself a representation of labor*.

What Dr. Hoffman's surreal political economy reveals is the paranoia that computers will somehow seize social control, a paranoia exploited by Kittler and perhaps unconsciously by Suleiman as well as David Porush, who situates “cybernetic fiction” in opposition to cybernetic science. But this opposition is itself a smokescreen that hides ignorance and exploitation by insisting that humans must resist the cold impersonality of technology. Carter's reversal,

however, locates beauty, sensuality, and spectacle within the whole world, suggesting that a libidinal investment in spectacle is not a condition of a media-saturated world, so much as it is an extension of a world whose spectacularity precedes its mediation. Desiderio witnesses Dr. Hoffman's first assault on the city in the Opera House, an ironic monument to founding imperialism, and an institution already dependent on the kind of spectacular illusions that Dr. Hoffman wields against the city:

When I had enough money, I would go to the Opera House for the inhuman stylization of opera naturally appealed to me very much. I was especially fond of *The Magic Flute*. During a certain performance of *The Magic Flute* one evening in the month of May, as I sat in the gallery enduring the divine illusion of perfection which Mozart imposed on me and which I poisoned for myself since I could not forget it was false, a curious, greenish glitter in the stalls below me caught my eye. I leaned forward. Papageno struck his bells and, at that very moment, as if the bells caused it, I saw the auditorium was full of peacocks in full spread who very soon began to scream in intolerably raucous voices, utterly drowning the music....Glancing around me, I saw that everyone in the gallery was wearing a peacock-green skull cap and each spectator stirred an incandescent, feathered fan....It was Dr. Hoffman's first disruptive coup. So I went home, disgruntled, balked of my Mozart, and, the next morning the barrage began in earnest. (*Infernal* 16–17)

The allure of the spectacle is located not only within technological media but also in art. Rejecting spectacle entails, as Carter argues in "The Box Does Furnish a Room," rejecting the world. Desiderio is attracted both to Mozart and the ancient Egyptians, "because they searched

for, arrived at and perfected an aesthetically entirely satisfactory pose” (*Infernal* 12). Media, for Carter, encompasses the representation of the whole world, making a rejection of representations implausible.

The Infernal Desire Machines of Doctor Hoffman does imagine an alternative, a culture in which representation is not mediated, but, in a manner reminiscent of Kafka’s penal colony, inscribed directly onto the body. Desiderio and Albertina find themselves in a land of centaurs, who deliberately invoke and also refuse comparisons with Swift: “because they were men, they had many words to describe conditions of deceit; they were not Houyhnhnms” (*Infernal* 187). These centaurs practice a fundamentalist and judgmental religion that requires the tattooing of religious text directly upon the body:

We would be tattooed upon the Holy Hill where the Sacred Stallion had first set us down. He had sent us into the world to show his flock what fearful shapes they might all still come to if they did not adhere even more strictly than before to his dogmas....The would paint us with his picture and then, to make us resemble him even more, they would nail the iron shoes on our feet with red hot nails. (*Infernal* 190)

The centaurs represent an alternate notion of the materiality of communication and technology. While, in most of Carter’s world, bodies, whether biological or technological, figuratively index their circumstances of production, the centaurs are determined to inscribe meaning directly onto the body. Instead of a libidinal investment that disguises labor as love, the centaurs attempt to erase mediation entirely. They are the dark fantasy of a culture without metaphor or symbol, a fantasy in which power and representation are the same. In the problematic of production and reproduction of bodies and images, it is not the body/image or body/machine opposition that

must be resolved. Rather, Carter forces attention away from what is a false dilemma, and toward a true problem: the disappearance of labor and the material.

The effacing of labor and the material has been particularly evident in a rhetoric of liberation associated with the discourse of computers. An associated rhetoric of liberation, however, has also appeared in the cybernetics-inflected discourse of the posthuman, which, following from Deleuze and Guattari's *Anti-Oedipus*, understands persons as desiring machines:

In what respect are desiring-machines really machines, in anything more than a metaphorical sense? ...Every machine, in the first place, is related to a continual material flow (*hylē*) that it cuts into. It functions like a ham-slicing machine, removing portions from the associative flow: the anus and the flow of shit it cuts off, for instance; the mouth that cuts off not only the flow of milk but also the flow of air and sound; the penis that interrupts not only the flow of urine but also the flow of sperm. (36)

This understanding of the body as a desiring machine will, Deleuze and Guattari assert, “bring about genuine liberation” (50).

Carter *is* critical of the cybernetic version of the body envisioned in *Anti-Oedipus*, although the two texts have a great deal in common. Carter uses the common vision of the body-as-machine to critique cybernetics' promise of liberation, not because of technology per se, but because in the conception of bodies as machines offered by Deleuze and Guattari, the emphasis on machines and the machinic connections of technological networks obscures material relations, relations characterized by conditions of labor, and by exploitation based on gender and class. The “Absolute authority to establish a regime of total liberation” (*Infernal* 38) that Dr. Hoffman

demands for himself, achieved through liberating objects at the expense of humans, distills this critique of the “genuine liberation” promised by Deleuze and Guattari.

Deleuze and Guattari’s language of the fluids and flows of the body, inspired, at least in part, by the function of computer processors,⁵ bears an uncanny similarity to Dr. Hoffman’s theory of eroto-energy. In Dr. Hoffman’s “distilling plant,” the “secretions of fulfilled desire are processed to procure an essence which has not yet pullulated into germinal form [...] and it is safe to say we have cooked up for ourselves in our glass casseroles a pure, uncreated essence of being” (*Infernal* 209). The understanding of humans as machines, connected and bisected by a network of fluids and flows characterizes the cybernetic-inflected understanding of the body that emerges from the discourse of information. Not only does this discourse of fluid inputs and outputs describe the fundamentals of computing, it also, quite deliberately, characterizes the exchange of fluids associated with sexual intercourse.

For Deleuze and Guattari, the machine-body association, with its exchange of fluids, suggests an organic network that arises spontaneously from multiple points of connection. For Deleuze and Guattari’s inheritors among the New Materialists, this understanding of objects as “active, agential and morphogenetic; self-differing and affective-affected matter” (Tiainen and Parikka I) conflates biological emergence with technical, cybernetic processes that imagine intelligence emerging from a computer network. Furthermore, that organic process of emergence that Deleuze and Guattari narrate, with its emphasis on sexual connection, aligns the politics of social liberation with those of sexual liberation. For Carter, that analogy is false because any sexual relation is determined by material circumstances as much as by erotic chemistry. Any conception of sexual liberation that ignores the material circumstances in which sexuality takes

shape reproduces the regime that Dr. Hoffman represents, in which “love” and “freedom” mask economic exploitation.

In *The Infernal Desire Machines of Doctor Hoffman*, Albertina asserts, “The ultimate simplicity, Desiderio, is Love. That is to say, Desire, Desiderio. Which is generated by four legs in bed” (*Infernal* 203), but Desiderio knows that there is nothing simple about love or desire. In *The Sadeian Woman*, a book-length essay on feminism, sexuality, and the Marquis de Sade, Carter rejects the notion that love or sex transcend particular material circumstances: “We do not go to bed in simple pairs; even if we choose not to refer to them, we still drag there with us the cultural impedimenta of our social class” (*SW* 9). In *The Infernal Desire Machines of Doctor Hoffman*, by equating the production and reproduction of information with sex, Carter makes those “impedimenta” evident in the technologies that sex powers. Information technologies index those impedimenta. Eventually *The Infernal Desire Machines of Doctor Hoffman* argues that liberation such as that promised by *Anti-Oedipus*, the transcendent emergence of networked humans and machines, is meaningless if it is enabled by exploited labor.

Dr. Hoffman insists on the liberatory potential of “two basic constituents—pure sex and pure energy” (*Infernal* 215), a liberation that reflects a Deleuzian attitude toward fluids and flows:

their plentiful secretions fall through the wire meshes into the trays underneath each tier, or dynamic set, of lovers and are gathered up three times a day by means of large sponges, so that nothing whatsoever is lost. And the energy they release—eroto-energy, the simplest yet most powerful form of radiant energy in the entire universe—rises up through these tunnels into the generating chambers overhead. (*Infernal* 214–215)

Not only do Deleuze and Guattari and Carter share the language of fluids and flows, they both seize on “infernal” as a descriptor of their desire machines.⁶ The inferno is not simply a literary reference, to Dante or to Blake’s Satanic Mills, but also a precise description of the generators of information, technological or biological, as thermodynamic and information engines, united by, at the very least, entropy. Entropy is a key example of what Jasia Reichardt identifies as the “contemporary sensibility” characterizing British and American art and science in the 1960s and 1970s.

Considered against both Deleuze and Guattari’s and Reichardt’s characterization of the contemporary moment, then, the important distinction between Carter’s synthesis of bodies and machines and that of her contemporaries is that her machines, particularly cybernetic fusions of human and machine and media technologies that produce and project information, always testify to the labor their production depends upon. This is evident in the labs of the Ministry of Determination, in the love pens of Dr. Hoffman, where coerced sexual congress produces the energy media technologies depend upon, and in the frequent appearance of automata, particularly female automata, in Carter’s text.

Suleiman argues that Carter’s machines are not as close to Deleuze and Guattari’s as they may seem. Rather,

It may be interesting to speculate on the relation of Surrealist ideas about desire to the “desiring machines” dreamed up by Deleuze and Guattari in their *Anti-Oedipus*, published the same year as Carter’s novel. At first glance, the *machines désirantes* may appear close to Doctor Hoffman’s desire machines (such is the power of the signifier); but in fact they are far from them and close to Surrealism. For Deleuze and Guattari, as for the Surrealists, desire is “in its essence revolutionary” and

implies ceaseless movement—that is why their ideal subject is the bachelor, “nomad and vagabond” (a kind of Desiderio, perhaps). The “fixed subject” is the repressed subject. In their terms as well, Doctor Hoffman’s love pens would have to be considered the very opposite of liberation, or revolution. (112)

Suleiman’s insistence that the desire machines are “dreamed up” by both Deleuze and Guattari and Carter is somewhat surprising considering the degree to which the language of cybernetics, permeates the discourse, the “sensibility” of the period. Rather, it is quite a natural step for Carter, just as it is for Deleuze and Guattari, to make the association between the machines of contemporary technoscience and the machines of the Surrealists. The desire machines of both Carter and Deleuze and Guattari are not “dreamed up” by either. Rather, they are adopted out of a specific history and contemporary usage.

That is not to say, however, that both Deleuze and Guattari and Carter are not responding to the machines of Marcel Duchamp and the Surrealists as well as the cyberneticists. While Carter is careful not to indict representation or media per se, she quite decidedly picks up the thread of politicized representation left by Surrealism and by the Situationist International of 1968. André Breton’s *Surrealist Manifesto* is a source for the precise distinctions between objects that “think but did not exist.” The cancer of the mind to which the Minister refers as the book begins is a direct reference to Breton’s manifesto. For him, the media virus is reality itself, a “cancer of the mind which consists of thinking all too sadly that certain things ‘are’ while others, which well might be, ‘are not’” (187). Dr. Hoffman’s images certainly “are” even though they represent things that cannot be.

Suleiman perhaps minimizes the connection between Carter and Deleuze and Guattari in order to emphasize Carter’s political association with the radicals of 1968, particularly Debord

and Marcuse. For Suleiman and those few critics who take up this novel's historicist and materialist resonances, the text is an exercise in taking sides in a crisis of representation produced by the diffusion of radical political energies after 1968. To Suleiman, *The Infernal Desire Machines of Doctor Hoffman* is an allegory

of the technological appropriation (but I prefer the Gallicism *récupération*) of Surrealism and liberation philosophy—precisely that *récupération* which Marcuse himself, not at all optimistically, analyzed as early as the 1961 preface to the second edition of *Eros and Civilization* (first published in 1955). Marcuse called this mode of *récupération* 'repressive desublimation' and saw in it, with something close to despair, the latest ruse of capitalism. (109)

Marcuse's pessimism about the infusion of the erotic into the mass media was shared, Suleiman goes on to say, in "the even more pessimistic analyses of Guy Debord's *La Société du spectacle*, published six years later. For Debord, there is no question that the society of the spectacle is the product of a technology gone bad" (110). Although Suleiman asserts that "Carter's position is not 'anti-technology,'" but, along with that of Marcuse and Debord, a critique "directed against the uses to which it has been put" (111), Suleiman's own conclusions slip into the position that it is technology that is the problem. At the conclusion of the novel, Suleiman writes, "life goes on as usual, dominated by the Minister's computers and clocks" (112).

The cold impersonality of technology and the reduction of human consciousness to information processing are in fact two orthodoxies of anti-science rhetoric that *The Infernal Desire Machines of Doctor Hoffman* challenges rather than reinscribes. Suleiman's emphasis on technology as tools, and on technology as object that, in its cold impersonality, "dominates" a life that would otherwise be liberated from such machinic regimentation, in fact suggests the

reduplication of the polarity that Carter makes a principled refusal to reconcile. Instead, Carter reveals that apparent opposition as a smokescreen for exploitation. Kittler also makes just such an arbitrary distinction when he opposes human creativity to “only processing information.” Carter would argue that arguments about that distinction hide more urgent historical and political concerns.

Albertina explains Dr. Hoffman’s theories in Newtonian terms:

in theory, one can reduce everything to a series of ultimate simples. When my father perfects this theory, which he will perhaps do in three or four years time, he will name it Hoffman’s Principle of Unwrought Simplicity and once he fully understands its laws, he will reduce everything in the world to the non-created bases from which the world is built. And then he will take the world apart and make a new world. (*Infernal* 203)

Carter suggests that while the Doctor insists he is creating wholly new world, he cannot avoid constructing it out of the bricolage of the old world. Carter’s response to the Surrealists, as well as Debord’s Situationists, is that a new world still has to reckon with the old. Dr. Hoffman’s castle reveals the ways in which Surrealism tries to both incorporate and erase history. A series of oil paintings, “in the style of the nineteenth-century academician” (*Infernal* 197), represents great artists, composing great works of art:

Van Gogh was shown writing ‘Wuthering Heights’ in the parlor of Haworth Parsonage, with bandaged ear, all complete. I was especially struck by a canvas of Milton blindly executing divine frescoes upon the walls of the Sistine Chapel. Seeing my bewilderment, Albertina said, smiling: ‘When my father rewrites the

history books, these are some of the things everyone will perceive to have always been true.’ (*Infernal* 198)

Hoffman represents, not a new world, despite what Albertina says, but the old world. Carter refutes the suggestion that shifting *Wuthering Heights* from the Victorian to the Post-Impressionist period, or making the creator of the Sistine Chapel frescoes a Protestant revolutionary rather than a servant of the Pope will have some profound effect on the future. The underlying “ideology and values” such structures represent undergo very little change.

This implication that Surrealism did little to create a new world is the basis of Carter’s critique in “The Alchemy of the Word,” whose title fuses Newton’s and Spinoza’s notion of first causes with Surrealism, as well as cybernetic scriptural science. In “Alchemy,” Carter observes the discursive connections between text, science, and Surrealist art. In the essay, Carter argues that it is the intellectual, and indeed scientific, shakiness that undercut Surrealism as a legitimate political and philosophical movement, “none of the surrealists knew any maths” (“Alchemy” 508). Not knowing, that is, not acknowledging, math has had some serious consequences for study and criticism of *The Infernal Desire Machines of Doctor Hoffman*, and it inhibits Suleiman’s account of Carter’s approach to technology as well as her consideration of the Surrealist influence.

Carter has always been associated with both Surrealism and Marxism (indeed she associated herself), and the possibilities embedded in each for a radical politics of representation, yet she criticized the “intellectually shaky” former for its heterosexism (“Alchemy” 508). Dr. Hoffman stands out as a Surrealist scientist, modeled on Breton, as well as contemporaries who mixed science with the hallucinatory and the ecstatic, including Timothy Leary and Wilhelm Reich. In addition to the namesake Hoffmanns—E.T.A. and Albert—Reich, especially, invokes

the interpenetration of technological and biological systems with the systems of representation. Reich is a key figure in *Anti-Oedipus* as well.

Although Deleuze and Guattari want to take his ideas seriously, Reich is perhaps the single most important model for Dr. Hoffman's wild theories. Both *The Infernal Desire Machines of Doctor Hoffman* and *Anti-Oedipus*, in fact, imagine a dialogue between Reich and Freud. Where Freud is a major figure in Deleuze and Guattari's revision of psychoanalysis as schizoanalysis, for Carter, he heralds the refiguring of representation. While for Deleuze and Guattari, Freud exerts a political and a disciplinary function, Carter's interest in Freud is as a founder of scientific accounts of representation, as well as the primary source that Surrealism reimagined.

Desiderio, who narrates the book from his old age, attempts to argue Hoffman's dubious science with Albertina by invoking Freud: "I remembered the words of another German savant," he tells her, "In the unconscious, nothing can be created or destroyed" (*Infernal* 186). Desiderio then adds a footnote to this text, directing readers to Freud's *The Interpretation of Dreams*. This claim is not, however, a quote from *The Interpretation of Dreams*, although it is an effective summary of many descriptions of the unconscious. It is, rather, the law of Conservation of Energy, or the First Law of Thermodynamics.

Desiderio repeats the law of Conservation of Energy as a philosophy of representation. Implicit, here, is the suggestion that the Doctor's claims to have overthrown the old order in favor of one that is wholly new are untrue. Dr. Hoffman's dreams are those of Freud's unconscious, composed out of the bricolage of conscious perception. Dr. Hoffman's world is simply a reorganization of the old world, despite Albertina's claim that he will "make a new world" (*Infernal* 203).

Porush explains the way in which entropy made the Second Law of Thermodynamics applicable both to heat engines and information. Desiderio's misattribution of Freud makes the First Law of Thermodynamics applicable to energy and representation. Carter further associates Freud with technologies of representation by adopting allusions to various Freudian texts into slogans that also invoke the Situationist graffiti that appeared on Paris walls in 1968 and 1969. In *The Infernal Desire Machines of Doctor Hoffman* those slogans act as emblems for surreal and erotic mechanical tableaux that Desiderio first encounters in a carnival peep show. The tableaux are eventually revealed as "samples," helping to structure the transformation of the world Dr. Hoffman attempts to bring about. The set of samples contains:

(a) wax models, often with clockwork mechanisms, as described;

(b) glass slides, as already described;

and:

(c) sets of still photographs which achieved the effect of movement by means of the technique of the flicker books of our childhood.

These sets usually consisted of six or seven different aspects of the same scene which might be, typically, a nursemaid mutilating a baby, toasting him over a nursery fire and then gobbling him up with every appearance of relish. (*Infernal* 107)

The labels affixed to each of the peepshow exhibits fuse psychoanalysis and Surrealism.

There is reason to be skeptical of Scott Dimovitz's assertion that "The peep show machines, therefore, replicate the psychoanalytic account of identity formation, and also offer the reader a skeleton key to decoding the rest of the text" (92–93). It's impossible to say with certainty that the peep show machines "replicate" anything, although they are certainly loaded

with representation. Additionally, far from offering the text an interpretive “skeleton key,” they highlight the ways in which paradoxes permeate the text. They offer no keys to Carter’s, or for that matter any of her protagonists’, intended meanings. Rather, the peep show illustrates the ways in which Dr. Hoffman’s new world is limited to the material of the old. Dimovitz has, however, identified sources for each of the seven exhibits Desiderio encounters early in his journey to find Dr. Hoffman:

The machines were of ancient rusted cast iron decorated with impressions of cupids, eagles and knots of ribbons. Each was the size and shape of an old-fashioned oven and, at the front, a pair of glass eye-pieces jutted out on long, hollow stalks. I examined all the exhibits in turn. Inside each one, underneath the item it represented, was a sign, clumsily lettered by hand, giving a title.

Exhibit One: I HAVE BEEN HERE BEFORE

The legs of a woman raised and open as if it were ready to admit a lover, formed a curvilinear triumphal arch. The feet were decorated with spike-heeled, black-leather pumps. This anatomical section, composed of pinkish wax dimpled at the knee, did not admit the possibility of the existence of a torso. A bristling pubic growth rose to form a kind of coat of arms above the circular proscenium it contained at either side but, although the hairs had been inserted one by one in order to achieve the maximum degree of verisimilitude, the overall effect was one of artifice. (*Infernal* 43–44)

The labels and the exhibits they introduce are incongruous and ironic. Obviously, the display is meant to evoke something paradoxical about pornographic display and sexual intercourse juxtaposed with childbirth. For Dimovitz this first exhibit illustrates Freudian déjà vu

overlaid on presexual identity formation. The third exhibit most explicitly references psychoanalysis, titled “THE MEETING PLACE OF LOVE AND HUNGER” and depicting, “a cut-glass dish of the kind in which desserts are served lay two spherical portions of vanilla ice-cream, each topped with a single cherry so that the resemblance to a pair of female breasts was almost perfect” (*Infernal* 45). For Dimovitz, this is a reference to Freud, as well as Melanie Klein’s “good” breast (90).⁷ However, these cryptic emblems also evoke Situationist slogans, scrawled on the streets of Paris after the International of 1968 along with Guy Debord’s film experiments with spectacle. One graffito from Paris 1968 read “I take my desires for reality because I believe in the reality of my desires,”⁸ which could quite easily describe *The Infernal Desire Machines of Doctor Hoffman*’s Sadeian Count, who does manage to create the world he experiences out of his own desire. “I ride the whirlwind of my desires,” he says to Desiderio by way of introduction (*Infernal* 124).

These quasi-Situationist slogans introduce visual spectacles that are simultaneously beautiful, repulsive, and erotic. Additionally, they call into question the possibility that the revolution doesn’t liberate everyone. Carter interrogates the very notion of Deleuze and Guattari’s “genuine liberation.” Despite his claims to free the imagination, and his appearance as a kind of Romantic visionary, Dr. Hoffman turns the imagination into a product. The technologies that help mediate that product, then, also index the transformation of imagination itself into commodity.

Dr. Hoffman’s desire machines generate the energy that, in turn, powers a media technology. The machines transmit what Desiderio describes as “lawless images”:

We did not understand the means by which the Doctor modified the nature of reality until much later. We were taken entirely by surprise and chaos supervened

immediately. Hallucinations flowed with magical speed in every brain...Dr. Hoffman's gigantic generators sent out a series of seismic vibrations which made great cracks in the hitherto immutable surface of the time and space equation we had informally formulated in order to realize our city and, out of these cracks, well—nobody knew what would come next." (*Infernal* 17)

Critics have for the most part failed to account for the ways in which the novel reveals the interdependent economies of representation and the erotic, and they have additionally failed to account for the novel's intersections with science and particularly with contemporary discourses of media and technology in a period that saw the widespread dissemination, through scientific and popular culture, of the network and virus concepts, as well as emergence, chaos, and complexity.

The images infect the city and render it isolated and defenseless are self-replicating automata, that is, viruses. Dr. Hoffman puts into action a system driven both by Breton's surrealist imagination and by Hoffman's Newtonian understanding of the world. In Dr. Hoffman's system, there is no "sad" distinction that "certain things 'are' while others, which well might be, 'are not.'" Yet every step of Desiderio's quest reveals that the world he experiences exceeds the constituents that create it.

The automaton, a figure in cybernetics for describing the shared self-reproducing systems of both computer and genetic code, for Carter represents a body that is simultaneously human and machine. Her automata, like those of Von Neumann, encompass, or indeed even reveal the falsity of, a biology/technology opposition. For Carter, the production of bodies, human or machine, is a kind of labor. Specifically feminine behaviors reflect the automatic qualities of

machines and machinic work, “I found all the women moved in this same, stereotyped way, like benign automata” (*Infernal* 73).

The replication of automata—as viruses or as computer programs—figures what Kay identifies as the scriptural modality of information science whether biological or technological. John von Neumann’s term, “cellular automata,” encompasses the reproduction of information, whether genetic or digital,

Analog and digital computers are the most important kinds of artificial automata, but other man-made systems for the communication and processing of information are also included, for example, telephone and radio systems. Natural automata include nervous systems, self-reproductive and self-repairing systems, and the evolutionary and adaptive aspects of organisms. (Neumann and Burks 21)

“The evolutionary and adaptive aspects of organisms,” of course, often requires sexual reproduction, traditionally the responsibility of women. *The Infernal Desire Machines of Doctor Hoffman* makes an extraordinary association between Neumann’s automata and E.T.A. Hoffmann’s female automaton from “The Sandman,” Olympia. Carter refigures Olympia in Albertina, Dr. Hoffman’s daughter, who is her father’s creation both biologically and technologically. Carter’s automata are women: biological and technological hybrids, “ideational,” and, often, less than human, not because of their mechanism, but because of their sex.

In E.T.A. Hoffmann’s “The Sandman” (1816), a young man falls madly in love with the daughter of a mathematician, Professor Spalanzani. The young woman, Olympia, is a clever clockwork automaton, whose mechanism is eventually revealed. This revelation drives her young lover into temporary madness. Olympia offers, among other things, an object lesson on

the narcissism of love. She reflects back to her lover his own desire, “it seemed to him that what Olympia said of his work, of his poetic talent in general, came from the depths of his own being, that her voice was indeed the voice of those very depths themselves” (118).

Women as projections of desire, as “ideational,” and as automata, recur throughout *The Infernal Desire Machines of Doctor Hoffman*. Albertina, the protagonist’s love object, represents one realization of his desire. In this, and in her relationship with her father, Dr. Hoffman, she evokes Olympia. Albertina personifies both Proustian and computer memory. She haunts Desiderio, appearing throughout the text in different disguises, and she recites the doctrine of her father’s techno-political program:

My father has discovered that the magnetic field formed by our reciprocal desire—yes, Desiderio, our desire—may be quite unique in its intensity. Such desire must be the strongest force in the world and, if it could be crystallized, would show itself as a deposit which is the definitive residuum of the most powerful inherited associations. And desire is also the source of the greatest source of radiant energy in the entire universe! (*Infernal* 203)

Albertina’s “inherited associations” function both as a genetic code to be passed down through sexual reproduction and a computer code, keyed by Desiderio’s desire. Like Olympia, she reflects back to her lover his own image: “I’ve been maintained in my various appearances only by the power of your desire,” she tells him (*Infernal* 204).

Critical to Carter’s resituation of cybernetic discourse within her radically materialist politics, politics which correlate sex difference as well as class difference with labor, is the representation of the lives of women as circumscribed. Here, they are circumscribed by both sexual and reproductive labor in a manner that suggests the technologically determinate limits of

program execution. Desiderio's mother is a prostitute, and his father, an "Indian," indigenous to this colonized country,

I was of Indian extraction. Yes. My mother came from feckless, middle-European immigrant stock and her business, which was prostitution of the least exalted type, took her to the slums a good deal. I do not know who my father was but I carried his genetic imprint on my face, although my colleagues always contrived politely to ignore it since the white, pious nuns had vouched for me. Yet I was a very disaffected young man for I was not unaware of my disinheritance. (*Infernal* 16)

Genetic input results in an output: Desiderio's disinheritance by means of racist and sexist social structures.

Prostitution further associates women with automata. Later in the novel, Desiderio and the Count visit a brothel in which both men are offered a variety of female automata:

This ideational femaleness took amazingly different shapes though its nature was not that of Woman; when I examined them more closely, I saw that none of them were any longer or might have been, woman. All, without exception, passed beyond or did not enter the realm of simple humanity. They were sinister, abominable, inverted mutations, part clockwork, part vegetable, and part brute. (*Infernal* 132)

The bodies of these women are hybrid, cyborgs shaped by technologies of automation and representation, "One leafy girl was grown all over with mistletoe but, where the bark was stripped away from her ribcage, you could see how the internal wheels articulating her went round. Another girl had many faces hinged one on top of the other so that her head opened out like a book, page by page, and on each page was printed a fresh expression of allure" (*Infernal* 133). Yet these "ideational" women's humanity, or lack thereof, has little to do with their

hybridity. Rather, their status is conferred by their sex. It is obvious that they represent a socially determined femininity, a femininity that does not require consciousness and instead perhaps simply “shits and fucks” like Deleuze and Guattari’s desire machines (2).

The clockwork bodies of the prostitutes, the indigenous River women, and Albertina, reveal something about bodies in general, something that Carter shares with Deleuze and Guattari, Richard Dawkins,⁹ and the cyberneticists: the notion that bodies are themselves machines, heat engines, employed in generating and storing energy as well as processing information. Bodies are technologies, for Carter, not only in the sense that they perpetuate Dawkins’ selfish genes, but in that they mediate a whole range of social and economic information.

Nicola Pitchford is perhaps the only scholarly reader of Angela Carter who recognizes the immediacy with which she treats politics and economics: “Britain’s economic and political crisis of the 1970s accompanied a crisis of representation” (107). *The Infernal Desire Machines of Doctor Hoffman* resituates the crisis of political representation as crisis of media and aesthetic representation, but then refuses to represent victory on either side. Carter’s oppositions, which represent the “continual back-and-forth movement in Carter’s work between the fantastic and the insistently material” (Pitchford 109), swing between the rational and the chaotic as a “strategy for engaging with the contemporary politics of Britain in the seventies, including the decline of socialism and the evolution of the women’s movement” (Pitchford 106). Yet while Pitchford recognizes the ways in which *The Infernal Desire Machines of Doctor Hoffman* is embedded in its contemporary moment, she ignores the degree to which this historical immediacy is tied to contemporary technoscientific practice. Furthermore, while Porush argues that cybernetic fiction “shows a definite hostility toward technology” even as it incorporates technology’s forms (381),

Carter rejects that hostility, looking past technology in order to identify what kinds of activities, histories, and social roles such technologies reveal. The most important of these, here, is the way in which technologies, both real and virtual, index the roles dictated by sex and by work. In *The Infernal Desire Machines of Doctor Hoffman*, then, humans and machines are not differentiated by the resistances identified by Porush as unique to humans. Instead—humans, particularly female and working class humans—and machines—particularly computers and other media technologies—are united by the circumstances and conditions of their labor, by their capacity to reflect and inhabit the desires of others, and by their role in the production and reproduction of other bodies, as well as images.

The “love pens” (*Infernal* 213), and Dr. Hoffman’s theory of eroto-energy as fuel for the realization of desires suggest a fusing of thermodynamic and information entropy that is characteristic of cybernetic fiction. Porush explains, “Claude Shannon in the 1940s took the formula for thermodynamic randomness (entropy) and used it to define the randomness which provides the necessary precursor for information, and then also called *it* entropy” (375). In *The Infernal Desire Machines of Doctor Hoffman* this fusion of entropies makes both energy and representation part of a system that may oppose chaos and order, but that refuses to either choose sides or reconcile that opposition. In the same way that thermodynamic entropy is a necessary precursor to information entropy, the thermodynamic energy produced by sexual intercourse is a necessary precursor to the images produced by Dr. Hoffman’s dream machines.

Carter’s particular refusal of the distinction between human and machine both exceeds and resists Porush’s characterization of cybernetic fiction. According to him, cybernetic fictions “pose as cybernetic devices which ultimately—and this is the source of their power and postmodernism—do not work” (381). Carter’s recursive and erudite fiction suggests however,

that if fiction is cybernetic then it always has been, part of a circuit of media and technology. Even if the machinery of the cybernetic novel does not work, many of Carter's creations, whether human or machine, do work. While Porush argues that "even as the cybernetic age progresses ineluctably, humans will manage to preserve their humanness" (393), Carter suggests that any essential humanness that distinguishes humans from machines is less important than the material relations that technologies of communication and control mediate.

For Carter, these material considerations remain in the foreground. Bodies, human or machine, index the labor that creates them, whether that's Desiderio, the product of his mother's prostitution, or Albertina, both human and automaton, the daughter of a dead mother her mad-scientist father treats as if alive, "The one discordant note in all this rich man's sumptuous country estate was the embalmed corpse of his dead wife he kept on a bergère settee in this white-walled room" (*Infernal* 198). Not only does this setting evoke the dead mother plot in an ironic way, it suggests that automata bridge a sort of gender gap in the labor of reproduction.

While Porush suggests that the humanness of fiction will proceed by means of "irony, rich metaphor, and self-effacement" (393), *The Infernal Desire Machines of Doctor Hoffman's* concern is the way in which technologies of communication and control efface the labor of those involved. In most theoretical accounts of cybernetics, the process of producing those cybernetic systems disappears into a fantasy of emergence. Carter's intervention into this fantasy situates technologies, such as the roads and clocks Dr. Hoffman liberates, as figures for a technological communications network to which Dr. Hoffman attributes the potential to achieve artificial intelligence, yet that illusory emergence masks the slave labor required to achieve the liberation he offers.

Dr. Hoffman uses a rhetoric of liberation in order to impose a totalitarian regime, under the guise of freeing the imagination:

The Doctor has liberated the streets from the tyranny of directions and now they can go anywhere they please. He also set the timepieces free so that now they are authentically pieces of time and can tell everybody whatever time they like. I am especially happy for the clocks. They used to have such innocent faces. They had the water-melon munching, opaquely-eyed visages of slaves and the Doctor has already proved himself a horological Abraham Lincoln, now he will liberate you all. (*Infernal* 33)

Dr. Hoffman's claim to be a new Lincoln is disingenuous, then, both because he accomplishes his liberation by means of enslavement, and because his vision of emancipation suggests racist egotism rather than a recognition of equality. Hoffman's emancipation of objects depends on the slave labor of those captives in the "love pens" even though their labor is apparently willingly-given. They have no choice but to engage in perpetual sexual intercourse: "we feed them hormones intravenously" (*Infernal* 214), the Doctor tells Desiderio.

The desire machine's dependence on eroto-energy generated by sexual intercourse may suggest, particularly to feminist scholars, a moralistic critique of media representation in which a libidinal investment in simulacra results in Dr. Hoffman's sexual slavery, and in the perpetual reinvestment of erotic energy in the information technologies of the dream machines, rather than a more appropriately ordered sexuality in which the circuit of desire has a human object who reciprocates affection. However, the distinction between sex as procreation and sex as media production is not a moral one for Carter. Rather, it speaks to a division of labor. Dr. Hoffman demands an investment that is literally libidinal, and his desire machines are, in fact, capitalist

mechanisms of exploitation that disguise labor as enjoyment. Carter makes an incongruous association between labor practices that are conventionally feminine, associated with sex and reproduction, and suggests that in an economy determined by the speculative and the imaginary, sex work constitutes information science.

Within the matrix of its setting: post-colonial racial oppression and center-periphery imperialist economic exploitation, *The Infernal Desire Machines of Doctor Hoffman* situates the information revolution in material circumstances that suggest a realism not usually associated with fiction like Carter's. The capital city

started life as a slaver, a pimp, a gun-runner, a murderer and a pirate, a rakish villain, the exiled scum of Europe...The city was built on a tidal river and the slums and the area around the docks still pullulated with blacks, browns and Orientals who lived in a picturesque squalor the city fathers in their veranda'd suburbs contrived to ignore.... The word 'indigenous' was unmentionable. Yet some of the buildings, dating from the colonial period, were impressive—the Cathedral; the Opera House; those memorials of a past to which few, if any, of us had contributed though, since I was of Indian extraction, I suffered the ironic knowledge that my forefathers had anointed the foundations of the state with a good deal of their blood. (*Infernal* 16)

It is therefore a mistake on the part of critics of Carter, and critics of postmodern fiction more generally, to assume that hostility to capitalism assumes hostility to technology. Rather, Carter, and Ishmael Reed and Thomas Pynchon, treat the practice of science as an essential constituent of the worlds that they narrate. Understanding capitalism and imperialism as a slaver and pimp is by no means incompatible with understanding the ways in which text and technology interact.

Indeed, Carter's extraordinary novel reveals the ways in which a cybernetic liberation, predicated on the illusion of emergence, acts as an alibi for capitalist regimes of exploitation that abide, no matter how networked we become.

¹ Hjortsberg, <http://www.nytimes.com/books/98/12/27/specials/carter-dreams.html>

² See Good, "Enigma and Fish" for an account of the women at Bletchley.

³ See Lavington, Simon Hugh. *Early British Computers: The Story of Vintage Computers and the People Who Built Them*. Manchester: Manchester University Press ND, 1980.

⁴ "Any labor that accepts the conditions of competition with slave labor accepts the condition of slave labor and is essentially slave labor" (27).

⁵ See Hillis, 21ff for an explanation of the basic binary input/output structure of computers.

⁶ "an infernal machine is being assembled" (Hjortsberg).

⁷ See Freud, "The Sexual Aberrations." *Three Essays On The Theory Of Sexuality*, and Melanie Klein, *The Psychoanalysis Of Children*, p 185 ff.

⁸ (Ford) Ford, *Situationist International*.

⁹ Throughout *The Selfish Gene*, but particularly pages 19-29, Dawkins describes bodies as "survival machines."

5. Coda: Zeroes and Ones

In an image from *The Crying of Lot 49* that has become something of a trope in this project, Oedipa imagines her search for the source of conspiracy as encoded in the binary logic of computing: the “zeroes and ones” of the “matrices of a great digital computer” are also the confirmations and denials, the clues and red herrings, of the mystery she tries to solve (*Crying* 150). This image crystallizes the unique accomplishment of these three novels among the mass of postmodern fiction published in the 1960s and 1970s. It represents the digital computer as both reference and as figuration, as both metaphor and phenomenon. It is also one instance of a long tradition in which the novel, as a literary form, has incorporated, and reckoned with, a communications technology—the letter in *Pamela*, the telegraph in *Lady Audley’s Secret*, even the smallpox virus in *Bleak House*—all represent the novel’s negotiations with the networked technologies that enable it.

This practice, in the novels that I have enumerated, is not particularly historical. Of these three examples, only *Pamela* is set in a historical past. Yet I denominate such a practice, in the three novels studied in this project, a historicist one. The label “history” remains the most accurate, albeit insufficient. What I argue is not that these novels engage in a practice of correcting gaps in the historical record,¹ but rather that they mark the circumstances of their present with a great deal of precision. Historicism remains the only term for this practice. Historicism also corrects, I think, the misperception by such critics as Emily Apter, who suggest, if not argue, that the value of such novels consists in their prescience and in their novelty. There is novelty here: *The Crying of Lot 49* is probably the first literary instance of the use of binary computer code as a metaphor, and these novels all can be seen to incorporate the new technologies with which they negotiate. However, the human, in these novels of the digital age,

emerges not in a resistance to technology, but in a marking of the ways in which *particular* technologies affect the material circumstances of life. Technologies have always, these novels acknowledge, traversed and connected human networks, and the novels here mark the specificities of particular traversals. These novels embrace the digital technologies they represent, but they represent humanity too, not just as assemblages, but, like Oedipa, within the nexus of labor, embodiment, and property. While the rise of cybernetic discourses in science and literature have tended to obscure such representations of the human, that is of the humans whose labor provides the conditions of possibility for communications networks, *these* novels resist not the cybernetic—indeed they embrace the cybernetic—but they resist the erasure that the cybernetic enables.

The visualization of binary code in *The Crying of Lot 49* incorporates communications technologies into literary form even while simultaneously marking the particularly immediate resonance of code as both phenomenon and metaphor. The conspiracy of the Tristero either is, or it isn't: "either there was some Tristero behind the appearance of the legacy America, or there was just America" (*Crying* 150–151). This binary "symmetry" of "ones and zeroes" represents, quite possibly, the first literary instance of binary code as a metaphor, a metaphor that subsequently drove literary critical discourse. That adoption represents, for scholars of cybernetic engagement in literature like David Porush, an intervention that adopts the forms of cybernetics, such as the binary code that drives all of digital computing, in order to resist the technological. Yet I hope to have shown here that, rather than participating in a project of simultaneous complicity and resistance, as Porush argues, these novels do not resist, but rather *embrace* technology while simultaneously keeping specific material values in the foreground. These values, additionally, are not particularly new. They are, rather, the values of the novel form, which has always been

concerned with the media technologies and the material circumstances that enable them. So while Porush and others designate postmodernism as an exercise in literary intervention into scientific discourse, it should be clear now that Lily E. Kay's identification of the "scriptural" sources of cybernetics, with all the theological resonance of that term, demonstrates a basis in the history of print and writing for the prevailing discourses in information science.

This scriptural discourse, then, constitutes an intervention of the literary into the scientific, or, rather, the scriptural discourse constitutes the textual basis that forms the ground on which "cybernetic technoscience" is built. For Kay, the "scriptural" is both textual and religious, in much the same way that Ishmael Reed's hieroglyphic anthology represents both a cultural and religious text. Reed's hieroglyphic translator studies "biochemistry philosophy math" (37) because those disciplines are necessary for textual interpretation. As Kay demonstrates, it was text, and the modalities of a culture of print and writing, that precipitated cybernetics itself as a science of communication and control. Information technology, Kay argues, *is* print culture. Furthermore, the information technology of biology, as identified by Watson and Crick, by Richard Dawkins, and others, was *generated* by a scriptural discourse that recognized the word, what Kay designates as the "book of life," the genetic code's textual key.

As she surveys her binary vista, Oedipa despairs, "waiting for a symmetry of choices to break down, to go skew. She had heard all about excluded middles; they were bad shit" (*Crying* 150). That "bad shit," the middle held in suspense by the binary logic of digital computing is, according to Caroline Levine, the substance of the novel itself. Just as Levine recognizes in *Bleak House* a "suspense of the middle" (521) that enables a narrative representation of a network only by withholding information about its composition and scope, the novels examined here identify in the representation of networks themselves the possibility for the erasure of the

material constituents of such networks. Yet these novels declare their own significance by approaching the decidedly material resonances of their own reference: labor, property, exchange. It's precisely these things that the cybernetic sensibility of the posthuman has obscured. Within a genealogy of narrative, originating, perhaps, with Quixote or Crusoe, these novels mobilize their own form in order to recuperate the apparently immaterial character of the culture of new media into a decidedly material project. It is also worth noting that what binary code represents is not really the on/off position of a switch; it is the *difference* between off and on. It is the middle, the suspense, the "bad shit." Binary code, in other words, is as imbued with representational capacity as any written or printed system.

These texts in particular work to demonstrate that the novel's concern with media technologies has never really been novelty, but rather historicity, the novel's precise attention to its own present. When, as I discuss in chapter four, Swift's Gulliver encounters the word machine, the irony obtains in the fact that the labor necessary for composing texts of such consequence is no less than that of the composition of narrative. These texts locate the human, not in a resistance to the technological, as Porush argues, but in the material, in the way the human is defined by labor, by property and access to property, by the exchange of information; they locate the human, not in a world that is virtual, speculative, or futurist, but within those spaces of "conviviality" that reveal the ways in which networks are a social fact of human history, neither created by the invention of packet switching nor by the representation of information as currency.

It's therefore necessary to acknowledge the ways in which recent critics have accounted for these fictions. They have, like Apter, criticized the ways in which these novels foreground mediation itself; or they have, like many others, but like Alan Liu and Porush particularly,

praised postmodernism's incorporation of new media, while adjudicating the quality of such novels in their resistance to postmodern economics: neoliberalism, immaterial labor, and financial speculation. Of course, fictions have been resisting such practices all along, so it is essential to reckon with these novels not as separate from their enabling tradition, but as a part of it, a cybernetic extension, as it were, of the novel's own practice.

Indeed, the network imaginary, a popular recent topic for critical investigation, might overemphasize the imaginary, when networks are themselves both facts of human social organization and perpetual products of a great deal of industrial, intellectual, and affective labor. The network imaginary too often obscures the *work* essential for the creation and function of networks. For Pynchon, Reed, and Carter, the significance that has come to imbue the network imaginary obscures the conditions of real, material networks. What is suspended and excluded becomes, as in Levine's account of suspense fiction, the essence of these network novels, novels concerned with the composition of social networks and technological networks, concerned with the *work* such networks require. Even the most organic of such networks, the "strong tie" networks of familial relationships (as opposed to the "weak tie" connections of casual social acquaintance),² depends on the reproductive and affective labor of women. When, I argue in chapter four, Doctor Hoffman automates that labor, Angela Carter reveals cybernetics' tendency to erase the production of the nodes and nets necessary for networked communication. The revulsion that the female automata inspire, "They were sinister, abominable, inverted mutations, part clockwork, part vegetable, and part brute," comes not from their mechanicity, but from their representation of an "ideational femaleness" (*Infernal* 132). Doctor Hoffman's erotic reconfiguration of the world will depend on the erasure of living, working bodies.

This project has stressed embodiment, particularly in chapters three and four, and emphasized materiality—that is the ways in which bodies mediate exchanges, and the ways in which material conditions circumscribe human life—because in the discourses of networks in the present, the early twenty-first century, those conditions are too often ignored and erased. The excluded middles, the solutions held in suspense, remain excluded and suspended in these fictions and in the present because, while these texts do embrace technologies, they also insist on the material conditions that produce those technologies.

The difference between a network imaginary, such as that prophesied by Deleuze and Guattari or explored by Tiainen and Parikka, and a historicist, material account of networks is that the latter recognizes the labor required in the production of the former. Networks are a fact of human social organization, as Stanley Milgram's experiments and as Nancy Tomes' history of infectious diseases reveal. Yet the technological networks that overlay such social networks are themselves the products of significant labor, whether that is the labor of producing the network of interstate highways, or the labor of building both the hardware and software to create a computer network. And, indeed, part of the revelation of these novels might be that the network imaginary is itself an insidious concept that works against the connections that material networks produce.

Disease, as both Levine and Tomes show, reveals networks. That is, disease reveals the lines of connection, edges in network theory, between persons of disparate social station.³ Yet the network imaginary is represented in *The Crying of Lot 49* by the reconfiguring of labor and capital in an information economy, and in *The Infernal Desire Machines of Doctor Hoffman* by the Doctor's infernal machines, which use the capacity for infinite reproduction of images by means of computer technology to efface the ways in which such reproductive labor is, and

continues to be, even in the network imaginary, performed by women. These novels mark those conditions, and therefore attempt to distinguish the imaginary and the material. Pynchon marks this material with a persistent emphasis on labor practices, reminding us that even when connections seem spontaneous, there is always real work performed.

Finally, the network imaginary threatens, in many quarters, to overtake the real science of human networks, appearing as a panacea for labor, for communication, and for representation. Assertions across many disciplines, including those in literary studies such as by Mark C. Taylor, in computer science by W. Daniel Hillis, and by the post-Deleuzian fetishizing of the “assemblage” as a figure for the posthuman network constituted by both human and machine bodies as by Tiainen and Parikka, obscure the labor necessary for the construction of such networks, even, indeed especially, now. While Taylor asserts the end of Marxism in the age of the network, and it may be true that literary Marxism, with a few notable exceptions, has had very little to say to cybernetics and its inheritors, political Marxism reminds us that for much of the world the age of information remains an industrial one. Indeed, the digital networks that create the conditions for the emergence of machinic intelligence are only possible because of the industrial labor of millions of workers. When the global scope is taken into account, therefore, it is impossible to say that the industrial economy has wholly been superseded by the informational.

These three novels considered together may be marginally global, but they are certainly transatlantic. Pynchon’s secret mail network offers both a history of the mail, praised by Friedrich Kittler for its accuracy,⁴ and a pattern of connection and communication that mirrors the contemporary construction of computer networks taking shape simultaneously.

The information flows imagined by the inheritors of Deleuze and Guattari follow, rather, in *Mumbo Jumbo*, the passages of the slave economy. They represent the theft of culture as a theft of text, the “old songs,” concurrent with the kidnapping of bodies for the purposes of the slave economy. When Jes Grew begins to be passed from Black carriers to white, via the spaces of 1920s conviviality identified by Tomes, the transatlantic network of slavery is revealed. This network is not apparent; it is painfully real. In Carter’s media system, the “direct and functioning ideology” in which capitalism had long since invested, has simply been reconfigured in an economy of images (Williams 135). Moreover, the cybernetic extension of women’s bodies further reproduces an economy in which the labor of women is erased. Accounts that efface the material conditions of the production of contemporary networks tell much too little of the story. These novels write the material history of networks over the network imaginary.

¹ This is the argument of Linda Hutcheon, in *A Poetics of Postmodernism*, in which she identifies postmodern historical fiction as “historiographic metafiction” (5, *passim*).

² For an explanation of “strong-tie” and “weak-tie” social networks see Granovetter, Mark S. “The Strength of Weak Ties.” *American Journal of Sociology* 78, no. 6 (May 1, 1973): 1360–1380.

³ For the history of network science, see Newman, Barabási, and Watts: *The Structure and Dynamics of Networks*.

⁴ Kittler, Friedrich. “Universities” 247.

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Madeleine Monson-Rosen

The University of Illinois at Chicago
Department of English
mmonso2@uic.edu

Education

- PhD in English, University of Illinois at Chicago, 2014
- MA in English, Fordham University, 2005
- BA in English and Latin, University of Minnesota, 2003, Summa cum Laude

Dissertation

- *Digital Humanity: The Novel and the Computer In the Information Age*, director: Joseph Tabbi

Fields of Expertise

- Twentieth-Century Fiction
- Print Culture
- Technology and Media
- History of the Novel
- Gender and Sexuality

Award

- Arthur L. Norberg grant, Charles Babbage Institute, Center for the History of Information Technology, University of Minnesota, 2012.

Publications

Articles:

- “Messenger Bug: Ishmael Reed’s Media Virus” in *Cultural Critique* 88, (Fall 2014).
- “‘An Intent to Communicate’: Technology and Digital Culture” in *The Crying of Lot 49*.” In *Technology and Humanity*. Carol Colatrella, ed. Pasadena, CA: Salem Press. 2012.
- “The Most Primeval of Passions: Incest in the Service of Women in Angela Carter’s *The Magic Toyshop*.” In *Straight Writ Queer*. Jefferson, NC: McFarland & Co. 2006.

Reviews:

- *The Networked Wilderness* by Matt Cohen in *electronic book review*, April 2012.

- *Pink Pirates: Contemporary American Women Writers and Copyright* by Caren Irr, in *Mediations*, Fall 2010.

Conference Presentations

- “‘God or a digital machine’: A Literary History of Computer Networks” NEMLA Conference, April 2014.
- “Information Thinking.” New Media in American Literary History Symposium, Northeastern University, December 2013.
- “Digital Humanity: The Novel and the Computer, 1964-1973.” Humanities and Technology Association Annual Conference, October 2012.
- “The Mails are Terribly Slow: Alternative Embodiments in Ishmael Reed’s *Mumbo Jumbo*.” Society for Literature, Science and the Arts Annual Conference, September 2012.
- “The Structure of a Media Revolution: Thomas Pynchon and the Politics of Paradigm Shift” 2011 Institute on Culture and Society, the Marxist Literary Group, June 2011.
- “‘Not an Interface, But an Intermedium’: Thomas Pynchon discovers the Internet in *The Crying of Lot 49*.” Post45 5th Anniversary Conference, April 2011.
- “*Das Kapital* on the Fairy-Tale Shelf: Postmodernism and Politics in *Almanac of the Dead*.” NEMLA Conference, 2009.
- “The Most Primeval of Passions: Incest in the Service of Women in Angela Carter’s *The Magic Toyshop*.” NEMLA Conference, 2005.

Courses Taught

- English 242: Survey of British Literatures 1660-1900
- English 105: British and American Fiction
- English 111: Women and Literature
- English 117: Gender and Literature
- English 122: Introduction to Rhetoric
- English 160: Academic Writing I
- English 161: Academic Writing II

Teaching Assistant

- English 241: British Literature from the beginnings to 1660
- English 242: British Literature from 1660 to 1900
- English 313: Major Plays of Shakespeare

Academic Administration

- Assistant Director, UIC First-Year Writing Program 2007-2009
- Writer-Editor, Illinois College Advising Corps 2010-2012