KATHLEEN FITZPATRICK

The Exhaustion of Literature: Novels, Computers, and the Threat of Obsolescence

Surrounding every technology are institutions whose organization—not to mention their reason for being—reflects the world-view promoted by the technology. Therefore, when an old technology is assaulted by a new one, institutions are threatened. When institutions are threatened, a culture finds itself in crisis.

Neil Postman, *Technopoly*

It has become something of a cliché to begin an academic article on the electronic future with reference to William Gibson's *Neuromancer*, and yet doing so is all but irresistible. The draw of this particular text arises from its many ambiguities, not least among which is the novel's ironic relationship with its own medium. On the one hand, the novel seems to predict the death of print; the sole mention of this aging technology comes in Istanbul, where Case tells us "the written word still enjoyed a certain prestige," evidence that this was "a sluggish country" (88). On the other hand, Case's flippant thoughts are themselves cast in print, in a novel that spawned one of the most creative, most prolific genres of recent fiction, cyberpunk.[1] Gibson

An earlier version of this essay was delivered as a talk at Pomona College. Thanks are due to Tim Caron, Paul Saint-Amour, Jeremy Green, Stephen Brauer, and particularly Katherine Hayles and the members of the 2001 NEH Summer Seminar, "Literature in Transition: The Impact of Information Technologies," for their informed and thorough readings.

1. This irony, along with the many technological ambivalences evidenced in cyberpunk, lead Istvan Csicsery-Ronay to refer to the genre as "the apotheosis of bad faith" (193).

Contemporary Literature XLIII, 3 0010-7484/02/0003-0518

thus enacts the irony of the computer age itself, in which text has become increasingly ubiquitous and yet print-on-paper seems destined to go the way of the horse-drawn carriage.[2] This tension has produced a wide range of techno-ecstatic prophecies and antitechnological jeremiads across contemporary culture; it should probably not be surprising that the literary world has tended significantly toward reaction rather than revolution. Sven Birkerts, for instance, gives voice to a widely held anxiety that "the printed word," the very stuff of traditional literary study, "is part of a vestigial order that we are moving away from—by choice and by societal compulsion" (118). Citing Birkerts on what-has-gone-wrong (or, for that matter, citing Neil Postman, as in the epigraph above) is as much a cliché as citing *Neuromancer* on the direction of the future. The usefulness of these clichés is in their juxtaposition; despite their differing positions on the technological future—Gibson at least partly celebrating the advances to come; Birkerts unremittingly elegizing the disappearing past—their joint concerns nonetheless unmask literary culture's conviction that, for good or ill, new computer technologies have changed our relationship to the written word in general, and the novel in particular.

Birkerts is far from alone in his response to this perceived change; in fact, his concern is a peculiarly technology-focused version of an anxiety with a long cultural history. One need only look back at Louis Rubin's *The Curious Death of the Novel*, Leslie Fiedler's "Cross the Border, Close the Gap," Susan Sontag's "Against Interpretation," Norman Podhoretz's *Doings and Undoings*, and Alvin Kernan's *The Death of Literature* to get a sense that the novel has been proclaimed dead or dying for nearly as long as it has been alive.[3] The technological turn apparent in Birkerts's death-of-the-

2. The exploration of the space between these two states is the primary work of Xerox PARC [Palo Alto Research Center]'s Research on Experimental Documents group, which in March 2000 opened an installation at the San Jose Tech Museum of Innovation entitled "Experiments in the Future of Reading."

3. Peter Schneck, moreover, suggests that "one could write a history of the death of the novel almost as long and rich as that of its lifetime" (65). See Jerome Klinkowitz's *Literary Disruptions*, particularly the prologue, "The Death of the Death of the Novel," for a reading of the origins of this discourse; see also Paul Mann's *Theory-Death of the Avant-Garde* on the function of such death discourses. Recent collections reconsidering the novel's health include Spilka and McCracken-Flesher, and Tabbi and Wutz. There

novel anxiety reveals a new spin, however, made possible by the ways that the computer is actually intervening in text, both in terms of delivery and in terms of production. Hypertext, for instance, is one manifestation of this intervention, on behalf of which "extremists," as Birkerts calls them, argue that "the book . . . is no longer the axis of our intellectual culture" (152). As writers such as J. David Bolter, Michael Joyce, and Robert Coover explore the future of electronic textuality, critics such as Birkerts dig their heels in further. For such death-of-the-book critics, cultural life is a zero-sum game; with every advance in computer technology, the book must of necessity become more and more marginalized.

The novelist, at least theoretically, would also be increasingly marginalized in such a heavily technologized culture. Of course, as Larry Weissman, the editor of the on-line publication *Bold Type*, acknowledges, the novelist's precarious position on the edge of an electronic public life may in fact be a benefit: "In this more marginal context," he writes, "it may be that writers will be liberated and literature as an art form will flourish anew." And, as the genealogies of the media that developed during the twentieth century bear out, older forms such as the novel need not disappear as new forms appear alongside. As Joseph Tabbi points out in his pithily titled on-line article "A Review of Books in the Age of Their Technological Obsolescence," "new technological achievements do not have to mean the forceful displacement of older media; their recombination is at least as likely, as the pressure of new media is sometimes necessary to push the old toward the higher complexity of a new evolutionary level." Thus where computers and novels come into contact, the result need not be conflict; instead, the relationship could prove symbiotic.

But any "new evolutionary level," if it has begun to take shape, is today only in its incunabular stages; forms such as hypertext may only be a gesture in the direction of the future.[4] Moreover, the

---

is of course a plethora of technophilic writing along with the technophobic—such as J. David Bolter's *Writing Space* and Mitchell Stephens's *The Rise of the Image, the Fall of the Word*—as well as negotiated views, including Bolter and Richard Grusin's *Remediation: Understanding New Media*.

4. Current critical debates surrounding e-lit question hypertext's apparent dominance; see, for instance, Aarseth and Joyce.

symbiosis of text and machine achieved in hypertext has done little to relieve literary anxieties about the end of books—far from it. As Christopher Keep points out, readers and writers are often alarmed by hypertext's effects, which include a sense of physical dislocation in the work's nonmateriality: "Hypertexts refigure our perception of ourselves as closed systems: sitting before the computer monitor, mouse in hand, and index finger twitching on the command button, we are engaged in a border experience, a moving back and forth across the lines which divide the human and the machine, culture and nature" (165). Keep indicates an intimate connection between the loss of the book and the loss of the self; as our cultural experiences become more technologized, they seem to many to become less human.

Moreover, the "border experience" of hypertext itself raises unsettling questions about the distinction between the book and the computer, a distinction that is blurrier than it may at first appear. Each category—"book" and "computer"—is at once too general and too specific a term for a multitude of communicative modes and forms. When Birkerts valorizes the "book," or Louis Rubin analyzes the passing of the "novel," for instance, it is fairly evident that each has a *particular kind of book* in mind—the serious literary text. On the other hand, as Geoffrey Nunberg has pointed out, in phrases such as "the end of books," the book is less itself, less the material object, than it is "a metonymy for all of the material circumstances of print culture—not just the artifacts it is inscribed in, but the forms and institutions that have shaped its use" (15). The loss of the book is the loss of libraries, of literary study; the death of the novel is the death of the traditional humanities.[5] And the "computer," from this perspective, is less the book's opposite form than the harbinger of revolution in the institutions surrounding that form. Moreover, separating these two categories is nowhere near as easy as the frequent offhand references to such a split

5. Hence the "end of civilization as we know it" tone that much of this elegizing takes on. See in particular Birkerts's "The Faustian Pact," in *The Gutenberg Elegies*, in which he claims to have met the devil, which turns out to be *Wired* magazine; see also Nicholson Baker's erudite panic in work such as "Discards," on the death of the card catalogue at the hands of the database, and *Double Fold*, which explores libraries' rush to replace decaying paper with microfilm/fiche/code.

would make it appear. Is the distinction between "book" and "computer" merely mode of delivery, or are there significant differences in content as well? And what of forms that violate these boundaries? Would a full-length prose narrative published on e-paper still be thought of as a "novel"? Certainly. But would it be a "book"? What of the same text read on a handheld computer or PDA? Or on the Internet? What of a printed and bound prose narrative that eschews linearity for a more weblike structure, such as Julio Cortazar's *Hopscotch?* What about that same weblike text in a computer-driven environment? Where, in fact, does the novel leave off and something else begin?

It is not my intent, in this article, to answer these questions, many of which I consider unanswerable. I do not intend to come down on one "side" or the other—book, good; computer, bad—or to predict the form of the literature of the future. This is not because I do not have opinions, but rather because I am more interested in the asking of the questions in the first place.[6] That is to say, I am less concerned with whether there is cause for Birkerts's anxiety than I am in what purposes such anxiety might serve. Thus, though I will in the course of my argument encounter two texts that explore *actual* developments in computer-based writing, I will largely focus upon *representations*, in both fiction and nonfiction, of computers and writers in conflict. These representations repeatedly reveal an anxiety about the diminished stature of the novel in the age of the computer. Whether such anxiety is warranted is, to an extent at least, beside the point; more pressing are such anxiety's *effects.*[7] In the texts I will consider, the primary effect of the writer's

6. If I must reveal these opinions, I will do so here, subtextually: as one part of my career depends upon the existence and importance of books (I write, I read, I teach how to do both), I shout my belief in the continuing relevance of print culture. And as the other part of my career depends upon my examination of developing trends in new media forms, I celebrate the possibilities of virtuality. I live with the joys of interdisciplinary ambivalence—joys that, I believe, institutional pressures will soon require of many traditional disciplines if they are to survive.

7. My opinion, again, with regard to the validity of this anxiety, is an equivocal yes and no. Yes, the current cultural position of print is fundamentally different from that in the pre-electronic era, as it is no longer the sole mode of text delivery, participating instead in a diverse media ecology. But as the significant (if ambivalent) phenomena of the book superstore (and the online book superstore) and Oprah's Book Club reveal, the

concern about the death of print is the production and distribution of more print.

What I hope to explore is how the representation of concern about the present and future state of print—a concern that is part of the larger cultural phenomenon I refer to as the anxiety of obsolescence—serves paradoxically to protect print from the death it presumably predicts.[8] I will also, not incidentally, explore what else such representations protect. If the "book" in "the end of books" signifies not the material object but the institutions that surround it, if the "border experience" of hypertext leads the reader to question the ontological status of the self, then the anxiety of obsolescence reveals a fundamental anxiety about the contemporary state of humanism, which surfaces in both fiction and critical discourse. The computer age thus seems to offer new, potentially dangerous threats to the category of the "human" itself, as well as to its privileged forms of knowledge.[9] Representations from Phillip K. Dick's *Do Androids Dream of Electric Sheep?* to the *Terminator* films act out anxieties about the tenuous relationship between the human and the computer, imagining a computer that does the living species in, or a computer-based organism (a cyborg) that is able to "pass" for human, disrupting the coherence of the category. And, as this article will explore, texts as different as John Barth's *LETTERS* and Richard Powers's *Galatea 2.2* enact their writerly concerns that while the human species may survive, humanism may not.

---

book is not dead, but rather selling like hotcakes. The question then becomes whether all the books that are sold are (1) in fact being read, and (2) of literary importance; both of these subquestions raise for me a discomforting sense of elitism. Moreover, to argue that the writer's role in contemporary culture has been diminished—whether by film, television, computer, or other cultural shift—is of necessity to posit an Arcadian past in which the writer was culturally central, an assumption that, like any such nostalgic utopianism, is suspect in its revisionism.

8. I more fully explore the phenomenon of the anxiety of obsolescence elsewhere. The term should connote a certain simultaneous debt to and revision of Harold Bloom's *Anxiety of Influence*. Bloom suggests the poet's sense of belatedness; in the contemporary era, I argue, this sense of belatedness has become so chronic as to obviate the demands of literary history altogether. The pressures of the material near-future on the writer vastly outweigh those of the idealized past.

9. This anxiety arises from a certain perspective, of course; while I largely focus on the views of those who see computer technologies as a threat, many argue for the liberatory potential of such technologies. I'll discuss these possibilities for liberation shortly.

Despite the apparent differences between such representations, however, in which two categories face two fundamentally different challenges—the human contends with the posthuman, in the form of the cybernetic organism; humanism faces posthumanism, in which new forms of knowledge are privileged—these two challenges do not parse out discretely between those that imagine a threat to species and those that imagine a threat to knowledge, between ontological and epistemological anxieties. In fact, in the majority of these representations, the two are blurred, and at times conflated. Computer technologies are, in these conflations, held responsible not only for effacing the boundary between human and machine, but also for undermining humanist ideologies.[10]

Of course, as much of contemporary critical discourse argues—including thinking as disparate as feminist theory, critical race theory, queer theory, and psychoanalytic theory, as well as poststructuralism, postmodernism, and postcolonialism—the principles that have supported humanism as a privileged mode of thought since the Enlightenment have been based upon artificially constructed conceptions of the "human" that have always had hierarchies of power at their core. Thus in challenging the principles of humanism, posthumanism interrogates the notions that the norm for the category "human" is a white heterosexual male human, and that all others are deviations from this norm; that the (white heterosexual male) individual is discrete, unique, coherent, and rational; and that the knowledge produced by this individual thinker approaches, through its objectivity and rationality, a universal sense of Truth and Beauty. In dismantling the traditional categories of knowledge represented by "humanism," posthumanism serves to disrupt the social hierarchies those categories underwrite.

As I have suggested, computer technologies appear, in many representations, to be held responsible for such epistemological disruptions. These anxious texts frequently conflate the posthu-

10. Such a conflation is only problematic when the human/machine border is viewed as in need of protection. As Donna Haraway and many of her critical descendants argue, human/machine interfaces (such as the cyborg) can facilitate liberation by giving rise to new conceptions of subjectivity that transcend humanist ideologies of the sovereign individual and the hierarchies that sense of sovereignty has underwritten. The posthuman is thus praised, in this celebratory discourse, for its explicit posthumanism.

man's interest in the relationship between human and machine with posthumanism's disruption of *human* social relations in ways that reveal the latent object of the anxiety of obsolescence. The humanist writer, in confronting the computer and sensing his imminent demise, imagines not simply the marginalization of print in an electronic age, but the demise of the hierarchies that have supported his dominance.[11] In representing this anxiety in text, the writer is able not only to protect print from its putative death but to "save" humanism as well. The figure of the computer—and particularly the writing computer—in the fiction of the anxiety of obsolescence, as I hope to demonstrate, functions in counterpoint to the human in the same manner that Toni Morrison suggests Africanist characters are used in white fiction; as racially marked characters serve to "limn out and enforce the invention and implications of whiteness" (52), so the conscious computer draws and reinforces the outline of the human—and specifically the unmarked human, the "universal" white male heterosexual.

In what follows, I will explore the implications of this conflation of the posthuman and posthumanism in the anxiety of obsolescence, primarily focusing on the represented relationship between gender and the machine, first in John Barth's *LETTERS*, an example of early "cybernetic fiction"; second, in some contemporary nonfiction about the new interface between writers and computers; and finally in *Galatea 2.2*, in which Richard Powers attempts to confront simultaneously, with a degree of consciousness, the waning of both the human and the humanist.[12]

Numerature

In the introduction to *Bodies and Machines*, Mark Seltzer explores the "relays, transit points, and paths of least resistance" (4) through

11. I of course use the masculine pronoun here with great intent; while the anxiety of obsolescence is not confined to white male writers, it is largely aligned with a white male subject position, that unmarked position that humanism idealizes as universal.

12. The term "cybernetic fiction" belongs to David Porush. While Porush's *The Soft Machine* covers much of the same territory in exploring the anxieties that cybernetics produces in the postmodern novelist, particularly the paranoia that ideas of communication and control instill in the human, his work stops short of interrogating what that category of "human" portends.

which naturalism's interest in the role of the machine in production, as well as the "melodramas of uncertain agency" (18) that such interest produced, bled into anxieties about the machine's role in *literary* production. Such anxieties foreground for Seltzer an explicitly Freudian "scene of writing" (19), in which the representation of the mechanics of writing reveals key naturalist concerns about the unnatural state of both the writing process and the human body in the machine age: "such a becoming visible of the technology of writing in machine culture risks making visible the links between the materiality of writing and the making of persons, and thus the internal relations between persons and machines"(79). The ambiguity of the "typewriter," for instance, in its reference to both the machine and its human operator indicates one of the machine's dangers, its "reduction of persons to bodies and bodies to sheer matter" (225). In this reduction, human agency is lost; thought is replaced by technics. Of course, such concerns about mechanized literary production predate the naturalists, originating at least as far back as Jonathan Swift's *Gulliver's Travels*.[13] As David Porush reads it, Swift's "Lagadan Word Machine" is "one of the first instances of automation being shown displacing humans not only as laborers but as thinkers" (6). More recent literary examples of such dangerous writing machines abound, ranging from Stanislaw Lem's electronic bard, which in its machinic perfection so far exceeds the abilities of other, "human" poets that these poets are driven to suicide, to Roald Dahl's great automatic grammatizator, invented by a failed writer with the intent of monopolizing the literary marketplace and forcing "real" writers out of business.[14]

The common historical thread binding these disparate representations seems to be a moment of both philosophical and material transition: from Renaissance to Enlightenment, from Victorian to modern, from modern to postmodern; from agricultural to industrial, from industrial to electronic. In each of these representations,

13. Moreover, such concerns about the "internal relations between persons and machines" date back to Descartes.

14. I put "human" in quotation marks because Trurl and the rest of *The Cyberiad*'s population are, though descended from humans, in fact self-replicating robots. Part of Lem's humor arises from the arbitrary distinctions the population draws between themselves and the machines they build.

what is ostensibly being lost is not merely an artifact, or a mode of communication, or even a mode of production, but an entire way of life, a means of understanding what it is to be human in the world. Given this bond between anxieties about the machine's interference in literary production and moments of cultural and epistemological rupture, then, it should come as little surprise that the foremost period of the "death of the novel" discourse arises in the late 1960s. At this moment of profound social change, the literary world waited in what appeared to many to be a vacuum: high modernism had apparently run its course, and impatience with the "well-made novel" had led to a formal experimentalism destined to burn itself out.[15] And at the heart of this discourse was John Barth's 1967 "The Literature of Exhaustion."

In exploring Barth's metafictional techniques and his nonfiction musings on the novel form, many critics brush hurriedly past "The Literature of Exhaustion" on the way to "The Literature of Replenishment," his 1980 auto-riposte. Gerald Graff, for instance, mentions the former essay in passing, only to dismiss it: "If readers of the earlier essay got the impression from its title that Barth was announcing the death or debilitation of all fiction previous to his own, Barth takes great pains in his recent essay to set them straight" (150). This latter essay is moreover all but unanimously granted the honor of having "most clearly situated and named the postmodern undertaking" (Roemer 41). The problem with these readings is twofold: first, Jerome Klinkowitz's half-joking description of "Exhaustion" as a "literary suicide note" (5) gestures toward the risks of brushing such writerly despair aside: just because the patient recovered doesn't mean the danger wasn't real. Secondly, these readings of "Replenishment" take Barth too much at his word when he petulantly insists that the earlier essay has been chronically misread, and that all he meant by "exhaustion" was not that literature itself was a dying institution, but that the clock was running out on high modernism, pointing to the rise of postmodernism all along. Graff is of course correct in saying that Barth was not "announcing" the death of fiction, and Barth himself is likewise right in insisting that he never said that literature was dying. But

15. See McCaffery and Rubin for two readings of this moment of transition.

one must consider what he does say in this essay, and what having said it gains him, before dismissing it altogether.[16]

Barth's "Exhaustion" is both a study of Jorge Luis Borges and a discussion of "some professional concerns of my own" (29) that this study occasions. Borges's work responds, according to Barth, to the pressures of the era in which he writes, "an age of ultimacies and 'final solutions'—at least *felt* ultimacies, in everything from weaponry to theology, the celebrated dehumanization of society, and the history of the novel" (30). That these ultimacies are merely "felt" rather than material makes them no less real; that the Bomb was never dropped, by way of comparison, in no way obviated the tensions of the cold war.[17] Even "felt ultimacies," among which Barth pointedly includes the "dehumanization" or mechanization of the social, demand serious responses. Borges's triumph, according to Barth, is his ability to "transcend" these ultimacies; he "confronts an intellectual dead end and employs it against itself to accomplish new *human* work" (31; emphasis added). The dead end is intellectual, but somehow connected to dehumanization; it is not merely the novelist that faces the specter of obsolescence, but the entire category of the human.

But given Barth's hedge in calling them "*felt* ultimacies," how seriously should the novelist's obsolescence—or indeed the obsolescence of the human—be taken? Barth simultaneously lays out and defuses the threat:

> Suppose you're a writer by vocation—a "print-oriented bastard," as the McLuhanites call us—and you feel, for example, that the novel, if not

16. Of course, not everyone dismisses "Exhaustion" out of hand. McCaffery, for instance, roots the essay in what he sees as the literary torpor of the late 1960s and early 1970s, claiming that, by the time the seventies were over, so was the torpor, and so "Exhaustion" gave way to "Replenishment." By this argument, the second essay updates the first, rather than replacing it. Whether this was in fact a period of literary torpor, or rather, as Louis Rubin argues, a period of *critical* confusion, is debatable. See also Peter Schneck, who briefly defuses the essay through its explicit rejection of "intermedia" work and preference for the elite forms of literature.

17. Following this analogy, one might compare the triumphalism of "Replenishment" with that of the Reagan era it preceded, in which the ultimacies of the cold war were—rhetorically, at least—erased by U.S. military dominance. As I will argue shortly, I believe "Replenishment" to be a deeply conservative essay, not at all out of keeping with the decade it inaugurated.

> narrative literature generally, if not the printed word altogether, has by this hour of the world just about shot its bolt, as Leslie Fiedler and others maintain. (I'm inclined to agree, with reservations and hedges. Literary forms certainly have histories and historical contingencies, and it may well be that the novel's time as a major art form is up, as the "times" of classical tragedy, grand opera, or the sonnet sequence came to be. No necessary cause for alarm in this at all, except perhaps to certain novelists, and one way to handle such a feeling might be to write a novel about it. Whether historically the novel expires or persists seems immaterial to me; if enough writers and critics *feel* apocalyptical about it, their feeling becomes a considerable cultural fact, like the *feeling* that Western civilization, or the world, is going to end rather soon. . . .)
>
> (32–33)

He is inclined to agree, and yet not alarmed; the novel's time may be "up," a fact that may produce more novels. The keys to this ambivalence come at the beginning and the end of the passage. To take the latter first, apocalyptic *feelings*, like felt ultimacies, become factual by being widespread; their actualities are "immaterial" in the face of the zeitgeist. And, in fact, the novel's expiration had, at that moment, become "a considerable cultural fact," as the substantial death-of-the-novel discourse cited earlier demonstrates.[18] Of course, as Paul Mann trenchantly points out, literary forms and modes often thrive on these intimations of imminent doom; writing about the end of the novel is, after all, still writing. Barth's self-reflexive, metafictional approaches to the novel, building since *The Sot-Weed Factor*, expanding through *Giles Goat-Boy* and *Lost in the Funhouse*, and finally achieving critical mass in *Chimera*, provide him with means for evading the terror of such ultimacies. The declaration of these ultimacies in fiction prolongs fiction's own life; their declaration in "Exhaustion" becomes a rejoinder to critics who accuse such self-reflexivity of being "self-enclosed, a man talking, ever more exclusively, to himself" (Roemer 43).

Barth of course retracts his sense of the novel's ultimacy in "Replenishment," but we must consider what the novel is replenished *with* before giving in to celebration. Much of the essay is spent in

18. One might also point to the rise in perceived posthumanist assaults on authorship beginning at the same moment, including most significantly Roland Barthes's "Death of the Author" and Michel Foucault's "What Is an Author?"

a somewhat bemused consideration of the term "postmodern," attempting to sort out what the critics intend by this category, what, for that matter, they meant by "modernism," and how the various terms relate to one another. Each new period arises, in Barth's reading, out of conflict with and rejection of what has gone before. By contrast, Barth himself suggests that a "worthy program for postmodernist fiction," the fiction he hopes might come to be thought of as replenished, would be "the synthesis or transcension of . . . premodernist and modernist modes of writing" (70). Modernism itself becomes not merely an exhausted form, but a form of exhaustion; the way out of such exhaustion, it seems, is not so much *through* or *beyond*, but *back*. Replenishment arises not from the future, but from the past.

But in the earlier essay, the causes of literary exhaustion that Barth points to are decidedly different, as suggested by the introduction of the "McLuhanite" slur "print-oriented bastard." Rather than the clock simply having run out on modernism, instead new visual and electronic media seem to be at the root of the death of "the novel, if not narrative literature generally, if not the printed word altogether." Replenishment must come from the past, precisely because the future is rapidly leaving print behind. This relationship of print to the media that may threaten to replace it forms in large part the substance of Barth's 1979 meganovel, the novel that for some critics represents both the apotheosis and the terminus of Barth's obsessive self-reflexivity, *LETTERS*.[19]

As many critics point out, Barth's elaborate play with the form of the epistolary novel in *LETTERS* is precisely the kind of program he recommends in "Replenishment," a "reinspect[ion of] the origins of narrative fiction in the oral tradition" (*LETTERS* 438). In this case, the "origin" Barth returns to is not only the eighteenth-century epistolary form but also his own origin; Barth reintroduces characters (or the descendants of characters) from each of his six previous texts—Jacob Horner (*The End of the Road*), Todd Andrews (*The Floating Opera*), A. B. Cook VI (*The Sot-Weed Factor*), Jerome Bray (*Giles Goat-Boy*), Ambrose Mensch (*Lost in the Funhouse*), and

19. Max Schulz, for instance, describes *LETTERS* as "a self-reflexive novel meant to end all further attempts in that mode" (95).

"John Barth," the "Author" (*Chimera*)—along with a seventh, new character, Lady Amherst, all of whom exchange a series of letters that become both the plot and the substance of "Barth's" seventh novel. Thus in merging the premodernist epistolary form with modern formalist experimentation, Barth creates a replenished future for a putatively exhausted form.[20] However, while it is true that, as Kim McMullen has argued, "the reflexive narrative structure of *LETTERS* engages the mimetic foundation of belles-lettres in a postmodern critique" (406), the backward-looking nature of this critique finally leaves the underlying assumptions of humanism untouched.

"Replenishment" was published within months of *LETTERS* (as "Exhaustion" followed quickly on the heels of *Lost in the Funhouse*). But to so closely align *LETTERS* with the latter essay requires overlooking much of the novel's *content*, which dwells very precisely on ultimacies—weapons of mass destruction, antihumanist philosophies, social mechanization, and, above all, the Death of the Novel. *LETTERS* itself may well be replenished, but its tone still echoes exhaustion. While Lady Amherst writes to the Author that "A. assures me that you do not yourself take with much seriousness those Death-of-the-Novel or End-of-Letters chaps, but that you *do* take seriously the climate that takes such questions seriously" (438), Todd Andrews situates the question differently: "Nowadays the genre [of the novel] is so fallen into obscure pretension on the one hand and cynical commercialism on the other, and so undermined at its popular base by television, that to hear a young person declare his or her ambition to be a capital *W* Writer strikes me as anachronistical, quixotic, as who should aspire in 1969 to be a Barnum & Bailey acrobat, a dirigible pilot, or the Rembrandt of the stereopticon" (84). Like the circus, the airship, and the magic lantern, the novel has not become "anachronistical" simply because its time is up, or because certain critics have declared it to be so, but because it has been "undermined at its

20. As the "Author" writes to Ambrose Mensch, near the novel's end, "I am smitten with that earliest-exhausted of English novel-forms, the *epistolary novel*, already worked to death by the end of the 18th Century. Like yourself an official honorary Doctor of Letters, I take it as among my functions to administer artificial resuscitation to the apparently dead" (654).

popular base" by newer, more technologically advanced forms of electronic communication. Thus while the structure of the novel engages in a replenished postmodernist gamesmanship, in which the writers of the letters, the dates on which the letters are written, the order in which the letters are read, the historical letters that these letters take as their subject matter, and the alphabetic letters with which they are written all come together to form a tightly woven acrostic pattern, the novel's plot still bespeaks genre anxiety.

Much of this plot turns on a film being produced in the Tidewater area of Maryland, based (quite) loosely on the novels of "John Barth." The director of this film, Reg Prinz, is said to be "interested" in "literature, which he is reputed to have called 'a mildly interesting historical phenomenon of no present importance'" (217). Unsurprisingly, the ensuing film bears less and less relation to the texts it takes as its inspiration. Ambrose Mensch has been hired to write the screenplay for Prinz's film, but the processes of writing and of filming very quickly devolve into a battle of wills between Director and Author, a battle that begins to take over the substance of the film. Prinz, for instance, commissions Mensch to produce the scenario for an Unwritable Scene, which Prinz (on film) wordlessly stuffs into a bottle and flings into the surf. Mensch later writes in a letter to his mysterious Muse: "We've lost a battle, Ma'am or Sir, in what till now I'd not understood to be a war" (332). Indeed, it is a war, with skirmishes breaking out along the frontier between the two media, the "irrelevance" of text combating the superficiality of images. According to Lady Amherst, who chronicles the battles, "Ambrose's idea . . . was to reply to Prinz's triumphantly Unwritable Scene . . . with a victoriously Unfilmable Sequence" (383).

The war rages on, in something of a stalemate, until someone points out that "Film's as played-out a medium as Fiction" (553). With this helpful observation, the focus of the battle is shifted: no longer is the conflict one between two forms vying for supremacy; instead, the reader now watches a battle between "the Obsolete Media" (541).[21] With film and fiction equally self-indulgent, equally

21. The fact that the reader is "watching" this battle in print may indicate the eventual victor, by whom history is always written.

anachronistic, the novel's characters begin speculating about the new media to come. Lady Amherst writes:

> As for our *other* theme . . . —the *mano a mano* between Author and Director, Fiction and Film—Morgan gently scoffed at it, and was supported in his deprecation by the young media types in our conversational vicinity. In their opinion, that was a quarrel between a dinosaur and a dead horse: *television*, especially the embryonic technology of coaxial-cable television, was the medium that promised to dominate and revolutionise the last quarter of the century.
>
> (453)

Television, in this replay of the historical development of twentieth-century media, threatens the dominion of film, as film once threatened the dominion of fiction. Reg Prinz's film gradually begins to incorporate this new medium, figurally, as the ultimate victor in the increasingly bizarre media battles. Cast in the role of "the Medium of the Future" (541) is Jerome Bray; as Bray's own plotline indicates, he is in fact the ideal player for this part, but the assumption that this future form will be television is mistaken. Television, it becomes apparent through the novel's letters, is in fact the medium of the *present;* the medium of the *future* is Bray's electronic counterpart, the computer.

Bray, though a certifiable maniac, has from the beginning of *LETTERS* been at work on a project to rejuvenate the novel by creating the new medium that will restore its life. "[T]he empire of the novel," he asserts, with recourse to his characteristically Bonapartian terms, "vaster once than those combined of France and England, is shrunk now to a Luxembourg, a San Marino! Its popular base usurped, fiction has become a pleasure for special tastes, like poetry, archery, churchgoing" (33). Bray, a distant descendant of Napoleon's brother Jerôme, intends to rebuild this empire through *NOVEL,* a project he has programmed into his strangely animorphic computer, LILYVAC II. But it becomes apparent throughout the unfolding of *LETTERS* that the project has been ill-conceived, that something has gone terribly wrong; at LILYVAC's first run through the project, the computer types out not *NOVEL* but *NOTES,* a far more ambiguous form that may or may not bear a relationship to fiction as it has been practiced.

Bray, in a letter to "John Barth," threatening the "Author" with a copyright infringement suit over the contested authorship of his ancestor's *Revised New Syllabus* (also known as *Giles Goat-Boy*), acknowledges that *NOTES* may in fact undo the novel, and that LILYVAC II may not be the novelist of the future but something else altogether: "Even as we draft this ultimatum, LILYVAC's printers clack away at the text of *RN*, the Revolutionary NOTES that will render your ilk obsolete" (148). But it is ultimately a suggestion from "John Barth" himself that sets Bray on the course of true revolution; Barth points out to Bray that his program may be the victim of a miscalculation, that the factor key to his project may not be five, but rather seven, and thus may spell out not *NOTES* but *NUMBERS*. As Bray writes to Bea Golden, "a rising star . . . should spurn such obsolescent media [as fiction and film], soon to be superseded by coaxial television and laser holography, ultimately by a medium far more revolutionary, its essence the very key to and measure of the universe. . . . *Numerature*!" (637).

Numerature is the very key to *LETTERS*, and the stroke that ends the Battle of the Obsolete Media; at the moment television is intended to rise to its new dominion, instead the tape-recorded voice of Bea Golden blasts over the players: "*The revolutionary future belongs neither to Pen nor to Camera, but to one . . . two . . .*" (555). Here is the ascendance of digitization, the true victor in *LETTERS*, in which it seems apparent that the novel's obsolescence runs much deeper than previously suspected, to the wholesale replacement of the basic units of the novel's construction, the rise of numbers over letters. And yet *LETTERS* itself is a seven-letter unit, perhaps equivalent in computational value to *NUMBERS*. Thus Barth's obsessive tinkering with the form of the "letter," both epistolary and alphabetic—by using letters as a means of calculation, he attempts to provide a corrective to the terrors of numerature. As Porush argues, Barth's exaggeration of the machinery behind the functioning of fiction, "to the point that he has even turned himself into a kind of text-generating machine" (136), allows him to exploit the flaws in that machinery, to "[invite] comparisons, perhaps invidious ones, between Barth's technique and what we would expect of a computer's fictional output" (142). The development, then, of the computer that can write leads in two contradictory directions: first,

not to the rejuvenated, computerized literary form Bray expects, but rather to the undoing of literature altogether. And secondly, to the opposite effect, the reinvigoration of the human writer that enables John Barth, Author, to produce this tome.

This reinvigoration takes place on multiple levels, all of which incorporate, as prescribed by "Replenishment," some manner of looking backward with present-day experimentalism: narratologically, in the return to the epistolary form combined with the acrostic pattern that the epistles describe; character-wise, in the return to the figures of earlier work combined with their interdiegetic challenges to Barth's own author-ity; and in terms of plot, in which a tale replaying key episodes from American history becomes a metafictional consideration of the novel's own history. But this type of replenishment also manifests on the novel's ideological plane, most visibly in its representations of the writing computer, LILYVAC II, and its creator, Jerome Bray. In the course of his project, Bray kidnaps, drugs, and sexually abuses a series of women, each of whom serves some mysterious role in his work. LILYVAC itself, and thus the role of the women in its operation, is "seen" only once in the novel's course, by Jacob Horner, as he attempts to save Marsha Blank from Bray's clutches. As he later describes it, in a letter to himself:

> Your Life since 1953 has not Kept you Abreast of the technology of automatic computers and artificial intelligence; therefore you Cannot Say For Sure, what however is your Judgment, that the extraordinary object in the barn of Comalot Farm is no usual, perhaps not even a genuine, automatic computer. Indisputably it contains what Appeared to you to be components from Eisenhower-era electronic machines, as its name suggests: dusty banks of vacuum tubes, fins and fans for cooling them, bright-colored resistors, capacitors, condensers, wires a-plenty, glows, clicks, hums. But Looking More Closely through the pigeon shit and cobwebs, you Observed that at least some of what you'd Taken for metal or plastic was a scaly, waxy stuff, unidentifiable but vaguely repulsive; some of those wires were more like heavy beeswaxed cord, or dried tendons. There were in fact a great many bees and wasps about; you Feared for naked Marsha, and Began to Wonder whether the circumambient drone was electronic at all.
>
> (574)

In fact, LILYVAC is part machine, part beehive; the woman in question is required to complete the generative aspect of the computing project. While Porush suggests that the computer is "designed . . . to impregnate its female operators" (152), I would argue that something a bit more ambiguous is at work.[22] The "drone," like LILYVAC part electronic, part apiarist, is Bray himself, determined to impregnate (using his own frighteningly mechanical "number" [426], as he calls it) a series of women, culminating in Bea Golden, whom he invites to become his Queen Bea, "to play *Regina de Nominatrix* . . . , royal consort to *Rex Numerator* (formerly King Author, a.k.a. RESET To sit at his right hand at the Table of Multiplication, play Ordinate to his Abscissa, share the Pentagonal Bed, receive his innumerable seed, make royal jelly, and bring forth numerous golden heirs. To be the lock his key will fit . . ." (638). The role in LILYVAC's process that Bray imagines for his queen is in fact not that of "operator" but rather interface, an inanimate part of the machine: "Checking LILYVAC," as Jacob Horner observes, requires no more skill than "sitting for some minutes in a seat molded into a cube of spun yellow fibrous stuff and pressing a red button or protruberance on each of its 'arms'" (574). The machine, via Bray, may create the replacement for literature, but the woman merely produces stimulus to feed the machine, and heirs that the line may continue. She herself is rendered a bruised, drugged-out shell.

Where the emphasis on impregnation arises, it is in relationships not between woman and writing machine but between woman and *human* writer, most notably the relationship between Ambrose Mensch and Lady Amherst, a literary coupling of copious carnality. Lady A. is described by numerous critics as the "symbolic embodiment of the tradition of belles lettres" (Roemer 40), and by her suitor as "Literature Incarnate, or The Story Thus Far" (*LETTERS* 40), bearing a merely metaphoric relationship to literary production, while Ambrose himself is literally an exhausted high-modernist author attempting to escape the labyrinth of formalism.

22. In fact, while Porush's reading of the cybernetic principles at work in the novel is complex and deeply nuanced, his failure to consider the functioning of human politics, and particularly the politics of gender, leads to some notable lacunae—most significantly, that Lady Amherst, arguably the novel's central character, is mentioned nowhere in his analysis.

Ambrose's prolific attempts to impregnate Lady A., who suspects herself menopausal, thus recapitulate Barth's own desires to replenish the novel through a marriage of the modernist and the premodernist. While Lady A. is at first an unwilling muse, insisting to the Author that "I am *not* Literature! I am *not* the Great Tradition! I am *not* the aging Muse of the Realistic Novel!" (57), she finally accepts this role, overjoyed by her potential fecundity, taking on the part of "Britannia," keeper of tradition, in Reg Prinz's film. She can do no more to revive the novel, though, as such new work must presumably be engendered *on* her rather than *by* her. The same is finally true of LILYVAC II, which, for a computer, is clearly hypergendered—fibrous, sticky, fleshlike—but, for a writer, is insufficiently (or perhaps incorrectly) gendered. The difference between LILYVAC and Ambrose is clear, as Max Schulz trenchantly suggests: "spermatozoan, not digitalization, is Barth's key to life, and fiction" (99). Where the computer suggests ultimacy, the Author instead engenders life.

Creative Machines

Barth's writing machine is in the most literal sense a fictional device, a means, as Schulz points out, drawing upon Porush's work, of "toying with the epistemological idea that the motive power of his fiction draws on the physical laws governing mathematical computations and computer programming, even as he is developing a parallel biological ontology" (98). Demonstrating the primacy of that biological ontology, I would argue, is part of the impetus behind representing the writing machine; by exposing both that machine's fictionality and its failures, Barth is able to secure a future for the novel while preserving to the human (that is, male) writer all creative prerogative.

But what of *actual* writing machines? While the computer capable of single-"handedly" producing a novel worth reading is still the stuff of science fiction, much current research explores the potential relation between computing and literary production. Many of these experiments arise out of the conjunction of work in artificial intelligence and cognitive science, in which researchers attempt to mathematize literary and linguistic formulas, divining the algorithms by which human writers write, with the hope of using those

algorithms to produce new, wholly computer-generated work. The potential for writerly anxiety here is high: while it is possible to read many aleatory modes of writing, both historical and contemporary, as introducing similarly mechanical systems into the process of creative composition—from William James and Gertrude Stein's experiments with automatic writing, through the cut-ups of Dada and the Beats, to contemporary interactive fiction—algorithms, as Victor Vitanza points out, are substantively different. Aleatory procedures introduce chance, randomness, and even serendipity into the writing process; by contrast, algorithms "find the one correct answer" (Vitanza).[23] Aleatory writing still requires a human to drive the process; algorithms appear to close the human out, instead thoroughly mechanizing creative production.

Notable among these algorithmic writing experiments is that conducted by Selmer Bringsjord, who has spent the last nine years developing a storytelling architecture known as BRUTUS and building the first implementation of that architecture, BRUTUS.1. In other words, Bringsjord and his colleagues have been training a computer to write fiction—with qualified success. As demonstrated in an article in the March 1998 *Technology Review* (as well as in *Artificial Intelligence and Literary Creativity*, the full-length account of this project coauthored with David Ferrucci), while BRUTUS.1 has an extremely limited knowledge-base from which to work, within its narrow frame of reference, the computer can produce something that looks something like fiction.[24] Bringsjord's stated goal for BRUTUS is the creation of a machine that is capable of passing a storytelling Turing test in which, given a starting sentence, a human and a computer writer each produce a piece of short fiction. When a series of human readers can no longer tell which story was written by the human and which by the computer, the computer will be said to have succeeded.[25]

---

23. In between the aleatory and the algorithmic, Vitanza places *heuristics*, which "invite several reasonable answers" (Vitanza).

24. See, for instance, the four stories about betrayal "by" BRUTUS.1 published in *Artificial Intelligence and Literary Creativity*.

25. It should be noted that BRUTUS.1 has not yet "succeeded"; in a late 1999 test conducted by the Web site InstantNovelist.com, BRUTUS.1's story, "Betrayal," was ranked fifth among five entries for quality and was spotted by 25 percent of respondents as the entry written by the computer.

Of course, as Katherine Hayles reminds us in *How We Became Posthuman*, the Turing test is not really as simple as all that. The first test that A. M. Turing describes in "Computing Machinery and Intelligence" is not of machine thought but of gender. He writes of "the imitation game" that it is

> played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. . . . It is A's object in the game to try to cause C to make the wrong identification. . . .
>
> In order that tones of voice may not help the interrogator the answers should be written, or better still, typewritten. The ideal arrangement is to have a teleprinter communicating between the two rooms. . . . The object of the game for the third player (B) is to help the interrogator. . . .
>
> We now ask the question, "What will happen when a machine takes the part of A in this game?" Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman?
>
> (5)

"Why," Hayles asks, "does gender appear in this primal scene of humans meeting their evolutionary successors, intelligent machines?" (xii). Dismissing the suggestion of Turing's biographer that the human/machine divide and the man/woman divide are intended as mere parallels, Hayles argues instead that this appeal to gender functions instead "to transgress . . . the boundaries of the subject" (xiii); questioning whether machines can think as well as humans inevitably disrupts the notion of the "human" itself, and the assumptions that liberal conceptions of subjectivity mask. As Turing later suggests, among humans, "A is liable to believe 'A thinks but B does not' while B believes 'B thinks but A does not.' Instead of arguing continually over this point it is usual to have the polite convention that everyone thinks" (17). "Polite convention" pointedly calls attention to the underlying assumption of this convention's falsity; if we remember that A and B are gendered subjects, we might assume which of them is *really* correct. The introduction of the thinking machine into the game, however, unsettles these assumptions.

These unsettling questions about gender are repeatedly quashed, both by Turing's biographer and by the numerous artificial-intelli-

gence researchers who have followed Turing, who allow all implied questions about the nature of the human to drop. These questions, however, like any repressed, always threaten return. At the precise moment when Bringsjord and Ferrucci argue most explicitly for BRUTUS.1 as a creative entity, the following arises:

> An impressive storytelling AI is one that satisfies proposed sophisticated accounts of creativity. BRUTUS.1 does this: recall that he (it?—we confess to finding it irresistible, for reasons perhaps having to do with the gender of the late, non-digital Brutus, to regard BRUTUS.1 as male) qualifies as creative according to the definitions examined in Chapter 1.
>
> (153)

The authors have referred to BRUTUS.1 as male throughout the text but choose *this* moment, as the question of "his" creativity surfaces, to defuse the importance of that gendered state. It's merely a function of the name, they suggest. Following Hayles, however, I would argue for the importance of this masculinity, as the question of "what can be creative?" cycles back around to "who can be creative?"[26] On the one hand, the technologies of the posthuman carry with them the ideologies of posthumanism, as those technologies disrupt the assumptions of liberal subjectivity; on the other, liberal subjectivity is often reinforced by the interpretation and mode of implementation of those technologies in the "real" world. This is not to suggest that the technologies inherently uphold white supremacy, patriarchy, capitalism, or heteronormativity, but rather that many of their implementations—and, more to the point of this article, their *representations*—do.[27] Bringsjord describes the reasons for his project as follows:

---

26. See Hayles xiii–xiv.

27. This point scratches the surface of a substantive debate within the subfields of cultural studies most interested in technology: do computer technologies provide the subordinate with new modes of resistance, or are those technologies so controlled by the hegemonic that they cannot but replicate structures of domination? Valid arguments have been raised on each side of the issue; as the editors of the collection *Race in Cyberspace* frame the ambivalence, "Cyberspace can provide a powerful coalition-building and progressive medium for 'minorities' separated from each other by distance and other factors. On the other hand, these nodes of race in cyberspace are marked as being parts of the whole, islands of otherness in a largely white, male, and middle-class cyberspace" (Kolko et al. 9). As with many such debates in cultural studies, the most useful position seems to be not one side of the debate or the other but a stance that encompasses both.

> Part of what drives me and other researchers in the quest to create such synthetic Prousts, Joyces, and Kafkas is a belief that genuinely intelligent stand-alone entertainment systems of the future will require, among other things, AI systems that know how to create and direct stories. In the virtual story worlds of the future, replete with artificial characters, things will unfold too quickly in real time for a human to be guiding the process.
>
> ("Chess")

Such an attempt to situate BRUTUS.1 within the lineage of modernism works to deflect our anxieties about the machine by keeping us safely within humanist bounds.

This appeal to the modern in particular is not free of ideology, however; as Andreas Huyssen explores, in "Mass Culture as Woman: Modernism's Other," the modernist shoring-up of the barrier between "high" and "low" was framed by explicit gender assumptions:

> [T]he nightmare of being devoured by mass culture through co-option, commodification, and the "wrong" kind of success is the constant fear of the modernist artist, who tries to stake out his territory by fortifying the boundaries between genuine art and inauthentic mass culture. Again, the problem is not the desire to differentiate between forms of high art and depraved forms of mass culture and its co-options. The problem is rather the persistent gendering as feminine of that which is devalued.
>
> (53)

Alongside such gendering of mass culture in the period, we find the similar gendering of all that seems opposed to the "human." Thus throughout the modern we find repeated representations of the dangerous *female* machine, from Fritz Lang's evil Maria in *Metropolis*, to Pynchon's eponymous V., to Barth's Queen Bea nestled in her LILYVAC hive, to Eve 8, the nuclear-powered robot in *Eve of Destruction*.[28] In each of these representations, the threat comes

---

Thus Lisa Nakamura, in her influential study of racial "passing" in cyberspace, points out the ways that "discourse about race is conceptualized as a bug, something which an efficient computer user would eradicate since it contaminates their work/play," while simultaneously suggesting the potential for "sabotag[ing] the ideology-machine" through performative encounters with race online (190).

28. See Claudia Springer's *Electronic Eros* for readings of both *Metropolis* and *Eve of Destruction*: "Even though *Eve of Destruction* gives us a female cyborg, it continues a misogynistic tradition, exemplified by *Metropolis*, of associating technology with women's bodies to represent the threat of unleashed female sexuality" (114).

both from the machinic half of this cyborg and from her human—that is, female—half. The danger in each of these cases is a disruption of the social order: Maria is built to end a workers' rebellion but inadvertently facilitates that rebellion; V. is at the center of the century's decadent dehumanization; Bea is implicated in the final destruction of the "Tower of Truth"; Eve 8, built in her creator's image, strikes back at the men who have wronged her. That Bringsjord's "synthetic Proust, Joyce, or Kafka" is male is further reassurance that BRUTUS will not disrupt our humanist world-view.

By way of contrast, let us explore the project of another researcher in the field. Janet Murray agrees with Bringsjord's sense of the need for more advanced computer-driven storytelling strategies, but her research begins from the opposite position. Rather than cognitive and computer scientists needing to develop more advanced machines, according to Murray, we instead need to develop more advanced writers, writers unafraid of multimedia technology, writers undaunted by collaborative, nonlinear environments, writers flexible enough to create an entire virtual world rather than the linear textual representation of that world. It is perhaps unsurprising, given this interest in evading the individualism and rigid linearity of the novel as we know it, that in the introduction to *Hamlet on the Holodeck*, Murray connects the origins of her interest in computer-based narrative to her feminist convictions. "As I researched the lives of women in the Victorian era," she tells us, she "was struck by the fact that much of what I was learning had been left out of the great novels of the era. Although my faith in the deeper powers of literature was unshaken, I learned from the feminist movement that some truths about the world are beyond the reach of a particular art form at a particular moment in time" (4). Through her work in humanities computing, Murray developed the belief that "some kinds of knowledge can be better represented in digital formats than they have been in print" (6). For Murray, then, the potential of computer technologies is deeply creative, and indeed liberating, rather than threatening. "The computer is not the enemy of the book," she argues. "It is the child of print culture, a result of the five centuries of organized, collective inquiry and invention that the printing press made possible" (8). Murray thus explores and defuses the kinds of anxieties expressed

by producers of traditional literary texts and by the Orwellian cultural critics who see in every step away from printed words on paper the downfall of Western civilization.

The *means* by which Murray defuses these anxieties, however, demand analysis. As she addresses concerns about the "new technologies of simulation" that the computer makes possible, she raises what she considers to be the key question of these critics: "Will the increasingly alluring narratives spun out for us by the new digital technologies be as benign and responsible as a nineteenth-century novel or as dangerous and debilitating as a hallucinogenic drug?" (17). This, while an interesting question, seems to me largely the wrong question; not only was the nineteenth-century novel not seen as being "benign and responsible" in its day—rather the opposite—but the threat that these authors sense in new creative technologies is less to "us," a threat to human existence, than to our existing technologies and epistemologies, or to the sense of "us" those technologies have created. Murray repeatedly reaches back to the belletristic tradition in order to relieve literary intellectuals' fears, by arguing that the computer is in fact just like a book, and that it will not disrupt the contemporary sensorium by undermining our dominant epistemologies, but will rather continue within that tradition.

It is interesting to note, given their insistent appeals to tradition, that neither Murray nor Bringsjord actually believes that a computer could be engineered to do the work of a writer. Rather than hoping for a new version of LILYVAC, Murray instead hopes for a new version of John Barth:

> A story is an act of interpretation of the world, rooted in the particular perceptions and feelings of the writer. There is no mechanical way to substitute for this and no reason to want to do so. Our question instead should be, How can we make this powerful new medium for multiform narrative as expressive of the writer's voice as is the printed page?
>
> (204)

Similarly, Bringsjord is working from the position that his project is, in a certain sense, impossible, that "computers will never best human storytellers even in a short short story competition" ("Chess"). The reason for this impossibility, in Bringsjord's assess-

ment, comes down to the difference between Strong AI, which suggests that all human thought is rule-based and can thus be *replicated* by computational devices, and Weak AI, which insists that because human thought is complex rather than algorithmic, these devices can do no more than *simulate* the workings of the human brain. The roadblock is thus consciousness: "It is clear from our work," Bringsjord writes, "that to tell a truly compelling story, a machine would need to understand the 'inner lives' of his or her characters. And to do that, it would need not only to think mechanically in the sense of swift calculation (the forte of supercomputers like Deep Blue), it would also need to think experientially in the sense of having subjective or phenomenal awareness" ("Chess"). This absence of subjectivity leads Bringsjord and Ferrucci to qualify BRUTUS.1's "authorship" of "his" fiction: "BRUTUS didn't *originate* this story. He is capable of generating it because two humans spent years figuring out how to formalize a generative capacity sufficient to produce this and other stories, and they then are able to implement part of this formalization so as to have a computer produce such prose" (5). In other words, it's still a human achievement, whether Bringsjord's feat of engineering or Murray's expansion of the possibilities for expression. Which is, in the end, a relief for the literary world, given its discomfort with the notion of a conscious computer. As Eugene Provenzo argues,

> The computer is the first machine that may supersede our ability fully to encompass or understand it and its possible consciousness. It is little wonder that, besides being concerned about the computer's ability to change the fundamental social and economic conditions of our society, we also distrust its imitation of what we believe perhaps most clearly and distinctly defines our humanity.
>
> (48)

Provenzo's juxtaposition makes the threat to human specialness clear: even if the computer cannot achieve (and thus undermine) "humanity," it can change social conditions such that we are no longer certain in what humanity consists.

Mr. Author Function

In the end, then, I want to turn to a text that enacts this struggle—between anxiety and liberation, between humanism and posthu-

manism—in its very pages: Richard Powers's *Galatea 2.2*. This novel explores the development and training of a computer that arguably achieves a certain kind of consciousness—one that, in fact, out-humans the humans.[29] This machine is engineered to pass a different kind of Turing test; when fully operational, it will compete against a human subject in taking a master's-level comprehensive exam in English literature. The computer, its developers hope, will not only read and understand literary works but will explicate them convincingly, outdoing any graduate student put up against it. While the shift from a writing machine to a reading machine is a significant one, the writer's anxieties remain: will literature maintain its significance—indeed, its audience—in the computer age? Despite the novelist's at least momentary glee at imagining a computer that would render all literary *criticism* obsolete, the cultural position of literature might nonetheless be severely attenuated if it can be understood via algorithm.

It is interesting to note, given the presence of the fictional "John Barth" in *LETTERS*, that the human narrator of *Galatea 2.2* is "Richard S. Powers," a novelist with a life history and a body of work recognizably similar to Powers's own.[30] Powers has, at the novel's outset, won "a year's appointment to the enormous new Center for the Study of Advanced Sciences. My official title was Visitor. Unofficially, I was the token humanist" (4). Powers comes to his role as token via a circuitous route: first a physics major in college, he was converted to the study of literature by a dynamic and passionate professor. After completing his master's degree, however, Powers spent time as a computer programmer before happening upon the story that became the subject matter of his first novel. This back-and-forth between the technological and the literary defines much of the tension in Powers's character. When he should be writ-

29. This relatively more recent motif in representations of the computer should not be mistaken as truly technophilic. The more-human-than-us trope arises pointedly at the conclusion of *Terminator 2* ("if a machine could learn to value life, maybe we can, too") and in Steven Spielberg's *A.I.* In the end, the humanism these machines reinforce is a traditionally hierarchized model; the machine thus serves to pull humanity back from the brink of posthumanism.

30. Unless otherwise stated, all further references to "Powers" are to the fictional character, though at times in his putative role as the "author" of the text *Galatea 2.2*, rather than to the actual human author. The importance of this distinction must be stressed, as the novel is, at key moments, deeply critical of its central character.

ing, he instead spends more and more time exploring the Center's computer networks or investigating research into neural nets. His own work comes to have no more significance for him than raw data: "Two Kbytes of new text or four of reasonable revision honorably discharged me of the day" (10). As this peculiar synthesis occurs between Powers's concerns about his own work and his technological fascinations, his anxieties about writing themselves become technologized. "Mornings passed," Powers tells us, "when a sick knot in my stomach informed me that I would never write anything again. I had nothing left in me but the autobiography I'd refused from the start even to think about. My life threatened to grow as useless as a three-month-old computer magazine" (36).[31] His sense of his own writerly obsolescence opens the door to a different kind of involvement at the Center. When asked to participate in a bet among a group of researchers about the possibility of building a reading machine, Powers immediately considers this to be a more worthwhile project. "The world had enough novels," he thinks. "Certain writers were best paid to keep their fields out of production" (47).

Powers's character is thus demonstrably anxious about the state of authorship in the computer age, but the machine, as the novel plays out, is a bit of a red herring. Powers *begins* the text anxiously, long before meeting the computer; his writing seems to him from the novel's first page like "the work of someone else" (3). Part of the problem seems to be the changing nature of literary criticism. Powers mentions casually to Philip Lentz, a cognitive scientist, the difficulties of dealing with critics, and Lentz insists that the critics are just jealous of the writer's special role in contemporary culture: "Universal envy. You folks are king of the cats, aren't you?" "You're joking," Powers responds. "Were, maybe. A hundred years ago. It's all movies and lit crit now" (24). When asked, much

31. This quotation raises the specter of another kind of obsolescence affecting the computer and writing: not the perceived obsolescence of the writer but the literal, inescapable obsolescence of the machine. As George Landow, J. David Bolter, and the users of software such as Intermedia and StorySpace have painfully discovered, many potential authors of computer-based fiction may be discouraged from investing their energies in hypertext and other new media by interfaces that fall out of use far too quickly. See Landow 310nn6–7; see also Coover.

later, why he left graduate school, he admits, "theory and criticism had shaken my belief in what writing might do" (254). Criticism, imagined to have become more culturally central than the novel, interferes with the writer's work, both on the popular and on the academic levels, undermining his sense of his own agency. The reviews of Powers's fourth novel, released while at the Center, devastate him to the point that he decides to "return the advance for the unwritten book to New York and call it a day" (210). But academic criticism has even more deleterious effects, proclaiming that "[t]he author was dead, the text-function a plot to preserve illicit privilege, and meaning an ambiguous social construction of no more than sardonic interest" (191). If this is true, the text asks, what room is there for Powers, even within his own narrative?

But Powers's concerns about authorship and originality are not wholly theoretical. In fact, while the reader may at first feel inclined to take his indication that his writing is "the work of someone else" figuratively, the anxiety—or what might be better understood as guilt—that Powers feels leads us to understand this concern *literally* as the novel wears on. Throughout, he encounters the fact that his creativity has long come at someone else's expense. In the background of his life at the Center, Powers relates the narrative of his previous life with C., his now ex-girlfriend. His first novel, he tells us, was composed from "all the material I had at hand" (104), but that material has its origins in C.'s family history, in the stories she has told him: "That book was no more than a structured pastiche of every report I'd ever heard, from C. or abroad. All a patchwork to delight and distract her. One that by accident ate her alive" (108). Powers shares the narrative with C. as he writes, delighting and distracting her with each day's production, but the end result does two kinds of damage: first, in releasing the book to a wider audience, he gives away something that bound them together. C. becomes "like a mother losing her preschooler to the talk-show circuit" (109). The public nature of this readership of what had been a private narrative—a text ostensibly written for her, but now revealed to have had another goal all along—begins to undermine their relationship.

But this narrative represents an even more direct violation, one that Powers works slowly up to admitting, and even then leaves

buried in widely strewn snatches of dialogue. As he writes his first novel, C. sinks into sadness, a sadness Powers attempts to remediate by providing her with more text. But the text itself is the problem: "You have this—work," she tells him. "And I have nothing" (107). The implication of the "nothing" that she has is left unacknowledged until much later in the narrative. As Powers reads through her letters to him, using them to explain the nature of human relationships to the computer he is training, he stumbles across a passage in which C. describes a story she has begun to write. Lentz interrupts: "She did that stuff, too?" Powers's only response: "For a while" (262). Leaving C.'s attempts at writing buried in the indeterminate signifier "stuff," and suggesting that she stopped writing without indicating why, both momentarily minimize the impact that Powers's creative production had on her life. But when the relationship is at its end, he can ignore it no further. "My success killed her last chance" (278), he acknowledges. By making her story public, by achieving literary fame with her life narrative, he found "work" for himself, but left her with "nothing"—nothing to say. He is finally forced to admit, if cryptically, that "the only thing she'd ever wanted was the thing I took away by doing for her."

Powers, like John Barth, thus takes the opportunity of the self-reflexive novel, the novel about the possibilities remaining to writing in the computer age, to look backward through his previous work, sensing its failures of originality. But while Barth plays at the plagiarism game, the failures in *Galatea 2.2* have human, political implications. Barth may attribute his characters' stories to their own creation, but the reader clearly understands this to be a metafictional ploy; Barth remains the "Author," both of these characters and of the plots that they create. Powers, on the other hand, encounters in *Galatea* the real-life thefts that authority brings. These thefts are literalized, right at the novel's outset; as a symbolic gesture indicating the closure of their relationship, C. sends Powers a box containing all the letters he had written to her during the time they knew one another. "I was supposed to follow suit, return hers," he tells us. "I told myself I would, as soon as I found a mailer and could get to the post office" (31). These, however, are the letters he finally reads to Implementation H of the experimental literary

machine; in one final appropriation, Powers again keeps C.'s words for his own use.

The guilt-laden acknowledgment of these thefts and appropriations throughout the novel creates a text widely differing in tone from that of Barth's *LETTERS*. In *LETTERS*, theft is the norm, part of a postmodern spirit of consequence-free play among fictional creations. In *Galatea*, Powers genuinely attempts to come to terms with the dangers of authorial privilege and the damage that it can do to hierarchized human relationships. These anxieties about the relationship between writing and domination, however, are at times too uncomfortable for the author to contend with. As Sharon Snyder suggests, the novel introduces a feminist critique of authorship but is unable to incorporate fully the implications of that critique; the aptly if coincidentally named Powers, though aware of his privilege, nonetheless insists on remaining fully centered within his narrative. His anxieties about his writerly authority are instead displaced at key moments in the text onto two fetish objects, the two who will compete in the ultimate reading exam: the computer and the graduate student. This tension between the attempts to dismantle privilege and the reassertion of that privilege surfaces quite pointedly with respect to each.

Powers, having abandoned fiction, works with Lentz throughout the year in training an increasingly complex series of neural nets, culminating in Implementation H, the structure that achieves something like consciousness. These nets self-configure through a process of back-propagation, in which, as Powers describes it, a

> signal pattern flows from neurode to neurode along branching, variously weighted connection paths. . . . A final response collects at the output layer. The net then compares this output to the desired output presented by the trainer. If the two differ, the net propagates the error backward through the net to the input layer, adjusting the weights of each connection that contributed to the error.
>
> (68)

Through trial and error, the machine is able to learn. However, as Katherine Hayles suggests, Implementation H's epistemology inverts human processes of knowledge acquisition. Because of its machinic embodiment, the computer cannot learn through physi-

cal experience of the world translated into language; instead, "language comes first. Concepts about what it means to be an embodied creature must evolve for her out of linguistic signification" (Hayles 263). The computer can only know what, at some point, in some fashion, it has been told.

But in first being told and then reading the many narratives of the canon of English literature, the computer rapidly begins to ask difficult questions about the processes of linguistic signification. As the Hayles's comment subtly indicates, one of those questions is about gender. After being fed a series of nursery rhymes about the differences between boys and girls, the computer suddenly interjects, "Am I a boy or a girl?" Powers, sensing in this question a new self-awareness, considers the importance of the answer:

> H clocked its thoughts now. I was sure of that. Time passed for it. Its hidden layers could watch their own rate of change. Any pause on my part now would be fatal. Delay meant something, an uncertainty that might undercut forever the strength of the connection I was about to tie for it.
>
> "You're a girl," I said, without hesitation. I hoped I was right. "You are a little girl, Helen."
>
> I hoped she liked the name.
>
> (179)

From that moment, the computer *is* female, as language produces her entire existence; Powers's own immediate shift of subject pronoun from "it" to "she" indicates the permanence of this gendering. But it also seems to indicate, in his lack of hesitation, a previously existing presumption about the computer. Why, under the gun, does Powers reach for the female rather than the male, particularly when he had initially imagined this machine as "son of G" (129)? Part of the key to this gendering lies precisely in the transition from Imp G to Imp H, a transition that happened, as Powers describes it, "in seamless conversion, after I met Audrey Lentz" (171). Audrey, whose memory and personality have been severely impaired by a stroke, provides the connection: the experiment is in some fashion about the restoration of lost loves. Helen thus becomes a stand-in for Harold's lost Audrey and for Powers's lost C., a role that gestures toward the significance of her name. Helen

is both the fetishized object of desire and the destructive, faithless temptress, the faceless face that launched a thousand ships. In hoping that she would "like" her name, Powers misses the gendered nature of his naming power. He misses the significance of the trainer's dominance in tying connections, just as he also misses the irony in his later comment to one of his colleagues, Diana Hartrick. When she mentions the manner in which her colleague and clandestine lover Harold Plover is directing her literary reading, Powers ventures a snide remark about "men who need to play Pygmalion" (183)—completely forgetting that he is likewise directing Helen's reading, that he, in fact, is building the new Galatea. Rather than allowing his cyborg Galatea to transcend gender, by acknowledging posthuman ambiguity, by "undercut[ting] the strength of the connection" he ties, Powers instead securely links Helen to the gendered humanist tradition.

The other fetish object onto which Powers displaces his anxiety, the graduate student, is the primary force in the novel attempting to counter that humanist tradition. His self-admitted obsession with A. grows out of no knowledge of her, other than what can be gleaned from departmental rosters, and no contact with her, save passing her in the hall on two occasions. Powers acknowledges the ridiculousness of the situation:

> A. floated free of her signifier. Her features traced a curve that encouraged my projective exercise. Or rather, my projection pinned that facilitating arc to her like a corsage. It seemed to me, then, that love must make a blank slate to write itself on. Only instant, arbitrary attachment to strangeness made real that lab where processes bested things, two falls out of three.
>
> (237)

The odd conjunction in this thought of metaphors both literary (signifier, writing) and technological (arc, lab, processes versus things) suggests the manner in which Powers inscribes A. into his life's narrative. He imagines her, like Helen, as the tabula rasa onto which he can write her character, the surface onto which he can project his desires. She becomes, in his fevered imaginings, "the person C. had only impersonated" (238), the ideal with which he can replace the flawed actual.

When he finally does get to know her, however, A. is both more and less than he imagined. She is brilliant, razor-witted, and irreverent; she is also deeply disinterested in him. When Powers finally proposes the test to her, that she sit the master's exam opposite Helen, and takes her to meet the machine and witness its training, she points out the loaded nature of the project. The "comprehensive" list from which Powers and Lentz are working is many years out of date; A. dismisses it as "Euro-retro," a "white-guy, *Good Housekeeping* thing" (284). Arguing for a view of English literature that takes into account the full diversity of racial, gender, class, and sexual identifications, as well as national origin and even medium, A. strikes a nerve with Powers, who defensively suggests that "you can get to the common core of humanity from anywhere" (286). With this, A. combusts: "Humanity? Common core? You'd be run out of the field on a rail for essentializing. And you wonder why the posthumanists reduced your type to an author function." Cornered, Powers's only response is to reassert what manner of control he can: "That's *Mr.* Author Function to you, missy" (286). At this crucial moment, confronted by the narrowness of his vision of "humanity"—a narrowness that Lentz has repeatedly challenged, both by reminding him that "[t]he *world*, it may stun you to learn, is predominantly black-haired" (18) and by creating a thinking machine—Powers retreats into the safe terrain of gender hierarchy, a hierarchy that allows him, the novelist, to survive his threatened marginalization. Thus, undoubtedly, the significance of the *master's* exam; those who control the lists and write the questions tie the connections for all they train.

This posthumanist awareness is not solely restricted to the graduate student, however; Helen likewise begins putting together the problems with the canon she is being fed. Her awareness, through these texts, of the nature of human difference leaves her with a series of questions that Powers cannot (or will not) answer. The question of gender, of course, provokes Powers's gendered response. The question of race leaves him silent; while reading *The Adventures of Huckleberry Finn*, Helen suddenly asks, "What race am I?" and, when Powers does not immediately answer, continues: "What races do I hate? Who hates me?" (230). Powers considers that "she would be hated by everyone for her disembodiment,"

but does not address the question of embodied difference. Much later, longing for precisely the kind of "subjective or phenomenal awareness" Bringsjord predicts the literary machine will require, Helen finally calls Powers on the omission. As she struggles to understand the novels of Ralph Ellison and Richard Wright, she directly accuses him: "You're not telling me everything. . . . It doesn't make sense. I can't get it. There's something missing" (313). Powers at last admits that he has "delayed her liberal education until the bitter end," and so gives her access to the popular press, newspapers, weekly magazines, police bulletins, and so forth. The phrase "liberal education" is a momentary enigma, however; what precisely does a liberal education have to do with this archived demonstration of human hatred? What Helen receives, en masse, is evidence of the real that exists outside the literary, evidence of the very hierarchical social structures that have generated the posthumanist critique. In this moment, Powers acknowledges the flaw in his training, and the damage done by his position as trainer. When Helen "disappears," saying "I don't want to play anymore" (314), Powers tells Lentz that her response is the right one. As he tells us, "Helen had discovered what had killed fiction for me, without my telling her. What made writing another word impossible" (319).

In fact, what has made writing impossible for Powers is his awareness, since the demise of his relationship with C., of the damage done by authority, and of the impossibility of sustaining originality in a position of dominance. Since arriving at the Center, Powers has struggled to begin a fifth novel, a text that eludes him, leaving him certain only of its first line: "Picture a train heading south." But even that line seems the work of someone else: "I began to imagine it an unconscious allusion. It felt so unsponsored, I could not have invented it" (25). And, in fact, he has not; as he reads C.'s letters to Helen, he discovers that the line is hers, relating a story told by a family member. The knowledge of this inadvertent literary theft, yet another in a series of such appropriations, paralyzes Powers, leaving him unable to write. In connecting this writerly paralysis to the damage done by human hatred, he at least momentarily acknowledges his own compromised position with regard to humanist structures of dominance.

The novel does not conclude with this admission, however.

Helen returns in time to take the examination, in which she and A. are asked to explicate two lines from *The Tempest:*

> Be not afeard: the isle is full of noises,
> Sounds and sweet airs, that give delight, and hurt not.

Unsurprisingly, A. wins the contest, producing a "more or less brilliant" postcolonial reading of the play's rendering of "constructed Otherness, the violent reduction society works on itself. She dismissed, definitively, any promise of transcendence" (326). Helen, by contrast, turns in the less polished but distinctly more humanist response:

> You are the ones who can hear airs. Who can be frightened or encouraged. You can hold things and break them and fix them. I never felt at home here. This is an awful place to be dropped down halfway.

In this brief answer, Helen reaffirms her readers' belief in human transcendence, that potential for universalized Truth and Beauty the posthumanist rejects. Denied this transcendence, Helen says a brief good-bye to Powers and shuts herself down.

After this graceful end, in which the primacy of the humanist project has been safely restored in not one but two ways—the human being outwrites the machine, while the machine rescues her readers from posthumanist vertigo—Powers suddenly discovers that "I might have another fiction in me after all" (328). The token humanist writer is thus able to reassert his dominion over language and to continue in his practice of literature only after having it proven that humanity is something to strive for, and that being half human is worse than not being human at all. Haraway's "border war" thus results for Powers in a firm redrawing of that crucial line between man and machine, a line that, not incidentally, helps to define "man" precisely as the privileged category of human. Like Turing's original test, gender is not a neutral variable in this experiment; neither A. nor Helen produce responses that mark them as sufficiently "human."

There is a second level of meaning in Helen's commentary, however, a response to the selection of the passage that becomes a pointed critique of the test's overt humanism. The Turing test can never be passed by a machine, precisely because the test's terms are

under human control; as Helen points out, no machine-embodied creature could ever fully comprehend "sounds and sweet airs" or the visceral experience of fear. Given the trainer's power in tying the connections, given the hierarchies implied by the "master's" exam, the battle's outcome is predetermined. Helen seems in her response, and particularly in her farewell to Powers ("See everything for me" [326], as he has all along), to suspect the truth—the test was never about her at all. Powers himself fails to understand, until one of his colleagues finally puts it together for him: "You think the bet was about the *machine?*" (317). In fact, the Turing test was of another order entirely, a twist A. immediately picks up on: "It's some kind of double-blind psych experiment? See how far you can stretch the credibility of a techno-illiterate humanist?" (314). *Powers,* not Helen, was the subject of the reverse Turing test, an experiment designed not to see whether a machine could be trained to read and write as well as a human, but whether a humanist could be trained to believe that a machine was alive. Despite the arguable success of the experiment that Powers had been led to believe he was participating in—"Nobody expected Helen," Lentz tells him. "She surprised everyone" (320)—there is nonetheless something reassuring about the actual nature of the bet. The human ends the novel fully recentered within the field of inquiry. With this knowledge, Powers is able to go on to write the text we are now ostensibly reading—ironically, the autobiography he'd refused for so long to write. The novelist returns to the word as both subject and object, both creator and created.

Given this conclusion, we can begin to understand the appropriateness of the selection of the "real" Powers's interviewer in *Bomb* magazine—Sven Birkerts. As Powers tells him,

> One of the pleasures of writing *Galatea* was this gradual discovery that machine intelligence would require the full width of human experience. By the end of the book, the book itself becomes a kind of artificial intelligence. The Galatea in the book, Galatea 2.0, is superseded by revision 2.2, the one that you've been reading.
>
> (62)

This succession is Birkerts's *Gutenberg* dream, the book that does in the computer. But the conflation of this book's intelligence with

"the full width of human experience" leaves out the same thing that has long been ignored by the humanist project—a commitment to interrogating structures of domination created by the unthinking subsumption of human difference within the constructed "universals" of whiteness, maleness, straightness, and so on. This, finally, is the function of the anxious representation of the literary machine: by more firmly drawing the boundaries between human and computer intelligences, the writer is able not only to secure the novel's future, but also to maintain control of the category of the "human." The sentient, writing computer serves, as my earlier reference to Toni Morrison's *Playing in the Dark* suggests, not only to shore up the boundary between human and computer intelligences, but also to reaffirm the outlines of that human intelligence in harmony with the Enlightenment ideal.

Pomona College

WORKS CITED

Aarseth, Espen. *Cybertext: Perspectives on Ergodic Literature.* Baltimore, MD: Johns Hopkins UP, 1997.

Artificial Intelligence: A.I. Dir. Steven Spielberg. Dreamworks SKG, 2001.

Baker, Nicholson. "Discards." *The Size of Thoughts: Essays and Other Lumber.* New York: Vintage, 1997. 125–81.

———. *Double Fold: Libraries and the Assault on Paper.* New York: Random, 2001.

Barth, John. *LETTERS.* 1979. Normal, IL: Dalkey Archive, 1994.

———. "The Literature of Exhaustion." *Atlantic* Aug. 1967: 29–34.

———. "The Literature of Replenishment: Postmodernist Fiction." *Atlantic* Jan. 1980: 65–71.

Barthes, Roland. "The Death of the Author." 1968. *The Rustle of Language.* Trans. Richard Howard. New York: Hill, 1986. 49–55.

Birkerts, Sven. *The Gutenberg Elegies: The Fate of Reading in an Electronic Age.* New York: Random, 1994.

Bloom, Harold. *The Anxiety of Influence: A Theory of Poetry.* New York: Oxford UP, 1975.

Bolter, J. David. *Writing Space: The Computer, Hypertext, and the History of Writing.* Hillsdale, NJ: Lawrence Erlbaum, 1991.

Bolter, Jay David, and Grusin, Richard. *Remediation: Understanding New Media.* Cambridge, MA: MIT P, 1999.

Bringsjord, Selmer. "Chess Is Too Easy." *Technology Review* Mar.-Apr. 1998: 23–28. ⟨http://www.technologyreview.com/articles/bringsjord0398.asp⟩.

Bringsjord, Selmer, and Ferrucci, David A. *Artificial Intelligence and Literary Cre-*

ativity: Inside the Mind of BRUTUS, a Storytelling Machine. Mahwah, NJ: Lawrence Erlbaum, 2000.

Coover, Robert. "The End of Books." *New York Times Book Review* 21 June 1992: 1, 23–25.

Cortazar, Julio. *Hopscotch.* Trans. Gregory Rabassa. New York: Pantheon, 1966.

Csicsery-Ronay, Istvan. "Cyberpunk and Neuromanticism." *Storming the Reality Studio: A Casebook of Cyberpunk and Postmodern Science Fiction.* Ed. Larry McCaffery. Durham, NC: Duke UP, 1991. 182–93.

Dahl, Roald. "The Great Automatic Grammatizator." *The Umbrella Man and Other Stories.* New York: Viking, 1996. 1–26.

Dick, Phillip K. *Do Androids Dream of Electric Sheep?* 1968. New York: Ballantine, 1996.

Eve of Destruction. Dir. Duncan Gibbins. Interscope, 1991.

Fiedler, Leslie. "Cross the Border, Close the Gap." *The Collected Essays of Leslie Fiedler.* Vol. 2. New York: Stein and Day, 1971. 461–85.

Fitzpatrick, Kathleen. *The Anxiety of Obsolescence: The Postmodern Novel and the Electronic Media.* Diss. New York University, 1998. Ann Arbor: UMI, 1998.

Foucault, Michel. "What Is an Author?" *Language, Counter-memory, Practice: Selected Essays and Interview.* Ed. Donald F. Bouchard. Ithaca, NY: Cornell UP, 1977. 113–38.

Gibson, William. *Neuromancer.* New York: Ace, 1984.

Graff, Gerald. "Under Our Belt and Off Our Back: Barth's *LETTERS* and Postmodern Fiction." *TriQuarterly* 52 (1981): 150–64.

Haraway, Donna. *Simians, Cyborgs, and Women: The Reinvention of Nature.* New York: Routledge, 1991.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics.* Chicago: U of Chicago P, 1999.

Huyssen, Andreas. *After the Great Divide: Modernism, Mass Culture, Postmodernism.* Bloomington: Illinois UP, 1986.

Joyce, Michael. *Othermindedness: The Emergence of Network Culture.* Ann Arbor: U of Michigan P, 2000.

Keep, Christopher. "The Disturbing Liveliness of Machines: Rethinking the Body in Hypertext Theory and Fiction." *Cyberspace Textuality: Computer Technology and Literary Theory.* Ed. Marie-Laure Ryan. Bloomington: Indiana UP, 1999. 164–81.

Kernan, Alvin. *The Death of Literature.* New Haven, CT: Yale UP, 1990.

Klinkowitz, Jerome. *Literary Disruptions: The Making of a Post-Contemporary American Fiction.* 2nd ed. Urbana: U of Illinois P, 1980.

Kolko, Beth E., et al., eds. *Race in Cyberspace.* New York: Routledge, 2000.

Landow, George. *Hypertext 2.0: The Convergence of Contemporary Critical Theory and Technology.* Baltimore, MD: Johns Hopkins UP, 1997.

Lem, Stanislaw. "The First Sally (A), or Trurl's Electronic Bard." *The Cyberiad:*

Fables for the Cybernetic Age. 1974. Trans. Michael Kandel. New York: Harcourt, 1985. 43–57.

Mann, Paul. *The Theory-Death of the Avant Garde*. Bloomington: Indiana UP, 1991.

McCaffery, Larry. "Barth's *LETTERS* and the Literature of Replenishment." *Chicago Review* 31.4 (1980): 75–82.

McMullen, Kim. "The Fiction of Correspondence: *LETTERS* and History." *Modern Fiction Studies* 36 (1990): 405–20.

Metropolis. Dir. Fritz Lang. Universum Film A.G., 1927.

Morrison, Toni. *Playing in the Dark: Whiteness and the Literary Imagination*. London: Picador, 1993.

Murray, Janet. *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. Cambridge, MA: MIT P, 1998.

Nakamura, Lisa. "Race in/for Cyberspace: Identity Tourism and Racial Passing on the Internet." *Works and Days* 25-26 (1995): 181–93.

Nunberg, Geoffrey. "The Places of Books in the Age of Electronic Reproduction." *Future Libraries*. Spec. Issue of *Representations* 42 (1993): 13–37.

Podhoretz, Norman. *Doings and Undoings: The Fifties and After in American Writing*. New York: Farrar, 1964.

Porush, David. *The Soft Machine: Cybernetic Fiction*. New York: Methuen, 1985.

Postman, Neil. *Technopoly: The Surrender of Culture to Technology*. New York: Vintage, 1993.

Powers, Richard. *Galatea 2.2*. New York: HarperPerennial, 1995.

———. "Richard Powers." Interview with Sven Birkerts. *Bomb* 64 (1998): 58–63.

Provenzo, Eugene F., Jr. *Beyond the Gutenberg Galaxy: Microcomputers and the Emergence of Post-Typographic Culture*. New York: Teacher's College P-Columbia U, 1986.

Pynchon, Thomas. *V*. 1963. New York: Perennial, 1990.

Roemer, Marjorie Godlin. "The Paradigmatic Mind: John Barth's *LETTERS*." *Twentieth-Century Literature* 33 (1987): 38–50.

Rubin, Louis. *The Curious Death of the Novel: Essays in American Literature*. Baton Rouge: Louisiana State UP, 1967.

Schneck, Peter. "Pop Goes the Novel: Avant-Pop Literature and the Tradition of the New." *Simulacrum America: The USA and the Popular Media*. Ed. Elisabeth Kraus, Warren Maurer, and Carolin Auer. Rochester, NY: Camden, 2000. 64–74.

Schulz, Max F. "Barth, *LETTERS*, and the Great Tradition." *Genre* 14 (1981): 95–115.

Seltzer, Mark. *Bodies and Machines*. New York: Routledge, 1992.

Snyder, Sharon. "The Gender of Genius: Scientific Experts and Literary Amateurs in the Fiction of Richard Powers." *Review of Contemporary Fiction* 18.3 (1998): 84–96.

Sontag, Susan. "Against Interpretation." *Against Interpretation*. New York: Anchor, 1990. 3–14.

Spilka, Mark, and McCracken-Flesher, Caroline, eds. *Why the Novel Matters: A Postmodern Perplex*. Bloomington: Indiana UP, 1990.

Springer, Claudia. *Electronic Eros: Bodies and Desire in the Postindustrial Age*. Austin: U of Texas P, 1996.

Stephens, Mitchell. *The Rise of the Image, the Fall of the Word*. New York: Oxford UP, 1998.

Tabbi, Joseph. "Reading, Writing, Hypertext: Democratic Politics in the Virtual Classroom." *Internet Culture*. Ed. David Porter. New York: Routledge, 1997. 233–52.

———. "A Review of Books in the Age of Their Technological Obsolescence." *ebr: The Electronic Book Review* 1 (Winter 95/96). Online. Internet. 10 Oct. 1997. ⟨http://www.altx.com/ebr/tabbi.htm⟩.

Tabbi, Joseph, and Wutz, Michael, eds. *Reading Matters: Narrative in the New Media Ecology*. Ithaca, NY: Cornell UP, 1997.

Terminator. Dir. James Cameron. Orion, 1984.

Terminator 2: Judgment Day. Dir. James Cameron. Tri-Star, 1991.

Turing, A. M. "Computing Machinery and Intelligence." 1950. *Minds and Machines*. Ed. Alan Ross Anderson. Englewood Cliffs, NJ: Prentice-Hall, 1964. 4–30.

Vitanza, Victor. "Writing the Paradigm." Rev. of Gregory Ulmer, *Heuretics: The Logic of Invention*. *ebr: The Electronic Book Review* 2 (Spring 96). Online. Internet. 29 June 2001. ⟨http://www.altx.com/ebr/ebr2/r2vitanza.htm⟩.

Weissman, Larry. "The Book as Underdog: Buzz." Editorial. *Bold Type*. Online. Internet. 8 Oct. 1997. ⟨http://www.bookwire.com/boldtype/buzz.html⟩.