6

Reconfiguring Narrative

Every digital narrative, we must remind ourselves, does not necessarily take the form of hypertext. A case in point appears in Christy Sheffield Sanford's visually elegant World Wide Web fiction, *Safara in the Beginning* (1996), which the author describes as "a web-novel" written in the spirit of classical tragedy about "a young African princess taken as a slave from Senegal to Martinique." The opening screen, the first of twenty-one successive lexias, explains that to the left of the "main textual body, Bible quotations and natural history descriptions echo Old Testament Christianity and Animistic traditions at their point of contact: mythopoetization of nature." Essentially, Sanford works with the powers of digital information technology to add colors, images, and some motion to narrative, but the HTML links function solely to provide sequence. Among her twenty-one lexias, she includes what she describes as "five filmic scenes using the close-up, time-lapse and other cinematic effects. These techniques enable the conflict-crisis-resolution model to have conciseness and scope." These cinematic effects appear, not as full-motion video but as a kind of a film script, though Sanford's romantic tragedy does use occasional animations above and to the left of the main text spaces. I cite this elegant project not to criticize its lack of hypertextuality but to remind us that the digital word and image, even on the World Wide Web, does not inevitably produce hypertextual narrative.

The examples of hypertext fiction at which we shall look in the following pages and have already examined in the earlier discussion of writing hypermedia suggest that even in this early stage hypertext has taken many forms, few of which grant readers the kind of power one expects in informational

hypertext. As Michael Joyce, our first major author of hypertext fiction, has explained, the desire to create multiple stories out of a relatively small amount of alphanumeric text provided a major force driving in writing *afternoon:*

I wanted, quite simply, to write a novel that would change in successive readings and to make those changing versions according to the connections that I had for some time naturally discovered in the process of writing and that I wanted my readers to share. In my eyes, paragraphs on many different pages could just as well go with paragraphs on many other pages, although with different effects and for different purposes. All that kept me from doing so was the fact that, in print at least, one paragraph inevitably follows another. It seemed to me that if I, as author, could use a computer to move paragraphs about, it wouldn't take much to let readers do so according to some scheme I had predetermined. (*Of Two Minds,* 31)

From one point of view, then, such an approach merely intensifies the agenda of high modernism, using linking to grant the author even more power.

Other authors take a self-consciously postmodern approach, using the multiplicity offered by branching links to create a combinatorial fiction that in some ways seems the electronic fulfillment of the French group, Oulipo. For example, in its forty-nine fictional lexias Tom McHarg's *The Late-Nite Maneuvers of the Ultramundane,* one of the hypertexts included in *Writing at the Edge,* attempt to "veer toward a narrative . . . not entirely dependent upon linearity, causality, and probable characterization" ("On Ultramundane"). McHarg creates seven lexias for each day of the week, each a variation or transformation of the other. Choosing the first Monday, for example, the reader encounters the following narrative (which represents the first half of the lexia):

Dwight awoke at 3:15 a.m. to find his girlfriend, Johnette, attempting to conceal a bomb under his pillow. "You've waken me up," he said. "And I've discovered your treachery."

"The only treachery is yours," said Johnette.

"I'm only sleeping," said Dwight. "You're the one planting bombs."

"Perhaps you deserve it," said Johnette.

"But I love you," said Dwight.

"Then why do you accuse me of treachery?" said Johnette.

"It's obvious," said Dwight. "You planned to murder me as I lie here dreaming of our sex."

"You weren't dreaming," said Johnette. "I was watching your eyes."

"Perhaps not, but at least I wasn't trying to murder you," said Dwight.

"I only meant to scare you into loving me more," said Johnette.

"With a bomb ?" said Dwight.

"You need to love me a lot more," said Johnette.

And so it goes. Each variation introduces a different weapon, a different betrayal, as *Ultramundane* explores how "a fictional text must be stretched, skewered, and sliced if it is to exploit the freedoms and accept the responsibilities offered by hypertext technology and its new writing spaces." Thus, on the first Tuesday a friend stands at the foot of their bed with a gun, on the first Wednesday the hero's hair has all fallen out, and on Sunday Dwight returns to find their home on fire. Like *afternoon, The Late-Nite Maneuvers of the Ultramundane* combines into different narratives, many about sex and violence, producing effects according to the route one follows through it. Otherwise, this web, whose tone and content suggest the influence of Coover's print fiction, contrasts entirely with Joyce's work. My point here is not that one should prefer either the crystalline richness and emotional intensity of *afternoon* to McHarg's PoMo playful, removed sense of literature as its own laboratory, or that *Ultramundane* is in some way more hypertextual. Rather, I wish to emphasize that, like print fiction, that produced in the form of linked lexias can take many forms.

In some the author compounds her or his power; in others, such as that exemplified by Carolyn Guyer's *Quibbling*, the author willingly shares it with readers. Similarly, in some fictional webs, such as *afternoon,* readers construct or discover essentially one main narrative; in others, like *Semio-Surf, Freak Show,* or *Ultramundane,* one comes upon either a cluster of entirely separate stories, or else one finds narrative segments out of which one weaves one or more of them. A third opposition appears between those stories that, however allusive, consist largely of fictional lexias, and those like *Patchwork Girl* and *Semio-Surf,* that weave together theory and nonfiction materials with the narrative. A fourth such opposition separates fictional hypertext entirely derived from the author's "own" writing and those, like *Patchwork Girl* and Stuart Moulthrop's *Forking Paths,* that their authors wrote to varying degrees in the interstices of other works.

Hypertext narrative clearly takes a wide range of forms best understood in terms of a number of axes, including those formed by degrees or ratios of (1) reader choice, intervention, and empowerment, (2) inclusion of extralinguistic texts (images, motion, sound), (3) complexity of network structure, and (4) degrees of multiplicity and variation in literary elements, such as plot, characterization, setting, and so forth. Following the lead of Deleuze and Guattari, I prefer to think of the organizing structures in terms of ranges,

spectra, or axes along which one can array the phenomena I discuss rather than in terms of diametric oppositions, such as male/female or alphanumeric versus multimedia text. I avoid such polarities because, particularly in the case of hypertext fiction and poetry, they hinder analysis by exaggerating difference, overrating uniformity, and suppressing our abilities to perceive complex mixtures of qualities or tendencies. Another reason for emphasizing a spectrum of possibilities when discussing hypertext lies in the fact that neither end of any particular spectrum is necessarily superior to the other. For example, hyperfiction that demands intervention by readers, or otherwise empowers them, will not on those grounds alone turn out to surpass hyperfiction that employs links to solidify—indeed amplify—the power of the author.

Hypertext and the Aristotelian

Conception of Plot

Hypertext, which challenges narrative and all literary form based on linearity, calls into question ideas of plot and story current since Aristotle. Looking at the *Poetics* in the context of a discussion of hypertext suggests one of two things: either one simply cannot write hypertext fiction (and the *Poetics* shows why that could be the case) or else Aristotelian definitions and descriptions of plot do not apply to stories read and written within a hypertext environment. At the beginning of this study, I proposed that hypertext permits a particularly effective means of testing literary and cultural theory. Here is a case in point. Although hypertext fiction is quite new, the examples of it that I have seen already call into question some of Aristotle's most basic points about plot and story. In the seventh chapter of the *Poetics,* Aristotle offers a definition of plot in which fixed sequence plays a central role:

Now a whole is that which has beginning, middle, and end. A beginning is that which is not itself necessarily after anything else, and which has naturally something else after it; an end is that which is naturally after something itself either as its necessary or usual consequent, and with nothing else after it; and a middle, that which is by nature after one thing and also has another after it. (1462)

Furthermore, Aristotle concludes, "a well-constructed Plot, therefore, cannot either begin or end at any point one likes; beginning and end in it must be of the forms just described. Again: to be beautiful, a living creature, and every whole made up of parts, must not only present a certain order in its arrangement of parts, but also be of a certain definite magnitude" (1462). Hypertext therefore calls into question (1) fixed sequence, (2) definite beginning and ending, (3) a story's "certain definite magnitude," and (4) the conception of unity or wholeness associated with all these other concepts. In hypertext

fiction, therefore, one can expect individual forms, such as plot, characterization, and setting, to change, as will genres or literary kinds produced by congeries of these techniques.

When I first discussed hyperfiction in the earlier versions of this book, the novelty, the radical newness, of the subject appeared in the fact that almost all the sources cited were unpublished, in the process of being published, or published in nontraditional electronic forms: these sources include unpublished notes on the subject of hypertext and fiction by a leading American novelist, chapters in forthcoming books, and prerelease versions of hypertext fictions. Now, a few years later, substantial numbers of examples of both hypertext fiction and critical discussions of the subject have appeared. Following the strategy used in previous chapters, I shall therefore take almost all of my examples from widely available work, using whenever possible material published on the World Wide Web.

Quasi-Hypertextuality in

Print Texts

One approach to predicting the way hypertext might affect literary form has pointed to *Tristram Shandy, In Memoriam, Ulysses,* and *Finnegans Wake* and to recent French, American, and Latin American fiction, particularly that by Michel Butor, Marc Saporta, Robert Coover, and Jorge Luis Borges (Bolter, *Writing Space,* 132–39). Such texts might not require hypertext to be fully understood, but they reveal new principles of organization or new ways of being read to readers who have experienced hypertext. Hypertext, the argument goes, makes certain elements in these works stand out for the first time. The example of these very different texts suggests that those poems and novels that most resist one or more of the characteristics of literature associated with print form, particularly linear narrative, will be likely to have something in common with new fiction in a new medium.

This approach therefore uses hypertext as a lens, or new agent of perception, to reveal something previously unnoticed or unnoticeable, and it then extrapolates the results of this inquiry to predict future developments. Because such an approach suggests that this new information technology has roots in prestigious canonical texts, it obviously has the political advantage of making it seem less threatening to students of literature and literary theory. At the same time, placing hypertext fiction within a legitimating narrative of descent from "great works," which offers material for new critical readings of print texts, makes those canonical texts appear especially forward-looking, since they can be seen to provide the gateway to a different and unexpected literary future. I find all these genealogical analyses attractive and even

convincing, but I realize that if hypertext has the kind and degree of power that previous chapters have indicated, it does threaten literature and its institutions as we know them. One *should* feel threatened by hypertext, just as writers of romances and epics should have felt threatened by the novel and Venetian writers of Latin tragedy should have felt threatened by the *Divine Comedy* and its Italian text. Descendants, after all, offer continuity with the past but only at the cost of replacing it.

One interesting approach to discussing hypertextual narrative involves deducing its qualities from the defining characteristics of hypertext—its non- or multilinearity, its multivocality, and its inevitable blending of media and modes, particularly its tendency to marry the visual and the verbal. Most who have speculated on the relation between hypertextuality and fiction concentrate, however, on the effects it will have on linear narrative. In order to comprehend the combined promise and peril with which hypertextuality confronts narrative, we should first recall that narratology generally urges that narration is intrinsically linear and also that such linearity plays a central role in all thought.[1] As Barbara Herrnstein Smith argues, "there are very few instances in which we can sustain the notion of a set and sequence of events altogether prior to and independent of the discourse through which they are narrated" ("Narrative Versions," 225).

Hayden White states only a particularly emphatic version of a common assumption when he asserts that "to raise the question of the nature of narrative is to invite reflection on the very nature of culture and, possibly, even on the nature of humanity itself . . . Far from being one code among many that a culture may utilize for endowing experience with meaning, narrative is a metacode, a human universal on the basis of which transcultural messages about the nature of a shared reality can be transmitted" (1–2). What kind of a culture would have or could have hypertextual narration, which so emphasizes non- or multilinearity, and what happens to a culture that chooses such narration, when, as Jean-François Lyotard claims, in agreement with many other writers on the subject, "narration is the quintessential form of customary knowledge" (*Postmodern Condition*, 18)? Lyotard's own definition of postmodernism as "incredulity toward metanarratives" (xxiv) suggests one answer: any author and any culture that chooses hypertextual fiction will either already have rejected the solace and reassurance of linear narrative or will soon find their attachment to it loosening. Lyotard claims that "lamenting the 'loss of meaning' in postmodernity boils down to mourning the fact that knowledge is no longer principally narrative" (26), and for this loss of faith in narrative he offers several possible technological and political expla-

nations, the most important of which is that science, which "has always been in conflict with narratives," uses other means "to legitimate the rules of its own game" (xiii).[2]

Even without raising such broader or more fundamental issues about the relation of narrative to culture, one realizes that hypertext opens major questions about story and plot by apparently doing away with linear organization. Conventional definitions and descriptions of plot suggest some of them. Aristotle long ago pointed out that successful plots require a "probable or necessary sequence of events" (*Poetics*, 1465). This observation occurs in the midst of his discussion of *peripeteia* (or in Bywater's translation, peripety), and in the immediately preceding discussion of episodic plots, which Aristotle considers "the worst," he explains that he calls "a Plot episodic when there is neither probability nor necessity in the sequence of its episodes" (1464).

Answering Aristotle: Hypertext

and the Nonlinear Plot

One answer to Aristotle lies in the fact that removing a single "probable or necessary sequence of events" does not do away with all linearity. Linearity, however, now becomes a quality of the individual reader's experience within a single lexia and his or her experience following a path, even if that path curves back on itself or heads in strange directions. Robert Coover claims that with hypertext "the linearity of the reading experience" does not disappear entirely, "but narrative bytes no longer follow one another in an ineluctable page-turning chain. Hypertextual story space is now multidimensional and theoretically infinite, with an equally infinite set of possible network linkages, either programmed, fixed or variable, or random, or both" ("Endings").

Coover, inspired by the notion of the active hypertext reader, envisions some of the ways the reader can contribute to the story. At the most basic level of the hypertext encounter, "the reader may now choose the route in the labyrinth she or he wishes to take, following some particular character, for example, or an image, an action, and so on." Coover adds that readers can become reader-authors not only by choosing their paths through the text but also by reading more actively, by which he means they "may even interfere with the story, introduce new elements, new narrative strategies, open new paths, interact with characters, even with the author. Or authors." Here, of course, Coover, who has used Intermedia and Storyspace in his hyperfiction classes, refers to the kind of hypertexts possible only with systems that permit readers to add text and links, and very few works of this sort have been attempted. Although some authors and audiences might find themselves chilled by such destabilizing, potentially chaotic-seeming narrative worlds,

Coover, a freer spirit, mentions "the allure of the blank spaces of these fabulous networks, these green-limned gardens of multiply forking paths, to narrative artists" who have the opportunity to "replace logic with character or metaphor, say, scholarship with collage and verbal wit, and turn the story loose in a space where whatever is possible is necessary."

Coover offers a vision of possibilities, and now that many instances of hyperfiction have seen publication, one can make some first guesses which of its suggestions seem most likely to be realized and which least. Although true that readers in certain systems—those with search tools or something like Microcosm's compute links functions—can follow "some particular character, for example, or an image, an action, and so on," the hypertext software used for writing most hyperfiction thus far does not make such reading easy or, in some cases, even possible. Similarly, Intermedia permitted reader-authors to enter the text freely, and students at Brown created works, such as *Hotel,* one version of which has since appeared in the web and recreated as a MOO (see Meyer, Blair, Hader, "*WAXweb*"). *Hotel* permitted any reader to add a new room to the fictional structure as well as change or even delete the work of others. Speaking with Coover in the Spring of 2004, I learned that he considered the experiment a failure because too many visitors vandalized the work of others. Just as the Internet later showed, cyber-utopian techno-anarchy did not fulfill the hopes of those who first envisaged it. I consider *Hotel* not so much a failure as an experiment using digital literature to test a theory. It was worth the effort.

The way readers follow links presents an even more fundamental issue in hyperfiction. In contrast to informational hypertext, which must employ rhetorics of orientation, navigation, and departure to orient the reader, successful fictional hypertext and poetry does not always do so with the result that its readers cannot make particularly informed or empowered choices. Webs created in systems like Storyspace that permit one-to-many links, link menus, and path names all provide authors with the power to empower the reader; that is, authors can write in such a way to provide the reader with informed choices. Taro Ikai's *Electronic Zen*, which we shall later examine in more detail (chapter 7), exemplifies a web that chooses to do so. Using Storyspace's link menus (rather than its richer ability to name links and create paths), Ikai named, as we have already observed, the first destinations "water" and "chef." After reading even a few of his brief lexias, readers realize that he has created two paths, one characterized by Zen meditations and the other by details of the speaker's mundane existence. With that information, readers can now choose which path they wish to follow.

Similarly, in *Quibbling*, which employs the Storyspace view, Carolyn Guyer permits readers at any point to leave individual lexias and pursue the characters and narratives suggested by the names of individual folders and folders within folders. In *Victory Garden* Stuart Moulthrop uses path names, overviews, and other devices to encourage readers to make wise choices. Many hypertext fictions published thus far show, in contrast, that authors either prefer authorial power, reader disorientation, or both. Rather than concluding too quickly that Coover's vision has motes or blurs, we should recognize two things: first, that there will be—indeed, there already are—as many kinds of hyperfiction as occur in print; there is probably no one ideal; and, second, that fictional hypertext has different purposes, modes, and effects than its informational and educational forms.

Print Anticipations of Multilinear Narratives in E-Space

Doing away with a fixed linear text therefore neither necessarily does away with all linearity nor removes formal coherence, though it may appear in new and unexpected forms. Bolter points out that

in this shifting electronic space, writers will need a new concept of structure. In place of a closed and unitary structure, they must learn to conceive of their text as a structure of possible structures. The writer must practice a kind of second-order writing, creating coherent lines for the reader to discover without closing off the possibilities prematurely or arbitrarily. This writing of the second order will be the special contribution of the electronic medium to the history of literature. (*Writing Space*, 144)

In "Poem Descending a Staircase," William Dickey, a poet who works with hypertext, similarly suggests that authors can pattern their hypertexts by creating links that offer several sets of distinct reading paths: "The poem may be designed in a pattern of nested squares, as a group of chained circles, as a braid of different visual and graphic themes, as a double helix. The poem may present a single main sequence from which word or image associations lead into subsequences and then return" (147). Hypertext systems that employ single directional as opposed to bidirectional linking make this kind of organization easier, of course, but fuller and freer forms of the medium also make such quasimusical organization possible and even inevitable. The main requirement, as Paul Ricoeur suggests, becomes "this 'followability' of a story," and followability provides a principle that permits many options, many permutations (1: 67).

Another possible form of hypertextual literary organization involves parataxis, which is produced by repetition rather than sequence. Smith explains that in literary works that employ logical or temporal organization, "the

dislocation or omission of any element will tend to make the sequence as a whole incomprehensible, or will radically change its effect. In paratactic structure, however (where the principle of generation does not cause any one element to 'follow' from another), thematic units can be added, omitted, or exchanged without destroying the coherence or effect of the poem's thematic structure." According to Smith, "'variations on a theme' is one of the two most obvious forms that paratactic structure may take. The other one is the 'list.'" The main problem with which parataxis, like hypertext, confronts narrative is that any "generating principle that produces a paratactic structure cannot in itself determine a concluding point" (*Poetic Closure*, 99–100).

Since some narratologists claim that morality ultimately depends on the unity and coherence of a fixed linear text, one wonders if hypertext can convey morality in any significant form or if it is condemned to an essential triviality. White believes the unity of successful narrative to be a matter of ideology: "Narrativity, certainly in factual storytelling and probably in fictional storytelling as well, is intimately related to, if not a function of, the impulse to moralize reality, that is, to identify it with the social system that is the source of any morality that we can imagine" (14). Writing as a historian and historiographer, White argues that such ideological pressure appears with particular clarity in the "value attached to narrativity in the representation of real events," since that value discloses a desire to endow "real events" with a necessarily imaginary "coherence, integrity, fullness, and closure" possible only in fiction. The very "notion that sequences of real events possess the formal attributes of stories we tell about imaginary events," insists White, "could only have its origin in wishes, daydreams, reveries" (20, 23). Does this signify or suggest that contemporary culture, at least its avant-garde technological phalanx, rejects such wishes, daydreams, and reveries? White's connection of plot and morality suggests several lines of inquiry. One could inquire if it is good or bad that linear narratives inevitably embody some morality or ideology, but first one should determine if rejecting linearity necessarily involves rejecting morality. After all, anyone taking seriously the fictional possibilities of hypertext wants to know if it will produce yet another form of postmodernist fiction that critics like John Gardner, Gerald Graff, and Charles Newman will attack as morally corrupt and corrupting (McHale, 219). If one wanted liberation from ideology, were such a goal possible, nonideological storytelling might be fine. But before concluding that hypertext produces either ideology-free miracles or ideology-free horrors, one should look at the available evidence. In particular, one should examine prehypertext attempts to create nonlinear or multilinear literary forms and evaluate the results.

A glance at previous experiments in avoiding the linearity of the printed

text suggests that in the past authors have rejected linearity because it falsified their experience of things. Tennyson, for example, as we have already observed, created his poetry of fragments in an attempt to write with greater honesty and with greater truth about his own experience. Moreover, as several critics have pointed out, novelists at least since Laurence Sterne have sought to escape the potential confinements and falsifications of linear narrative.

One does not have to look back at the past for examples. In his review of *Dictionary of the Khazars,* a work by the Yugoslavian Milorad Pavic that Robert Coover describes as a hypertext novel, he asserts that "there is a tension in narrative, as in life, between the sensation of time as a linear experience, one thing following sequentiality (causally or not) upon another, and time as a patterning of interrelated experiences reflected upon as though it had a geography and could be mapped" ("He Thinks," 15). Nonlinear form, whether pleasing to readers or even practically possible, derives from attempts to be more truthful rather than from any amorality. Many contemporary works of fiction explore this tension between linear and more spatial sensations of time that Coover describes. Graham Swift's *Waterland* (1983), for instance, questions all narrative based on sequence, and in this it agrees with other novels of its decade. Like Penelope Lively's *Moon Tiger* (1987), another novel in the form of the autobiography of a historian, *Waterland* relates the events of a single life to the major currents of contemporary history.

Using much the same method for autobiography as for history, Swift's protagonist would agree with Lively's Claudia Hampton, whose deep suspicion of chronology and sequence explicitly derive from her experience of simultaneity. Ricoeur suggests that "the major tendency of modern theory of narrative—in historiography and the philosophy of history as well as narratology—is to 'dechronologize narrative,'" and these two novelists exemplify a successful "struggle against the linear representation of time" (1: 30). Thinking over the possibility of writing a history of the world, Lively's heroine rejects sequence and linear history as inauthentic and false to her experience:

The question is, shall it or shall it not be linear history? I've always thought a kaleidoscopic view might be an interesting heresy. Shake the tube and see what comes out. Chronology irritates me. There is no chronology inside my head. I am composed of a myriad Claudias who spin and mix and part like sparks of sunlight on water. The pack of cards I carry around is forever shuffled and re-shuffled; there is no sequence, everything happens at once. (2)

Like Proust's Marcel, she finds that a simple sensation brings the past back flush upon the present, making a mockery of separation and sequence.

Returning to Cairo in her late sixties, Claudia finds it both changed and unchanged. "The place," she explains, "didn't look the same but it felt the same; sensations clutched and transformed me." Standing near a modern concrete and plate-glass building, she picks a "handful of eucalyptus leaves from a branch, crushed them in my hand, smelt, and tears came to my eyes. Sixty-seven-year-old Claudia . . . crying not in grief but in wonder that nothing is ever lost, that everything can be retrieved, that a lifetime is not linear but instant." Her lesson for narratology is that "inside the head, everything happens at once" (68). Like Claudia, Tom Crick takes historical, autobiographical narratives whose essence is sequence and spreads them out or weaves them in a nonsequential way.

The difference between quasi-hypertextual fictions and those in electronic form chiefly involves the greater freedom and power of the hypertext reader. Swift decides when Tom Crick's narrative branches and Lively decides when Claudia Hampton's does, but in Stuart Moulthrop's hypertext version of Borges's "Forking Paths" and in Leni Zumas's *Semio-Surf* or Carolyn Guyer's *Quibbling*, the reader makes this decision. Important prehypertextual narrative has, however, also required such reader decision. One of the most famous examples of an author's ceding power to the reader is found in "The Babysitter," in which Robert Coover, like an author of electronic hypertext, presents the reader with multiple possibilities, really multiple endings, with two effects. First, the reader, who takes over some of the writer's role and function, must choose which possibility, if any, to accept, and second, by encountering that need to decide, the reader realizes both that no true single narrative exists as the main or "right" one and that reading traditional narrative has brainwashed him or her into expecting and demanding a single right answer and a single correct story line. Coover's story not only makes a fundamentally moral point about the nature of fiction but also places more responsibility on the reader. One may say of Coover's text, in other words, what Bolter says of Joyce's interactive hypertext—that "there is no single story of which each reading is a version, because each reading determines the story as it goes. We could say that there is no story at all; there are only readings" (*Writing Space*, 124).

Narrative Beginnings and Endings

As we have already observed in chapter 3, the problems that hypertext branching create for narrativity appear with particular clarity in the matter of beginning and ending stories. If, as Edward Said claims, "a 'beginning' is designated in order to indicate, clarify, or define a *later* time, place, or action," how can hypertext fiction begin or be said to begin? Furthermore, if as Said also convincingly

argues, "when we point to the beginning of a novel . . . we mean that from that beginning in principle follows *this* novel" (5), how can we determine what novel follows from the beginnings each reader chooses?

Thus far most of the hypertext fictions I have read or heard described, like many collections of educational materials, take an essentially cautious approach to the problems of beginnings by offering the reader a lexia labeled something like "start here" that combines functions of title page, introduction, and opening paragraph. They do so for technological, rhetorical, and other reasons. Most authors who wrote in HyperCard, Guide, and Storyspace did not use these environments on networks that could distribute one's texts to other reading sites. To disseminate their writings, authors had to copy them from their own machines to some sort of transfer media—at first floppy discs, later Zip or similar disks, CD-ROMs, or little memory cards that plug into a USB port—and then give that physical storage device to someone with another computer. This use of non-networked (or stand-alone) machines encourages writers to produce stories or poems that are both self-contained and small enough to fit on a single disk. In addition, since most of these early hypertextual environments do not give the reader the power to add links, authors in them necessarily tend to consider their works to be self-contained in a traditional manner. Another reason for using the "start here" approach appears in some writers' obvious reluctance to disorient readers upon their initial contact with a narrative, and some writers also believe that hypertextual fiction should necessarily change our experience of the middle but not the beginnings of narrative fiction.

In contrast, William Dickey, who has written hypertext poetry using Apple's HyperCard, finds it a good or useful quality of hypertext poetry that it "may begin with any one of its parts, stanzas, images, to which any other part of the poem may succeed. This system of organization requires that that part of the poem represented on any one card must be a sufficiently independent statement to be able to generate a sense of poetic meaning as it follows or is followed by any other statement the poem contains" (147). Dickey, who is writing about poetic rather than fictional structure, nonetheless offers organizational principles that apply to both.

Beginnings imply endings, and endings require some sort of formal and thematic closure. Ricoeur, using the image of "following" that is conventionally applied to narratives that writers about hypertext also use to describe activating links, explains that "to follow a story is to move forward in the midst of contingencies and peripeteia under the guidance of an expectation that finds its fulfillment in the 'conclusion' of the story." This conclusion "gives the story

an 'end point,' which, in turn, furnishes the point of view from which the story can be perceived as forming a whole." In other words, to understand a story requires first comprehending "how and why the successive episodes led to this conclusion, which, far from being foreseeable, must finally be acceptable, as congruent with the episodes brought together by the story" (1: 66–67).

In her classic study of how poems produce satisfying endings, Smith provides evidence that might prompt students of hypertext to conclude that it either creates fundamental problems in narrative and other kinds of literary texts or else that it opens them to an entirely new form of textuality. She explains that since "a poem cannot continue indefinitely" (*Poetic Closure*, 33), it must employ devices that prepare the reader for ending rather than continuing. These devices produce in the reader "the sense of stable conclusiveness, finality, or 'clinch' . . . referred to here as closure . . . Whether spatially or temporally perceived, a structure appears 'closed' when it is experienced as integral: coherent, complete, and stable" (2)—qualities that produce a "sense of ultimate composure we apparently value in our experience of a work of art" and that we label "stability, resolution, or equilibrium" (34). Unlike texts in manuscript or print, those in hypertext apparently can continue indefinitely, perhaps infinitely, so one wonders if they can provide satisfying closure.[3] Or to direct this inquiry in ways suggested by Smith's analysis of closure, one should ask what techniques might provide something analogous to that desirable "sense of stable conclusiveness, finality, or 'clinch.'"

Taking another clue from fiction created for print publication, one perceives that many prehypertext narratives provide instances of multiple closure and also a combination of closure with new beginnings. Both Charles Dickens's novels written specifically for publication in periodicals at monthly intervals and those by other nineteenth-century novelists intended for first publication in the conventional triple-decker form make use of partial closure followed by continuation. Furthermore, Trollope's Palliser series, Lawrence Durrell's *Alexandria Quartet*, Faulkner's works, and countless trilogies and tetralogies in both fantastic and realistic modes suggest that writers of fiction have long encountered problems very similar to those faced by writers of hypertext fiction and have developed an array of formal and thematic solutions to them. In fact, the tendency of many twentieth-century works to leave readers with little sense of closure—either because they do not learn of the "final" outcome of a particular narrative or because they leave the story before any outcome occurs—shows us that as readers and writers we have long learned to live (and read) with more open-endedness than discussions of narrative form might lead us to expect.

Coover proclaims that endings will and must occur even in infinitely expandable, changeable, combinable docuverses:

> There is still movement, but in hyperspace it is that of endless expansion. "A" is, or may be, an infinite multiplicity of starting points, "B" a parenthetical "B" somewhere beyond the beyond, or within the within, yet clearly mapped, clearly routed, just somewhat less definite than, oh, say, dying. Which for all the networking maneuvers and funhouse mirrors cannot be entirely ignored. Sooner or later, whatever the game, the whistle is blown. Even in hyperspace, there is disconnection. One last windowless trajectory. ("Endings")

Hypertext fictions always end because readings always end, but they can end in fatigue or in a sense of satisfying closure. Writing of the printed text, Barbara Herrnstein Smith reminds us that "the end of the play or novel will not appear as an arbitrary cut-off if it leaves us at a point where, with respect to the themes of the work, we feel that we know all there is or all there is to know" (*Poetic Closure*, 120). If individual lexias provide readers with experiences of formal and thematic closure, they can be expected to provide the satisfactions that Smith describes as requisite to the sense of an ending.

Michael Joyce's *afternoon*

Michael Joyce, a hypertext author, is suspicious of closure. In Joyce's *afternoon*, a hypertext fiction in 538 lexias, the section appropriately entitled "work in progress" advises readers: "Closure is, as in any fiction, a suspect quality, although here it is made manifest. When the story no longer progresses, or when it cycles, or when you tire of the paths, the experience of reading it ends." In other words, Joyce makes the responsibility for closure, for stopping, entirely the reader's. When the reader decides he or she has had enough, when he or she wishes to stop reading, why then the story is over. Joyce continues, however: "Even so, there are likely to be more opportunities than you think there are at first. A word which doesn't yield the first time you read a section may take you elsewhere if you choose it when you encounter the section again; and what sometimes seems a loop, like memory, heads off in another direction." Reading the highly allusive *afternoon*, which has so many points of departure within each lexia as well as continually changing points of linkage, one sees what Joyce means[4] (Figure 27).

The successive lexias one encounters seem to take form as chains of narrative, and despite the fact that one shifts setting and narrator, one's choices produce satisfying narrative sets. Moving from section to section, every so often one encounters puzzling changes of setting, narrator, subject, or chronology, but two things occur. After reading awhile one begins to construct
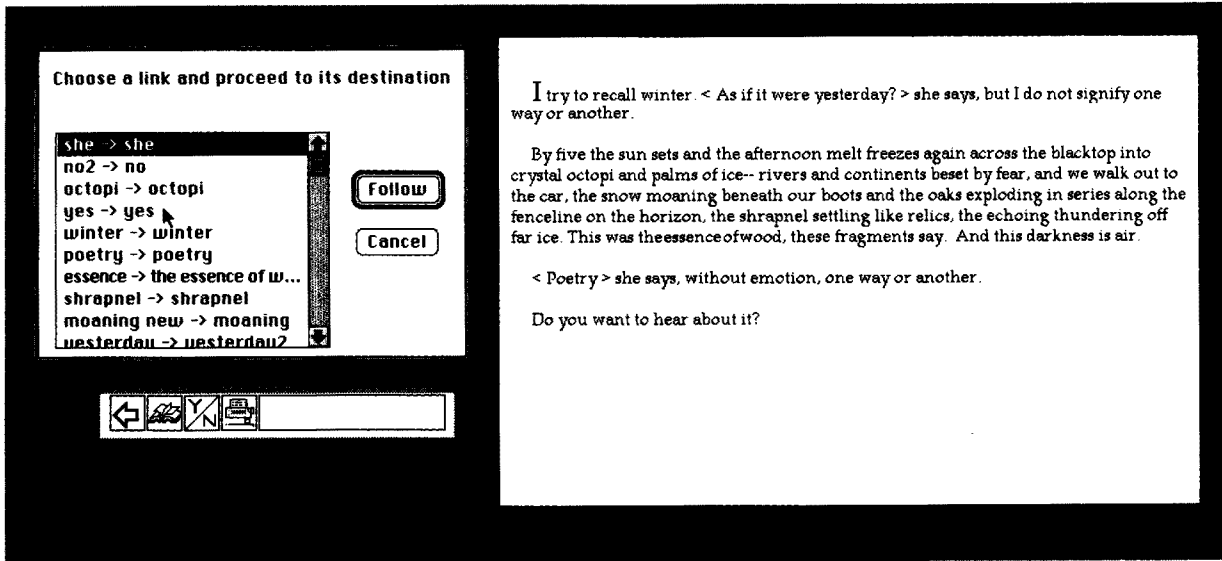
Choose a link and proceed to its destination

```
she -> she
no2 -> no
octopi -> octopi
yes -> yes
winter -> winter
poetry -> poetry
essence -> the essence of w...
shrapnel -> shrapnel
moaning new -> moaning
yesterday -> yesterday2
```

[**Follow**]

[**Cancel**]

I try to recall winter. < As if it were yesterday? > she says, but I do not signify one way or another.

By five the sun sets and the afternoon melt freezes again across the blacktop into crystal octopi and palms of ice-- rivers and continents beset by fear, and we walk out to the car, the snow moaning beneath our boots and the oaks exploding in series along the fenceline on the horizon, the shrapnel settling like relics, the echoing thundering off far ice. This was the essence of wood, these fragments say. And this darkness is air.

< Poetry > she says, without emotion, one way or another.

Do you want to hear about it?

Figure 27. The Storyspace Page Reader: Michael Joyce's *afternoon*. The Page Reader, one of several ways of distributing a system's webs to readers without the authoring environment, has a moveable palette providing access to five functions: the arrow at left provides a backtracking function, and clicking on the book icon produces a menu of all links from the current lexia, such as appears at the left. In addition, readers can respond positively or negatively to questions in the text, such as we encounter here, by choosing the appropriate button, or they can search for links relating to a specific word by typing it in the space at right. Finally, readers can print individual lexias by using the icon at far right. (Courtesy of Eastgate Systems.)

narrative placements, so that one assigns particular sections to a provisionally suitable place—some lexias obviously have several alternate or rival forms of relation. Then, having assigned particular sections to particular sequences or reading paths, many, though not all, of which one can retrace at will, one reaches points at which one's initial cognitive dissonance or puzzlement disappears, and one seems satisfied. One has reached—or created—closure!

One might describe Joyce's hypertext fiction in the way Gérard Genette describes "what one calls Stendhal's *oeuvre*":

a fragmented, elliptical, repetitive, yet infinite, or at least indefinite, text, no part of which, however, may be separated from the whole. Whoever pulls a single thread must take the whole cloth, with its holes and lack of edges. To read Stendhal is to read the whole of Stendhal, but to read all of Stendhal is impossible, for the very good reason, among others, that the whole of Stendhal has not yet been published or deciphered, or discovered, or even written: I repeat, all the Stendhalian text, because the

gaps, the interruptions are not mere absences, a pure non-text: they are a lack, active and perceptible as lack, as non-writing, as non-written text. (*Figures*, 165)

Genette, I suggest, describes the way a reader encounters the web of Joyce's hypertextual narrative. Even entering at a single point determined by the author, the reader chooses one path or another and calls up another lexia by a variety of means, and then repeats this process until she or he finds a hole or a gap. Perhaps at this point the reader turns back and takes another direction. One might just as well write something oneself or make present a remembered passage by another author in the manner that a book reader might begin a poem by Stevens, think of some parallel verses by Swinburne or a passage in a book by Helen Vendler or Harold Bloom, pull that volume off its shelf, find the passage, and then return to the poem by Stevens.

Whereas Genette's characterization of the Stendhalian oeuvre captures the reader's experience of the interconnectedness of *afternoon* and other hypertext fictions, his description of temporality in Proust conveys the experience of encountering the disjunctions and jumps of hypertextual narrative. Citing George Poulet's observation that in *À la Recherche du temps perdu* time does not appear as Bergsonian duration but as a "succession of isolated moments," he points out that similarly "characters (and groups) do not evolve: one fine day, they find that they have changed, as if time confined itself to bringing forth a plurality that they have contained in potentia from all eternity. Indeed, many of the characters assume the most contradictory roles *simultaneously*" (216). In other words, in *À la Recherche du temps perdu* readers find themselves taking leaps and jumping into a different time and a different character. In a hypertext narrative it is the author who provides multiple possibilities by means of which the readers themselves construct temporal succession and choose characterization—though, to be sure, readers will take leaps, as we do in life, on the basis of inadequate or even completely inaccurate information.

So many different contexts cross and interweave that one must work to place the characters encountered in them. Joyce's world, which also inevitably includes the *other* Joyce, has many moving centers of interest, including marriage and erotic relationships, sexual politics, psychotherapy, advertising, filmmaking and the history of cinema, computing, myth, and literature of all kinds. Reading habits one has learned from print play a role in organizing these materials. If one encounters a speaker's mention of his marriage and, in a later lexia, finds him at the scene of an automobile accident from which the bodies or injured people have already been removed, one might take the

accident as an event in the recent present; the emotional charge it carries serves to organize other reported thoughts and events, inevitably turning some of them into flashbacks, others into exposition. Conversely, one could take that event as something in the past, a particularly significant moment, and then use it as a point of origin either that leads to other events or whose importance endows events it has not caused with a significance created by explanation or contrast or analogy. Our assistance in the storytelling or story-making is not entirely or even particularly random since Joyce provides many hooks that can catch at our thoughts, but we do become reader-authors and help tell the tale we read.

Nonetheless, as J. Hillis Miller points out, we cannot help ourselves: we must create meaning as we read. "A story is readable because it can be organized into a causal chain . . . A causal sequence is always an implicit narrative organized around the assumption that what comes later is caused by what comes before, 'post hoc, propter hoc.' If any series of random and disconnected events is presented to me, I tend to see it as a causal chain. Or rather, if Kant and Kleist are right, I must see it as a causal chain" (*Versions*, 127, 130). Miller, who silently exchanges a linear model of explanation for one more appropriate to hypertextual narrative, later adds: "We cannot avoid imposing some set of connections, like a phantasmal spiderweb, over events that just happen as they happen" (139).

Miller's idea of reading printed text, which seems to owe a great deal to gestalt psychology's theories of constructionist perception, well describes the reader-author demanded by Joyce's *afternoon* and other works of hypertext fiction. According to Miller, reading is always "a kind of writing or rewriting that is an act of prosopopoeia, like Pygmalion giving life to the statue" (186).[5] This construction of an evanescent entity or wholeness always occurs in reading, but in reading hypertext it takes the additional form of constructing, however provisionally, one's own text out of fragments, out of separate lexias. It is a case, in other words, of Lévi-Strauss's *bricolage*, for every hypertext reader is inevitably a *bricoleur.*

Such *bricolage*, I suggest, provides a new kind of unity, one appropriate to hypertextuality. As long as one grants that plot is a phenomenon created by the reader with materials the lexias offers, rather than a phenomenon belonging solely to the text, then one can accept that reading *afternoon* and other hypertext fictions produces an experience very similar to that provided by reading the unified plot described by narratologists from Aristotle to White and Ricoeur. White, for example, defines plot as "a structure of relationships by which the events contained in the account are endowed with a meaning by

being identified as parts of an integrated whole" (9). Ricoeur similarly defines plot, "on the most *formal* level, as an integrating dynamism that draws a unified and complete story from a variety of incidents, in other words, that transforms this variety into a unified and complete story. This formal definition opens a field of rule-governed transformations worthy of being called plots so long as we can discern temporal wholes bringing about a synthesis of the heterogeneous between circumstances, goals, means, interactions, and intended and unintended results" (2: 8). According to Ricoeur, the metaphorical imagination produces narrative by a process of what he terms "predicative assimilation," which "'grasps together' and integrates into one whole and complete story multiple and scattered events, thereby schematizing the illegible signification attached to the narrative taken as a whole" (1: x). To this observation I would add, with Miller, that as readers we find ourselves forced to fabricate a whole or, as he puts it, integrate "into one whole and complete story multiple and scattered events, separate parts."

In his chapter on Heinrich von Kleist in *Versions of Pygmalion*, Miller provides us with an unexpectedly related model for this kind of extemporized construction of meaning-on-the-run. He quotes Kleist's claim that Mirabeau was "unsure of what he was about to say" (104) when he began his famous speech that ended "by creating the new French nation and a new parliamentary assembly" (105). The speaker posits a "syntactically incomplete fragment, says Kleist, without any idea . . . of where the sentence is going to end, [and] the thought is gradually 'fabricated'"; and Kleist claims that the speaker's feelings and general situation in some way produce his proposals. Disagreeing with him, Miller argues in the manner of Barthes that Mirabeau's revolutionary "thought is gradually fabricated not so much by the situation or by the speaker's feelings," as Kleist suggests, "but by his need to complete the grammar and syntax of the sentence he has blindly begun" (104). Structuralists and poststructuralists have long described thinking and writing in terms of this extemporized, in-process generation of meaning, the belief in which does so much to weaken traditional conceptions of self and author. Hypertext fiction forces us to extend this description of meaning-generation to the reader's construction of narrative. It forces us to recognize that the active reader fabricates text and meaning from "another's" text in the same way that each speaker constructs individual sentences and entire discourses from "another's" grammar, vocabulary, and syntax.

Vladimir Propp, following Veselovsky, long ago founded the "structuralist study of plot" and with it modern narratology applying notions of linguistic combination to the study of folk tales.[6] Miller, who draws upon this tradition,

reminds us that fabricating folk tales, spoken discourses, and interpretative readings of print narratives follow an essentially similar process that entails the immediate, in-process construction of meaning and text. Miller's observations allow us to understand that one must apply the same notions to the activities of the reader of hypertext fiction. In brief, hypertext demands that one apply this structuralist understanding of speaker and writer to the reader as well, since in hypertext the reader is in this limited sense a reader-author. From this theory of the reader and from the experience of reading hypertext narratives, I draw the following, perhaps obvious but nonetheless important, conclusions. In a hypertext environment a lack of linearity does not destroy narrative. In fact, since readers always, but particularly in this environment, fabricate their own structures, sequences, and meanings, they have surprisingly little trouble reading a story or reading for a story.[7] Obviously, some parts of the reading experience seem very different from reading a printed novel or a short story, and reading hypertext fiction provides some of that experience of a new orality that both McLuhan and Ong have predicted. Although the reader of hypertext fiction shares some experiences, one supposes, with the audience of listeners who heard oral poetry, this active reader inevitably has more in common with the bard, who constructed meaning and narrative from fragments provided by someone else, by another author or by many other authors.

Like Coover, who emphasizes the inevitable connection of death and narrative, Joyce seems to intertwine the two. In part it is a matter, as Brian McHale points out, of avant-garde authors using highly charged subjects (sexuality, death) to retain readers' interest that might stray within puzzling and unfamiliar narrative modes. In part it is also a matter of endings: when the reader decides to stop reading *afternoon*, he or she ends, kills, the story, because when the active reader, the reader-author, stops reading, the story stops, it dies, it has reached an ending. As part of that cessation, that willingness to stop creating and interpreting the story, certain acts or events in the story become deaths because they make most sense that way; and by stopping reading the reader prevents other alternatives from coming into being.

Stitching Together Narrative, Sexuality, Self: Shelley Jackson's *Patchwork Girl*

Patchwork Girl, Shelley Jackson's brilliant hypertext parable of writing and identity, generates both its themes and techniques from the kinds of collage writing intrinsic to hypertext (Figure 28). Jackson, a published book illustrator as well as author, creates a digital collage out of her own words and images (and those of others, including Mary Shelley, Frank L. Baum,
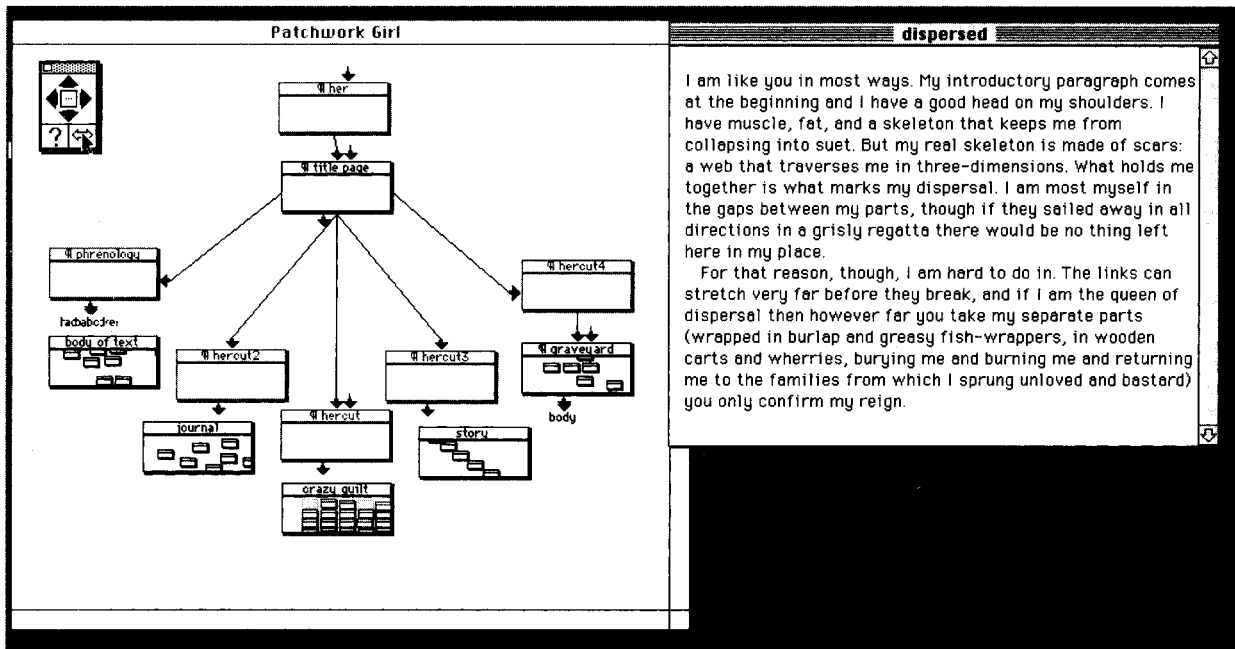
Figure 28. The Storyspace Reader: Shelley Jackson's *Patchwork Girl*. Readers can navigate the web (1) by simultaneously pressing option and ⌘ (or the command key in Windows) to discover linked text and then double clicking on it, (2) by mousing down on the double-headed arrow on the moveable palette (for default links), or (3) by exploring the Storyspace view, which consists of a folderlike arrangement of the web that authors can arrange as they wish. Unlike the Page Reader, which derives from the tiny size of original Macintosh screens, this form of Storyspace does not restrict documents to a cardlike format and permits scrollable text that readers can reconfigure. (Courtesy of Eastgate Systems.)

and Jacques Derrida) as she tells us about the female companion to Frankenstein's monster whose "birth takes place more than once. In the plea of a bygone monster; from a muddy hole by corpse-light; under the needle, and under the pen."

One form of collage in *Patchwork Girl* appears in the thirty-lexia section entitled "Crazy Quilt." As Karyn Raz explains in her section of "*Patchwork Girl* Comments," a student-created portion of the *Cyberspace, Hypertext, and Critical Theory Web*, "Each patch in Jackson's quilt is composed of various other patches, various other texts, from theoretical to fictional, from pop cultural to hearsay, sewn together to form either a sentence or paragraph" ("Patches"). The lexia entitled "seam'd" thus combines sentences from *Getting Started with Storyspace*, Frank L. Baum's *Patchwork Girl of Oz*, and Barbara

Maria Stafford's *Body Criticism: Imagining the Unseen in Enlightenment Art and Medicine:*

> You may emphasize the presence of text links by using a special style, color or type-face. Or, if you prefer, you can leave needles sticking in the wounds—in the manner of tailors—with thread wrapped around them. Being seam'd with scars was both a fact of eighteenth century life and a metaphor for dissonant interferences ruining any finely adjusted composition. "The charm you need is a needle and thread," said the Shaggy Man.

As Raz points out, "Stitches, or links connect one patch to another, one text to another. Jackson seems particularly interested in examining the points of union between texts, such that 'being seam'd with scars' becomes a fact not only of eighteenth-century life but of hypertext writing, and indeed of any sort of creative process."

Fittingly, my discussion of Jackson's web has already taken on much of the appearance of collage itself. I first wrote a good portion of what follows for the *Electronic Book Review,* one of an increasing number of critical and scholarly World Wide Web periodical publications, but after students in my course on cyberspace and critical theory supplemented it with an HTML web in the form of some two dozen commentaries, I decided to find some way here to draw upon their work in a manner appropriate to print. In the *Cyberspace, Virtual Reality, and Critical Theory Web,* our lexias appear woven together, and I could *add to* my single lexia simply by using links. Here, following the conventions of print, I shall sum up and introduce these additional comments (which are now, of course, part of the "main" text, and hence no longer "additional"), citing some longer passages in the endnotes. Back to *Patchwork Girl* and hypertext collage.

Most of *Patchwork Girl's* collage effects occur, not within individual patches or lexias but across them as we readers patch together a character and a narrative. Opening Jackson's web, we first encounter a black-and-white image of the stitched-together protagonist that she cuts and recombines into the images we come upon at various points throughout our reading. The first link takes us to her title page, a rich crossroads document, to which we return repeatedly, that offers six paths out: "a graveyard," "a journal," "a quilt," "a story," "broken accents," and a list of sources. The graveyard, for example, takes us first to a patchwork image created by cutting and rearranging the title screen, after which we receive some directions and then reach the head-stone, another overview or crossroads lexia that provides multiple paths; these paths take us to the lives of each of the beings, largely women, whose parts contributed to the Patchwork Girl.

According to Jason Williams, the graveyard section functions as a collage of "mini-narratives and fragmented character sketches" that serves as a "matrix for the meta-character and her story." Its removal from the narrative of the Patchwork Girl's own life avoids "interrupting the story's flow, and its compartmentalization encourages the application of its contents to the smaller narrative subsections. The graveyard itself focuses on the headstone and the list of the urns' contents, giving it a double-focus radial structure that unifies the parts without imposing a hierarchical order upon them. The introductory and concluding lexias temporally frame this structure and facilitate passage to the more linear sections of the text" ("Texture, Topology, Collage, and Biology in *Patchwork Girl*").

Jackson endows each tale, each life, encountered in the graveyard with a distinctive voice, thereby creating a narrative of Bakhtinian multivocality while simultaneously presenting a composite image of women's lives at the turn of the nineteenth century. The Everywoman Monster's left leg, we read,

belonged to Jane, a nanny who harbored under her durable grey dresses and sensible undergarments a remembrance of a less sensible time: a tattoo of a ship and the legend, Come Back To Me. Nanny knew some stories that astonished her charges, and though the ship on her thigh blurred and grew faint and blue with distance, until it seemed that the currents must have long ago finished their work, undoing its planks one by one with unfailing patience, she always took the children to the wharf when word came that a ship was docking, and many a sailor greeted her by name.

My leg is always twitching, jumping, joggling. It wants to go places. It has had enough of waiting.

Patchwork Girl makes us all into Frankenstein-readers stitching together narrative, gender, and identity, for as it reminds us: "You could say all bodies are written bodies, all lives pieces of writing." This digital collage-narrative assembles Shelley Jackson's (and Mary Shelley's and Victor Frankenstein's) female monster, forming a hypertext Everywoman who embodies assemblage, concatenation, juxtapositions, and blurred, recreated identities—one of many digital fulfillments of twentieth-century literary and pictorial collages. As the monster slyly informs us in a lexia one encounters early on,

I am buried here. You can resurrect me, but only piecemeal. If you want to see the whole, you will have to sew me together yourself. (In time you may find appended a pattern and instructions—for now, you will have to put it together any which way, as the scientist Frankenstein was forced to do.) Like him, you will make use of a machine of mysterious complexity to animate these parts.

In emphasizing the way we as her readers have to start out without a map or plan and then do a lot of the assembling ourselves, Jackson playful prepares us for the gaps and jumps we shall have to make.

In making us all readers in the mode of Dr. Frankenstein, she also strikes a Baudrillardian note. As David Goldberg argues, "Hypertext represents the fulfillment of the fantasy that Shelley proposes and Jackson revitalizes. A prevailing theme throughout the history of modern science and technology has been the simulation of life by artificial means. Frankenstein and his real-life predecessors . . . sought . . . to create new life, a copy without an original— Baudrillard's simulacrum," and reading *Patchwork Girl* offers "the opportunity to create a unique conformation of the text, of creating a copy without an original," something, one may add, characteristic of the collage form.[8]

Another source of such collage patchwork appears in the different link structures—what Jason Williams terms the link topologies—that characterize each section of the web. As Williams points out, that portion which tells the story of the Patchwork Girl herself relies on unified setting and chronological change. "Because this section emphasizes temporal dynamics, its link structure correspondingly parallels our normal linear perception of time, regularly progressing from past lexias forward. Mary Shelly's encounter outdoors with the monster and the more ambiguous bedroom scene behave similarly but take the peculiar cast of ancillary narratives, like apocryphal stories or appended myths—complete units that draw upon and support material from other units" ("Texture, Topology, Collage, and Biology in Patchwork Girl").

In contrast, that portion of the web containing the nonfictional components takes a more characteristically hypertext form of "paths that intersect at lexias containing similar subject matter. This arrangement permits a digressive textual interrogation in which the reader pursues attractive ideas down branching paths. This mode feels appropriate to nonfiction because it mirrors the normal scholarly process of following references between texts." Although the "Crazy Quilt" section follows a stricter, more limited sequence, "its clear grid layout [in the Storyspace view], the arrow keys, and the chunked arrangement of its content allow a grazing approach to reading."

According to Williams, each of these linking topologies patterns the sequence in which a reader experiences, constructs, or reconstructs the text: "Each corresponds to a temporal texture" created by the reader's perception of transitions between lexias "as smooth and determined, chaotic, or ornately interlocking." *Patchwork Girl* then combines these "linking textures and their composition into a meta-collage with a meta-texture":

Thematic, word-based links act as singular jumps between sections, but, ironically, a woven mass of them forms a canvas on which the author mounts scraps of structure. Links destabilize—or, more positively—stretch the text to flexibility, by pointing away from themselves, by suggesting the reader might read better elsewhere. But again ironically, this pulling apart lends the text its unity, because it permits meanings from separate subsections to bleed into one another through the cracks between them, permitting the text's colorings to mix throughout it.[9]

Finally, Williams concludes, he finds it less surprising that such qualities "appear so fundamental to hypertext and to *Patchwork Girl* than that earlier literary forms subdued them."

Having glanced at *Patchwork Girl's* linking topologies and its collage-like features, let us next examine some of the ways they and its themes and techniques appear in its use of seams, sutures, links, and scars. As Tim McConville points out, cinema "theoreticians use the word suture to describe a film's ability to cover up cuts and fragments," thereby creating the appearance of "a fluid text that reads 'naturally.'" But because *Patchwork Girl*, "like all hypertext fiction, scoffs at the notion of a neat and tidy text," Jackson's patched-together protagonist defines herself by her scars. Thus, although, "like film, *Patchwork Girl* and all hypertext implement suture," unlike film, they do not do so "as a means of holding narrative together in one cohesive unit. Jackson uses sutures to tie various pieces together so that narrative may merely exist. After sutures have been set in place, the end result is a scar" ("Sutures and Scars").

And scars define the Patchwork Girl, *Patchwork Girl,* and, Jackson implies, all hypertext. In fact, according to Erica Seidel,

scars are analogous to hypertextual links. The monster's scars are intimate, integral, the essence of her identity. Similarly, the essence of hypertext is the linking, the private ways that the author chooses to arrange her piece, and the reader uses to meander through it. Just as the monster finds pleasure and identity in her scars,[10] good hypertext works are defined and distinguished by their unique linking structures. When Shelley and the monster become intimate, she first understands the significance of the monster's scars: "I see that your scars not only mark a cut, they also commemorate a joining." During this sexual encounter, Shelley genuinely identifies with the scars. "Her scars lay like living things between us, inscribing themselves in my skin. What divided her, divided me." Just as the stitchings of skin unite Shelley and the monster, hypertext links unite author and reader. ("The Hypertextuality of Scars")

Jeffrey Pack's mini-web discussing *Patchwork Girl* takes this analogy even farther, first looking at Webster's definitions of a scar as, "among other

things, a 'mark left on the skin or other tissue after a wound, burn, ulcer, pustule, lesion, etc. has healed,' a 'marring or disfiguring mark on anything,' and 'the lasting mental or emotional effects of suffering or anguish.'" The first meaning, Pack explains, defines the scar "as a joining, that is, a visual signal that two pieces of skin that were not contiguous at one time now are. In this sense, a scar is the biological version of the seam, where Mother Nature (or, in the case of *Frankenstein* and *Patchwork Girl*, a human creator) sews flesh together in the same way a seamstress stitches together a quilt or the creator of a hypertext links texts together."

According to Pack, the next definition "presents the scar as a mark of disfigurement. Scars are ugly (in modern Western society, at least). They're jarring breaks in the otherwise even epidermis," and links similarly "disrupt, scar, an otherwise linear text." (Pack wrote his critique in HTML to be read with a World Wide Web viewer, and he thus added that the appearance of the link "is even similar; most graphical browsers will display a 'scar' beneath the links on this page, though a user can play the role of cosmetic surgeon and opt to conceal this disfigurement of the text if they so choose.")

The last definition

gives the scar a more abstract meaning; it is now a sign of trauma. In order for a scar to exist, the flesh must have been torn. The formation of a scar is a kludge: its appearance is the result of haphazard regeneration rather than orderly growth. The link is similarly a textual trauma; the transitions between sentences and paragraphs give way to (presumably) intuitive leaps between texts and ideas. The replacement (as opposed to the appending) of text caused by following an HTML link is disorienting to say the least; even the sudden appearance of another window (in an environment such as Storyspace) interferes with the reader's practiced down-and-to-the-right movement across a "page" of text.

Pack entitled his subweb, "Frankenfiction," and his examination of scars, links, and seams in *Patchwork Girl* emphasizes the way Jackson uses them to create a textual "monster."

Like Donna J. Haraway, Jackson rejoices in the cultural value of monsters. Traveling within Jackson's multisequential narrative, we first wander along many paths, finding ourselves in the graveyard, in Mary Shelley's journal, in scholarly texts, and in the life histories of the beings—largely women but also an occasional man and a cow—who provided the monster's parts. As we read, we increasingly come to realize an assemblage of points, one of the most insistent of which appears in the way we use our information technol-

ogies, our prosthetic memories, to conceive ourselves. Jackson's 175-year-old protagonist embodies the effects of the written, printed, and digital word. "I am like you in most ways," she tells us.

My introductory paragraph comes at the beginning and I have a good head on my shoulders. I have muscle, fat, and a skeleton that keeps me from collapsing into suet. But my real skeleton is made of scars: a web that traverses me in three-dimensions. What holds me together is what marks my dispersal. I am most myself in the gaps between my parts, though if they sailed away in all directions in a grisly regatta there would be no thing left here in my place.

For that reason, though, I am hard to do in. The links can stretch very far before they break, and if I am the queen of dispersal then however far you take my separate parts (wrapped in burlap and greasy fish-wrappers, in wooden carts and wherries, burying and burning me and returning me to the families from which I sprung unloved and bastard) you only confirm my reign.

Hypertext, Jackson permits us to see, enables us to recognize the degree to which the qualities of collage—particularly those of appropriation, assemblage, concatenation, and the blurring of limits, edges, and borders—characterize a good deal of the way we conceive of gender and identity.

Michael DiBianco points out, for example, that *Patchwork Girl* "addresses the issue of identity as it is inextricably linked to the author/subject relationship," particularly in relation to the narrator, who appears "as much a jumbled collection of disparate parts as her monster," something apparent in the way "Jackson continually incorporates different personas, different voices, at all levels of the text. There is a sense of unceasingly assuming new identities, trying them on briefly, then letting the hypertextual structure of the fiction erase them, only to be subsequently replaced by new identities" ("Commentary"). As the narrator puts it, "I hop from stone to stone and an electronic river washes out my scent in the intervals. I am a discontinuous trace, a dotted line." And: "I am a mixed metaphor. Metaphor, meaning something like 'bearing across,' is itself a fine metaphor for my condition. Every part of me is linked to other territories alien to it but equally mine."

Sooner or later all information technologies, we recall, have always convinced those who use them both that these technologies are natural and that they provide ways to describe the human mind and self. At the early stage of a digital information regime, *Patchwork Girl* permits us to use hypertext as powerful speculative tool that reveals new things about ourselves while at the same time retaining the sense of strangeness, of novelty.[11]

Quibbling: A Feminist Rhizome Narrative

Quibbling, Carolyn Guyer explains, "is about how women and men are together, it tends slightly toward salacious, it is broadly feminist (so to speak), or, one could say it is the story of someone's life just before the beginning or a little after the end" ("Something"). I begin my discussion of *Quibbling* by directing attention to Guyer's emphasis on *are*—on a state of being rather than on narrative drive, for in fact the tale accumulates, eddies, and takes the form, as Guyer puts it, of a "lake with many coves." *Quibbling'*s dispersed set of narratives include those of four couples—Agnes and Will, Angela and Jacob, Hilda and Cy, and Heta and Priam—as well as a range of other characters, including several in a novel one of the characters is writing.

Quibbling sharply contrasts with Joyce's *afternoon,* which seems the electronic translation of high modernist fiction—difficult, hieratic, earnest, allusive, and enigmatic. In essence, the opposition comes down to attitudes toward sharing authorial power with readers, and Coover therefore well describes *Quibbling* as a "conventional, but unconventionally designed, romance by one of the most radical proponents of readerly interventions in hyperfictions" ("And Now," 11). In contrast to *afternoon,* which uses the resources of hypertext to assign even more authorial power relative to the reader, *Quibbling* tantalizes readers into wandering through its spaces in unexpected ways.

The contrast between the attitudes toward reader intervention taken by *Quibbling* and *afternoon* clearly appears in the versions of Storyspace they employ. Like *Patchwork Girl,* Guyer's hypertext fiction uses the Storyspace reader, which presents a single scrollable page, similar to that one encounters in the World Wide Web, along with the folder-like Storyspace view that permits readers to search in the innards of the text. Although Joyce originally used the Storyspace reader for some of the prepublication versions of *afternoon* (including one I illustrated in the first version), in the published version, he employed the simple Page Reader, which offers the reader far less power. In explaining her own choice, Guyer points out: "I want people to see the topographic structure itself, be able to go inside it and muck about directly. I want access left to the reader as much as possible." This choice means, as Coover correctly points out, that *Quibbling* "can be read by way of its multiple links, but it can also be read more 'geographically' simply by exploring these nested boxes as though they constituted a kind of topographical map" ("And Now," 11).

Similarly, Guyer's approach to linking reveals her to be far more willing to share power with the reader, as her changing attitude toward links suggests: "I've always felt dense linkage meant more options for the reader, and so greater likelihood of her taking the thing for her own. But this idea now seems

wrong to me. Excessive linkage can actually be seen as something of an insult, and certainly more directive . . . In the end, I find I cannot bring myself to make the physical links that are inherent in the writing, that is, the 'obvious' ones (the motifs of glass, water, hands, color, walking, etc.)" (Journal).

Guyer's emphasis on an active reader, as opposed to simply a responsive, attentive one, relates directly to her conception of hypertext as a form of feminist writing. In fact, like *Patchwork Girl, Quibbling* makes us wonder whether hypertext fiction and, indeed, all hypertext is in some sort a feminist writing, the electronic embodiment of that *l'écriture féminine* for which Hélène Cixous called several decades ago. Certainly, like Ede and Lunsford, whose alignment of collaborative authorship with feminist theory we have already observed, Guyer believes that hypertext—an intrinsically collaborative form as she employs it—speaks to the needs and experience of women: "We know that being denied personal authority inclines us to prefer . . . decentered contexts, and we have learned, especially from our mothers, that the woven practice of women's intuitive attention and reasoned care is a fuller, more balanced process than simple rational linearity" (quoted by Greco from Joyce, *Of Two Minds,* 89).

According to Diane Greco, Guyer sees hypertext as the embodiment of "ostensibly female (or perhaps, feminine) characteristics of intuition, attentiveness, and care, all of which are transmitted from one woman to another via the universal experience of having a (certain kind of) mother. The opportunities for non-linear expression which hypertext affords coalesce, in this view, to form a writing that is 'female' in a very particular way: hypertext writing embraces an ethic of care that is essentially intuitive, complicated, detailed, but also 'fuller' and 'balanced'" (88). Reminding us that "some notable hypertexts by women, such as Kathryn Cramer's *In Small & Large Pieces* and Jane Yellowlees Douglas's *I Have Said Nothing,* feature violence, rupture, and breakage as organizing imagery," Greco remains doubtful of any claims that hypertext, or any other mode of writing, could be essentially female or feminine.[12]

Whether we agree with Guyer that hypertext fiction necessarily embodies some essential form of women's writing, we have to recognize that she has written *Quibbling* as a non-Aristotelian networked cluster of stories, moods, and narrative fragments that gather and rearrange themselves in ways that embody her beliefs about female writing. In her essay in *Leonardo,* she emphasizes both how her fiction web lacks conventional narrative and conventional aspirations to be literary: "It is hardly about anything itself, being more like the gossip, family discussions, letters, passing fancies and daydreams that we tell ourselves every day in order to make sense of things. These are not exactly like myths, or fairy tales, or literary fiction. They are instead the

quotidian stream. In this sense, then, *Quibbling* is a work that tries not to be literary." Wending our ways through it, we encounter lexias that take the form of messages received via electronic mail, brief notes, and poetry as well as more usual narrative, description, and exposition. The links that join these lexias do not produce straight-ahead, or even eddying, narratives but instead generate an open montage-textuality, like that of *In Memoriam,* in which lexias echo one another, gathering meaning to themselves and sharing it with other, apparently unrelated patching of writing.

Guyer's basic approach appears in the way individual lexias follow one another and hence come to associate with each other. If, after reading the lexia entitled "walking w/Will," which relates an episode in the relationship of Agnes and Will, one double clicks on it to follow a link out, that action brings one to "following her," which relates how after their first date Priam secretly followed Hetta home to make sure she was safe; activating a link from this lexia brings one to an event or state in the relationship of Angela and Jacob. Reading along this link path, one perceives the somewhat analogous situations, thus finding similarity, though not identity, in the lives of different couples. In some cases, only by looking at the lexia's location in the web's structure (presented by the Storyspace view) can readers discern which couple they are reading. These stories take form, in other words, by gentle accretion as one lexia rubs up against another. In contrast to *afternoon,* in which our ignorance of a crucial event drives our reading, here no single core quickly comes to prominence as the necessary axis or center of all lexias. No single event endows the others with meaning. *Quibbling* seems far more a networked narrative in which the similar situations bleed back and forth across the boundaries of individual lexias, gradually massing meanings. "It is," as Guyer explains,

in that rhythmic sense of ebb and flow, of multi-directional change, of events that disappear before they are quite intelligible but somehow come to mean something, that *Quibbling* was made. In hindsight, I can see why water and its properties became one of the pervasive, propelling metaphors in the work. A lake with many coves is how I saw it. The coves being where we focus, where individuals exist, where things are at least partly comprehensible; the lake being none of that, but, naturally, more than the sum of the coves, or more than what connects them. As a metaphor, the lake and coves stand not just for the form of this hyperfiction, but hyperfictions generally, and yes, for life itself. ("Something")

Guyer has stated that when she encountered *Plateaus,* she recognized Deleuze and Guattari's ideas as something for which she'd long sought, and

not surprisingly her conceptions of event and resolution in narrative are illu-minated far more by their conceptions of nomadic thought than Aristotelian notions of plot. In *Quibbling,* she explains, "closure, resolution, achievement, the objects of our lives are inventions that operate somewhat like navigational devices, placemarkers if you will." Guyer's exposition of the ideas and atti-tudes that inform her fiction provides a valuable guide to her world of fluid narrative, a world of change and flux that has strong resemblances to that cre-ated by *In Memoriam,* a world in which "we go on like waves unsure of the shore, sometimes leaping backwards into the oncoming, but always moving in space-time, always finding someplace between the poles that we invent, shifting, transforming, making ourselves as we go" ("Buzz-Daze").

In discussing *Quibbling,* Guyer turns to Deleuze and Guattari's ideas of the smooth and the striated as a conceptual and fictional way of resolving problems created by the "nonexistent" sets of polarized abstractions in terms of which we lead our lives: "Female/Male, Night/Day, Death/Life, Earth/Sky, Intuitive/Rational, Individual/Communal . . . We make these things up! Deleuze and Guattari shift attention from polar oppositions to the constant transformations of one pole into the other. What's important to recognize is not the impossible duality of the poles, but what happens between them. You might say it's What We Learn, what we actually experience in space-time as we conceive ourselves, as we conceive space-time" ("Buzz-Daze").

Storyworlds and Other Forms of Hypertext Narratives

Many hypertexts, like *Quibbling* and *Ultramundane,* exem-plify what Michael Innis, head of Inscape, Inc., termed a "story-world." Storyworlds, which contain multiple narratives, de-mand active readers because they only disclose their stories in response to the reader's actions. Obviously derived from computer-based ad-venture gaming, these storyworlds, however, generally play down elements of danger or fighting monsters as a means of approaching some goal. *Uncle Buddy's Phantom Funhouse,* which John McDaid created in Hypercard, seems the first of this electronic genre whose more recent examples on CD-ROMs include Laurie Anderson and Hsien-Chien Huang's *Puppet Motel* (1996) and the Residents' *Freak Show* (1993) and *Bad Day at the Midway* (1995).

Like the extremely popular CD-ROM adventure game *Myst* (1993), these storyworlds reconfigure conflict and the role it plays in narrative and the reader's experience. All stories take the form of the conflict or the journey, and if one considers that distance serves as the antagonist in the journey narra-tive, then all stories turn out to involve various forms of conflict. The antag-onist can be a personal opponent, a force, fate, or ignorance (or cognitive

dissonance), which appear either as an internal state or as a relation between the self and environment. Whereas in both adventure narratives and adventure games the conflict requires some form of physical opposition, in the story-world that role is taken by mystery and enigma. The detective story becomes the paradigm for this electronic form—something already present in modernist and postmodern fictions such as *Absalom, Absalom!* and *Waterland.*

Like the detective, readers who find themselves within storyworlds must take an aggressive approach, even performing actions supposedly forbidden. In most narratives as in real life one learns it is considered bad form or even criminal behavior to interrogate, trespass, investigate behind the scenes. In hypertext storyworlds, one must do so or one encounters very little in the way of story or world. In both *Myst* and *Freak Show* one receives very little in the way of clues or instructions and must gradually piece together one's strategy, which involves recognizing the presence of clues and the attitude one must take toward the environment in which one comes upon them. When *Freak Show* begins, we find ourselves outside a side show tent, and using a computer mouse we move inside it and encounter a ringmaster who introduces us to what he terms "the world's most disturbing collection of human oddities"—Herman the Human Mole, Harry the Head, Jelly Jack, Wanda the Worm Woman, and so on. He pauses before the doorway or curtain that leads to each, providing a brief introduction in the manner of the carnival barker. Finding ourselves within this carefully rendered three-dimensional overview, we can pause before each of several possible choices, which also include a sampling of the Residents' music and a historical archive of freaks and deformities, listening to the barker's description. After each introduction, we can approach the relevant exhibit, thus prompting its display, or we can cut off the barker in midsentence, causing him to cry out, "Forget it!," "Okay! Okay," or a number of other expressions of irritation.

More important, this storyworld rewards readers who repeatedly disobey his irritated pronouncements that they cannot go behind the scenes. On the third attempt, readers discover that they can in fact enter a passage that takes them to the trailers inhabited by members of the sideshow. Entering each environment similarly rewards the active, intrusive, curious reader. Finding ourselves projected into the cursor (or reduced to it), we probe objects until they yield stories. Entering Herman the Human Mole's area, we find his wagon and can get a brief glimpse of him through the porthole-like window of his circus wagon. At this point, we can turn around, returning to the main tent, or nosily wander around until we find a way into his wagon. Probing this

environment successfully, we eventually find Herman in hiding and he tells us his sad tale in the form of a set of primitive cartoons in what appears to be his personal style. The narratives of Herman and the other characters, each of which take very different forms, themselves have little of hypertextuality. They are simply the rewards of the reader's aggressive curiosity.

Readers or viewers of *Freak Show* find themselves in a situation quite different from that of the reluctant wedding guest whom Coleridge's Ancient Mariner forces to hear his tale. Here the reader-listener acts as the obsessive one, forcing the story out of a reluctant narrator, one who must be convinced by intrusive actions that the reader's obsessive curiosity matches his need to tell an explanatory narrative. Storyworlds, in other words, take the active, aggressive, intrusive critic as the paradigm of the ideal reader.

In what he terms *narrative archaeology,* Jeremy Hight moves the storyworld from a CD-ROM or the Internet to the physically existing city of Los Angeles. In his *34 North 118 West* project, "participants"—his word for what elsewhere would be readers or game players—"walk the streets of a city with a G.P.S. unit attached to a lap top computer" and at numerous "hot spots" can listen to recorded fictional narratives, thus experiencing a kind of augmented reality. Whereas virtual reality (VR) immerses the user within a world of represented data, augmented reality overlays information on top of the physical world in which one lives. Examples of augmented reality include images of an airplane's navigational devices projected on the windscreen so the pilot sees information superimposed upon the world through which he flies and wiring diagrams similarly projected upon the physically existing wires and cables so an airplane mechanic can more easily and accurately assemble or repair them.

The very idea of augmented reality prompts one to observe that stories always overlay and thus augment reality. Stories, written or heard, that we usually encounter differ from Hight's narrative archeology in one crucial way: we experience the narrative as removed from our physical world, and therefore as we enter the narrative world, we imaginatively and experientially leave our own to the extent to which we immerse ourselves in the story; when we return to our physically and emotionally existing world, we may bring the emotions, attitudes, and ideas of the story back with us and thus experience our everyday world in a somewhat different way. In written and oral narrative, whatever augmentation occurs happens after we experience the entire story. Hight wants to use his augmented reality to create something radically different by making the augmentation occur in the same place and time as the

everyday physical world. He wants to create "an overlap experience in real time of experiencing two places at once."

He explains in his description of *34 North 118 West* that

> voice actors read all written narratives to create an overlap in real-time experience of two places at once. The only visual is the map that tracks one's movement and shows hot spots and the distance readings on the G.P.S. unit . . . The key is the usage of sound. Walking the city with sounds from different points in time and metaphorical relationships with what is being seen allows the author to guide a fused experience of critical analysis and creative writing.

Like David Yun's Web-based *Subway Story, 34 North 118 West* uses a map of a city as an overview that permits access to many narratives. The participant encounters the city plus a map superimposed upon it as an overview (or, in World Wide Web terms, a "sitemap"). In this narratively augmented physical world, "movement and reading," as Hight beautifully puts it, "brings a narrative of what was unseen and what has been lost in time, only for it to quiet again once passed."

One of Hight's most interesting points is that a "fictional narrative is an agitated space." Ever since Aristotle, students of narrative have understood that it involves disequilibrium and disturbance, for the antagonist, whether person, place, or thing that blocks the main character, in essence creates the story. With no obstacle there is no story. Instead of simply emphasizing the process—and hence the temporal, sequential aspect of narrative—Hight also conceives it in more spatial terms. A story, for him, is a storyworld; or perhaps one might say that narrative requires a world within which to take place. Furthermore, he points out that a "city is also an agitated space" that exists as "data and sub-text to be read in the context of ethnography, history, semiotics, architectural patterns and forms, physical form and rhythm, juxtaposition, city planning, land usage shifts and other ways of interpretation and analysis. The city patterns can be equated to the patterns within literature: repetition, sub-text shift, metaphor, cumulative resonances, emergence of layers, decay and growth." City spaces therefore provide an obvious way to reconfigure narrative, thus providing a means of experiencing the words of earlier inhabitants, including railroad workers and Latina women who worked nearby in the 1940s. Here are the fictional words, supposedly spoken in 1946, of a man who worked thirty-five years clearing the railroad tracks that ran through this space:

> Those men, along the rails, tired. Death by train we called it . . . It was my job to assist . . . to help . . . kind words . . . or help clear the tracks after the impact . . . Such

failures. My failures. Such small horrors. And it is not the most dramatic: an eye open tomato red with blood, a nose with ice covered nostril hairs that looked like a crab emerging from a shell, an ear lying by a man's feet like some dead wingless bird, a cheek punctured with teeth exposed, a wound open steaming in the snow. Those are so few, so specific, so clearly cut from men with faces I cannot help but still see. It is what never comes clear, not faces, not expressions, not the dignity of person, something that had a name. There is a sort of mutant slot machine, it comes to me at night: an odd collection, ever shifting, not bells and lemons but eyes, scars, blood, mouths, wounds, meat, an eye hanging alone gleaming wet and alien yet from some lost moment in 35 years, a nostril disconnected a failing island of memory from some dead man's face like an odd little lost cave. Those are the ones I truly failed.

Hight's narrative archeology reveals often obscured and forgotten layers of the past, thus augmenting present physical reality with lost voices. This kind of storyworld reveals an often opaque, meaningless physical cityspace to be a rich palimpsest of human meanings and experience. But, like *Myst* or *Freak Show,* his project requires the reader-listener-participant to explore a space to discover its stories; unlike these earlier storyworlds set in fictional spaces created by digital information technology, Hight demands that we traverse real, physically existing spaces augmented by this technology.

In the storyworld and noncombative adventure game, reader-viewers assume the positions of protagonist and their reward comes in the form of experience, not as a reward one might attain. Both these qualities involve or produce repetitive narrative structure as in the picaresque novel of old or much Japanese fiction, neither of which builds toward a single unique climactic movement. But this form of hypertext narrative does not so much do away with climaxes as emphasize multiple ones. We have already observed something akin to this tendency in Joyce's *afternoon* and Tennyson's *In Memoriam,* both of which achieve some sort of wholeness by formal terms. In Tennyson's case this derives from virtuoso formal closures, many of which pointedly do not coincide with intellectual or thematic ones, thereby making an individual lexia simultaneously self-sufficient and yet part of a larger whole because it demands closure elsewhere; the formal closure makes them end satisfactorily, the lack of intellectual closure joins each into a larger whole. Joyce's similar effects arise not so much from any formal closure—something harder to achieve in prose since one doesn't have what J. V. Cunningam used to called "the exclusions of a rhyme"—but from ornate, rich prose, each example of which in some sense satisfies. Thus in hypertext fiction, one needs a certain modicum of lexias that not only make sense when entered from multiple

places but also satisfy, in some way seeming (partially) complete when they end or when one departs from them.

Computer Games, Hypertext, and Narrative

As these examples of gamelike storyworlds (or storyworld-like games) show, any discussion of narrative in digital forms leads sooner or later to the increasingly important topic of computer games. These take various forms, including story-worlds (*Myst*), simulations (*Sims*), first-person shooter (*Quake*), multiplayer (*Lineage*), and god-games. Although students of computer games compare them to print and hypertext narratives, I believe that the most useful point of comparison is instead to *hypertext as a medium* and not to hypertext narrative.[13] All computer or video games have five important similarities to hypertext. First, the player's actions—clicking a mouse or manipulating a similar device, such as a joystick—determines what the player encounters next. Second, like hypertext, games rely on branching structure and decision-points. Since the places in the video game where the player acts produce potentially different results, they appear structurally identical to hypertext's branching links. If one defines the production of different results by user's choice (whether alpha-numeric texts or actions), then hypertext becomes, as Aarseth claims, a subset of ergodic text. Third, games, like hypertext fictions (but unlike print narra-tive), are meant to be performed, and fourth, they are meant to be performed multiple times. Fifth (and this may only be a trivial point of convergence), the record of a game player's actions, like the experience of reading a hypertext, appears linear since both the players of games and readers of texts make their way through a series of choices in linear time; of course, the range of possible actions, of roads not taken, themselves constitute a branching or multilinear structure but one that is not immediately available to players and readers.

Janet Murray, who draws on Aristotle's *Poetics*, makes several compelling observations about the relation of gaming and narrative, the first of which is that both share two basic structures—those of the contest and puzzle. More-over, "stories and games are like one another in their insularity from the real world, the world of verifiable events and survival-related consequences" (3). Murray unfortunately also introduces the misleading term *cyberdrama* for computer games, which Michael Mateas expands on when trying to relate them to the *Poetics*. This approach has fundamental problems. Aristotle, we recall, distinguished between narrative in which an author relates a story (the *Iliad*) and drama in which actors show us a story (*Oedipus Rex*). The immer-sive video game, in which we take part as actors, is a third, fundamentally different mode. Saying that video games are like drama seems not much

different from saying a cow is like a frog, except that, well, it's bigger, and it's a mammal, and it doesn't live in the water.

In contrast to the self-proclaimed Aristotelians, who argue that literary and cinematic studies of narrative have much to tell us about games, another group led by Espen Aarseth, Markku Eskelinen, and Raine Koskimaa argue that computer and other games require a new discipline—ludology. Aarseth, who introduced the concept of ergodic text, explains the fiercely contested battle "over the relevance of narratology for game aesthetics": "One side argues that computer games are media for telling stories while the opposing side claims that stories and games are different structures that are in effect doing opposite things" (45). "The traditional hermeneutic paradigms of text, narrative and semiotics are not well suited to the problems of a simulational hermeneutic" (54). Celia Pearce presents the ludologist's case in forceful, if measured, prose:

Because computer game theory is a relatively new discipline, much of which has emerged thus far has come from other disciplines absorbing game theory into their purview. It seems axiomatic that there must always be a phase where established media seek to "repurpose" their existing "assets" for use in the new medium. Most notably, film and literary theorists have begun to discuss game theory within their own idiosyncratic frameworks. These disciplines have much to add to the discourse on games, particularly when the discussion is centered on narrative. However, they are missing a fundamental understanding of what games are about . . . The result is a kind of theoretical imperialism. ("Towards a Game Theory of Game," in *First Person*, 143–44) [14]

In contrast, Eric Zimmerman argues, in "Narrative, Interactivity, Play, and Games," "as we observed with chess, games are in fact narrative systems. They aren't the only form that narrative can take, but every game can be considered a narrative system" (*First Person*, 160). In fact, most writers who compare games to narratives take chess as an example of a game that *cannot* be a narrative. Zimmerman, however, decides it is one, but I suspect that he confuses the experience of someone observing a game with that of the player.

Some of those who claim that stories and associated narratological theory provide the best way to understand computer games make the error of assuming that if a game includes any sort of a story, then narrative is a defining characteristic of games. There are, however, plenty of precedents for essentially non-narrative forms that include narrative. Victorian writers of nonfiction, such as Thomas Carlyle, John Ruskin, and Henry David Thoreau, all employ narratives, created characters, and dialogue within argumentative

prose.[15] Markku Eskelinen, the most aggressively outspoken of the ludologists, therefore makes the crucial point in "Towards Computer Game Studies" that "a story, a backstory or a plot is not enough. A sequence of events enacted constitutes a drama, a sequence of events taking place a performance, a sequence of events recounted a narrative, and perhaps a sequence of events produced by manipulating equipment and following formal rules constitutes a game" (*First Person*, 37). Distinguishing between games and narratives, Eskelinen further explains that "in games, the dominant temporal relation is the one between user time and event time and not the narrative one between story time and discourse time" (37).

Even those theorists who insist that games are a form of narrative recognize that games and stories have major differences. "A story," Janet Murray explains, "has greater emphasis on plot; a game has greater emphasis on the actions of the player" ("From Game-Story to Cyberdrama," in *First Person*, 9). Furthermore, as Eskelinen points out, "information is distributed and regulated very differently in games than in narratives" (39). Pearce points to a third difference, namely, that "games tend to favor abstracted personas over 'developed' characters with clear personalities and motivations" (146). Despite the many disagreements between the two groups, they all accept two of Murray's major points—that agency is crucial to computer games and narrative has at least *something* to do with them.[16]

Aarseth, the founding father of studies of nonliterary digital textuality, makes what seems to me to be the crucial point that computer games characteristically involve simulation:

The computer game is the art of simulation. A subgenre of simulation, in other words. Strategy games are sometimes misleadingly called "simulation games," but all computer games include simulation. Indeed, it is the dynamic aspect of the game that creates a consistent gameworld. Simulation is the hermeneutic Other of narratives; the alternative mode of discourse, bottom up and emergent where stories are top-down and preplanned. In simulations, knowledge and experience is created by the player's actions and strategies, rather than recreated by a writer or moviemaker. ("Genre Trouble" in *First Person*, 52)

Aarseth's emphasis on simulation as a key element in games appears supported by an early nonludic hypermedia simulation project I saw demonstrated in 1988. To train trauma surgeons for conditions in military field hospitals, a group from the Uniformed Services University of the Health Sciences developed powerful scenarios, using a computer and video disc (Henderson). Video discs were then the latest thing, and although now generally obsolete,

they provided valuable lessons directly applicable to the use of computer animation and video. In this training system, a surgeon would sit before a computer that was attached to a television and a video disc player and encounter the following scenario. A session begins when the surgeon, who has been assigned to a field hospital, arrives suitcase in hand, goes to the hospital tent to present himself to the officer in charge, expecting a warm greeting as a new member of a team. Inside the tent, as he greets his commanding officer, who is in surgical garb, he hears the sound of approaching helicopters. His superior, all business, orders him to drop his bags and get to work, since the short-handed unit needs him to begin immediately. In the scenario I saw, two medics bearing a wounded soldier on a stretcher appear, telling him that the patient who has no apparent wound and whom triage had therefore classified as not requiring immediate treatment has stopped breathing. They ask him what to do. At this point a clock appears at upper screen right, and its second hand begins to move. If the role-playing trainee makes a mistake and orders an x-ray, the corpsmen respond angrily that there's no time for that and the patient will die.[17] The clock keeps moving—the physician has a fixed limit, say, 120 seconds before his patient dies. If the trainee finds the right solution in time—the patient has a collapsed lung caused by a barely discernible wound—the patient lives. At this point the surgeon in charge, the trainee's new commanding officer, appears and, depending on his actions, praises him, welcoming him to the unit, responds rather more coldly, or, if the patient has died, bawls him out, ordering him to improve his skills.

Viewing this project demonstrated several points of value to anyone considering the relation of narrative, simulation, and games. First, the simulation did not have to achieve anything like a complete reality-effect to immerse the user (and onlookers) in the situation. Although the acting and production values were not of the highest quality, these lacks did not reduce the tremendous emotional effect of the simulation exercise. As part of the project, the researchers filmed physicians using the system and recorded their blood pressure before and during each session; their pressure shot up, they perspired, and in other ways they acted as if they were confronting an actual medical emergency. The fundamental connection of the scenario to the user's profession and self-image as a professional immediately produced a reality effect, a fact that reminds us the amount of authentic detail unconnected to the main enterprise—here making a correct diagnosis and saving the patient's life— plays only a minor role in the effectiveness of the simulation.

A second point: although this simulation has important narrative elements, they obviously play only a secondary role, setting the stage for the

defining feature of the simulation, the surgeon's *choices*. Finally, this simulation takes the form of a game, although the player's professional investment in the outcome produces an earnestness only occasionally associated with game play.

In conclusion, although computer games have something to tell us of relevance to digital text and art, virtual reality, and educational simulations, they do not seem closely enough related to hypertext to tell us much about it. Video games have received their own field of study, and it is from this new discipline that we can expect insights about how they work and their social and political implications.

Digitizing the Movies: Interactive versus Multiplied Cinema

Although computers have affected cinema as dramatically as they have affected verbal text, at one crucial point—the relation of each medium to its audience—hypermedia and cinema appear fundamentally opposed. Since hypertext requires reader choice, it therefore fundamentally conceives of its audience, unlike that for cinema, as an audience of one. This statement of course presupposes that by "cinema" we want or expect it to remain a form intended for group audiences. Cinema, however, might divide into two forms, one remaining essentially identical to that now enjoyed in theaters, and another intended for single viewers. Given the financial success of both single-player computer games and DVD versions of films first shown in theaters, one very well could find a large audience for this second kind of virtual cinema.

Even if we compare traditional theatrical cinema to hypertext, it reveals important points of convergence. First of all, computer technology has so changed the ways we compose, edit, and even conceive of filmmaking that we can now accurately speak of digital (or virtual) cinema in the same way that we speak of digital writing and digital textuality. Computers have affected cinema in at least four ways, the first of which involves the near-universal use of digital technologies to edit footage produced by nondigital cinematic technology; this first form also includes the increasingly popular use of digital, rather than analogue, cameras to shoot film footage. The second effect of digital technology on cinema involves using computer-manipulated images. Such digitally created imagery ranges from manipulating individual frames to creating substantial sequences or even entire films with computer animation. Working on individual frames, for example, graphic artists employ software like Photoshop to remove visual evidence of the safety wires that permit actors to perform dangerous or otherwise impossible actions. These specially edited sections are then combined with nondigitally produced footage. Safety, con-

venience, and relative ease of manipulation often lead to employing computer animation for elaborate special effects, including flying over or zooming into cityscapes. These two contributions of computing to cinema have already had major economic effects on both Hollywood and independent filmmaking.

The two other ways computers have affected filmmaking bear more directly on its relation to digital and hypertext narrative, since they include two essentially new forms of digital cinema. The first, hypertext cinema—cinema closely analogous to hypertext narrative—theoretically permits the audience to choose narrative direction at key points in the story. Both the trauma surgery simulation and Janet Murray's MIT French language-teaching project, which exemplify this particular mode of virtual cinema, exemplify educational hypermedia that closely resembles computer-based adventure games. In Kristoffer Gansing's study of what he calls "the 'imaginary' genre of interactive film" (51), he claims that adventure games hold "a position as the *mainstream* of interactive cinema" (54), though he is more interested in the possibilities revealed by various forms of CD-ROM art films and net-based cinema. Gansing describes the "mini-genre . . . already made up of 'database narratives' which utilizes associative interaction with audio and video sequences—often collected from linear films. The user deconstructs and constructs his/her own version from a given set of materials that is called upon through experimental interfaces sometimes combined with elements of randomization" (55).

Like hypertext cinema, the second branch of digital filmmaking, which I term *randomized* or *multiple cinema,* also conceives of the film as essentially divided into a significant number of discrete sections. Unlike the hypermedia form, however, either the filmmaker or a computer program decides the order in which the audience views the segments. Since I have not seen Gansing's examples, I'll discuss instead Ian Flitman's *Hackney Girl* (2003) and that part of Diego Bonilla's *A Space of Time* that he calls *Stream of Consciousness* (2004). *Hackney Girl* (Figure 29), an example of net cinema, presents a varying number of randomized sections of film, presenting them in a different sequence each time viewed; I encountered between 139 and 143 sections, and the full viewing time also varied but remained somewhere around fifteen minutes. The viewer first encounters a large black screen on which appears a collage of as many as seven small windows, only one of which contains video. Some of these windows are monochrome, others color. Every version I saw fairly quickly made clear that London, departing airplanes, a young Englishman, his Turkish wife or girlfriend, and her cat would be the main subjects. The first version I encountered told a tale of the young woman's arrangements to leave London for Istanbul. Another began with scenes of London

Figure 29. Multiple Cinema Online: Ian Flitman's *Hackney Girl*. In this screenshot five thematically related images appear in the Web browser while another loads at the lower right. Only one image at a time activates as video, and as soon as one video segment ends, the number and arrangement of panels change. (Courtesy of Ian Flitman.)

life and then moved to many images of the couple's cat, a third began with the young woman walking down Chatsworth Road, London E5, going into a café, returning home, and discussing her cat's reaction to her departure while her young man, who remains offscreen, tells her about Freud's theory of the Oedipus complex, after which a series of scenes in a pub appeared. Later, in one window the young woman touches up her lipstick before Hagia Sophia in Instanbul while others show the building alone, people putting their shoes on apparently after visiting it, shoes awaiting their owners, and a juxtaposed scene in the couple's London flat. Next followed scenes in Istanbul, and it ended with a screen containing four images of the young woman plus a street scene in Turkey. After seeing one version, I already knew the main characters

and settings in others. Nonetheless, I'm not sure that differing versions suggest the same chronological endpoint, since I thought in one that the young woman traveled alone and in another she was with her companion. According to Flitman's directions, viewers can change windows by hitting a key combination, but I seemed unable to activate specific windows of my choice. In this example the element of randomization proved far more important than any viewer intervention. I found *Hackney Girl* visually very interesting, even though I never encountered the usual kind of narrative in which a character overcomes an antagonist and reaches a goal, and despite the fact that certain events, such as packing, playing with the cat, and arriving in Instanbul occur repeatedly, they form more of a mosaic narrative than an orthodox one. Like *afternoon* and other enigmatic hypertexts, *Hackney Girl* demonstrates that readers or viewers can construct a coherent narrative from small chunks that they encounter in varying orders.

Diego Bonilla's *A Space of Time* (Figure 30) which comes on a CD-ROM, contains two forms of digital cinema constructed out of some of the same materials. *Stream of Consciousness*, like *Hackney Girl*, takes the form of randomized or what I would prefer to call multiplied cinema, and a viewing occupies between forty minutes and two hours. *Limbo*, the second part of *A Space of Time*, exemplifies a form of interactive cinema that has much in common with an adventure game centered on exploration rather than combat. Using Quicktime VR, Bonilla has created what he describes as "a virtual tour of a century-old building as a narrative device to tell the story." The viewer enters and explores a large, multistoried empty building, using the features of Quicktime VR to obtain 360-degree views of each of its parts. Moving one's mouse, the viewer finds hot spots that when clicked on move one forward, so one can climb stairs and explore each room. This portion of *Limbo*, therefore, provides an example of virtual reality hypertext. The user's mode of movement through its spaces feels very much like that used in *Myst* and *Riven*, the main difference between them being that Bonilla's work employs digital photography rather than computer graphics.

Limbo begins with three brief videos intended to set the scene, after which the viewer can explore the building. The most interesting part of *Limbo* appears in the way it branches to filmic segments taken from *Stream of Consciousness*: clicking on a photograph of a young woman on a wall produces a home movie of a young child, presumably the girl in the photograph. Entering a room on the first floor, one discovers half a dozen television monitors floating in midair; clicking on any one of them activates a video of an older woman, apparently a real estate agent, talking about the history of the building.

Figure 30. Integrating Virtual Reality and Video. In Diego Bonilla's *Limbo* section of *A Space in Time*, the viewer moves through a Quicktime VR environment, climbing stairs, moving through corridors, and entering various rooms, always able to rotate 360 degrees. Upon entering one of the large rooms in the empty building, the viewer encounters one or more floating figures, each of which functions as a link that activates segments of video taken from the project's second part, *Stream of Consciousness*. (Courtesy of Diego Bonilla.)

Similarly, upon entering certain rooms on the upper floors, the viewer sees one or more people floating in the air (Figure 30); clicking on them either launches videos or animated poetry supposedly written by Pandora (or Panda). Many of the videos present young people who have spent the night in the building at other times and places. In one group of these videos Panda and friends confront a local talk show host and attack the way advertising damages culture. In another, a young woman rants—Pandora's word—about the existence of websites offering beautiful Russian brides to ugly American (and other) men. Yet others depict the police interviewing a homeless man while sitting in a diner. Throughout, as the CD cover explains, Panda and her friends "attack the most wicked result of Capitalism. In addition to her criticism of advertising, Panda, her friends and colleagues express their contempt for the blind use of technology, the commercialization of love and sentiment, current fanatical faith in science, and ever-increasing speed of so-called 'pro-

gress.'" The dialogue, as one can gather from Bonilla's description, is very heavy handed, making these prosperous young people sometimes sound like seventy-five-year-olds. Some of the acting is also not very good, but the major problem with this nonetheless fascinating project is that the rants remain just that—passionate harangues—and that they seem to have no connection to the figures flying in the otherwise empty rooms. I found exploring the spaces of *Limbo* enjoyable and think the clickable floating fantastic figures a delightful conceit.

Bonilla's two experiments in digital cinema conceive their relation to their audience very differently. Whereas hypercinema like *Limbo* makes the single, isolated active reader its model audience, multiplied cinema like *Stream of Consciousness* is intended for a more conventional, essentially passive, group audience. Since a hypertextualized cinema treats passages of cinema like lexias in verbal hypertext, linking them with or without branching, it places major emphasis on audience choice, but it's difficult to imagine audiences composed of more than one or two people being able to make such choices. Murray's French language project, in which the student chooses key narrative arcs, obviously was intended for a single student in a language laboratory. The second form of digital cinema avoids this issue altogether, by emphasizing, not viewer choice and control, but narrative richness since it defines itself by creating multiple permutations of a limited set of bits of time-bound cinema.

One approach to such a single-person hypercinema appears in the *Hyper-Cafe* interactive video project created by Nitin Sawhney, David Balcom, and Ian Smith at the Georgia Institute of Technology (Figure 31). Their combination of digital video and hypertext, the authors explain, "places the user in a virtual cafe, composed primarily of digital video clips of actors involved in fictional conversations . . . You enter the Cafe, and the voices surround you. Pick a table, make a choice, follow the voices. You're over their shoulders looking in, listening to what they say—you have to choose, or the story will go on without you" (1). This experiment in multiple narrative was created in part to explore and extend the rhetoric of hypermedia. In particular, Sawhney, Balcom, and Smith successfully devise a means of permitting choice—and hence branching—in so fundamentally linear an information technology as video.

Some work in interactive video concentrates on creating branching within (or from) a narrative line, often by enabling the user to switch from the position of one character to another. In Greg Roach's *The Wrong Side of Town* (1996), for example, a woman on a business trip—the exposition is provided by a telephone call to her husband at home—goes to a diner for supper, encounters a beggar, orders her meal, and leaves. The viewer can experience

Figure 31. *HyperCafe*'s Overview Screen. This project employs an overview suited to its interactive materials, effectively mediating between the linear drive of video and the reader's desire for control. Although viewers cannot halt the videos, as they can in *Kon-Tiki Interactive*, they can choose among them. (Used by permission of the authors.)

the encounter with the beggar from the vantage point of either person, and once the protagonist enters the diner, one can experience her interaction with a waiter and waitress from each of their positions as well as from hers. The creators of *The Wrong Side of Town* use this opportunity in a clever, if heavy-handed, way to produce a Rashomon-like divergence of events coded according to class and gender positions.

Bad Day at the Midway, an interactive CD-ROM created by some members of the team that produced *Freak Show*, takes the ability to exchange positions

even farther by employing it as a means of switching not just vantage points but entire lines of narrative. Although a storyworld rather than a full hyper-video, it exmplifies a work in which the areas one can explore, the facts one discovers, and the dangers that threaten one all depend on one's characters. Thus, although the little boy "Bobby" cannot gain access to certain dangerous heights, he also seems safe from the predations of a homicidal maniac who inhabits the midway. In contrast, each of the adults has the capacity to make more discoveries than does Bobby, but each also exists in greater danger as well.

"The time-based, scenario-oriented hypermedia" (2) of *HyperCafe* takes a different approach, for rather than finding oneself within a narrative where one discovers choices, one begins by encountering a field of competing narratives—essentially a video version of the situation one has in certain static hyperfictions, such as *Adam's Bookstore*, in which one begins by choosing a lexia as one's starting point (Figure 32). As Sawhney, Balcom, and Smith explain: "In *HyperCafe*, the video sequences play out continuously, and at no point can they be stopped by actions of the user. The user simply navigates through the flow of the video and links presented . . .The camera moves to reveal each table (3 in all), allowing the user 5–10 seconds to select any conversation. The video of the cafe overview scene plays continuously, forwards and then backwards, until the user selects a table" (2). Once viewers make a choice, they enter a particular scene, which then offers particular narrative lines.

The designers of the HyperVideo environment in which *HyperCafe* exists created three forms of linking—the temporal form we have already observed, what they term "spatial link opportunities," and a third kind, interpretive textual links. Viewers learn about the presence of spatial links by means of three "potential interface modes: flashing rectangular frames within the video, changes in the cursor, and/or possible playback of an audio-only preview of the destination video" (4). Finally, viewers learn about the choices they can make from text that scrolls across the screen, and these texts can take the form of random bits of dialogue or scripts for particular scenes. "Text intrudes on the video sequences, to offer commentary, to replace or even displace the videotext. Words spoken by the participants are subverted and rewritten by words on the screen, giving way to tensions between word and image" (4). Building upon the research of workers at MIT and the Universities of Amsterdam and Oslo, *HyperCafe* demands active, intrusive reader-viewers who build narratives by following links. The result, as the authors make clear, is that individual lexias participate in various story lines, or, as they put it, "narrative sequences may 'share' scenes" (5), and for this reason they specifically compare the kind of narrative found in *HyperCafe* to that of Joyce's *afternoon*.

The figure contains overlapping window text:

Window 1:
Simply stated, the woman was old, black, and blind. And dusty. She had long grey-streaked hair which hung over her shoulders...

Window 2 (mystery):
I ducked around a few of the shelves, straining my neck to gaze at the top rows of books ...

Window 3 (confusion):
"120 pages" read the first label, and the one on the second shelf was even more bizarre, reading "Printed in Phila." I looked back towards the room at the rear of the store, hoping for a hint to this crazy system, when it came to me that, despite my usual affinity for easy order, this method of categorizing a bookstore, without regard for author or content, might just be the best way. For the second time that day I smiled.

Figure 32. The Structure of Networked Hypertext. In creating a narrative that the reader can enter and leave at any point, Adam Wenger took advantage of the graphic capacities of Storyspace to arrange the individual lexias of *Adam's Bookstore* in the form of a circle or large polygon. (For the sake of legibility, I have increased the font size in three of the lexias in relation to the Storyspace view; in the original, one can easily read the titles of all the lexia icons.) (Used by permission of the author.)

Film theory does not have much in common with hypertext theory, but the one point at which writings on cinema converge with hypertext theory concerns the viewer's encounter with dramatic changes of direction after a cut. Ever since Sergei Eisenstein, film theorists have discussed the effect of changing scenes—the cinematic equivalent to arriving at a new hypertext lexia. At first glance, Eisenstein's writings on film would not seem to provide a very promising place to begin, since it is Eisenstein, after all, who complains that contemporary filmmakers have seemingly "forgotten . . . that role set itself by every work of art, *the need for connected and sequential exposition of the theme, the material, the plot, the action,* the movement within the film sequence and within the drama as a whole . . . The simple matter of telling *a connected story* has been lost in the works of some outstanding film masters"

(3). Taken out of context, Eisenstein sounds like twenty-first-century skeptical critics of hypernarrative, who claim readers and viewers cannot follow abrupt changes of direction. Nonetheless, despite this apparent insistence on linearity, Eisenstein's more fundamental emphasis that fragments form an assemblage that makes sense to the audience (and not only in montage) shows us someone who recognizes that segmentation, discontinuity, and gaps do not destroy narrative but are crucial to it. First of all, he recognizes that the universal human "tendency to bring together into a unity two or more independent objects or qualities is very strong" (5). This tendency appears in what Eisenstein calls "the basic fact" that "the juxtaposition of two separate shots by splicing them together resembles not so much a simple sum of one shot plus another shot—as it does a *creation*" (7). In fact this human need for order underlies "perception *through aggregation*" (16).

This pioneer of cinema shares a second point with writers on hypertext, for he claims, though not very convincingly, that requiring spectators to construct order and meaning out of fragments provided by the filmmaker empowers them: "the spectator," Eisenstein claims, "is drawn into the creative act in which his individuality is not subordinated to the author's individuality, but is opened up throughout the process of fusion with the author's intention, just as the individuality of a great actor is fused with the individuality of a great playwright in the creation of a classic scenic image" (33). Moreover, he not only asserts that this discontinuous form produces audience creativity; he also sees the audience in some sense as performing the text. According to him, "it is precisely the *montage* principle, as distinguished from that of *representation*, which obliges spectators themselves to *create*" (35). Obviously, a theorist and practitioner who asserts that "modern esthetics is built upon the disunion of elements" (95) anticipates some of the ideas found in hypertext theory. Like hypertext theorists, he assumes that when the audience encounters fragments and discontinuity, it will nonetheless manage to perceive (or construct) order, coherence, and continuity. Again, like hypertext theorists, he also claims that a constructivist art form shares some of the author's creativity and power—though, to be sure, his claim appears little more than that of theologians and New Critics, who asserted that enigma, which exercises the mind, provides a means of forcefully conveying one's points to the reader.

A more useful point at which film and hypertext theorists have something in common appears in what Christian Metz terms the "syntagma" of film. As Clara Mancini has argued, Metz's classification and analysis of syntagma (including parallel, brace, alternative, descriptive, episodes, linear, and

so on) does prove useful because these categories directly involve how audiences of both media find coherence upon encountering the filmic or alphanumeric text—in other words, Metz and Lancini describe what I have elsewhere termed the *rhetoric of arrival*. Metz and other film theorists, like those concerned with the rhetoric of hypermedia, propose techniques that convince the audience that a newly encountered segment of a larger work is coherent—that is, that it has a comprehensible relation to something that the audience previously encountered. In this one sense, both forms of virtual cinema have much of importance to offer hypertext and hypermedia. Only single-person hypercinema, however, has close parallels with hypertext.

Is Hypertext Fiction Possible?

Is hypertext fiction—narrative composed and read within a hypertext environment that encourages branching story lines—possible? Some years back the *New York Times* printed a novelist's assertion that, contra what Bob Coover said, no one would *ever* write a hypertext novel. Admittedly, this statement appeared pretty silly on the face of it since at the time she wrote hundreds of examples of hypertext fiction had already been written and some famous ones had seen publication. Nonetheless, as one looks at the literature created in hypermedia that has appeared since then one wonders if perhaps that print-limited novelist might have unknowingly hit upon something important. One finds large numbers of digital poems in the form of animated text, hyperpoetry, and a combination of the two. Where amid all the digital literature that resides on the Web and within other hypertext environments offline is what Robert Coover has taught us to call hyperfiction?

No one doubts that digital literature, digital art, and fusions of the two flourish, and perhaps we are at the threshold of a new Lucasian age of literature. Georg Lukacs's *Theory of the Novel* (1923) proposed that each age has its own chief narrative form. Thus the classical ages had the epic, the medieval (or Christian) ages the chivalric romance, and the modern age the novel. Reinterpreting Lucas in terms of ages of information technology, we see that oral civilizations produce the epic, scribal culture the romance, and print culture the novel. What will be the major narrative form of digital information technology, if any? Or, put another way, will the major form be hyperfiction—or something else, perhaps poetry? I believe it's obviously too soon to make any sure predictions. One can, however, make a few observations, the first of which is that the first decades of digital literature consist largely of movemented or moving text, hyperpoetry, and fusions of word and image. The expected explosion of hyperfiction does yet not seem to have taken place and,

moreover, much hypertext fiction, including some of the best, exhibits a minimum hypertextuality. As the examples of two well-regarded works—Shelley Jackson's *Patchwork Girl* and Caitlin Fisher's *Waves of Girls*—reveals, much of the limited hypertextuality in these and similar works takes the form of an organizational superstructure, a top-level branching structure that leads to multiple, relatively isolated linear narratives. Looking back at the brief history of hyperfiction, one is surprised to note how few works have accepted the challenge of Michael Joyce's *afternoon* to create branching story lines. Joyce's linking produces what we may term *branching narrators,* and one would expect that more writers would have tried varieties in chronology, setting, character, and so on. Of course, an advocate of the view that hypermedia is chiefly a poetic form can point to the other part of *afternoon* in which links produce a poemlike collage of texts from Creeley and Basho. Even one of the most successful pioneers of hypertext with multiple narrative lines moves in the direction of poetry when he begins to explore the medium.

One can hazard a few explanations for the turns that digi-lit has taken. One possible explanation would lie in the simple fact that it's too soon to take stock of this new literary form. If it took a hundred years to invent the title page and other distinguishing features of the print codex, such as pagination and the alphabetized index, at this moment we might find ourselves too early in the learning curve for any assessments. Another related possibility is that writers are immersing themselves in various capacities of digital text— including blending of word and image, animating words, and exploring the ludic or the gamelike possibilities—because they delight in the new possibilities of text. Again, this could just be a stage in the development of a new literary form. A third explanation might center on the claim that human beings in all times and cultures, including our own, depend on linear narrative. "We tell ourselves stories," Joan Didion points out, "in order to live." Perhaps linear narrative has too much human importance to abandon.

A final possibility: hypertext as a creative medium is not fundamentally a narrative form; hypertext, this argument goes, is an information technology unsuited to telling stories—just as orality, so McLuhan argued in *The Gutenberg Galaxy,* makes precise logical argumentation unlikely because it cannot be remembered and repeated. William Ivins similarly pointed out many decades ago that a scribal culture, which has no means of accurately reproducing and hence communicating color and form, does not permit the development of many forms of modern science, such as zoology and botany. What, then, would be the message of hypertext as medium? What features of text does it privilege and thereby make likely? Since the link characterizes

hypertext, and links are reified associations, a poetic mode or form seems especially suited to hypertext. Looking at a range of digital works, we see that much hyperfiction actually takes the form of hyperpoetry.

Coover himself has expressed the idea that hypertext might turn out to be more a poetic than a narrative form, and many of the webs at which we have already looked, particularly those by Guyer and Joyce, suggest that such might be the case. They reveal, as Jean Clement has argued, "a shift from narration to poetry in fiction hypertexts." According to Clement, "hypertexts produce— at the level of narrative syntax—the same 'upheaval' as poems produce at the level of phrastic syntax." In other words, the way links reconfigure narrative leads to a defamiliarization that parallels the effects of characteristically poetic departures from word order, common usage, and the like. Clement contin- ues: "Hypertexts free narrative sequences from their subjection to the syntax of conventional narration to insert them into the multidimension[al] space of a totally new and open structure, as poems free words from their linkage to the straightness of the syntagmatic axis to put them in a network of thematic, phonetic, metaphoric (and so on) connections which create a multi-isotopic configuration" (71). The explanation may be even simpler: the link, the ele- ment that hypertext adds to writing, bridges gaps between text, bits of text, and thereby produces effects similar to analogy, metaphor, and other forms of thought, other figures, that we take to define poetry and poetic thought.

Yet another ground for believing that hypertext might privilege poetry, particularly its lyric forms, appears in Jerome J. McGann's argument that "the object of poetry is to display the textual condition. Poetry is language that calls attention to itself, that takes its own textual activities as its ground sub- ject." He emphasizes that such a claim does not assume "poetic texts lack polemical, moral, or ideological materials and functions. The practice of lan- guage takes place within those domains. But poetical texts operate to display their own practices, to put them forward as the subject of attention" (*Textual Condition*, 10–11), or, as McGann explains later, "The object of the poetical text is to thicken the medium as much as possible—literally, to put the resources of the medium on full display, to exhibit the processes of self-reflection and self-generation which texts set in motion, which they *are*" (14). McGann refers to the bibliographical and linguistic resources of written and printed language, but hypertext adds a new element—the link—to the mix. Since the link and various associated functions, such as lists of destination lexias, serve as the defining resources of hypertext, one expects to find them fore- grounded in literary webs, and such is in fact the case. Of course, at this point

in the development of this new medium, one cannot tell whether the sheer novelty of the medium motivates foregrounding these writing resources, and later hyperwriters will not do so, though I must admit that I find it difficult imagining literary hypertext that does not in this poetic manner make the most of its unique features.

Certainly, as we have already seen, poetry appears throughout the docuverse, often in unexpected places. That is, we encounter poetry not only in the form of scholarly hypertext editions, such as Peter Robinson's Chaucer project, or in translations into the hypertextual, such as Espen Aarseth's Hyper-Card version of Raymond Queneau's *Cent Mille Milliards de Poèmes* or Jon Lanestedt's and my *In Memoriam Web*. It also appears brushing up against other forms and modes, sometimes merely as a defining allusion within the midst of a prose fiction (*afternoon* and Joshua Rappaport's *Hero's Face*) and other times as part of a prose mystory (Taro Ikai's *Electronic Zen*). Karen Lee's *Lexical Lattice* demonstrates that poetry comes braided together with theory and literary history. Poetry also shows up in the most unexpected places within hypertext webs, none more so than in Stuart Moulthrop's *Victory Garden*, where at least one of his link menus forms a sonnet!

You will have noticed, I suspect, that more of the examples of both digital text and hypermedia textuality and rhetoric summoned in earlier chapters came from poetry than from fiction. The dozens of poems on the Brazilian and Spanish CD-ROMs show poets themselves exploring the possibilities of both animated text and hypermedia. Almost all the works on the New River website take the form of hyperpoetry: David Herrstrom's "City of Angels and Anguish" and "To Find the White Cat," Stephanie Strickland's *Vniverse*, Christie Sanford's "Light-Water: A Mosaic," and Robert Kendall's "A Study in Conveyance." Similarly, much of the Eastgate offering is hyperpoetry, including works in Storyspace (Ed Falco's *Sea Island*, Richard Gess's *Mahasukha Halo*, Kathryn Kramer's *In Small and Large Pieces*, and Kathy Mac's *Unnatural Habitats*) and those in other environments (Jim Rosenberg's *Intergrams*, Robert Kendall's *A Life Set for Two*, and Judy Malloy and Cathy Marshall's *Forward Anywhere: Notes on an Exchange between Intersecting Lives*). The enormous amount of hyperpoetry in the Electronic Literature Directory—twenty-nine screens of around ten poems each—suggests the amount of it being written in hypertext.

Hypertext poets have created their work in a wide variety of software environments, although HTML and Flash have recently become the most popular. A number of them have used Storyspace, but William Dickey, one of the first (possibly the very first) hypertext poets, used HyperCard, some poets in France
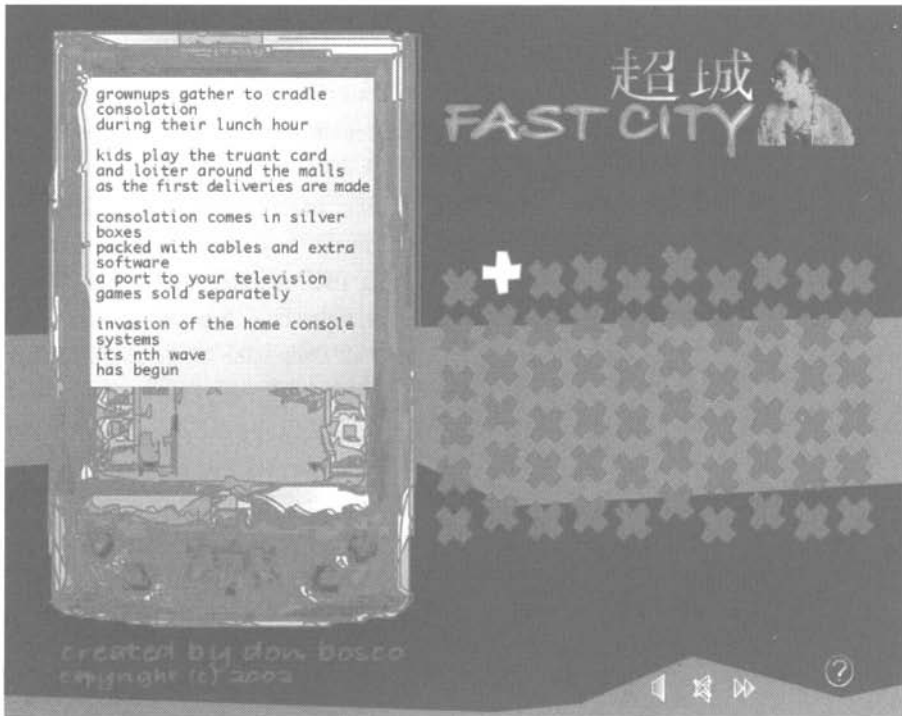
Figure 33. A Spatial Hypertext that Readers Perform: Don Bosco's *Fast City*. (Courtesy of Eastgate Systems.)

have used the help system for Windows, and Robert Kendall and Ian M. Lyons write in Visual Basic. Many of those working in new media, as I suggested above, tend to produce genres that seem more like poetry than narrative.

Take, for example, *Fast City*, Don Bosco's witty, combinatorial mosaic portrait of modern urban life, which he composed in Flash (Figure 33). *Fast City* appears in the online journal *Tekka*, and to read it the user downloads either the Windows or Macintosh version, double clicks on its pink and gray icon, and watches the opening animation. First, to the sound of a drumbeat and sounds of urban dissonance, giant Chinese characters and then the words "Fast City," which I assume refers to Singapore, overwhelm a black and gray background, shrinking in size and settling at upper-screen right, next to the image of a woman. Then the image of a blue PDA appears on the left and increases in size until it occupies a little less than half of the screen, after which six rows of ten "X's" snap into place accompanied by sound. Bosco's mosaic of modern urban lives takes the form of sixty lexias whose texts appear on the screen of the PDA. One can "play" the PDA, creating an assem-

blage of texts, and one can also create one's own dub music by manipulating the buttons. Mousing over each of the sixty X's at the right of the PDA produces a snippet of urban sound—barking dogs, sirens, for example—and brings up an associated text, each a mini-portrait of life in the *Fast City*—the out-of-work surveillance expert looking at the classifieds, urbanites assembling a home entertainment center, kids playing video games, rush hour traffic jams, dance-clubbers immersing themselves in the bangbangbang of "guitaristic assaults," the fashion model on the runway, and the soldier back for R&R: lives and deaths, all permeated by modern media:

the news channel is attractive
for adults going nowhere fast
playing out international
economics
with all the fury of mtv
creating fantastic paradigms
of market behaviour
businesscasters in their
powersuits
mouthing miraculous updates
every minute, second, split
second
inside of a nano-second.

As a Singaporean author and an inhabitant of the world's most globalized (and technologized) nation-state, Bosco effortlessly moves between Asian, American, and European scenes. As he writes, "Each simple lexia" is "a potent meme engine inserting its own unique values . . . into the flow of everyday media." Since the reader can see only one text at a time, the succession of them as one explores each X-shaped button forms more of a montage than a collage: the lexias appear sequentially rather than across the screen, and the method here is associative rather than narrative. After mousing over the various buttons for a while, readers begin to remember the texts and sounds that some of them produce, and then they can return to their favorites or construct some sort of order. Like a musician sight-reading a score, instrument in hand, the reader becomes a performer.

Gray Matters, a three-dimensional hyperpoem created in Pad ++ by a team at the NYU Media Lab, uses "15 images from *Gray's Anatomy* [to] form a patchwork body. Embedded within each image are a text from Henry Gray, Kirstin Kantner, Chris Spain, and Noah Wardrip-Fruin" (*Gray Matters* site).

Figure 34. Text in a Virtual Reality Environment: *Screen* by Noah Wardrip-Fruin, Andrew McClain, Shawn Greenlee, Robert Coover, and Josh Carroll. This photograph of a session in the Brown University Cave environment shows a reader after the text has begun to cascade off the walls. In the original photograph the letters appear in light blue and green while the heap directly in front of the reader is white. (Used by permission of Noah Wardrip-Fruin.)

Using a mouse the reader flies into images of body parts taken from the famous anatomy book, and as one approaches more closely, texts appear.

The illusion of immersing oneself in the poem leads to Wardrip-Fruin's later projects in the Virtual Reality Cave at Brown University, where he worked with Andrew McClain, Shawn Greenlee, Robert Coover, and Josh Carroll to create poetry in a more complete immersive environment.[18] In their *Screen*, the reader-viewer (immersee?) dons headtracker goggles and a VR glove, which allows the system to track her position and movement, and then enters the three-sided space whose white walls three projectors cover with text rather than images or, rather, with texts *as* images (Figure 34). As the introduction to the *Iowa Review* Web interview points out, "This experience in virtual reality is very different from the Holodeck vision of total immersion in a

make-believe world. Screen does not attempt to replicate a real-world environment, but instead immerses the user in a reflexive literary representation, one in which words and narrative remain predominant." The reader experiences the text as existing in three dimensions rather than on a flat surface. As the piece begins, a voice—a second "reader"—begins to read: "In a world of illusions, we hold ourselves in place by memories." The texts hovering in space on three sides variously relate the memories of a man and a woman who feel them weaken, fade, vanish.

She uncurls her arm,
reaches back to lay her hand across
his thigh, to welcome him home,
but touches only a ridge of sheet,
sun warmed, empty.

After the voice has finished reading, the words, first on one wall then another, begin to fall. Using the VR glove, the reader can at first grab the words and replace them, but if more than one word is falling, words that she catches do not return to their original position, so despite her best efforts, text becomes corrupted. Then, as the words begin to cascade ever more quickly off the walls, she moves even faster but misses more and more of them until finally, realizing that she cannot stay time, she stops moving her hand and stands motionless. *Screen* thus includes text, movement, sound, and the reader's own actions, which in one sense are ultimately useless and in another absolutely necessary to read the poem successfully. I do not know if we can legitimately term *Screen*, which includes elements of narrative, lyric, animation, interactivity, and immersive VR, hypertext, though it does show the poetic possibilities of New Media.

In conclusion, as the example of *afternoon* and *Waves of Girls* demonstrates, hypertext fiction that compels the interest of readers is clearly possible. We also find a number of examples of fiction in hypermedia environments, like *Patchwork Girl*, that has a little hypertext branching in the main narratives and uses hypertext chiefly to create a contents page. Spatial hypertext has also played a role in hyperfictions, such as *Adam's Bookstore, Patchwork Girl*, and *Quibbling*. It has also been used to generate combinatorial fiction like Tom McHarg's just as it has been used in combinatorial poetry like Aarseth's translation of Queneau. Although I suspect that poetry will probably dominate hypermedia, hypertext fiction still seems to have great promise. If, as Didion says, we need stories to live, authors will always find themselves tempted to tell stories in any and all media.

7
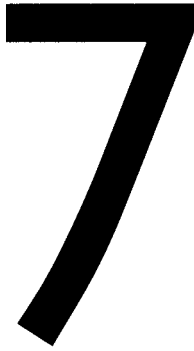
Reconfiguring Literary Education

Like many other observers of the relations between information technology and education, Jean-François Lyotard, writing as early as 1979, perceived that "the miniaturization and commercialization of machines is already changing the way in which learning is acquired, classified, made available, and exploited. It is reasonable to suppose that the proliferation of information-processing machines is having, and will continue to have, as much of an effect on the circulation of learning as did advances in human circulation (transportation systems) and later, in the circulation of sounds and visual images (the media)" (*Postmodern Condition*, 4). One chief effect of electronic hypertext lies in the way it challenges now conventional assumptions about teachers, learners, and the institutions they inhabit. It changes the roles of teacher and student in much the same way it changes those of writer and reader. Its emphasis on the active, empowered reader, which fundamentally calls into question general assumptions about reading, writing, and texts, similarly calls into question our assumptions about literary education and its institutions that so depend on these texts. Gary Marchioni who created evaluation procedures for the pioneering Project Perseus, reminds us that "each time a new technology is applied to teaching and learning, questions about fundamental principles and methods arise" ("Evaluating Hypermedia-Based Learning," 10.1). Hypertext, by holding out the possibility of newly empowered, self-directed students, demands that we confront an entire range of questions about our conceptions of literary education.

Hypertext systems promise—or threaten—to have major effects on literary education, and the nature of hypertext's potential effect on human thought

appears in descriptions of it from its earliest days. Writing of Bush, Engle-bart, Nelson, and other pioneers of hypertext, John L. Leggett and members of his team at the Hypermedia Lab at the University of Texas point out that "the revolutionary content of their ideas was, and continues to be, the extent to which these systems engage the user as an active participant in interac-tions with information" ("Hypertext for Learning," 2.1), Students making use of hypertext systems participate actively in two related ways: they act as reader-authors both by choosing individual paths through linked primary and secondary texts and by adding texts and links to the docuverse.[1]

Now that more than a decade and a half has passed since I began teach-ing with hypertext—and a decade since I completed the typescript of the first version of this book—I can see that hypertext has been used in four ways. One cannot accurately term them stages since several coincided with each other, and all continue in use today on the Web. Starting with Intermedia, read-only hypermedia helped students acquire both information and habits of thinking critically in terms of multiple approaches or causes. These first two uses or results represent the effects of employing an information medium based on connections to help students develop the habit of making connec-tions. Next, almost immediately we discovered that Intermedia, which pro-vided a participatory reading-and-writing environment, empowered students by placing them within—rather than outside—the world of research and scholarly debate. Finally, writing hypermedia enabled students to explore and create new modes of discourse appropriate for the kind of reading and writ-ing we shall do increasingly in e-space, the writing necessary for the twenty-first century. In the first version of this book, by necessity I cited materials chiefly available only on Intermedia at Brown. Because many of these webs have now moved into other systems, I shall use examples easily accessible to readers, choosing, whenever possible, either materials published in Story-space or other environments or available on the Web.

All these effects or applications encourage and even demand an active student. The ways in which hypertext does so leads writers on the medium like David H. Jonassen and R. Scott Grabinger to urge that "hypermedia learning systems will place more responsibility on the learner for accessing, sequencing and deriving meaning from the information." Unlike users of "most information systems, hypermedia users must be mentally active while interacting with the information" ("Problems and Issues," 4).

From this emphasis on the active reader follows a conception of an active, constructivist learner and an assumption that, in the words of Philippe C. Duchastel, "hypermedia systems should be viewed not principally as teach-

ing tools, but rather as learning tools" (139). As Terry Mayes, Mike Kibby, and Tony Anderson from the Edinburgh Centre for the Study of Human-Computer Interaction urge, systems of computer-assisted learning "based on hypertext are rightly called *learning systems,* rather than *teaching systems.* Nevertheless, they do embody a theory of, at least an approach to, instruction. They provide an environment in which *exploratory* or *discovery* learning may flourish. By requiring learners to move towards nonlineal thinking, they may also stimulate processes of integration and contextualization in a way not achievable by linear presentation techniques" (229). Mays and his collaborators therefore claim:

> At the heart of understanding interactive learning systems is the question of how deliberate, explicit learning differs from implicit, incidental learning. Explicit learning involves the conscious evaluation of hypotheses and the application of rules. Implicit learning is more mysterious: it seems almost like a process of osmosis and becomes increasingly important as tasks or material to be mastered becomes more complex. Much of the learning that occurs with computer systems seems implicit. (228)

Rand J. Spiro, working with different teams of collaborators, has developed one of the most convincing paradigms yet offered for educational hypertext and the kind of learning it attempts to support. Drawing on Ludwig Wittgenstein's *Philosophical Investigations,* Spiro and his collaborators propose that the best way to approach complex educational problems—what he terms "ill-structured knowledge domains"—is to approach them as if they were unknown landscapes: "The best way to [come to] understand a given landscape is to explore it from many directions, to traverse it first this way and then that (preferably with a guide to highlight significant features). Our instructional system for presenting complexly ill-structured 'topical landscape' is analogous to physical landscape exploration, with different routes of traversing study-sites (cases) that are each analyzed from a number of thematic perspectives" ("Knowledge Acquisition," 187). Concerned with developing efficient methods of nurturing the diagnostic skills of medical students, Spiro's team of researchers involve themselves in knowledge domains that present problems similar to those found in the humanistic disciplines. Like individual literary texts, patients offer the physician ambiguous complexes of signs whose interpretation demands the ability to handle diachronic and synchronic approaches. Young medical doctors, who must learn how to "take a history," confront symptoms that often point to multiple possibilities. They must therefore learn how to relate particular symptoms to a variety of different conditions and diseases. Since patients may suffer from a combi-

nation of several conditions at once, say, asthma, gall bladder trouble, and high blood pressure, physicians have to learn how to connect a single symptom to more than one explanatory system.

Spiro's explanation of his exploration-of-landscape paradigm provides an excellent description of educational hypertext:

The notion of "criss-crossing" from case to case in many directions, with many thematic dimensions serving as routes of traversal, is central to our theory. The treatment of an irregular and complex topic *cannot be forced in any single direction* without curtailing that potential for transfer. If the topic can be applied in many different ways, none of which follow in rule-bound manner from the others, then limiting oneself in acquisition to, say, a single point of view or a single system of classification, will produce a relatively *closed* system instead of one that is open to context-dependent variability. By criss-crossing the complex topical landscape, the twin goals of highlighting multifacetedness and establishing multiple connections are attained. Also, awareness of variability and irregularity is heightened, alternative routes of traversal of the topic's complexities are illustrated, multiple entry routes for later information retrieval are established, and the general skill of working around that particular landscape (domain-dependent skill) is developed. *Information that will need to be used in a lot of different ways needs to be taught in lots of different ways.* (187–88)

In such complex domains, "single (or even small numbers of) connecting threads" do not run "continuously through large numbers of successive cases." Instead, they are joined by "'woven' interconnectedness. In this view, strength of connection derives from partial overlapping of many different strands of connectedness across cases rather than from any single strand running through large numbers of the cases" (193).

Reconfiguring the Instructor

Educational hypertext redefines the role of instructors by transferring some of their power and authority to students. This technology has the potential to make the teacher more a coach than a lecturer, and more an older, more experienced partner in a collaboration than an authenticated leader. Needless to say, not all my colleagues respond to such possibilities with cries of glee and hymns of joy.

Before some of my readers pack their bags for the trip to Utopia and others decide that educational computing is just as dangerous as they thought all along, I must point out that hypertext systems have a great deal to offer instructors in all kinds of institutions of higher education. To begin with, a hypermedia corpus of multidisciplinary materials provides a far more efficient means of developing, preserving, and obtaining access to course mate-

rials than has existed before. One of the greatest problems in course development lies in the fact that it takes such a long time and that the materials developed, however pioneering or brilliant, rarely transfer to another teacher's course because they rarely match that other teacher's needs exactly. Similarly, teachers often expend time and energy developing materials potentially useful in more than one course that they teach but do not use the materials because the time necessary for adaptation is lacking. These two problems, which all teachers face, derive from the classic, fundamental problem with hierarchical data structures that was Vannevar Bush's point of departure when he proposed the memex. A hypertext corpus, which is a descendant of the memex, allows a more efficient means of preserving the products of past endeavors because it requires so much less effort to select and reorganize them. It also encourages integrating all one's teaching, so that one's efforts function synergistically. A hypermedia corpus, such as a website, has the potential to preserve and make easily available one's past efforts as well as those of others.

Hypertext obviously provides us with a far more convenient and efficient means than has previously existed of teaching courses in a single discipline that need the support of other disciplines. As I discovered in my encounter with the nuclear arms materials, which I discussed in chapter 4, this educational technology permits teachers to teach in the virtual presence of other teachers and other subsections of their own discipline or other closely related disciplines. Thus, someone teaching a plant-cell biology course can draw upon the materials created by courses in very closely related fields, such as animal-cell biology, as well as slightly more distant ones, such as chemistry and biochemistry. Similarly, someone teaching an English course that concentrates on literary technique of the nineteenth-century novel can nonetheless draw upon relevant materials in political, social, urban, technological, and religious history. All of us try to allude to such aspects of context, but the limitations of time and the need to cover the central concerns of the course often leave students with a decontextualized, distorted view.

Inevitably, the Web and other forms of hypertext give us a far more efficient means than has previously existed of teaching interdisciplinary courses, of doing, that is, which almost by definition "shouldn't be done." (When most departmental and university administrators are not applying for funding from external agencies, they use the term *interdisciplinary* to mean little more than "that which should not be done" or "that for which there is no money." After all, putting together biology and chemistry to study the chemistry of organisms is not interdisciplinary; it is the subject of a separate discipline called biochemistry.) Interdisciplinary teaching no longer has its earlier

glamour for several reasons. First, some have found that the need to deal with several disciplines has meant that some or all end up being treated superficially or only from the point of view of another discipline. Second, such teaching requires faculty and administration to make often extraordinarily heavy commitments, particularly when such courses involve teams of two or more instructors. Then, when members of the original team take a leave or cover an essential course for their department, the interdisciplinary course comes to a halt. In contrast to previous educational technology, hypertext offers instructors the continual virtual presence of teachers from other disciplines.

All the qualities of connectivity, preservation, and accessibility that make hypertext an enormously valuable teaching resource also make it equally valuable as a scholarly tool. The medium's integrative quality, when combined with its ease of use, offers a means of efficiently integrating one's scholarly work and work-in-progress with one's teaching. In particular, one can link portions of data on which one is working, whether they take the form of primary texts, statistics, chemical analyses, or visual materials, and integrate these into courses. Such methods, which we have already tested in undergraduate and graduate courses at Brown, allow faculty to explore their own primary interests while showing students how a particular discipline arrives at the materials, the "truths of the discipline," it presents to students as worthy of their knowledge. Materials on anti-Catholicism and anti-Irish prejudice in Victorian Britain created by Anthony S. Wohl, like some of my recently published work on Graham Swift and sections of this book, represent such integration of the instructor's scholarship and teaching. Such use of one's own work for teaching, which one can use to emphasize the more problematic aspects of a field, accustoms students to the notion that for the researcher and theorist many key problems and ideas remain in flux.

Hypermedia linking, which integrates scholarship and teaching and one discipline with others, also permits the faculty member to introduce beginners to the way advanced students in a field think and work while it gives beginners access to materials at a variety of levels of difficulty. Such materials, which the instructor can make easily available to all or only advanced students, again permit a more efficient means than do textbooks of introducing students to the actual work of a discipline, which is often characterized by competing schools of thought. Because hypertext interlinks and interweaves a variety of materials at differing levels of difficulty and expertise, it encourages both exploration and self-paced instruction. The presence of such materials permits faculty members to accommodate the slower as well as the faster, or more committed, learners in the same class. I've often been asked if the very

abundance of materials, which I've just praised, does not confuse and intimidate students. I don't believe that it does, chiefly because students, like other computer users, generally employ these kinds of electronic resources for a specific task. Many doubters, it is clear, envisaged students wandering aimlessly about enormous information spaces, but the key here is that students, who have limited amounts of time to prepare for each assignment, tend to act rationally and first concentrate on obviously relevant materials.

A reasonably well-organized website will permit students to find what they need in short order, though it may also encourage them to explore—something that assignments can encourage. *The Victorian Web*, which includes about twenty thousand documents, some of which are entire book chapters, obviously offers a daunting amount of information, but students don't immediately encounter all that information. Instead, upon arriving at the site, users find an overview that offers twenty categories. Students wishing to read about Dickens's *Great Expectations* see the icon labeled "Authors," click on it, receiving a list of writers, and then choose the Dickens link. Upon opening that author's overview, they go to "Works" and thence to *Great Expectations*. Even here, students do not find themselves in some inchoate information space, since they have a local sitemap that makes it easy for them to locate essays, reading questions, and other materials that meet their needs. A student looking for information about the novelist's relation to Carlyle can go to the "Literary Relations" section while one wanting discussions of Dickens's early life chooses "Biography."

Reconfiguring the Student

For students hypertext promises new, increasingly reader-centered encounters with text. In the first place, experiencing a text as part of a network of navigable relations provides a means of gaining quick and easy access to a far wider range of background and contextual materials than has ever been possible with conventional educational technology. Students in schools with adequate libraries have always had the materials available, but availability and accessibility are not the same thing. Until students know how to formulate questions, particularly about the relation of primary materials to other phenomena, they are unlikely to perceive a need to investigate context, much less know how to go about using library resources to do so.

Even more important than having a means of acquiring factual material is having a means of learning what to do with such material when one has it in hand. Critical thinking relies on relating many things to one another. Since the essence of hypertext lies in its making connections, it provides an effi-

cient means of accustoming students to making connections among materials they encounter. A major component of critical thinking consists in the habit of seeking the way various causes impinge upon a single phenomenon or event and then evaluating their relative importance, and well-designed hypertext encourages this habit.

Hypertext also offers a means for a novice reader to learn the habit of multisequential reading necessary for both student anthologies and scholarly apparatuses. Hypertext, which has been defined as text designed to be read nonsequentially or in a nonlinear mode, efficiently models the kind of text characteristic of scholarly and scientific writing. These forms of writing require readers to leave the main text and venture out to consider footnotes, evidence of statistics and other authorities, and the like. Our experience at Brown University in the late 1980s suggests that using hypertext teaches students to read in this advanced manner. This effect on reading, which first appears in students' better use of anthologies and standard textbooks, exemplifies the way that hypertext and appropriate materials together can quickly get students up to speed.

In addition, a corpus of hypertext documents intrinsically joins materials students encounter in separate parts of a single course and in other courses and disciplines. Hypertext, in other words, provides a means of integrating the subject materials of a single course with other courses. Students, particularly novice students, continually encounter problems created by necessary academic specialization and separation of single disciplines into individual courses. In the course of arguing for the historic contextualization of literary works, Brook Thomas describes this all too familiar problem:

The notion of a piece of literature as an organic, autonomous whole that combats the fragmentation of the modern world can easily lead to teaching practices that contribute to the fragmentation our students experience in their lives; a fragmentation confirmed in their educational experience. At the same time sophomores take a general studies literature course, they might also take economics, biology, math, and accounting. There is nothing, not even the literature course, that connects the different knowledge they gain from these different courses . . . Furthermore, because each work students read in a literature course is an organic whole that stands on its own, there is really no reason why they should relate one work to another in the same course. As they read one work, then another, then another, each separate and unique, each reading can too easily contribute to their sense of education as a set of fragmented, unrelated experiences in which wholeness and unity are to be found only in temporary, self-enclosed moments. (229)

Experience of teaching with various kinds of hypertext demonstrates that its intrinsic capacity to join varying materials creates a learning environment in which materials supporting separate courses exist in closer relationship to one another than is possible with conventional educational technology. As students read through materials for one English course, they encounter those supporting others and thereby perceive relationships among courses and disciplines.

Learning the Culture of

a Discipline

Hypertext also offers a means of experiencing the way a subject expert makes connections and formulates inquiries. One of the great strengths of hypertext lies in its capacity to use linking to model the kinds of connections that experts in a particular field make. By exploring such links, students benefit from the experience of experts in a field without being confined by them, as students would be in a workbook or book approach.

Hypertext thus provides novices with a means of quickly and easily learning the culture of a discipline. From the fact that hypertext materials provide the student with a means of experiencing the way an expert works in an individual discipline it follows that such a body of electronically linked material also provides the student with an efficient means of learning the vocabulary, strategies, and other aspects of a discipline that constitute its particular culture.

The capacity of hypertext to inculcate the novice with the culture of a specific discipline and subject might suggest that this new information medium has an almost totalitarian capacity to model encounters with texts. The intrinsically antihierarchical nature of hypertext, however, undercuts such possibilities and makes it a means of efficiently adapting the materials to individual needs. A body of hypertext materials functions as a customized electronic library that makes available materials as they are needed and not, as lectures and other forms of scheduled presentation of necessity must often do, just when the schedule permits.

The infinitely adaptable nature of this information technology also provides students a way of working up to their abilities by providing access to sophisticated, advanced materials. Considered as an educational medium, hypertext also permits the student to encounter a range of materials that vary in terms of difficulty, because authors no longer have to pitch their materials to single levels of expertise and difficulty. Students, even novice students, who wish to explore individual topics in more depth therefore have the opportunity of following their curiosity and inclination as far as they wish. At the

same time, more advanced students always have available more basic materials for easy review when necessary.

The reader-centered, reader-controlled characteristics of hypertext mean that it offers student-readers a way of shaping and hence controlling major portions of what they read. Since readers shape what they read according to their own needs, they explore at their own rate and according to their own interests. In addition, the ease of using hypertext means that any student can contribute documents and links to the system. Students can thus experience the way contributions in various fields are made.

Finally, hypertext produces an additional form of discussion and a new means of contributing to class discussions that assists many students. Jolene Galegher and Robert Kraut, like most students of cooperative work, point out that "one of the failures of group discussion is the social influence that inhibits the quantity of original ideas that the members would have generated had they been working in isolation." In this context, hypermedia exemplifies those "permissive technologies" that "allow current practices to be extended into new realms in which they had previously been impracticable" (9). This feature of hypertext doubly permits students to contribute to the activity of a class: they can contribute materials in writing if they find group discussions difficult, and other students can cite and discuss their hypertext contributions. By giving an additional means of expression to those people shy or hesitant about speaking up in a group, electronic conferencing, hypertext, and other similar media shift the balance of exchange from speaking to writing, thus addressing Derrida's calls to avoid phonocentrism in that eccentric, unexpected, very literal manner that, as we have seen before, characterizes such hypertext instantiations of theory.

Nontraditional Students: Distant Learners and Readers outside Educational Institutions

The combination of the reader's control and the virtual presence of a large number of authors makes an efficient means of learning at a distance. The very qualities that make hypertext an efficient means of supporting interdisciplinary learning also permit students to work without having to be in residence at a geographical or spatial site. In other words, the adaptable virtual presence of hypermedia contributors serves both the distant, unconventional learner and the college student in a more conventional setting. For those interested in the efficient and just distribution of costly educational resources, hypertext offers students at one institution a way to share resources at another. Hypermedia provides an efficient means for

students anywhere potentially to benefit from materials created at any participating institution.

The very strengths of hypertext that make it work so well in conventional educational settings also makes it the perfect means of informing, assisting, and inspiring the unconventional student. Because it encourages students to choose their own reading paths, hypertext provides the individualistic learner with the perfect means for exploration and enrichment of particular areas of study. By permitting one to move from relatively familiar areas to less familiar ones, a hypertext corpus encourages the autodidact, the resumed education student, and the student with little access to instructors to get in the habit of making precisely those kinds of connections that constitute such an important part of the liberally educated mind today so necessary in government and business. At the same time the manner in which hypertext places the distant learner in the virtual presence of many instructors both disperses the resources they have created in a particularly effective manner and allows the individual access to some of the major benefits of an institutional affiliation without the cost to either party in terms of time and money.

The World Wide Web has enabled the rapid development of a widespread, if all but unnoticed, form of distant learning. With good reason, attention has been paid to the use of the Web for distant learning courses offered by both conventional tertiary institutions and those, such as the Open Universities of the United Kingdom and Catalonia, dedicated to distant learning. Meanwhile, secondary and tertiary students have quietly used the Web with or without the knowledge of their instructors. I first became aware of this phenomenon after I began to receive e-mail thanking me for my *Victorian* and *Postcolonial* sites from undergraduates, postgraduate students, instructors, and even provosts of institutions from Europe, Asia, Australia, and the Americas. At the same time, contributions to the sites by students as well as faculty from all these areas continue to arrive. These distant students—distant, that is, to the web servers in New York and Singapore and to the university where I am paid to teach—came to the sites by different routes: some have been assigned to use them by their instructors, others have followed recommendations by the ministries of education in France and Sweden, National Endowment for the Humanities (NEH), the BBC, or groups representing individual disciplines, such as history, art history, and the sciences; yet others discovered them by using popular search engines. This kind of use of these sites, which now receive 15 million hits/month, suggests several things. First of all, while experts in distance education have been understandably concentrating the use

of digital technologies by institutions like the Open University and the U.S. Military, students and faculty have quietly begun to use the Web to supplement educational resources at their own institutions.[2] Second, skeptics like Vincent Mosco have denigrated as mere hype—contributions to the "cyberspace myth"—predictions about the future of higher education made by cyber enthusiasts, such as William J. Mitchell in *City of Bits* (65–70). Many claims about the effect of the Internet, however, appear to becoming true outside the purview of the elite institutions, which thereby lose an important opportunity to influence the course of higher education. Universities that support important scholarly and educational sites, like the University of Virginia, create cultural influence and academic reputation far from their physical campuses.

Two of the most exciting and objectively verifiable effects of using educational hypertext systems involve the way they change the limiting effects of time. The modularization that John G. Blair has described as characteristic of American (as opposed to European) higher education appears in the concepts of credit hours, implicitly equivalent courses, and transcripts.[3] It also appears, one may add, in the precise, necessarily rigid scheduling of the syllabus for the individual course, which embodies what Joseph E. McGrath describes as a naively atomistic Newtonian conception of time:

Two of the assumptions of the Newtonian conception of time, which dominates our culture and organizations within it, are (a) an atomistic assumption that time is infinitely divisible, and (b) a homogeneity assumption that all the "atoms" of time are homogeneous, that any one moment is indistinguishable from and interchangeable with any other. But these assumptions do not hold in our experience . . . Ten 1-minute work periods, scattered throughout the day, are not of equivalent productivity value to one 10-minute period of work from 9:15 to 9:25 a.m. Nor is the day before Christmas equivalent to February 17th for most retailers. A piece of time derives its epochal meaning, and its temporal value, partly in terms of what activities can (or must) be done in it. (38)

The division—segregation, really—of individual weeks into isolated units to which we have all become accustomed has the unfortunate effect of habituating students to consider in isolation the texts and topics encountered during these units. The unfortunate effects of precise scheduling, which coverage requires, only became apparent to me after teaching with hypertext. Here, as in other cases, one of the chief values of teaching with a hypertext system has proved to be the light it unexpectedly has cast on otherwise unexamined, conventional assumptions about education.

The Effects of Hypermedia in Teaching and Learning

One ethnographical team devoted three years to studying the effects of hypermedia in teaching.[4] The first effect comes from the experience of Peter Heywood, associate professor of biology, who used an Intermedia component in his upper-class course in plant-cell biology. The term paper for his course, which he intended to be a means of introducing students to both the literature of the field and the way it is written, required that students include all materials on their particular topic that had seen publication up to the week before papers were handed in. This demanding assignment required that Heywood devote a great deal of time to assisting individual students with their papers and their bibliographies, and one of the chief attractions of the Intermedia component to him lay in its potential to make such information more accessible. Using hypermedia greatly surprised Heywood by producing a completely unexpected effect. In the previous seventeen years that he had taught this course, he had discovered that many term papers came in after the deadline, some long after, and that virtually all papers concerned topics covered in the first three weeks of the course. The first year that students used the Intermedia component, all thirty-four papers came in on time. Moreover, their topics were equally distributed throughout the fourteen weeks of the semester. Heywood explains this dramatic improvement in student performance as a result of the way hypertext linking permits students to perceive connections among materials covered at different times during the semester. Although all other components of the course remained the same, the capabilities of hypermedia permitted students to follow links to topics covered later in the course and thereby encounter attractive problems for independent work. For example, while reading materials about the cell membrane in the first weeks of the course, students could follow links that brought them to related materials not covered until week eight, when the course examined genetics, or until the last weeks of the course, when it concerned ecological questions or matters of bioengineering. Many who enrolled in this upper-division course had already taken other advanced courses in genetics, biochemistry, or similarly related subjects. From the very beginning of the semester, linking permitted these students to integrate materials encountered early in this course with those previously encountered in other classes.

Educational hypertext in this way serves what McGrath describes as one of those "technological tools . . . designed in part to ease the constraints of the time/activity match in relation to communication in groups. For example, certain forms of computer conference arrangements permit so-called asyn-

chronous communication among group members" (39). As the example from Heywood's course shows, hypertext systems also support this "asynchronous communication" between students and chronologically ordered modular components of the course.

The way that hypertext frees learners from constraints of scheduling without destroying the structure and coherence of a course appears in more impressionistic observations reported by members of both biology and English courses. One of Heywood's students described working with hypertext as providing something like the experience of studying for a final examination every week, by which, he explained that he meant that each week, as students encountered a new topic, they discovered they were rearranging and reintegrating the materials they had already learned, an experience that previously they had encountered only during preparations for major examinations. English students similarly contrasted their integrative experience of course readings with those of acquaintances in sections of the survey course that had not used hypermedia. The English students, for example, expressed surprise that whereas they placed each new poem or novel within the context of those read previously as a matter of course—considering, say, the relation of *Great Expectations* to "Tintern Abbey" and "The Vanity of Human Wishes" as well as to *Pride and Prejudice* and *Gulliver's Travels*—their friends in other sections assumed that, once a week was over, one should set aside the reading for that week until the final exam. In fact, students in other sections apparently expressed surprise that my students wanted to make all these connections.

A second form of asynchronous communication involves the creation by hypertext of a course memory that reaches beyond a single semester. Galegher and Kraut propose that "technologies that allow users to observe each other's contributions (such as computer conferences and hypermedia systems) may provide a system for sustaining group memory independent of the presence of specific individuals in an organization" (15). The contributions of individual student (and faculty) reader-authors, which automatically turn Intermedia and its Web-based descendants into fully collaborative learning environments, remain on the system for future students to read, quote, and argue against. Students in my literature courses encounter essays and reading questions by at least a dozen groups of students from earlier years plus by students at other universities whose work they or their instructors submitted. Coming upon materials created by other students, some of whom one may know or whose name one recognizes, serves to convince them that they are in a very different, more active kind of learning situation. As we shall also

observe when we return to this subject in discussing the political implications of such educational media, this technology of memory produces effects quite unusual in a university setting.

Reconfiguring Assignments and Methods of Evaluation

To take advantage of hypertext's potential educational effects, instructors must decide what role it will play and must consciously teach with it. One must make clear to students both the goals of the course and the role of the hypertext system, generally a website, in meeting them. Peter Whalley correctly points out that "the most successful uses of hypertext will involve learners and lead them to adopt the most appropriate learning strategy for their task. They must . . . allow the learner to develop higher level skills, rather than simply become the passive recipients of a slick new technology" (68). Instructors therefore must create assignments that emphasize precisely those qualities and features of hypertext that furnish the greatest educational advantages. I have elsewhere described in detail such an initial assignment and will summarize it below before providing the example of a more complex exercise.

Whether it is true that readers retain less of the information they encounter while reading text on a screen than while reading a printed page, electronically linked text and printed text have different advantages. One should therefore prepare an initial assignment that provides the student with experience of its advantages—the advantages of connectivity. Obviously, instructors wishing to introduce students to the capacity hypertext gives them to choose their own reading paths and hence construct their own document must employ assignments that encourage students to do so.

The first hypertext assignment I formerly used derives from one first developed for Intermedia and then modified for Storyspace and later the World Wide Web. This assignment instructed students to follow specific links, report what they found, and offer both suggestions for additional links and sample passages from a work being discussed in class. In recent years students have become so Web savvy that I no longer need this kind of basic introductory assignment; in fact, students occasionally enter my classes having used *The Victorian Web* in courses in other departments. Since I employ a corpus of linked documents to accustom students to discovering or constructing contexts for individual blocks of text or data, my assignments require multiple answers to the same question or multiple parts to the same answer. If one wishes to accustom students to the fact that complex phenomena involve complex causation, one must arrange assignments in such a way as to make students summon different kinds of information to explain the phenomena they en-

counter. Since my courses have increasingly taken advantage of hypertext's capacity to promote collaborative learning, my assignments, from the beginning of the course, produce material that becomes part of the website.

Instructors employing educational hypertext must also rethink examinations and other forms of evaluation. If the Web's greatest educational strength as well as its most characteristic feature is its connectivity, then tests and other evaluative exercises must measure the results of using that connectivity to develop the ability to make connections. Independent of educational use of hypertext, dissatisfaction with American secondary school students' ability to think critically has recently led to a new willingness to try evaluative methods that emphasize conceptual skills—chiefly making connections—rather than those that stress simple data acquisition.

Taking advantage of the full potential of hypertext obviously forces instructors to rethink the goals and methods of education. If one wishes to develop student skills in critical thinking, then one might have to make one's goal elegance of approach rather than quantitative answers. Particularly when dealing with beginning students, instructors will have to emphasize that several correct answers may exist for a single problem and that such multiplicity of answers does not indicate that the assigned problem is subjective or that any answer will do. If, for example, one asks students to provide a context in contemporary philosophy or religion for a literary technique or historical event, one can expect to receive a broad range of correct solutions.

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A Hypertext Exercise

Several of the courses that I teach with the Web employ the following exercise, which may take the form of either an in-class exercise or a take-home exam that students have a week or more to complete. The exercise consists of a series of passages from the assigned readings that students have to identify and then relate to a single work in brief essays; in the past, these exercises have used Wordsworth's "Tintern Abbey," Dickens's *Great Expectations*, and Austen's *Pride and Prejudice* as the central texts; those for courses in Victorian literature have similarly employed Charlotte Brontë's *Jane Eyre*, Elizabeth Barrett Browning's *Aurora Leigh*, Thomas Carlyle's "Signs of the Times," and other works. The instructions for the exercise asking students to relate passages to a specific text directs them thus:

Begin each essay by identifying the full name, exact title, and date of the passage, after which you should explain at least three ways in which the passage relates (whatever you take that term to mean) to the poem. One of these connections should

concern theme, a second should concern technique, and a third some aspect of the religious, philosophical, historical, or scientific context . . . Not all the relations you discover or create will turn out to be obvious ones, such as matters of influence or analogous ideas and techniques. Some may take the form of contrasts or oppositions that tell us something interesting about the authors, literary forms, or times in which these works appeared.

To emphasize that demonstrating skill at formulating possible explanations and hypothesizing significant relations counts as much as factual knowledge alone, the directions explain that some subjects, "particularly matters of context, may require you to use materials" in whatever website or book they use "to formulate an hypothesis," and the assignment goes on to warn that in many cases, the hypermedia materials, like the library, "provide the materials to create an answer but not answers themselves."

Using this exercise in six iterations of the survey course as well as in various other upper-level courses convinces me that it provides a useful and accurate means of evaluation that has several additional beneficial effects. Although the exercise does not directly ask for specific factual information other than titles, authors, and dates, students soon recognize that without such information they cannot effectively demonstrate connections between or among texts. In comparing a passage from Pope's "Essay on Man" with "Tintern Abbey," for example, they soon realize that only specific examples and specific comments on those examples produce effective discussion. Gary Marchioni points out that "hypermedia is an enabling technology rather than a directive one, offering high levels of user control. Learners can construct their own knowledge by browsing hyperdocuments according to the associations in their own *cognitive structures*. As with access, however, control requires responsibility and decision making" ("Evaluating Hypermedia-Based Learning," 356). By making students choose which literary techniques, themes, or aspects of context they wish to relate, the exercise emphasizes the major role of student choice.

This assignment itself also proves an effective educational tool because while attempting to carry it out many students realize that they have difficulty handling matters of context, which at the beginning they often confuse with the theme or main idea of a passage. Discussions of context require one to posit a connection between one phenomenon, say, the imagery in a poem, and some other, often more general, phenomenon, such as conceptions of the human mind, gender roles, or religious belief contemporaneous with that

imagery. Perceiving possible connections and then arguing for their validity is a high-level intellectual skill. Since students are permitted and in fact encouraged to redo these exercises as many times as they wish, these exercises simultaneously furnish students the opportunity to make conceptual breakthroughs and teachers the opportunity to encourage and then measure them.

Two additional advantages of this exercise for the courses in which it appears involve writing. Since both the survey and the more advanced courses are intended to be intensive writing courses, the opportunity to do a large amount of writing (and rewriting) supports one of their goals, although obviously that might prove a hindrance in other kinds of courses, particularly those with large enrollments. Second, the several short essays that the structure of the assignment requires seem to accomplish more than a single long essay. At the same time that students find writing many short essays easier than constructing a single much longer one, they cover far more material than they could with a more conventional assignment and they cover different approaches, each demanding the kind of materials generally available only in a hypermedia corpus.

Another advantage of this exercise, which I find well suited to courses with hypertext supplements, lies in the fact that, particularly in its take-home version, it demonstrates the usefulness of the website at the same time that it draws on skills encouraged by using it. The hypertext materials show students possible connections they might wish to make and furnish information so they can make their own connections. Our hypermedia corpora, which have taken the form of websites for more than a decade, also permit them to range back and forth throughout the course, thereby effecting their own syntheses of the materials.

A final utility of this exercise lies in the fact that by encouraging the students to take a more active, collaborative approach to learning, it thereby creates exemplary materials for students to read. I used to require students to hand in both paper copies of their papers and HTML versions on disks, which I provided along with templates, but as computer displays dramatically improved and reading on them became more pleasant, I have the essays submitted by e-mail; this practice saves paper, and it provides me with the opportunity to make interlinear comments easily and return the essay with my comments to the student; this way I no longer devote an hour writing comments on a term paper with serious problems only to discover, as one often does, that the author of the essay never bothers to pick it up, and it remains in a box outside one's office until, a year or so later, it ends up in the trash.

During the past few years, I have used what has turned out to be a particularly effective assignment involving student contributions to websites. These weekly exercises take the form of question sets. As the syllabi for several of my courses explain, these weekly reading and discussion questions have three parts: "(a) a substantial passage of 1–3 paragraphs from the assigned readings (please include page numbers and give your question set a title); (b) a graceful and effective introduction to the passage that suggests why the reader wants to read it; and (c) 4–5 questions, chiefly concerning matters of technique or relations to previous readings, for which you do not have to have answers." The class uses e-mail to submit these exercises, which provide the basis for class discussion, to me no later than 6:00 p.m. the day before we begin talking about the reading or painting. In addition to the minor goal of providing a way for students to bootstrap a new section of the website, I find the assignment has several beneficial effects for both instructor and student, the first of which is that it encourages students to come to class having read the assignment with care. In addition, it encourages active discussions in which all members of the class participate, even those too shy to do so willingly without such a prop, and because presentations begin with references to specific texts, the discussions are much more substantial than they usually are.

This assignment also encourages students at all levels—and I've used it for freshmen and for graduate students—to develop important academic skills, which include learning how to use textual data to support an argument, choosing appropriate passages, and, a technique almost all students need to learn, developing effective ways to introduce quoted material. The assignment also has the major advantage for the instructor of permitting him or her to work with very brief, but typical, passages of a student's writing each week, thereby providing a convenient and yet effective way to correct common mistakes and encourage new skills. Beginning students tend to write fairly brief question sets, and I find that I devote most of my comments to their writing; juniors, seniors, and graduate students tend to send in substantial brief essays, even though the assignment does not require them to do so, and most of my comments involve matters of rhetoric and interpretation. (Anyone who wants to take a look at these question sets can find typical examples in the *Victorian Web*'s sections on Elizabeth Barrett Browning, Thomas Carlyle, J. E. Millais, and A. C. Swinburne; just click on the icon labeled "Leading Questions" in each author's overview.)

Each week, when the question sets arrive, I respond to them by return e-mail, often adding interlinear comments, after which I place the reading question in a previously prepared template, and upload it to the relevant section of the website. Starting with the second week of the course, I teach the class HTML tags that create paragraphs, indented passages, and various forms of emphasis, so after the first few weeks the students become HTML "experts" and I have to do little formatting. When and if students ask, I also teach them how to make links, because some of them wish to refer to discussion questions from previous weeks or other material on the site. These question sets remain online after the course ends, and the fact that students who come after them might read their work, like the fact the site is public, provides student-authors with a crucial sense that they are writing for an audience and that they are engaged in collaborative learning.

All texts on a hypertext system potentially support, comment on, and collaborate with one another. Once placed within a hypertext environment, a document created by a student no longer exists alone. It always exists in relation to other documents in a way that a book or printed document never does and never can. From this follow two corollaries. First, any document placed on a networked system that supports electronically linked materials potentially exists in collaboration with any and all other documents on that system. Second, any document electronically linked to any other document collaborates with it.[5]

To create a document or a link in hypertext is to collaborate with all those who have used it previously and will use it in the future. The essential connectivity of the medium encourages and demands collaboration. By making each document in the docuverse exist as part of a larger structure, hypertext places each document in what one can term the *virtual presence* of all previously created documents and their creators. This electronically created virtual presence transforms individual documents created in an assembly-line mode into ones that could have been produced by several people working at the same time. In addition, by permitting individual documents to contribute to this electronically related overarching structure, hypertext also makes each contribution a matter of versioning. In so doing, it provides a model of scholarly work in the humanities that better records what actually takes place in such disciplines than does traditional book technology.

The same factors—connectivity, virtual presence, and shifting of the balance between writer and reader—that prompt major, perhaps radical, shifts in teaching, learning, and the organization of both activities inevitably have the potential to affect the related notions of canon and curriculum. For a work to enter the literary canon—or, more properly, to be entered into the canon—gains it certain obvious privileges. That the passive grammatical construction more accurately describes the manner in which books, paintings, and other cultural texts receive that not-so-mysterious stamp of cultural approval reminds us that those in positions of power decide what enters this select inner circle. The gatekeepers of the fortress of high culture include influential critics, museum directors and their boards of trustees, and a far more lowly combine of scholars and teachers. One of the chief institutions of the literary canon is the middlebrow anthology, that hanger-on of high culture that in the Victorian period took the form of pop anthologies like *Golden Treasury* and today exists principally in the form of major college anthologies. In America, to be in the Norton or the Oxford anthology is to have achieved, not greatness, but what is more important, certainly—status. And that is why, of course, it matters that so few women have managed to gain entrance to such anthologies.

The notion of a literary canon descends from that of the biblical one, in which, as Gerald L. Bruns explains, canonization functions as "a category of power":

What is important is not only the formation, collection, and fixing of the sacred texts, but also their application to particular situations. A text, after all, is canonical, not in virtue of being final and correct and part of an official library, but because it becomes *binding* upon a group of people. The whole point of canonization is to underwrite the authority of a text, not merely with respect to its origin as against competitors in the field . . . but with respect to the present and future in which it will reign or govern as a binding text . . . From a hermeneutic standpoint . . . the theme of canonization is *power.* (81, 67)

One sees the kind of privileges and power belonging to canonization in the conception that something is a work of art; the classification of some object or event as a work of art enters it into a form of the canon. Such categorization means that the work receives certain values, meanings, and modes of being perceived. A work of art, as some modern aestheticians have pointed out, is functionally what someone somewhere takes to be a work of art. Saying it's so makes it so. If one says the found object is a work of art, then it is; and having become such (however temporarily), it gains a certain status, the

most important factor of which is simply that it is looked at in a certain way: taken as a work of art, it is contemplated aesthetically, regarded as the occasion for aesthetic pleasure or, possibly, for aesthetic outrage. It enters, one might say, the canon of art; and the contemporary existence in the Western world of galleries permits it to inhabit, for a time, a physical space that is taken by the acculturated to signify, "I am a work of art. I'm not (simply) an object for holding open a door. Look at me carefully." If that object is sold, bartered, or given *as a work of art* to one who recognizes the game or accedes in the demand to play her or his role in it, then it brings with it the capacity to generate that special space around it that signals it to be an object of special notice and a special way of noticing.

In precisely the same way, calling something a work of literature invokes a congeries of social, political, economic, and educational practices. If one states that a particular text is a work of literature, then for one it is, and one reads it and relates it to other texts in certain definite ways. As Terry Eagleton correctly observes, "anything can be literature, and anything which is regarded as unalterably and unquestionably literature—Shakespeare, for example—can cease to be literature. Any belief that the study of literature is the study of a stable, well-definable entity, as entomology is the study of insects, can be abandoned as a chimera . . . Literature, in the sense of a set of works of assured and unalterable value, distinguished by certain shared inherent properties, does not exist" (*Literary Theory,* 10–11). The concept of literature (or literariness) therefore provides the fundamental and most extended form of canonization, and classifying a text as a work of literature is a matter of social and political practice.

I first became aware of the implications of this fact a bit more than several decades ago when I was reading the sermons of the Evangelical Anglican, Henry Melvill, in an attempt to understand Victorian hermeneutic practice. Upon encountering works by a man who was the favorite preacher of John Ruskin, Robert Browning, W. E. Gladstone, and many of their contemporaries, I realized that his sermons shared literary qualities found in writings by Ruskin, Carlyle, Arnold, and Newman. At first Melvill interested me solely as an influence on Ruskin and as a means of charting the sage's changing religious beliefs. In several studies I drew upon his extraordinarily popular sermons as extraliterary sources or as indications of standard Victorian interpretative practice. If I were to write my study of Ruskin now, three decades later, I would treat Melvill's sermons also as works of literature, in part because contemporaries did so and in part because classifying them as literature would foreground certain intertextual relations that might otherwise remain

invisible. At the time, however, I never considered discussing Melvill's sermons as literary texts rather than as historical sources, and when I mentioned to colleagues that his works seemed in some ways superior to Newman's, none of us considered the implications of that remark for a concept of literature. Remarks by colleagues, even those who specialized in Victorian literature, made clear that paying close attention to such texts was in some way eccentric and betokened a capacity to endure reading large amounts of necessarily boring "background material." When I taught a course in Anglo-American nonfiction some fifteen years after first discovering Melvill, I assigned one of his sermons, "The Death of Moses," for students to read in the company of works by Thomas Carlyle and Henry David Thoreau. Reading Melvill's sermon for an official course given under the auspices of the department of English, they assumed that it was a work of literature and treated it as such. Considering "The Death of Moses," which has probably never before appeared in an English course, as a work of "real" literature, my students, it became clear, assumed that Melvill's writing possessed a certain canonical status.

The varieties of status that belonging to the canon confers—social, political, economic, aesthetic—cannot easily be extricated one from the others. Belonging to the canon is a guarantee of quality, and that guarantee of high aesthetic quality serves as a promise, a contract, that announces to the viewer, "Here is something to be enjoyed as an aesthetic object. Complex, difficult, privileged, the object before you has been winnowed by the sensitive few and the not-so-sensitive many, and it will *repay* your attention. You will receive a frisson; at least you're supposed to, and if you don't, well, perhaps there's something wrong with your apparatus." Such an announcement of status by the poem, painting, building, sonata, or dance that has appeared ensconced within a canon serves, as I have indicated, a powerful separating purpose: it immediately stands forth, different, better, to be valued, loved, enjoyed. It is the wheat winnowed from the chaff, the rare survivor, and has all the privileges of such survival.

Anyone who has studied literature in a secondary school or university in the Western world knows what that means. It means that the works in the canon get read, read by neophyte students and expert teachers. It also means that to read these privileged works is a privilege and a sign of privilege. It is also a sign that one has been canonized oneself—beautified by the experience of being introduced to beauty, admitted to the ranks of those of the inner circle who are acquainted with the canon and can judge what belongs and does not. Becoming acquainted with the canon, with those works at the cen-

ter, allows (indeed, forces) one to move to the center or, if not absolutely to the center, at least much closer to it than one had been before.

This canon, it turns out, appears far more limited to the neophyte reader than to the instructor, for few of the former read beyond the reading list of the course, few know that one *can* read beyond, believing that what lies beyond is by definition dull, darkened, dreary. One can look at this power, this territoriality of the canonized work, in two ways. Gaining entrance clearly allows a work to be enjoyed; failing to do so thrusts it into the limbo of the unnoticed, unread, unenjoyed, unexisting. Canonization, in other words, permits the member of the canon to enter the gaze and to exist. Like the painting accepted as a painting and not, say, a mere decorative object or even paint spill, it receives a conceptual frame; and although one can remark upon the obvious fact that frames confine and separate, it is precisely such appearance within the frame that guarantees its aesthetic contemplation— its capacity to make the viewer respect it.

The very narrowness of the frame and the very confinement within such a small gallery of framed objects produces yet another effect, for the framed object, the member of the canon, gains an intensification not only from its segregation but also because, residing in comparative isolation, it gains splendor. Canonization both permits a work to be seen and, since there are so relatively few objects thus privileged, canonization intensifies the gaze; potentially distracting objects are removed from the spectator's view, and those that are left benefit from receiving exclusive attention.

Within academia, however, to come under the gaze, works must be teachable. They must conform to whichever currently fashionable pedagogy allows the teacher to discuss this painting or that poem. In narrating the formation of the modernist canon, Hugh Kenner explains that "when Pound was working in his normal way, by lapidary *statement,* New Critics could find nothing whatever to say about him. Since 'Being-able-to-say-about' is a pedagogic criterion, he was largely absent from a canon pedagogues were defining. So was Williams, and wholly. What can Wit, Tension, Irony enable you so say about The Red Wheelbarrow?"[6] Very little, one answers, and the same is true for the poetry of Swinburne, which has many similarities to that of Stevens but which remained unteachable for many trained in New Criticism. In painting the situation is much the same: critics of purely formalist training and persuasion had nothing to say about the complex semiotics of Pre-Raphaelite painting. To them it didn't really seem to be art.

Thematic as well as formal filters render individual texts teachable. As

Sandra M. Gilbert and Susan Gubar, Ellen Moers, Elaine Showalter, and many others have repeatedly demonstrated, people who for one reason or other do not find interesting a particular topic—say, the works, fates, and subjectivities of women—do not see them and have little to say about them. They remove them from view. If belonging to the canon brings a text to notice, thrusts it into view, falling out of the circle of light or being absent or exiled from it keeps a text out of view. The work is in effect excommunicated. For, as in the Church's excommunication, one is not permitted to partake of the divine refreshing acts of communion with the divinity, one is divorced from sacramental life, from participation in the eternal, and one is also kept from communicating with others. One is exiled from community. Likewise, one of the most savage results of not belonging to the canon is that these works do not communicate with one another. A work outside the canon is forgotten, unnoticed, and if a canonical author is under discussion, any links between the uncanonical work and the canonical tend not to be noticed.

I write *tend* because under certain conditions, and with certain gazes, they can be at the other end of the connections. But within the currently dominant information technology, that of print, such connections and such linkages to the canonical require almost heroic and certainly specialized efforts. The average intelligent educated reader, in other words, is not expected to be able to make such connections with the noncanonical work. For him or her they do not exist. The connections are made among specialized works and by those readers—professionalized by the profession of scholarship—whose job it is to explore the reader's equivalent of darkest Africa of the nineteenth- and early-twentieth-century Western imagination—the darkest stacks of the library where reside the unimportant, unnoticed books, those one is supposed not to know, not even to have seen. The situation, not so strangely, resembles that of the unknown dark continent, which certainly was not dark or unknown to itself or to its inhabitants but only to Europeans, who labeled it so because to them, from their vantage point, it was out of view and perception. They did so for obviously political—indeed, obviously colonialist—reasons, and one may inquire if this segregation, this placement at a distance, accurately figures the political economy of works canonized and uncanonized.

Like the colonial power, say, France, Germany, or England, the canonical work acts as a center—the center of the perceptual field, the center of values, the center of interest, the center, in short, of a web of meaningful interrelations. The noncanonical works act as colonies or as countries that are unknown and out of sight and mind. That is why feminists object to the omission or excision of female works from the canon, for by not appearing within

the canon works by women do not . . . appear. One solution to this more or less systematic dis-appearance of women's works is to expand the canon.

A second approach to the decanonization of works is the creation of an alternate tradition, an alternate canon. Toril Moi points to the major problems implicit in the idea of a feminist canon of great works (though she does not point to the possibility of reading without a canon) when she argues that all ideas of a canon derive from the humanist belief that literature is "an excellent instrument of education" and that the student becomes a better person by reading great works. "The great author is great because he (occasionally even she) has managed to convey an authentic vision of life." Furthermore, argues Moi—and thus incriminates all canons and all bodies of special works with the same brush—"the literary canon of 'great literature' ensures that it is this 'representative experience' (one selected by male bourgeois critics) that is transmitted to future generations, rather than those deviant, unrepresentative experiences discoverable in much female, ethnic, and working-class writing. Anglo-American feminist criticism has waged war on this self-sufficient canonization of middle-class male values. But they have rarely challenged the very notion of such a canon" (78). Arguing that Showalter aims to create a "separate canon of women's writing, not to abolish all canons," she points out that "a new canon would not be intrinsically less oppressive than the old" (78).

Unfortunately, one cannot proclaim the end of canons, or do away with them since they cannot be ended by proclamation. "To teach, to prescribe a curriculum, to assign one book for a class as opposed to another," Reed Way Dasenbrock points out, "is ineluctably to call certain texts central, to create a canon, to create a hierarchy" ("What to Teach When the Canon Closes Down," 67). Rather, we must learn to live with them, appreciate them, benefit from them, but, above all, remain suspicious of them. Grandiose announcements that one is doing away with The Canon fall into two categories: announcements, doomed to failure, that one is no longer going to speak in prose, and censorship that in totalitarian fashion tells others what they cannot read. Doing away with the canon leaves one not with freedom but with hundreds of thousands of undiscriminated and hence unnoticeable works, with works we cannot see or notice or read. Better to recognize a canon, or numerous versions of one, and argue against it, revise it, add to it.

Having thus far paraphrased—but I hope not parodied—now-popular notions of the positive and negative effects of a literary canon, I have to express some reservations. I have little doubt that a canon focuses attention, provides status, and screens noncanonical works from the attention of most

people. That seems fairly clear. But I do not believe the one canon about which I know very much, that for English and American literature, has ever been terribly rigid. The entire notion of world literature, great touchstones, and studying English academically has a comparatively brief history. Victorian literature, that area of literature to which I devote most of my attention, certainly shows astonishing changes of reputations. When I first encountered the Victorians in undergraduate courses some thirty years ago, Tennyson, Browning, and Arnold claimed positions as the only major poets of the age, and Hopkins, when he was considered, appeared as a protomodernist. In the following decades, Swinburne and the Pre-Raphaelites, particularly Christina Rossetti and her brother Dante Gabriel Rossetti, have seemed more important, as has Elizabeth Barrett Browning, who had a major reputation during her own lifetime. Arnold, meanwhile, has faded rather badly. Looking at older anthologies, one realizes that some of the poets whose reputations have of late so taken a turn for the better had fairly strong reputations in the 1930s and 1940s but disappeared into a shade cast by modernism and the New Criticism.

Such evidence, which reminds us how ideological and critical fashions influence what we read as students and what we have our students read now, suggests, perhaps surprisingly, that the literary canon, such as it is, changes with astonishing speed. Viewing it over a scholarly or critical career, only the historically myopic could claim that the academic canon long resists the pressures of contemporary interests. No matter how rigid and restrictive it may be at any one moment, it has shown itself characterized by impermanence, even transience, and by openness to current academic fashion, over a university "generation," a far shorter span of time, the lag seems intolerably long. What good does it do an individual student to know that students will be able to study, say, a particular Nigerian writer a few years after *they* graduate?

Nonetheless, the canon, particularly that most important part of it represented by what educational institutions offer students in secondary school and college courses, takes a certain amount of time to respond. One factor in such resistance to change derives from interest and conviction, though as we have seen, such conviction can change surprisingly quickly in the right circumstances—right for change, not necessarily right according to any other standard. Another factor, which every teacher encounters, derives from book technology, in particular from the need to capitalize a fixed number of copies of a particular work. Revising, making additions, taking into account new works requires substantial expenditure of time and money, and the need to sell as many copies as possible to cover publication costs means that one

must pitch any particular textbook, anthology, or edition toward the largest possible number of potential purchasers.

As Richard Ohmann has so chillingly demonstrated in "The Shaping of a Canon: U.S. Fiction, 1960–1975," the constraints of the marketplace have even more direct control of recent fiction, both bestsellers and those few books that make their way into the college curriculum. The combination of monopoly capitalism and a centralized cultural establishment, entrenched in a very few New York–based periodicals has meant that for a contemporary novel to "lodge itself in our culture as precanonical—as 'literature,'" however briefly, it had to be "selected, in turn, by an agent, an editor, a publicity department, a review editor (especially the one at the *Sunday New York Times*), the New York metropolitan book buyers whose patronage [is] necessary to commercial success, critics writing for gatekeeper intellectual journals, academic critics, and college teachers" (381). Once published, "the single most important boost" for a novel is a "prominent review in the *Sunday New York Times*," which, Ohmann's statistics suggest, heavily favors the largest advertisers, particularly Random House (380).

Historians of print technology have long argued that the cost of book technology necessitates standardization, and although education benefits in many ways from such standardization, it is also inevitably harmed by it as well. Most of the great books courses, which had so much to offer within all their limitations, require some fixed text or set of texts.[7]

Although hypertext can hardly provide a universal panacea for all the ills of American education, it does allow one to individualize any corpus of materials by allowing reader and writer to connect them to other contexts. In fact, the connectivity, virtual presence, and shifting of the balance between writer and reader that permit interdisciplinary team teaching to do away with this kind of time lag at the same time permit one to preserve the best parts of book technology and its associated culture. Let me give an example of what I mean. Suppose, as is the case, that I am teaching a survey course in English literature, and I wish to include works by women. A few years ago, if one turned to the Oxford or Norton anthologies, one received the impression that someone had quite consciously excluded the presence of women from them— and therefore from most beginning undergraduates' sense of literature. One could of course complain, and in fact many did. After a number of years, say, seven or eight, a few suitable texts began to appear in these anthologies, though Norton also took the route of publishing an anthology of women's literature in English. This new presence of women is certainly better than the former nonpresence of women, but it takes and is taking a long time. What

is worse, many of the texts that appear at last in these anthologies may well not be those one would have chosen.

Let us consider a second problem I have encountered in introducing new materials into my teaching, one less likely to find redress anywhere as quickly as has the first. I refer to the difficulty of introducing authors of non-English ethnic backgrounds who write in English. This problem, which precisely typifies the difficulties of redefining the canon and the curriculum alike, arises because a good many of Britain's major authors during the past century have not been English.[8] In England, where the inhabitants distinguish quite carefully among English, Welsh, Scots, and Irish, the major figures since the rise of modernism have not necessarily been English: Conrad was Polish; James, American; Thomas, Welsh; and Joyce and Yeats, Irish. Generally, anthologies work in these figures without placing too much emphasis on their non-Englishness, which shows a nice capacity to accommodate oneself to the realities of literary production. Of course, such accommodation has taken a rather long time to materialize.

Today the situation has become far more complex, and in Great Britain's postcolonial era, if one wishes to suggest the nature of writing in English—which is how I define English literature—one must include both writers of Commonwealth and ex-Commonwealth countries and also those with a wide range of ethnic origins who live in the United Kingdom and write in English. Surveying leading novelists writing in English in Britain, one comes upon important English men and women, of course, like Graham Swift, Jane Gardam, and Penelope Lively; but such a survey almost immediately brings up the matter of national origins. After all, among the novelists who have won prestigious prizes of late one must include Salman Rushdie (India and Pakistan), Kazuo Ishiguro (Japan), and Timothy Mo (Hong Kong), and if one includes novels in English written by authors occasionally resident in Britain, one must include the works of Chinua Achebe and Nobel Prize winner Wole Soyinka (Nigeria), and of Anita Desai (India). And then there are all the Canadian, Australian, not to mention American novelists who play important roles on the contemporary scene. The contemporary English novel, in other words, is and is not particularly English. It is English in that it is written in English, published in England, and widely read in England and the rest of Britain; it is non-English insofar as its authors do not have English ethnic origins or even live in England.

The canon, such as it is, has rather easily accommodated itself to such facts, and while the academic world churns away, attacking or defending the supposedly fearsome restrictions of the canon and the virtual impossibility

of changing it, contemporary writers, their publishers, and readers have made much of the discussion moot, if not downright comical. The problem faced by the teacher of literature, then, is how in the case of contemporary English literature to accommodate the curriculum to a changing canon. Of course, one can include entire novels in a course on fiction, but that means that the new does not enter the curriculum very far. In practice, the academic version of the expanded canon of contemporary literature will almost certainly take the form of African American literature, which now appears in separate courses and is experienced as essentially unconnected to the central, main, defining works.

Hypertext offers one solution to the problem of accommodating the curriculum to a changing canon. In my section of the standard survey course, which is a prerequisite for majoring in English at Brown University, I included works by Derek Walcott (Jamaica) and Wole Soyinka. How can hypertext aid in conveying to students the ongoing redefinition, or rather self-redefinition, of English literature? First of all, since Soyinka writes poems alluding to *Ulysses* and *Gulliver's Travels,* one can easily create electronic links from materials on Joyce and Swift to Soyinka, thus effortlessly integrating the poems of this Nigerian author into the literary world of these Irish writers.

Since hypertext linking also encourages students to violate the rigid structure of the standard week-by-week curriculum, it allows them to encounter examples of Soyinka's work or questions about its relation to earlier writers in the course of reading those writers earlier in the curricular schedule. By allowing students to range throughout the semester, hypertext permits them to see various kinds of connections, not only historical ones of positive and negative influence but equally interesting ones involving analogy. In so doing, this kind of educational technology effortlessly inserts new work within the total context.

Such contextualization, which is a major strength of hypermedia, has an additional advantage for the educator. One of the great difficulties of introducing someone like Soyinka into an English literature course, particularly one that emphasizes contextualization, involves the time and energy—not to mention additional training required—to add the necessary contextual information. Our hypertext component, for example, already contains materials on British and continental history, religion, politics, technology, philosophy, and the like. Although Soyinka writes in English, received his undergraduate degree from Leeds, and wrote some of his work in England, he combines English and African contexts, and therefore to create for him a context analogous to that which one has created for Jonathan Swift and Robert Browning,

one has to provide materials on colonial and postcolonial African history, politics, economics, geography, and religion. Since Soyinka combines English literary forms with Yoruban myth, one must provide information about that body of thought and encourage students to link it to Western and non-Western religions.

Such an enterprise, which encourages student participation, draws upon all the capacities of hypertext for team teaching, interdisciplinary approaches, and collaborative work and also inevitably redefines the educational process, particularly the process by which teaching materials, so called, develop. In particular, because hypertext corpora are inevitably open-ended, they are inevitably incomplete. They resist closure, which is one way of stating they never die; and they also resist appearing to be authoritative: they can provide information beyond a student's or teacher's wildest expectations, but they can never make that body of information appear to be the last and final word.

Creating the New Discursive Writing

Since writing the first version of *Hypertext* my interest in the educational applications of this information technology has increasingly shifted from read-only informational hypertext to those forms created by one or more students. Although I continue to use hypertext in the ways described in the preceding sections for courses on both literature and critical theory, students in the theory-related courses have begun to invent the ways of writing hypermedia at which we have already looked in chapter 5. Equally important, they have also in often brilliant and unexpected ways tested my proposal that hypertext offers a rare laboratory in which to test the ideas of poststructuralist theory.

As part of my courses in hypertext and critical theory, I developed the electronic versions of this volume in Intermedia and other systems described in chapter 5 as an example of translating a print book into hypertext. As I've already explained in chapter 5, students radically reconfigured the original in several ways, since they read *Hypertext* as wreaders—as active, even aggressive readers who can and do add links, comments, and their own subwebs to the larger web into which the print version has transformed itself.

Although students continued to make similar contributions while working with the Storyspace version of *Hypertext*, they also began to create their own self-contained sets of interlinked lexias. In thus moving from Intermedia, a truly real-time or synchronous collaborative environment, to Storyspace, students repeated many of the changes, advantages, and disadvantages that occurred when my institution switched most of its word-processing activities from centralized networked mainframe computing to stand-alone personal

computers: the personal computer brought with it both greater convenience and resultant wider usage but also a marked loss in certain forms of computer literacy based on networked computing. Many more people used computers, though often inefficiently as little more than typewriters, but comparatively few took advantage of electronic mail, bulletin boards, and discussion groups. Without access to the kind of networked textuality provided by Intermedia, students found synchronous collaboration more difficult to carry out. Fortunately, when moving from Intermedia to Storyspace a great deal was also gained.

The sophistication and intellectual accomplishments exemplified by these first student webs compensated in many ways for the loss of an immensely powerful, if occasionally unstable, networked environment. The very first webs demonstrated more clearly than could any theoretical argument that writing in this medium creates new genres and new expectations. As one looks at these projects, it is clear that new kinds of academic writing were taking form. A few of them, like David Stevenson's *Freud Web*, whose dozen and a half lexias offer an introduction to Freud's theories, represent attempts to create hypertext versions of the standard academic term paper. Intrigued by the possibilities of hypertext, which he had encountered in English 32, Stevenson asked permission to create his term paper in Intermedia, and not surprisingly he followed the approaches used in developing the lexias he had seen in *Context32;* that is, like the developers of the course materials, he wrote each of his substantial discussions of free association, libido, and the like, and to these he added a bibliography, chronology, bibliography, and various graphic presentations of Freud's model of the mind.

The Freud Web, like a number of others, moved first to Storyspace and then Stevenson himself created an HTML version, making it one of the very first set of humanities materials available anywhere on the World Wide Web (it resided on a server belonging to the High Energy Theory Group in Brown's physics department). In its earliest version Stevenson interlinked it to the text of Rudyard Kipling's "Mary Postgate," a narrative of psychosexual violence that he believed Freud's theories would illuminate. Looking in retrospect at this pioneering student web, one sees how it combines two different kinds of writing. *The Freud Web* itself contains only materials written by a single author, but he then pushed the resulting web up against a literary text, thereby creating a hybrid form of writing in which the intellectual connections and interpretations consist only in links.

In contrast to Stevenson's approach of linking *from outside*, Steve Boyan's adaptation of Edgar Lee Master's *Spoon River Anthology,* like the *In Memoriam Web*, uses paths or trails of links through an existing text to permit reading

the poem more easily in ways that the print version already encourages or even demands. Its added interpretative link paths serve as readings, or rather as records of readings, that, if we wish, we can make into our own.

Most student academic webs, however, rely less on either central print texts or on ways of writing associated with them. Once students began to use Storyspace, a hypertext environment that easily imports text, I began to notice something that I have since realized characterizes hyperwriting—its tendency, already observed in the discussion of hypertext as collage, to take the form of appropriation and abrupt juxtaposition. For example, Tom Meyer's *Plateaus* appropriates and interlinks a broad variety of materials to explain the relation of Deleuze and Guattari's thought to hypertext. In addition to Meyer's substantial discussion-lexias and material garnered from the Internet, his Storyspace web has folders containing multiple documents from *A Thousand Plateaus,* the Cabbala, Calvino's *Invisible Cities,* Burrough's *Naked Lunch,* and *The Satyricon.*

In addition to this tendency to exploit electronic collage for purposes of interpretive juxtaposition and comparison, the student webs share other qualities, one of which involves joining what one might consider academic and so-called creative writing; that is, poetry and fiction. Again, this tendency appeared in some of the earliest Storyspace webs. *Adam's Bookstore* by Adam Wenger developed in two stages, the first as hyperfiction and the second as a laboratory for theory. As a midterm exercise Wenger created a Borgesian tale that readers can enter and leave at any point, something enforced by the fact he provided no title screen and arranged his lexias as a circle in the Storyspace view (see Figure 32). For his final project, Wenger, who was highly skeptical of Barthes's approach in *S/Z,* applied the theorist's five codes to his own work, producing a very heavily linked web. Of the fifty-one lexias and 354 links that constitute *Adam's Bookstore,* approximately half consist of the original story, and if one clicks on the hot text in a specific lexia, one receives a list of six, eight, or even more links, the first several constructing the narrative, those that appear farther down in the list constructing Wenger's Barthean reading.

Although few webs thus self-consciously apply critical theory to the student-author's own texts, a large number move effortlessly between theory and fiction or poetry. Karen Kim's *Lexical Lattice,* Shelley Jackson's *Patchwork Girl,* and Michael DiBianco's *Memory, Inc.* (created in HTML and now part of the *Cyberspace Web*) all thus interweave substantial lexias containing text similar to standard academic discourse with fiction or poetry.

Lars Hubrich's *In Search of the Author, or Standing up Godot,* first created in Storyspace and then recreated by him for the Web, exemplifies the playful

"Killing Me"

Lars Hubrich '98 (English 111, 1995)

Killing me

"The birth of the reader must be at the cost of the death of the Author" -R. Barthes

		Landow	Barthes	Dada	
I h ha to ve red rad to wa for to red pla T tha off sor be las ne	This me Du you aut par is me, bes con lex	"Hypertext has no authors in the conventional sense...hypertext as a writing medium metamorphoses the author into an editor or developer. Hypermedia...is a team production" -George Landow- *Hypertext*	"A text's unity lies not in its origin but in its destina- tion." -Roland Barthes- *The death of the Author* Toolbar	"Art is a private affair, the artist produces it for himself." -Tristan Tzara- *Dada Manifesto 1918* Toolbar	ntly ction ool by ole of ioning ere to be n of athor he t as I n the on', pty

"Killing Me" is a simple web that mainly tries to question the importance of its author for two reasons. First, it does not matter whether you know who wrote this web (especially in my case where you won't have read another text written by me to compare it with). Second, the arguments I come up with are presented in a way that does not allow to see different importances or levels. Therefore, the reader is encouraged to make (or read) his own connections and thus is reading his perception of the arguments rather than my digested version of them.

Use the *icon-bar* below this paragraph to get to read different lexias. Each icon stands for a different link to a single lexia. All the links are simple one way links with the option of getting back to the *icon-bar*.

Figure 35. Lars Hubrich's *Killing Me*. This web, which represents another translation of Storyspace web into HTML, playfully ex-plores the notions of authorship in e-space, braiding together texts from Foucault, Barthes, and Landow with the student-author's own challenges to the reader.

examination of central critical issues that often characterize this writing (Fig-ure 35). An introductory title screen explains that readers can choose to begin with either of its two separate parts or subwebs, one of which, "Killing Me," wryly meditates on the ways hypertext reconfigures our conceptions of authorship. In the World Wide Web version, "Killing Me" begins with a screen shot of the Storyspace original, showing six-layered, overlapping lexias on this theme, three of which are entirely visible—those from Barthes's "The Death of the Author," Tristran Tzara's *Dada Manifesto,* and my *Hypertext.*

Beneath the defining image provided by this screenshot, Hubrich places a brief introduction that explains several ways in which his web reveals the problematic nature of conventional understandings of authorship, after which the text directs readers to use an immediately following set of thirteen cryptic magenta-and-yellow icons that stretch across the screen. Clicking on them brings the reader to individual statements about issues of authorship, intellectual property, and our assumptions about them. Thus, in addition to the three statements one can read in the screenshot, one comes upon additional passages from Barthes, Emile Benveniste's definition of the self, and Michel Foucault's "What Is an Author?" as well as questions to the reader about Hubrich's educational background and a humorous example of the way people use the author function in making aesthetic choice and evaluation:

I have a friend who hates U2. One day, I went to his house to find him very excited. He had just recorded a song from the radio and wanted to play it to me. He said that this was the best song he heard for months and that he had to find out which band recorded it. What he finally played to me was U2's "The Fly." When I told him that, he frowned and shut off the music mumbling something like "That can't be . . . sounded much better last time I heard it." He never again mentioned U2 to me. ("U2")

Other brief lexias challenge our habit of reading a coherent authorial self out of a text. In fact, the very first lexia readers are likely to encounter—that obtained by clicking on the icon at the extreme left—reads: "I paid someone to do this midterm assignment for me. I really had no time at all to get it done. Therefore, everything you are going to read and what you already read has been written by someone else." Another announces: "I don't know if you care, but you are misinterpreting this web. I never meant what you think this web is about." And yet another entitled "Handwriting" takes the form of an image of what appears to be a handwritten three-paragraph statement, which begins: "This was written by me and Marcel Duchamp. Who do you think holds the authorship of this paragraph?" Duchamp, "for it is his handwriting," or Hubrich, who wrote the lexia? Using a computer font named "Duchamp" based on the artist's handwriting, Hubrich created his lexia in Storyspace and then made an image of it for the HTML translation. With effective playfulness he uses it to question our assumptions about authorship on several levels. As he explains in his introductory lexia, he has arranged his materials nonhierarchically in a way that makes his text multivocal. "Therefore, the reader is encouraged to make (or read) his own connections and thus is reading his perception of the arguments rather than my digested version of them."

A great many of the other several hundred student projects in Storyspace

and HTML that students have created take the form of similar experiments, for they use hypertext to test the theories of Barthes, Derrida, and others. Borges often appears as the Vergilian guide to these electronic explorations. Karen Kim thus created a hypertext version of Borges's "Grains of Sand" to the individual lexias of which she linked analyses in the manner of Barthes's *S/Z*, and other students have taken similar approaches to works of Carroll, Lorca, Maupassant, and Proust. Derrida, Bakhtin, Baudrillard, Haraway, and theorists not mentioned in the print version of *Hypertext* also appear within such laboratory-for-theory webs.

Many student-created webs exemplify that new form of discourse proposed in Gregory Ulmer's *Teletheory* (where, however, he presents it in the context of video and film; he has since discovered hypertext and become a major innovator using it, particularly in the form of the World Wide Web, to teach large classes at the University of Florida in writing and literature). This genre, which Ulmer terms "mystory," combines autobiography, public history, and popular myth and culture. As Ulmer explains, his proposed new mode of writing "brings into relationship the three levels of sense—common, explanatory, and expert—operating in the circulation of culture from 'low' to 'high' and back again," and thereby offers a means of

researching the equivalencies among the discourses of science, popular culture, everyday life, and private experience. A mystory is always specific to its composer, constituting a kind of personal periodic table of cognitive elements, representing one individual's intensive reserve. The best response to reading a mystory would be a desire to compose another one, for myself . . . mystory assumes that one's thinking begins not from the generalized classifications of subject formation, but from the specific experiences historically situated, and that one always thinks by means of and through these specifics, even if that thinking is directed against the institutions of one's own formation. (vii–viii)

Although Ulmer presented his Derridean notions of the new writing in *Teletheory,* a work subtitled *Grammatology in the Age of Video,* it turns out to describe not so much—or at least not only—the kind of textuality one finds in the analogue media of film and video but that emanating from (or instantiated by) digital word and digital image. As we have several times observed, hypertext, a border- and genre-crossing mode of writing, inevitably stitches together lexias written "in" different modes, tones, genres, and so on. Ulmerian mystory provides us with a first, possibly preliminary, model of how to write hypermedia.

One of the most interesting of such mystories is Taro Ikai's *Electronic Zen,*

which uses hypertext linking to allow the reader to travel among lexias relating his experiences as a security guard in Tokyo, work with a Zen master, and Japanese poetry. Following directions and clicking on the introduction, one encounters two possible routes—"water" or "chef"—and following the first, one encounters four lexias that, taken together, produce the following:

[1] Water flows, unceasingly.

[2] It never stops. Not for a second.

[3] To hear it makes me think that I can hear the sound of time trickling down like water.

[4] Look without your eyes, straight—at all that has life, and simply to obey them.

Following the link from this last lexia opens an image of the night sky from which one can take a dozen different paths, some of which cycle back through the sky. At first, like the lexia entitled "chef," some on this path appear to contrast sharply with the tone and subject of the Zen materials, but increasingly as one encounters and reencounters them, these supposedly disparate subjects begin to interpenetrate and interilluminate one another, drawing closer together, as it were: the hard-working short-order cook turns out to fulfill the Nun Aoyama's injunction "Don't think about yourself" while the words of a half-witted co-worker, obsessed with the weather, blend eerily with those of his Zen master.

Some mystories, to be sure, may well be fictional through and through; that is, like *Jane Eyre* and *Great Expectations,* they imitate or simulate autobiographies, and however much autobiographical material may permeate them, they nonetheless take the form of autobiographies of fictional characters. Helene Zumas's *Semio-Surf,* at which we have already looked when discussing the rhetoric of writing hypermedia for the World Wide Web, exemplifies such a possibly fictional mystory, and so do several other works submitted as course projects.

In contrast, Jeffrey Pack's *Growing Up Digerate,* which now forms a part or subweb of the *Cyberspace, Virtual Reality, and Critical Theory Web,* combines theory, here chiefly relating to cyberspace, and autobiography of someone who grew up "'digitally literate,' that is, having a familiarity with computers." As Pack's "Introduction" points out,

Most autobiographies start at birth, or with a short prelude describing how one's parents met. For this web, however, such things aren't very important. A birthdate (February 14, 1977) may prove useful if you're the sort of person who likes to do the math and figure out how old I was when various things happened, but isn't very

necessary since I *am* that sort of person and will probably do it for you if I feel it's important. Where this story *really* begins is in 1983, when our family purchased its first computer.

At this point one can follow links within the text from the phrases "William Gibson's *Neuromancer*" or "its first computer," or one can use Pack's footer links to open an index that lists alphabetically approximately forty items ranging from America On-Line and Apple IIe through MS-DOS and MUD to World Wide Web and Zork. One can read this mystory more or less linearly, or one can go to the index or cycle through it by means of its many links—the lexia entitled "MS-DOS," for example, has seven in addition to the four footer links—and in doing so one receives both a personal history of computer literacy and a personal history.

As these few examples show, hypertext is here and undergraduate students are already mapping out the new forms of discourse that this combined information technology promises. After giving readings of these and similar webs at conferences and workshops, I am often asked how I go about evaluating them, and I respond that I combine the requirements of the old and the new; that is, accuracy, quality of research, writing at the level of the individual sentence and paragraph, and rhetorical effectiveness still count for a great deal, but webs also have to show visual literacy, skillful linking, clear and effective organization, and the like.

From Intermedia to the Web—

Losses and Gains

After changes in Apple Computers' hardware and software effectively ended the Intermedia project, my students and I used various other hypertext systems, each of which has its own distinctive strengths and disadvantages and its corresponding educational effects. Experiences with these different systems revealed several important points of interest to anyone working with educational hypermedia, the first of which is that the apparently most minute technological change, such as system speed or screen size, can have unexpected, broad effects on reading, writing, and learning with hypertext.

Storyspace, which works on both Macintosh and Windows machines, does not have Intermedia's UNIX-based system of varying permissions (which permits an instructor to fix or freeze a document while allowing students to link to it), and it also does not have either Intermedia's structured graphics editor or its ability to permit individual documents to participate in multiple webs. On the other hand, it has a range of valuable qualities, not the least of which is that it will work on any Macintosh or Windows machine; unfortunately,

moving webs between environments is not entirely automatic. Importing text and images, making links between words and phrases, full-text searching, and organizing documents are all very easy, and although this system does not have Intermedia's Web View, the Storyspace Roadmap (see Figure 17), which one can call up by pressing a simple key combination, provides a partial analogue to this invaluable feature by furnishing a reading history and list of link destinations for each individual document.

Perhaps most important, the simple fact that Storyspace runs on any PC created novel portability for all the webs originally created for Intermedia. Since students were able to copy any web from a server situated in the Computing and Information Technology building but accessible from various parts of the university, including some residence halls, they both read and wrote webs anywhere they had access to a Macintosh. (Since Storyspace permits one to copy linked sets of lexias easily, one can create comments at home and later paste them into the master or server version of any web to share with others.) The ease and convenience of working with what J. David Bolter called the "poor man's Intermedia" led, particularly in my hypertext and literary theory courses, to students creating their own considerable hypertext webs, some of them quite massive.

Storyspace has proved itself extremely useful but reduced the ability of students to read spontaneously as wreaders. Yes, students can add links but, without Intermedia's UNIX-based system of hierarchical privileges, they can only do so if they meet in lab with the person having the course password. In retrospect, one can see that the convenience of using a hypertext system based on the standard operating system meant that we gained greater ease of use, particularly when importing materials, and far greater accessibility. In return, we lost a real-time—as opposed to asynchronous—collaborative work environment. Nonetheless, having experience of working with Intermedia, I could easily develop strategies to ensure that students created valuable collaborative webs and even added their own links. Collaborative authoring, however, proved, and remains, a much easier matter than does adding links. One of the first exercises using Intermedia and Storyspace involved students creating their own links in the course webs, but the absence of a convenient way of doing so meant that students did not tend to think of working in this manner unless an assignment called for them to do so.

Using Storyspace also affected the kinds of visual materials students created, paradoxically reducing the visual literacy of student work in the purely literary courses while radically increasing it in those on digital culture and critical theory. The reason for the first change lies in the fact that whereas

Intermedia had a simple graphics editor that permitted student-wreaders to create diagrams, concept maps, and overviews within the system, Storyspace and World Wide Web viewers do not, thus requiring them to use Photoshop or similar graphics software. The immediate effect of the switch from Intermedia to Storyspace, therefore, was that students in my survey and Victorian courses stopped producing interesting concept maps that I discussed above. At the same time, because students experienced in using Photoshop, Illustrator, and image scanning programs found adding visual materials to their webs very easy to do in Storyspace—one simply copies images from a graphics program and pastes them directly into a Storyspace lexia—they began to use images (and video and sound) much more often.

Another anticipated difference appeared in the way students manipulate the Storyspace view to convey information. Although both Intermedia and Storyspace share what at first appear near-identical folder structures, authors can arrange the individual items in the Storyspace view to create patterns and hence display a web's organization. Experimenting with this feature, students quickly began to use it as a visual element in their writing (for examples, see Figures 14 and 26).

Using the World Wide Web again confronts the teacher with another set of advantages and disadvantages. Most obviously, available resources and potential collaborations are truly worldwide rather than being limited to a single class or campus, and students find creating basic HTML documents very easy to do, particularly if instructors provide simple templates. Although images consume time and resources, they are easy to employ, and sheer visual literacy has risen greatly with the Web. Assuming that students have access to a server on which they can place their own documents (and a considerable number of students in my hypermedia classes do), the World Wide Web once again grants student-collaborators the power to create their own documents and sets of links.

On the other hand, as we have already seen, HTML viewers come with a heavy cost as well. HTML produces a relatively flat version of hypertext, and students used to working with two features shared by Intermedia and Storyspace—one-to-many linking and various aspects of the multiwindow feature—often complain bitterly how confining and disorienting they find the Web to be. As I have already explained in chapter 5, course templates, identifying headers, and sets of linked footer icons solve many of the potential problems of navigation and orientation in HTML-based systems. One-to-many linking, which I take to be one of the defining qualities of a true hypertext system and one of its educationally most valuable, proves harder to replace or

find an equivalent. The laborious task of creating and then maintaining sub-overviews for each item in an author and text overview solves the problem of using effective overview and crossroads documents on the Web, but the common Intermedia, Storyspace, and Microcosm practice of attaching several links to a word or phrase in a text document—particularly useful because multiple links produce a valuable preview function in the form of automatically generated menus—simply disappears.

Answered Prayers, or the

Academic Politics of Resistance

After a lecture I had delivered at an Ivy League campus on the role of hypertext in literary education, a distinguished historical scholar worried aloud in conversation with me that the medium might serve primarily to indoctrinate students into poststructuralism and Marxist theory. After another talk at a large state university in the Deep South, a younger academic, concerned with critical theory and the teaching of writing, argued (on the basis of my use of hypermedia in a historical survey) that it would necessarily enforce historical approaches and prevent the theorizing of literature. Such responses have proved typical of a sizable minority of those to whom I and others who work with this new medium have introduced educational and other applications of hypertext. Many with whom I have spoken have shown interest and enthusiasm, of course, and some of those concerned with critical theory as a major professional interest have responded with valuable suggestions and advice, even when remaining guardedly skeptical. For a sizable minority, however, hypertext represented and still represents the unknown, and one is not surprised to find that they project their fears on it, as people do on any unknown Other.

Not all observers find themselves troubled by the entrance of this latest educational technology into the portals of academe. Jean-François Lyotard, for example, argued as early as 1979 that "it is only in the context of the grand narratives of legitimation—the life of the spirit and/or the emancipation of humanity—that the partial replacement of teachers by machines may seem inadequate or even intolerable" (*Postmodern Condition*, 51). Since he has abandoned these "grand narratives," he does not resist technology that might threaten them. The historical record reveals, however, that university teachers have fiercely resisted all educational technology and associated educational practice at least since the late Middle Ages. Those who feel threatened by hypertext and associated technologies might do well to remember that, as Paul Saenger points out, when the introduction of spacing between words made reading to oneself possible, in "fourteenth-century universities, private silent reading [was] forbidden in the classroom" ("Books of Hours," 155). One can

easily imagine the objections to the new technology and its associated practice, since those objections have not changed very much in the past seven centuries: "Students, if left to their own devices, will construe the texts incorrectly. Everyone knows that permitting them such control over their own education before they are ready for it is not good for them. They don't yet know enough to make such decisions. And besides, what is to become of us if they use this insidious technology by themselves? What are we to *do?*" Similarly, when books appeared, many faculty members feared these dangerous new teaching machines, which clearly ceded much of the instructor's knowledge and power to the student. The mass production and wide distribution made possible by printing, which threatened to swamp ancient authority in a flood of modern mediocrity, also permitted people to teach themselves outside institutional control. Therefore, well into the eighteenth century, undergraduates in European universities had access to the library only a few hours per week.

Hypertext systems, just like printed books, dramatically change the roles of student, teacher, assignment, evaluation, reading list, relations among individual instructors, courses, departments, and disciplines. No wonder so many faculty find so many "reasons" not to look at hypertext. Perhaps scariest of all for the teacher, hypertext answers teachers' sincere prayers for active, independent-minded students who take more responsibility for their education and are not afraid to challenge and disagree. The problem with answered prayers is that one may get that for which one asked, and then . . . What more terrifying for professors of English, who have for decades called for creativity, independent-mindedness, and *all those other good things,* to receive them from their students! Complaining, hoping, even struggling heroically, perhaps, to awaken their students, they have nonetheless accommodated themselves to present-day education and its institutions, which include the rituals of lecture, class discussions, and examinations through which they themselves have passed and which (they are the evidence) have some good effects on some students.

What Chance Has Hypertext in Education?

My experience of teaching with hypertext since 1987 convinces me that the Web materials currently available have enormous potential to improve teaching and learning. Skeptical as I first was when I became involved with the Intermedia hypertext experiment, I discovered two years later that the hypertext component of my courses allowed me to accomplish far more with them than ever before possible. In the decade since I began to work with educational hypermedia, I have observed increasingly computer-literate students either

demand hypertext materials or, now that the World Wide Web has arrived, go in search of them independent of their instructors' suggestions, wishes, or even knowledge. One of my favorite stories in this regard involves a student in one of the earliest classes to use Intermedia who took a visiting year at Columbia University. After the opening meeting of a course on James Joyce, he perplexed the lecturer by asking, "Where is your Intermedia web on *Ulysses?*" Now they just ask for the URL of the course website. Students, in other words, increasingly drive the use of hypertext—just as they did the use of silent reading in the late Middle Ages. As we have seen in the discussion of distance learning, students at traditional tertiary institutions already use the Web for their courses—whether or not their instructors tell them to do so.

Nonetheless, even with the enormous impetus provided by the World Wide Web I do not expect to see dramatic changes in educational practice for some time to come, in large part because of the combination of technological conservatism and general lack of concern with pedagogy that characterizes the faculty at most institutions of higher learning, particularly at those that have pretensions to prestige. There is, however, occasion to hope as I first wrote in 1991, because as one of those attending a 1988 conference on educational hypermedia at Dartmouth commented: "It took only twenty-five years for the overhead projector to make it from the bowling alley to the classroom. I'm optimistic about academic computing; I've begun to see computers in bowling alleys."[9] Academic computing in the form of course and university websites, e-mail, and online course information has in fact arrived, and there is much about which to be pleased, particularly concerning administrative matters like submitting and advertising course descriptions, obtaining classlists, ordering books, scheduling meetings, and so on. Teaching has yet to take full advantage of the Web, in part because many educational technologists and faculty users still think in terms of the book.

Getting the Paradigm Right

Although the World Wide Web has obviously already had a major effect on colleges, universities, and other cultural institutions, it has not realized many of the more utopian visions of hypertext. A small part of the reason involves the already-discussed limitations of the Web as form of hypertext. At this point, however, the limitations of our mentalware are clearly more to blame than the limitations of our software. Too many of us—and I include teachers, educational technologists, webmasters, and software developers—remain so deep inside the culture of the book that we automatically conceive of digital media in terms of the printed book. We base our ideas about the nature of teaching, the purpose of

documents, and their relation to courses, disciplines, and universities on the mistaken assumption that electronic documents are essentially the same as printed ones. They're not.

Digital media, hypertext, and networked computing, like other innovations, at first tend to be (mis)understood in terms of older technologies. We often approach an innovation, particularly an innovative technology, in terms of an analogy or paradigm that at first seems appropriate but later turns out to block much of the power of the innovation. Thinking about two very different things only in terms of their points of convergence promotes the assumption that they are in fact more alike than they really are. Such assumptions bring much comfort, for they remove much that is most threatening about the new. But thus emphasizing continuity, however comforting, can blind us to the possibilities of beneficial innovation. Yes, it is easier to understand an automobile as a horseless carriage or a personal computer as a convenient form of typewriter. But our tendency to put new wine in old bottles, so common in early stages of technological innovation, can come at a high cost: it can render points of beneficial difference almost impossible to discern and encourage us to conceptualize new phenomena in inappropriate ways. Thus, thinking of an automobile as a horseless carriage not only emphasizes what is missing (a horse) but also fails to take into account the way speed greatly changes the vehicle's relation to many aspects of self and society. Similarly, thinking of a computer, as so many users do, as a fancy typewriter that easily makes corrections prevents taking advantage of the labor-saving possibilities of the digital text, such as its configurability by styles or the ways it permits seamless movement between paper documents and those moved about by e-mail.

Working with the right paradigm—that is, conceiving digital media in the correct terms—is essential if one is to take advantage of their special strengths. The paradigm, in other words, is more important than the purchase. Unfortunately, many computer users still think primarily in terms of the book. Examining educational institutions, including my own, reveals both that they commonly use the print paradigm in inappropriate applications and they often fail to take advantage of the particular strengths of the digital technology in which they have invested so heavily.

There is nothing strange about such resistance during a transitional period, and examples lie close at hand. During the first decades of e-mail, many potential users in business, education, and government preferred faxes, which still rely on the physical page, despite the fact that for those with Internet access, the telephone charges associated with faxing documents made them much more expensive for the individual person or administrative unit.

I'm sure we all recall hearing fax users boast how they'd entered the electronic age while refusing to use e-mail. The fax machine still has its function, though it is a diminishing one, since facsimiles can now be sent to one's e-mail account, and some business, educational, and governmental organizations permit and even encourage one to e-mail important correspondence as long as it is accompanied by a digital image of one's signature—an ingenious compromise that will no longer be necessary once secure electronic signatures become widely used.

The inappropriate use of the printed page as a basic model in an electronic environment appears again in the widespread misuse of PDF (Portable Document Format) files on websites. A PDF version of text documents has the great value of preserving the exact appearance of the original document. It has the strengths—but also the limitations—of print. Within an electronic environment, a PDF presentation of a document represents a refusal to employ any of the advantages of digital technology other than its ability to send copies quickly and cheaply over a network. It permits, however, neither searching nor linking, thereby creating an annoyingly inefficient means of conveying information. At my university, for example, some departments place their course listings on the institution's website as PDF files while others present them in HTML. If a faculty member or student wishes to look at English department course offerings or find important information, such as the section number of an individual course (necessary when placing book orders with the university store), she must download a PDF file on her computer's desktop, open it with the proper software, and read through page after page of text. Then, she either stores the PDF file or discards it. Instead of using PDF files, some departments and administrative units present the information in HTML, which is searchable and which also permits linking from course titles to brief descriptions, reading lists, and information about the course instructor. The use of PDF here instead of HTML represents a refusal to take advantage of the institution's expensive electronic infrastructure. It exemplifies, in other words, what happens when one thinks in terms of print or the printed book when using digital media. (New versions of Adobe Acrobat do in fact allow both text searching and linking, but my point still holds: many organizations eagerly choose to use earlier versions of PDF documents despite—or perhaps because—they sacrificed the advantages of digital text by closely imitating those of print.)

In contrast to portions of the institution that chose the PDF route, the university library has a beautiful and superbly conceived site that efficiently permits users to obtain information about its collections and also employ a

large number of digital reference materials, such as encyclopedias, diction-aries, bibliographies, and collections of scholarly articles. Ironically, that part of the institution specifically dedicated to storing, preserving, and dispensing books and other physical information media, such as microfilm and micro-fiche, has made an especially well thought-out application of digital media.

Thus far I have discussed only colleges and universities as educational institutions, but museums are also educational institutions, and their use of digital resources often shows dependence on the print paradigm. Two examples from small museum websites demonstrate the high cost in lost opportunities when one fails to conceive an innovative technology in its own terms. In the first, a small historical museum in a region of the United States once dominated by the logging industry created a website as part of its man-date to play a greater role in the cultural life of its community. Featuring an exhibition of what life was like in old logging days, it encouraged visitors to record their handwritten comments in a guestbook. Visitors responded by writing that their fathers had worked in the logging industry, or they remem-bered it as part of their own childhoods. What's wrong here? Having conceived its website as a printed book, the museum has blinded itself to the possibili-ties of the new technology. In particular, by assuming that a website is *essen-tially* a book, its creators suppressed various innovative capacities that would have well served their project and mission. Working with the flawed assump-tion that the website is fundamentally a particular kind of book—in this case, a print exhibition catalogue placed in the gallery with a guest book next to it for handwritten comments—the website's developers made several unfortu-nate corollary assumptions. They took it for granted, for example, that the printed book's separation of author and audience is the right way to concep-tualize the relationship between website and user. But is it? Since one of the purposes of this site involves building a sense of community and creating a community memory, why not take advantage of visitors' comments by adding them to the website, inviting people to expand upon them, provide family information, photographs, and the like? Why not use the fundamental charac-teristics of linked digital information resources (hypertext) to "grow the site"? Why not use a dynamic site to create or enhance a sense of community among its constituents? A dynamic, fluid textuality, such as that found on websites, can change and easily adapt to its users, taking advantage of the modularity and capacity for change of digital text. But it cannot do so if its developers and home institution only think of it as a book—wonderful as books are.

Another example: a small anthropological museum at a Midwestern American university created a website with elegant graphic design obviously

intended both to draw visitors and allow those who cannot come in person to enjoy some of its treasures. Individual screens present images of North American Indian artifacts together with basic information about them. So far so good. Unfortunately, that's all there is, for the entire site is nothing more than a direct electronic presentation of a museum catalogue. Putting print-derived text and images online, however, requires doing much more than formatting them in HTML, and a description of the site shows why. Since the designers began with the idea that a website is little more than an electronified book, they also assumed that readers would begin at the opening screen and make their way through one of several tightly limited paths. Making a common error, they failed to permit readers to return easily to the opening screen or sitemap, much less provide similar access to sitemaps for subcategories (departments) in the museum. Such book-blindered design, all too common on websites, also shows the designers never took into account that many webreaders will not arrive at the front entrance of the museum but led there by Internet search tools, arrive by falling through the roof and landing in the middle of a strange gallery. At a very minimum, they need to know where they are, and where they can go next.

The failings I've described thus far exemplify what happens when one assumes that a website, a nonphysical, electronic form, has the attributes of a book, which has physical form. A related, though less obvious set of problems has broader cultural, educational, and political implications. In the first kind of mistake, one uses a potential innovation inefficiently; in the following, one suppresses it entirely. Looking at the elegant graphic design of the site, one realizes the brief texts describing the represented objects in the collection contain no links. Conceptualized as old-fashioned catalogue entries, these passages fail to take advantage of the innovative capacity of links, which can provide basic glossary items that help younger users or those unfamiliar with the topic under discussion. Links can also lead interested readers to more advanced materials. Links, which can produce a kind of customizable text, have the power to turn such a site into a fully functioning educational resource. Used in this way, they serve to enrich and deepen the site as an introduction to the entire museum itself. Furthermore, linking to documents about materials outside the museum can also reconfigure the site's relation to its intellectual community. Here, however, relying on the book as thought-form or conceptual model prevented such innovation. Although this anthropology museum site exists at a university that also has a department of anthropology, it makes no attempt to connect the two. The site contains no

documents by members of that department, nor does it list relevant courses available at the university.

What could one do differently with such a resource if one understands that a website can be more than a booklike static introduction to a museum collection? Since links cross borders and reconfigure our senses of the relationships, why not use them to reconfigure the relations of museum and university? The site could include relevant departmental research, all or parts of previously published papers, bibliographies, research guides, exemplary work by undergraduate and graduate students, even material from other universities' collections, and so on. Once one conceives a website from the vantage point of innovation—asking what's different about this new information technology and what we can do with such differences—one can conceptualize it as a network within other networks, and not simply (and misleadingly) as a book. At the same time, we must not exaggerate the differences between electronic hypertext and print text, for the many continuities between them require that we not only pay close attention to the relative strengths of each but that we also take from the printed page as much can help us in the new media. Hypertext is still text.

The same approaches to incorporating websites into institutional practice that we saw in museums occur in many colleges and universities. Increasingly, educational institutions around the world have turned to WebCT, Singapore's Interactive Virtual Learning Environment (IVLE), and similar software packages, which provide many valuable features for administering and teaching a course. These include not only electronic class lists and spread sheets for grades joined to a central database but also other features more directly related to teaching than to administration, such as collections of texts and images, discussion lists, multiple-choice tests, and course websites. What's wrong with a course-based website? Those that move beyond serving as mere replacements for paper syllabi often show intelligent planning and valuable resources, but most that I've seen have three major shortcomings. In the first place, they do not always include student work, and when they do they almost never keep these materials online past the end of the class, thereby sacrificing any opportunity for developing a critical mass of student-created materials that later students could use and that could convince students that they actively contribute to the educational process. Erasing these materials at semester's end also destroys the possibility of creating a valuable course memory.

Second, course websites are almost always closed to the public, thereby losing opportunities to obtain contributions of useful materials and to show

off what the class is doing. At one institution at which I've taught, class websites proved valuable informational and recruiting tools. Many universities prevent public access to course websites either because they contain materials for they have paid a subscription or, in other cases, because instructors have illegally used copyrighted materials without permission. Still, that's no reason to close off the entire site.

Third, a course website is almost always associated with a particular instructor, and only very rarely will others in the same department use it, which means in practice that the time and energy that go into creating a website can never be shared or leveraged. For that reason I would urge departments and institutions to create broader sites like *The Victorian Web* and *The Postcolonial Web* that many courses and instructors can use. For example, a website with materials about eighteenth-century Anglo-European culture could be of use not only to courses in English, German, French, Italian, Spanish, and other literatures but also to those in nonliterature departments, such as art history, religious studies, social and political history, music, philosophy, and so on. Websites, like all hypertext, are fundamentally modular. Therefore, such sites can grow slowly and only in certain areas. I find that people are far more willing to contribute a small module to an ongoing enterprise, such as this kind of a website, than to begin creating a body of materials by themselves.

The next step away from course-based websites involves creating departmental or institutional ones that include more than administrative information. When I served as the founding dean of the University Scholars Program (USP), an interdisciplinary honors college at the National University of Singapore, we created the usual institutional site with information about admissions and sections for all disciplines and courses. We also used hypertext as an institutional paradigm.[10] Courses ranging from writing, ethics, and the culture of Islam to physics and statistics raised questions with students about connections of their classes to other fields. The site for Science, Technology, and Society in addition to including lists of courses offered also had brief introductions to the relations of technology, particularly information technology, to literature, computer science, ethics, and so on. Since Singapore is a multiethnic, multiracial society, many courses tried to reflect that fact, incorporating materials from two or more cultures. Thus an introduction to political theory included both European political thinkers and those from Islamic countries, a course in the history of cosmologies included India, China, the Middle East, and Europe. Like the sitemaps in *The Victorian Web,* the USP site was designed to suggest to students the many different ways of approaching a subject, not all of which any one person could cover.

8
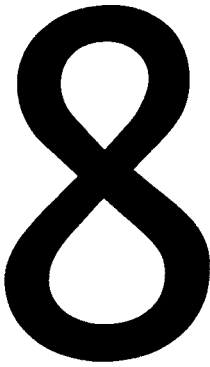
The Politics of Hypertext: Who Controls the Text?

Can Hypertext Empower Anyone? Does Hypertext Have a Political Logic?

After all my claims for reader empowerment in educational applications of hypermedia, the question remains, in what senses can hypertext or any other information technology empower anyone? In what sense and to what extent can we claim that they democratize, or even tend to democratize, the people and societies that use them? Certainly, despite all the enthusiasm for hypermedia, the Web, and the Internet, skeptical voices have made themselves heard early and often. As early as 1989—that is, before the appearance of the World Wide Web—Norman Meyrowitz, a leader of the team that developed Intermedia, delivered a keynote address at a major computer conference entitled "Hypertext—Does It Reduce Cholesterol, Too?" Several obvious reasons for skepticism come to mind when encountering statements by those whom Vincent Mosco calls the "visionaries promising an electronic utopia" (118), part of which is supposedly created by hypermedia and the Internet.[1] Most obviously, as Mosco, Tom Standage, and others have pointed out, during the past two centuries enthusiasts have proclaimed that every new technology would transform the world for the better. Electricity, telegraphy, photography, cinema, microfilm, video, cable television, computing, space satellites, and the Internet all were supposed to bring the world peace, prosperity, and freedom. All these technologies, as it turned out, did have major economic and social effects, though they hardly engendered any of the promised utopias.

Others who doubt claims that hypermedia or other digital technologies can produce beneficial political effects fall into several categories. First, there are those like Meyrowitz, myself, and other experienced workers with hyper-

text who reject outlandish claims for it. Then, there are those like Mitchell who recognize the "no free lunch" factor—in other words, that every advantage of a new information medium brings with it a possible disadvantage. For example, many have proclaimed, quite correctly, the enormous benefits of the Internet, but connectivity has its downside, too, for as Mitchell warns after 9/11, "in a networked, electronically interconnected world, there is no fundamental difference between addresses and targets" (*Me++*, 5). "The densely, globally networked world," Mitchell further explains, "is emphatically not (as early cyberspace utopians had sometimes imagined) inherently one of self-regulating, libertarian harmony. The proliferation and geographic distribution of access points—the very essence of the benefits of networks—also multiplies and distributes opportunities to create threats to the safety and well-being of those who have come to rely upon network capabilities" (*Me++*, 179). Moreover, even those who remain convinced of the positive personal and political benefits of the Net, such as the cyber-activist Geert Lovink, have learned from experience that discussion lists and other electronic forums require some form of central control—editors, webmasters, moderators, gate-keepers.[2] Multiuser digital environments, like all human enterprises, turn out to need organizational techniques found outside cyberspace: "After a brief period of excitement, the newly founded web sites, lists, servers, media labs, etc. have to find ways to deal with growth, economic issues, internal hierarchies, ever-changing standards, ongoing convergence problems between platforms, and incompatible software while establishing a form of cybernetic normalcy in the process" (*Dark Fiber*, 4).

Another reason for skepticism about the possibility of hypermedia, the Internet, and other digital technologies fulfilling predictions that they would democratize institutions and empower users derive from justifiable fears that, as Lovink puts it, "the Internet, bit by bit, is being closed down, sealed off by filters, firewalls, and security laws, in a joint operation by corporations and government in order to create a 'secure' and 'safe' information environment, free of dissents and irritants to capital flows" (*Dark Fiber*, 11–12). Lovink, one of many who believe that "it is time to say goodbye to the short summer of the internet" (19), fears that governmental and commercial interference with the Internet threatens to choke off its potential for political good:

The primary values of the early Internet, with its Usenet, virtual communities and focus on the fight against censorship are under threat. The consensus myth of an egalitarian, chaotic system, ruled by self-governing users with the help of artificial life and friendly bots, is now crushed by the take-over of telecom giants, venture capital

and banks and the sharp rise in regulatory efforts by governments. ("Information Warfare: From Propaganda Critique to Culture Jamming," 309)

China's decade-long efforts to censor the Internet, the U.S. government's tracking Internet users, and Microsoft's continuing attempts to control the consumer and business market exemplify narrowing the possibilities of Internet freedoms. As a 1996 article in the *Wall Street Journal* explains, China "is determined to do what conventional wisdom suggests is impossible: Join the information age while restricting access to information" (Kahn, Chen, and Brauchli, A1), and its authorities hope to do so by creating an electronic Wall of China, a heavily filtered and censored "'intranet' or Internet-lite" (A4) with a "monolithic Internet backbone, centrally administered, that minimizes the threat of the Internet's amoeba-like structure" and thereby control the "two things China's authoritarian government most dreads, political dissent and pornography" (A4). Eight years later, the struggle to control the Internet continues, with the government sending mixed signals. On the one hand, a court "recently announced that an Internet democracy advocate charged with subversion would get a suspended sentence instead of a long prison term." On the other, the government relies on Internet controls and surveillance of users. According to Howard French's article in the *New York Times*, "Internet café users in China have long been subject to an extraordinary range of controls. They include cameras placed discreetly throughout the establishments to monitor and identify users and Web masters, and Internet café managers who keep an eye on user activity, whether electronically or by patrolling the premises." In addition, approximately thirty thousand Internet police play "a cat-and-mouse game with equally determined Web surfers, blocking access to sites that the government considers politically offensive, monitoring users who visit other politically sensitive sites and killing off discussion threads on Internet bulletin boards." Web users who try to reach censored sites "receive messages announcing a page is no longer accessible, or their computer screen may simply go blank, or they may be redirected to unrelated sites." Furthermore, to join a discussion on politically sensitive topics, users must identify themselves by their real names, e-mail addresses, and even phone numbers. The government appears alarmed by the sudden popularity of blogs, in large part because as Xiao Qiang, director of the China Internet Project at Berkeley, explains, "'the volume of online information is increasing vastly, and there's nothing the government can do about that. You can monitor hundreds of bulletin boards, but controlling hundreds of thousands of bloggers is very different.'"

According to researchers at Berkeley, Cambridge, Harvard, and Toronto, the Chinese government may well have found a way to control this vast amount of information using a variety of filtering software. One method uses filtering technology that in effect disables features of the search engine Google by tapping "into snapshots of web pages stored on Google's servers—which are based outside China" that formerly provided "a common way for Chinese to view sites that were otherwise blocked" (Hutzler, B1). According to researchers at Berkeley, a second part of "the Great Firewall of China" takes the form of "a list of banned words and phrases that a Chinese company embeds in desktops to filter messaging among PCs and cellphones. Among the more than 1,000 taboo terms: 'democracy,' 'sex,' and 'Hu Jintao,' China's president" (B1). The new filtering technologies comb the Internet and make sure that e-mails objectionable to the government become lost "in Chinese cyberspace and never reach their destinations, and requests to search engines, which provide lists of Web sites based on words, can go unanswered" (B1).

The government of Singapore, "one of the world's most enthusiastic users of the Internet," also wishes to take advantage of the new technology while simultaneously silencing any liberatory message that might be in the medium, for as Dan McDermott wrote on March 6, 1996,

Chill winds blew through Singapore cyberspace yesterday, as the government announced sweeping plans to filter what the average Singaporean can see and say on the Internet. Joining several other governments in seeking to filter the rivers of words and pictures pouring onto the Internet, Singapore said it will hold both content providers and access providers responsible for keeping pornographic and politically objectionable material out of the country's 100,000 Internet accounts. (A1)

Singapore has already blocked computer sites objectionable to the government, shutting down access both to Playboy Enterprises Inc. homepage and to that of the Socratic Circle, "an informal discussion group that . . . briefly held some animated political discussions last year" (A1). In the intervening years, the Singaporean government has somewhat loosened its grip, announcing, for example, that Internet providers would no longer be held responsible for content placed on their servers by users—a crucial point in a country with especially stringent libel laws.

For many observers, increasing commercial control of the Internet arouses more concern than government surveillance and censorship. According to Mosco, the most worrisome changes includes "three interrelated trends: the digitization and commodification of communication, corporate integration and concentration in the communication industry, and the deregulation of

the industry" (143). Lovink, who took part in Amsterdam's early experiments in using the Internet to empower citizens—see his "The Digital City—Metaphor and Community"—provides an example of what happens when several large corporations try to control the technology. He was one of many observers who noted that in the 1990s Microsoft and other large corporate interests tried to undermine the fundamental user-centered nature of the World Wide Web by turning it into another broadcast medium: "Due to the commercialization of the net, big publishing houses, cable giants, telecoms and software companies have moved in and are now pushing the web in the direction of old-style broadcasting technologies. *Wired* calls this the revenge of 'TV'" ("A Push Media Critique," 130). Lovinck wrote this in 1997, when Microsoft tried to direct users of its Internet Explorer in discrete channels through which information could be "pushed." The attempt was a complete failure, for users preferred to search the Web, however inefficiently, and choose their own links and paths. The notorious failure of push media, I would argue, demonstrates that users believe that user-centered hypermedia best serves their needs—and that networked computer environments do in fact empower users to act as more than mere consumers. In his "Insider's Guide to Tactical Media," Lovink argues that information technologies do in fact have an ideological bias: "Being a 'difference engine' on the level of representation may put out a lot of useful public content, but it does not touch on the 'media question.' What is of interest are the ideological structures written into the software and network architecture. It is not just enough to subvert or abuse this powerful structure" (263). The reactions by users to commercial attempts to turn the World Wide Web into another form of broadcast media—that is, *the choices they made*—demonstrate that users experienced the Web as having a bias toward reader empowerment.

The most extreme doubters include those like Espen Aarseth, who denies the possibility that hypertext in any way empowers or liberates its users. Let us look first at Aarseth, whom we may accurately describe as the leading antihypertext theorist. In his otherwise valuable *Cybertext* (1997), which advances pioneering ideas about computer games, he mounts a fierce attack on most earlier writings on hypertext, particularly on those that invoke poststructuralist theory to explain digital media or that claim that the new media in any way empowers users. Although he himself freely draws on Eco, Genette, and Barthes at points in his book, he charges that people who use critical theory to explain hypertext, or to point out parallels between them, are using an "imperialist pretext" to "colonize" another field (83). Similarly, to call paper-based texts that partially anticipate electronic hypertext proto-

hypertexts is an "imperialist classification" (75). Strong words, but not surprising when one considers the context in which they appear. Most of *Cybertext* concerns computer games and other forms of digital media, such as MUDs and MOOs, which Aarseth earnestly wishes to establish as important cultural forms. For some reason, he seems to believe—or at least *writes* as if he believes—that to clear intellectual space for games, MUDs, and other forms of what he terms "cybertext," he must trash hypertext, denying that it has any positive qualities. Certainly, at the time he began his project, hypertext and hypermedia were the forms of digital text that received most attention, particularly in Norway, which has important hypermedia theorists and practitioners like Gunnar Liestøl.

Reading *Cybertext*, I was struck by how little actual hypertext Aarseth seems to have read, and how few hypertext systems he seems to have used. Michael Joyce's pioneering *afternoon*, which is one of the few hypertexts he mentions, is the only one he discusses at any length, and his remarks closely follow the writings of Jane Yellowlees Douglas and Stuart Moulthrop. His specific comments show little understanding or experience of either *afternoon* or its software environment, Storyspace. According to Aarseth, in Storyspace "readers could follow *only* the sequences laid down by the writer. Hyperfictions written in *Storyspace*, like *Afternoon*, do not allow its readers free browsing, unlike any codex fiction in existence" (77). His general remarks about Storyspace, which apply only to the page reader version used by Joyce, are wrong on several counts. As we've already observed, Storyspace hypertexts, like *Patchwork Girl* and *Quibbling*, which employ the Storyspace reader that includes the software's characteristic graphic map, permit readers to browse freely and indeed encourage readers to do so. Other Storyspace webs, such as the *In Memoriam Web, Breath of Sighs*, and *Hero's Face*, were published in the Demo version of the authoring environment, which not only features "free browsing" but also includes a search tool.

Another fundamental flaw in Aarseth's chapter on hypertext, perhaps suggested by his almost total reliance on a single work of hyperfiction, is that he almost completely neglects informational and educational hypertext and examines no specific examples of them. This turns out to be a major weakness in his evaluation of reader empowerment, because these kinds of hypertext offer much clearer positive choices, in part because many of them have vastly more lexias than any existing hyperfiction, and this factor provides a greater range of *informed* choices. One of the few places he mentions such forms of hypertext comes when he responds to my claim that "hypertext blurs the boundary between author and reader" ("Hypertext, Metatext," 70):

"First by permitting various paths through a group of documents (one can no longer write 'one document or text'), it makes readers, rather than writers, control the materials they read and the order in which they read them. Second, true hypertext, such as the Intermedia system developed at Brown University, permits readers to become authors by adding electronic links between materials created by others and also by creating materials themselves." Aarseth comments: "Landow's project at Brown is one of institutional reform, and even if he bestows the role of reformer on the technology—in this case, hypertext—it really belongs to him" (171). I certainly agree that my teaching with hypermedia from Intermedia to the present involves institutional as well as pedagogical reform, but one hardly needs Aarseth to point that out, since the eighty-page chapter in which the quotation appears continually emphasizes that to activate the educational potential of hypertext, instructors must rethink and reconfigure the subjects, procedures, assignments, and evaluation methods they use. Here as throughout much of his critique of statements about the potentially positive nature or effects of hypertext, Aarseth falsely claims that someone else has identified hypertext as the sole and sufficient cause of something when they have in fact actually argued that it provides an enabling, though not by itself a sufficient, condition.

One of the most disturbing aspects of Aarseth's critique involves his lack of any comment on the following sentence: "Second, true hypertext, such as the Intermedia system developed at Brown University, permits readers to become authors by adding electronic links between materials created by others and also by creating materials themselves." I find such omissions very odd since I am claiming that read-write hypertext systems like Intermedia fulfill his own definition of an author. As he points out, "the politics of the author-reader relationship, ultimately, is not a choice between various pairs of media or forms of textuality, but instead is whether the user has the ability to transform the text into something that the instigator of the text could not foresee or plan for" (164). After all his denials that choosing links in any way affects the relation between author and reader, he doesn't even acknowledge the claims of a hypermedia system in which readers clearly can act as authors.

Aarseth also claims that "it seems somewhat self-contradictory to claim, as Landow does, that hypertext blurs the distinction between reader and author while at the same time permitting the former to become the latter" (173). His difficulties in comprehending my ideas of hypertext readers here come from his habit of thinking in terms of binary oppositions. In fact, I argue that the reader who chooses among links or takes advantage of Storyspace's spatial-hypertext capabilities shares *some* of the power of the author.

We both agree, following Foucault, that authorship "is a social category and not a technological one" (172)—the point, after all, of much of my chapter 4—and I claim that different forms of information technology plus their social and political contexts have produced different notions of authorship.

Perhaps our fundamental points of disagreement appear when he asserts that "there is no evidence that the electronic and printed texts have clearly divergent attributes" (70) while also denying that hypermedia in any way empowers anyone or could tend toward democratization. Here in response are three real-life examples of the ways hypertext and the Internet empower users by democratizing access to information. Note that I do not claim that any of these examples shows that the Internet and associated technologies by themselves produce political democracy. I also do not claim that they in any way make the reader of Internet materials an author of them. In the first case, a young man encounters some pills that resemble an antihistamine for which he has a prescription, but he cannot definitely identify them for he no longer has on hand the bottle in which they came. Each pill, however, has three numbers impressed in the surface, so he types just the three numbers into Google, a popular Web search tool, and the first hit brings one to a pharmaceutical manufacturer's site for a drug, which identifies it as a very different medication—an antibiotic, in fact—and he does not take the wrong medication. Even if one had a *Physicians Desk Reference* (*PDR*) at hand, one could not search by number but would have to compare the pill to images of various medications. In a similar situation involving unidentified medications for elderly people, consulting a pharmacist did not help, since the pharmacist claimed the *PDR* contained so many pills, he did not have the time to try to identify any. In other words, information one would have to expend many hours or even days to acquire was located on the Web in less than fifteen seconds.

This user's experience, I submit, provides clear answers to two questions. First, does the Internet democratize information and empower users? I believe the obvious answer is, yes, for as this example demonstrates, digital information technology provides to people other than physicians and pharmacists information when they need it. In fact, anyone with a computer connected to the Internet, even if located far from a hospital, physician's office, or medical library, has access to the needed information. Second, does the quality—in this case, chiefly time—needed to access information prove an important enough factor to distinguish media from one another? Again, I would say, yes, for even though the same information (the identity of the pill) is available in both print and digital media, the vastly different experience of

using them constitutes a major, distinguishing characteristic that separates different information technologies.

The previous example is, properly speaking, more a matter of information retrieval on the Internet than pure hypertext, but since Google ranks search results in part by numbers of links to each site, even this example involves hypertext. The next example does so directly. It also involves medication: some time after an elderly male relative begins taking a newly prescribed medication, he becomes less energetic and clear-headed. Since his children do not know much about the medication, they Google its name and immediately (within less than a second) they locate a list of sites, and picking the highest-ranked one they open a web document devoted to this drug, which contains links to its possible side effects, contraindications, statistics, and so on. Determining that the medication could not possibly cause the new symptoms, the family at least knows that there is no need to contact a physician.

The next example concerns access to sources about international news events. While in Singapore when NATO began bombing Kosovo as a means of halting the ethnic cleansing in the former Yugoslavia, I wanted to know what *The Providence Journal*, my local newspaper at home, had to say, and so I opened my web browser and typed in http://www.projo.com. When the homepage for the online version of the newspaper appeared, I discovered links to a story about the Kosovo situation. Following the link I was surprised to find not just the usual news from a wire service like the Associated Press but also a dozen links to statements by the governments of concerned countries, including Serbia, Russia, and the United States, thus presenting opposing interpretations of events. Following another link labeled something like "NATO starts bombing campaign," I found myself in a document containing links to information about the airplanes and weaponry of all parties. Additional links led to information about the number, cost, development problems, and legislative history of each airplane plus similarly detailed information about every kind of bomb, rocket, or other munitions employed. Other links brought me to the website of an Italian airbase, which contained many photos of actions taking place there, including images of ground crews from one European NATO nation arming the planes of another. Finally, I came upon information about when each group of planes had arrived at the base or was scheduled to do so as well as additional links to information about individual pilots and aircrews. By this point, I wondered why governments employed spies if all this information could be found so easily on the Net.

In 1993, shortly after the appearance of the World Wide Web, I gave a talk

at the Niemann Foundation at Harvard about the implications of the new technology for journalism. I speculated that if we could apply the hypertext paradigm to news, we might have news media in which individual readers could pursue subjects that interested them as long as they had time and patience to do so.[3] I hardly expected to encounter such a rich example half a dozen years later! Let me emphasize how this hypertext version of the news differs from both the television and newspaper ones. To procure the same information I obtained on the web, I would need to expend several days and possibly weeks using a conveniently located information resource, such as a large library, and I would also have to supplement my search with telephone calls to various embassies, including those located abroad. Compare this to what we may term the *Aarseth principle*—the idea that if two different information technologies contain essentially the same information, no difference exists between them. As in the searches for information about medications, this hypertextual presentation of news about a current event clearly empowers the user—if by "empower" we mean, as I do here, "provides information that would be difficult if not impossible to obtain otherwise." Again, Aarseth finds absolutely no difference between information technologies that contain the same information, but to do so he has to ignore the vastly different ways each one is experienced. Using the words Mitchell uses to distinguish between digital and printed text, I emphasize "that is relevant at the level of everyday experience." Whether or not they have a place in Aarseth's theories, the democratization effects of hypermedia and the Internet are relevant at the level of everyday experience.

The Marginalization of

Technology and the Mystification

of Literature

Discussions of the politics of hypertext have to mention its power, at least at the present time, to make many critical theorists, particularly Marxists, very uncomfortable. Alvin Kernan wryly observes, "That the primary modes of production affect consciousness and shape the superstructure of culture is, not since Marx, exactly news, but . . . both Whiggish theories of progress and Marxist historical dialectic have failed to satisfy the need to understand the technologically generated changes or to provide much real help in deciding what might be useful and meaningful responses to such radical change" (3). Anyone who encounters the statements of Frederic Jameson and other critical theorists about the essential or basic lack of importance of technology, particularly information technology, to ideology and thought in general recognizes that these authors conspicuously marginalize technology. As Terry Eagleton's fine discussions of general and literary modes of produc-

tion demonstrate, contemporary Marxist theory has drawn upon the kind of materials Kernan, McLuhan, and other students of information technology have made available.[4] For this reason, when other Marxists like Jameson claim that examining the effects of technology on culture inevitably produces technological determinism, one should suspect that such a claim derives more from widespread humanist technophobia than from anything in Marxist thought itself. Jameson's statements about technological determinism bear directly on the reception of ideas of hypertext within certain portions of the academic world for which it has most to offer but which, history suggests, seem most likely to resist its empowerment. This rejection of a powerful analytic tool lying ready to hand appears particularly odd given that, as Michael Ryan observes, "technology—form-giving labor—is, according to Marx, the 'nature' of human activity, thereby putting into question the distinction between nature and culture, at least as it pertains to human life."[5]

In *Marxism and Form*, Jameson reveals both the pattern and the reason for an apparently illogical resistance to work that could easily support his own. There he argues that

however materialistic such an approach to history may seem, nothing is farther from Marxism than the stress on invention and technique as the primary cause of historical change. Indeed, it seems to me that such theories (of the kind which regard the steam engine as the cause of the Industrial Revolution, and which have been rehearsed yet again, in streamlined modernistic form, in the works of Marshall McLuhan) function as a substitute for Marxist historiography in the way they offer a feeling of concreteness comparable to economic subject matter, at the same time that they dispense with any consideration of the human factors of classes and of the social organization of production. (74)

One must admire Jameson's forthrightness here in admitting that his parodied theories of McLuhan and other students of the relations of technology and human culture potentially "function as a substitute for Marxist historiography," but the evidence I have presented in previous pages makes clear that Eisenstein, McArthur, Chartier, Kernan, and many other recent students of information technology often focus precisely on "the human factors of classes and of the social organization of production." In fact, these historians of information technology and associated reading practices offer abundant material that has potential to support Marxist analyses.

Jameson attacks McLuhan again a decade later in *The Political Unconscious*. There he holds that an old-fashioned, naive conception of causality, which he "assumed to have been outmoded by the indeterminacy principle

of modern physics," appears in what he calls "that technological determinism of which MacLuhanism [*sic*] remains the most interesting contemporary expression, but of which certain more properly Marxist studies like Walter Benjamin's ambiguous Baudelaire are also variants." In response to the fact that Marxism itself includes "models which have so often been denounced as mechanical or mechanistic," Jameson gingerly accepts such models, though his phrasing suggests extraordinary reluctance: "I would want to argue that the category of mechanical effectivity retains a purely local validity in cultural analysis where it can be shown that billiard-ball causality remains one of the (nonsynchronous) laws of our particular fallen social reality. It does little good, in other words, to banish 'extrinsic' categories from our thinking, when they continue to have a hold on the objective realities about which we plan to think." He then offers as an example the "unquestioned causal relationship" between changes in "the 'inner form' of the novel itself" (25) and the late-nineteenth-century shift from triple-decker to single-volume format. I find this entire passage very confusing, in part because in it Jameson seems to end by accepting what he had begun by denying—or at least he accepts what those like McLuhan have stated rather than what he apparently assumes them to have argued. His willingness to accept that "mechanical effectivity retains a purely local validity in cultural analysis" seems to do no more than describe what Eisenstein, Chartier, and others do. The tentativeness of his acceptance also creates problems. I do not understand why Jameson writes, "I would want to argue," as if the matter were as yet only a distant possibility, when the end of this sentence and those that follow show that he definitely makes that argument. Finally, I find troubling the conspicuous muddle of his apparently generous admission that "it does little good . . . to banish 'extrinsic' categories from our thinking, when they continue to have a hold on the objective realities about which we plan to think." Such extrinsic categories might turn out to match "the objective realities about which we plan to think," or again, these objective realities might turn out to support the hypothesis contained in extrinsic categories, but it only mystifies things to describe categories as having "a hold on . . . objective realities."

Such prose from Jameson, who often writes with clarity about particu-larly difficult matters, suggests that this mystification and muddle derives from his need to exclude technology and its history from Marxist analyses. We have seen how hard Jameson works to exclude technological factors from consideration, and we have also observed that they not only offer no threat to Jamesonian Marxism but even have potential to support it.[6] Jame-

son's exclusions, I suggest, therefore have little to do with Marxism. Instead, they exemplify the humanist's common technophobia, which derives from that "venerable tradition of proud ignorance of matters material, mechanical, or commercial" Elizabeth Eisenstein observes in students of literature and history (706).

Such resistance to the history of technology does not appear only in Marxists, though in them, as I have suggested, the exclusion strikes one as particularly odd. While reading Annette Lavers's biography of Roland Barthes, I encountered another typical instance of the humanist's curious, if characteristic, reticence to grant any importance to technology, however defined, as if so doing would remove status and power: "The contemporary expansion of linguistics into cybernetics, computers, and machine translation," she tells us, "probably played its part in Barthes's evolution on this subject; but the true reason is no doubt to be found in the metaphysical change in outlook which resulted in his new literary doctrine" (138). After pointing to Barthes's obvious intellectual participation in some of the leading currents of his own culture (or strands that weave his own cultural context), she next takes back what she has granted. Although her first clause announces that computing and associated technologies "probably" played a part in "Barthes's evolution on this subject," she immediately takes back that "probably" by stating unequivocally that "the true reason"—the other factors were apparently false reasons, now properly marginalized—"without a doubt" lies in Barthes's "metaphysical change." One might have expected to encounter a phrase like "the most important reason," but Lavers instead suddenly changes direction and brings up matters of truth and falsity and of doubt and certainty.

Two things about Lavers's discomfort deserve mention. First, when confronted with the possibility that technology may play a contributing role in some aspect of culture, Lavers, like Jameson and so many other humanists, resorts to devices of mystification, which suggests that such matters intrude in some crucial way upon matters of power and status. Second, her mystification consists of reducing complexity to simplicity, multivocality to univocality. Her original statement proposes that several possible contributing factors shaped Barthes's "evolution," but once we traverse the semicolon, the possibilities, or rather probabilities, that she herself has just proposed instantly vanish into error, and a "metaphysical change in outline" in all its vagueness becomes the sole causation.

One wonders why critical theorists thus marginalize technology, which, like poetry and political action, is a production of society and individual imag-

ination. Since marginalization results from one group's placement of itself at a center, one must next ask which group places itself at the center of power and understanding, and the answer must be one that feels itself threatened by the importance of technology. Ryan asks, "What is the operation of exclusion in a philosophy that permits one group, or value, or idea to be kept out so that another can be safeguarded internally and turned into a norm?" (*Marxism and Deconstruction*, 3). One such operation that I have frequently encountered after talks on educational hypertext takes the form of a statement something like "I am a Luddite" or "What you say is very interesting, but I can't use (or teach with) computers, because I'm a Luddite." (Can you imagine the following? "I can't use lead pencils—ballpoint pens—typewriters—printed books—photocopies—library catalogues because I'm a Luddite.") All the self-proclaimed Luddites in academe turn out to oppose only the newest machines, not machines in general and certainly not machines that obviate human drudgery. Such proclamations of Ludditism come permeated by irony, since literary scholars as a group entirely depend on the technologies of writing and printing. The first of these technologies, writing, began as the hieratic possession of the politically powerful, and the second provides one of the first instances of production-line interchangeable parts used in heavily capitalized production. Scholars and theorists today can hardly be Luddites, though they can be suspicious of the latest form of information technology, one whose advent threatens, or which they believe threatens, their power and position. In fact, the self-presentation of knowledge workers as machine-breakers defending their chance to survive in conditions of soul-destroying labor in bare, subsistence conditions tells us a lot about the resistance. Such mystification simultaneously romanticizes the humanists' resistance while presenting their anxieties in a grotesquely inappropriate way. In other words, the self-presentation of the modern literary scholar or critical theorist as Luddite romanticizes, in other words, an unwillingness to perceive actual conditions of his or her own production.

Perhaps my favorite anecdote and possibly one that makes a particularly significant contribution to our understanding of resistance is this: after a lecture on hypertext and critical theory at one institution, a young European-trained faculty member who identified his specialty as critical theory candidly admitted, "I've never felt old-fashioned before." As the latest of the newfound, new-fangled developments, hypertext, like other forms of New Media, in general has the (apparent) power to make those who position themselves as the advocates of the new appear to themselves and others as old-fashioned.

The Politics of

Particular Technologies

Discussions of hypertext all raise political questions—questions of power, status, and institutional change. All these changes have political contexts and political implications. Considerations of hypertext, like all considerations of critical theory and literature, have to take into account what Jameson terms the basic "recognition that there is nothing that is not social and historical—indeed, that everything is 'in the last analysis' political" (*Political Unconscious*, 20). A fully implemented embodiment of a networked hypertext system such as I have described obviously creates empowered readers, ones who have more power relative both to the texts they read and to the authors of these texts. The reader-author as student similarly has more power relative to the teacher and the institution. This pattern of relative empowerment, which we must examine with more care and some skepticism, appears to support the notion that the logic of information technologies, which tends toward increasing dissemination of knowledge, implies increasing democratization and decentralization of power.

Technology always empowers someone. It empowers those who possess it, those who make use of it, and those who have access to it. From the very beginnings of hypertext (which I locate in Vannevar Bush's proposals for the memex), its advocates have stressed that it grants new power to people. Writers on hypertext almost always continue to associate it with individual freedom and empowerment. "After all," claim the authors of a study concerning what one can learn about learning from the medium, "the essence of hypertext is that users are entirely free to follow links wherever they please" (Mayes, Kibby, and Anderson, 228). Although Bush chiefly considered the memex's ability to assist the researcher or knowledge worker in coping with large amounts of information, he still conceived the issue in terms of ways to empower individual thinkers in relation to systems of information and decision. The inventors of computer hypertext have explicitly discussed it in terms of empowerment of a more general class of reader-authors. Douglas Englebart, for example, who invented the first actual working hypertext environment, called his system Augment; and Ted Nelson, who sees Xanadu as the embodiment of the 1960s New Left thought, calls on us to "imagine a new accessibility and excitement that can unseat the video narcosis that now sits on our land like a fog. Imagine a new libertarian literature with alternative explanations so that anyone can choose the pathway or approach that best suits him or her; with ideas accessible and interesting to everyone, so that a new richness and freedom can come to the human experience; imagine a rebirth of literacy" (*Computer Lib*, 1/4).[7]

Like other technologies, those centering on information serve as artificial, human-made means of amplifying some physical or mental capacity. Jean-François Lyotard describes computing and other forms of information technology in terms usually assigned to wooden legs and artificial arms: "Technical devices originated as prosthetic aids for the human organs or as physiological systems whose function it is to receive data or condition the context. They follow a principle, and it is the principle of optimal performance: maximizing output (the information or modifications obtained) and minimizing input (the energy expended in the process)" (*Postmodern Condition*, 44). According to *The American Heritage Dictionary*, the term *prosthesis* has the two closely related meanings of an "artificial replacement of a limb, tooth, or other part of the body" and "an artificial device used in such replacement." Interestingly, prosthesis has an early association with language and information, since it derives from the late Latin word meaning "addition of a letter or syllable," which in turn comes from the Greek for "attachment" or "addition, from *prostithenai*, to put, add: *pros-*, in addition + *tithenai*, to place, to put." Whereas its late Latin form implies little more than an addition following the rules of linguistic combination, its modern application suggests a supplement required by some catastrophic occurrence that reduced the individual requiring the prosthesis to a condition of severe need, as in the case of a person who has lost a limb in war, in an automobile accident, or from bone cancer or, conversely, of a person suffering as a result of a "birth defect." In each case the individual using the prosthesis requires an artificial supplement to restore some capacity or power.

Lyotard's not uncommon use of this term to describe all technology suggests a powerful complex of emotional and political justifications for technology and its promises of empowerment. Transferring the term *prosthesis* from the field of rehabilitation (itself an intriguing term) gathers a fascinating, appalling congeries of emotion and need that accurately conveys the attitudes contemporary academics and intellectuals in the humanities hold toward technology. Resentment of the device one needs, resentment at one's own need and guilt, and a Romantic dislike of the artificiality of the device that answers one's needs mark most humanists' attitudes toward technology, and these same factors appear in the traditional view of the single most important technology we possess—writing. These attitudes result, as Derrida has shown, in a millennia-long elevation of speech above writing, its supposedly unnatural supplement.

Walter J. Ong, who reminds us that writing is technology, exemplifies the comparatively rare scholar in the humanities who considers its artificiality as

something in its favor: "To say that writing is artificial is not to condemn it but to praise it. Like other artificial creations and indeed more than any other, it is utterly invaluable and indeed essential for the realization of fuller, interior, human potentials . . . Alienation from a natural milieu can be good for us and indeed is in many ways essential for full human life. To live and to understand fully, we need not only proximity but also distance" (*Orality and Literacy*, 82). Like McLuhan, Ong claims that "technologies are not mere exterior aids but also interior transformations of consciousness" (82), and he therefore holds that writing created human nature, thought, and culture as we know them. Writing empowers people by enabling them to do things otherwise impossible—permitting them not just to send letters to distant places or to create records that preserve some information from the ravages of time but to think in ways otherwise impossible.

Abstractly sequential, classificatory, explanatory examination of phenomena or of stated truths is impossible without writing and reading . . . In the total absence of any writing, there is nothing outside the thinker, no text, to enable him or her to reproduce the same line of thought again or even to verify whether he or she has done so . . . In an oral culture, to think through something in non-formulaic, non-patterned, non-mnemonic terms, even if it were possible, would be a waste of time, for such thought, once worked through, could never be recovered with any effectiveness, as it could be with the aid of writing. It would not be abiding knowledge but simply a passing thought. (8–9, 34–35)

Technology always empowers someone, some group in society, and it does so at a certain cost. The question must always be, therefore, what group or groups does it empower? Lynn White showed in *Medieval Technology and Social Change* that the introduction from the Far East of three inventions provided the technological basis of feudalism: the horse collar and the metal plow produced far higher yields than had scratch plowing on small patches of land, and these two new devices produced food surpluses that encouraged landowners to amass large tracts of land. The stirrup, which seems to have come from India, permitted a heavily armored warrior to fight from horseback; specifically it permitted him to swing a heavy sword or battle axe, or to attack with a lance, without falling off his mount. The economic power created by people employing the horse collar and the metal plow provided wealth to pay for the expensive weaponry, which in turn defended the farmers. According to White, these forms of farming and military technology provided crucial, though not necessarily defining, components of feudalism. Whom did this technology empower? Those who ultimately became knights and

landowners in an increasingly hierarchical society obviously obtained more power, as did the Church, which benefited from increasing surplus wealth. Those who made and sold the technology also obtained a degree of status, power, and wealth. What about the farm worker? Those freemen in a tribal society who lost their land and became serfs obviously lost power. But were any serfs better off, either safer or better fed, than before feudalism, as apologists for the Middle Ages used to argue? I do not know how one could answer such questions, though one component of an answer is certain: even if one had far more detailed evidence about living conditions of the poor than we do, no answer will come forth garbed in neutrality, because one cannot even begin to consider one's answer without first deciding what kind of weight to assign to matters such as the relative value of nutrition, safety, health, power, and status both in our own and in an alien culture. Another thing is clear as well: the introduction of new technology into a culture cuts at least two ways.

Like other forms of technology, those involving information have shown a double-edged effect, though in the long run—sometimes the run has been very long indeed—the result has always been to democratize information and power. Writing and reading, which first belonged to a tiny elite, appears in the ancient Middle East as an arcane skill that supports the power of the state by recording taxes, property, and similar information. Writing, which can thus conserve or preserve, has other political effects, Ong tells us, and "shortly after it first appeared, it served to freeze legal codes in early Sumeria" (*Orality and Literacy*, 41). Only careful examinations of the historical evidence can suggest which groups within society gained and which lost from such recording. In a particular society within a particular battle of forces, only nobility or nobility and priesthood could have gained, whereas in other situations the common person could have benefited from stability and clear laws.

Another political implication inheres in the fact that a "chirographic (writing) culture and even more a typographic (print) culture can distance and in a way denature even the human, itemizing such things as the names of leaders and political divisions in an abstract, neutral list entirely devoid of a human action context. An oral culture has no vehicle so neutral as a list" (42). The introduction of writing into a culture effects many changes, and all of them involve questions of power and status. When it first appeared in the ancient world, writing made its possessors unique. Furthermore, if writing changes the way people think as radically as McLuhan, Ong, and others have claimed, then writing drove a sharp wedge between the literate and the illiterate, encouraged a sharp division between these two groups that would rap-

idly become classes or castes, and greatly increased the power and prestige of the lettered. In the millennia that it took for writing to diffuse through large proportions of entire societies, however, writing shifted the balance from the state to the individual, from the nobility to the polis.

Writing, like other technologies, possesses a logic, but it can produce different, even contrary, effects in various social, political, and economic contexts. Marshall McLuhan points to its multiple, often opposing effects when he remarked that "if rigorous centralism is a main feature of literacy and print, no less so is the eager assertion of individual rights" (*Gutenberg Galaxy*, 220). Historians have long recognized the contradictory roles played by print in the Reformation and in the savage religious wars that followed. "In view of the carnage which ensued," Elizabeth Eisenstein observes, "it is difficult to imagine how anyone could regard the more efficient duplication of religious texts as an unmixed blessing. Heralded on all sides as a 'peaceful art,' Gutenberg's invention probably contributed more to destroying Christian concord and inflaming religious warfare than any of the so-called arts of war ever did" (319).[8] One reason for these conflicts, Eisenstein suggests, lies in the fact that when fixed in print—put down, that is, in black and white, "positions once taken were more difficult to reverse. Battles of books prolonged polarization, and pamphlet wars quickened the process" (326).

I contend that the history of information technology from writing to hypertext reveals an increasing democratization or dissemination of power. Writing begins this process, for by exteriorizing memory it converts knowledge from possession of one to the possession of more than one. As Ryan correctly argues, "writing can belong to anyone; it puts an end to the ownership or self-identical property that speech signaled" (*Marxism and Deconstruction*, 29). The democratic thrust of information technologies derives from their diffusing information and the power that such diffusion can produce.[9] Such empowerment has always marked applications of new information technology to education. As Eisenstein points out, for example, Renaissance treatises, such as those for music, radically reconfigured the cultural construction of learning by freeing the reader from a subordinate relation to a particular person: "The chance to master new skills without undergoing a formal apprenticeship or schooling also encouraged a new sense of independence on the part of many who became self-taught. Even though the new so-called 'silent instructors' did no more than duplicate lessons already being taught in classrooms and shops, they did cut the bonds of subordination which kept pupils and apprentices under the tutelage of a given master" (244). Eisenstein cites Newton as an example of someone who used books obtained

at "local book fairs and libraries" to teach himself mathematics with little or no outside help (245). First with writing, then with print, and now with hypertext, one observes increasing synergy produced when readers widely separated in space and time build upon one another's ideas.

Tom McArthur's history of reference materials provides another reminder that all developments and inflections of such technology serve the interests of particular classes or groups. The early-seventeenth-century "compilers of the hard-word dictionaries" did not in the manner of modern lexicographers set out to record usage. Instead, they achieved great commercial success by "transferring the word-store of Latin wholesale into their own language . . . They sought (in the spirit of both the Renaissance and Reformation) to broaden the base of the educated Elect. Their works were for the nonscholarly, for the wives of the gentry and the bourgeoisie, for merchants and artisans and other aspirants to elegance, education, and power" (87). These dictionaries served, in other words, to diffuse status and power, and the members of the middle classes who created them for other members of their classes self-consciously followed identifiable political aims.

The dictionary created by the French Academy, McArthur reminds us, also embodies a lexicographical program that had clear and immediate political implications. Claude Favre de Vaugelas, the amateur grammarian who directed the work of the Academy, sought "to regulate the French language in terms of aristocratic good taste" as a means of making French the "social, political and scientific successor to Latin" (93). This dictionary is one of the most obvious instances of the way print technology sponsors nationalism, the vernacular, and relative democratization. It standardizes the language in ways that empower particular classes and geographical areas, inevitably at the expense of others. Nonetheless, it also permits the eventual homogenization of language and a corollary, if long-in-coming, possibility of democratization.

By the end of the eighteenth century, Kernan argues, print technology had produced many social and political changes that transformed the face of the literary world. "An older system of polite or courtly letters—primarily oral, aristocratic, amateur, authoritarian, court-centered—was swept away at this time and gradually replaced by a new print-based, market-centered, democratic literary system" (4). Furthermore, by changing the standard literary roles of scholar, teacher, and writer, print "noticeably increased the importance and the number of critics, editors, bibliographers, and literary historians" at the same time that it increasingly freed writers from patronage and state censorship. Print simultaneously transformed the audience from a few readers of manuscripts to a larger number "who bought books to read in

the privacy of their homes." Copyright law, which dates from this period, also redefined the role of the author by making "the author the owner of his own writing" (4–5).

Like earlier technologies of information and cultural memory, electronic computing has obvious political implications. As Gregory Ulmer argued during a recent conference on electronic literacy, artificial intelligence projects, which use computers either to model the human mind or to make decisions that people would make, necessarily embody a particular ideology and a particular conception of humanity.[10] What, then, are the political implications of hypertext and hypertext systems?

I propose to begin examining that question by looking at the political implications of events described in a scenario that opened an article on hypertext in literary education that I published several years ago. It is 8:00 p.m., and, after having helped put the children to bed, Professor Jones settles into her favorite chair and reaches for her copy of Milton's *Paradise Lost* to prepare for tomorrow's class. A scholar who specializes in the poetry of Milton's time, she returns to the poem as one turns to meet an old friend. Reading the poem's opening pages, she once again encounters allusions to the Old Testament, and because she knows how seventeenth-century Christians commonly read these passages, she perceives connections both to a passage in Genesis and to its radical Christian transformations. Furthermore, her previous acquaintance with Milton allows her to recall other passages later in *Paradise Lost* that refer to this and related parts of the Bible. At the same time, she recognizes that the poem's opening lines pay homage to Homer, Vergil, Dante, and Spenser and simultaneously issue them a challenge.

Meanwhile John H. Smith, one of the most conscientious students in Professor Jones's survey of English literature, begins to prepare for class. What kind of a poem, what kind of text, does he encounter? Whereas Professor Jones experiences the great seventeenth-century epic situated within a field of relations and connections, her student encounters a far barer, less connected, reduced poem, most of whose allusions go unrecognized and almost all of whose challenges pass by unperceived. An unusually mature student, he pauses in his reading to check the footnotes for the meaning of unfamiliar words and allusions, a few of which he finds explained. Suppose one could find a way to allow Smith to experience some of the connections obvious to Professor Jones. Suppose he could touch the opening lines of *Paradise Lost*, for instance, and the relevant passages from Homer, Vergil, and the Bible would appear, or that he could touch another line and immediately encounter a list of other mentions of the same idea or image later in the poem

or elsewhere in Milton's writing—or, for that matter, interpretations and critical judgments made since the poem's first publication—and that he could then call up any or all of them.

This scenario originally ended with my remark that hypertext allows students to do "all these things." Now I would like to ask what such a scenario implies about the political relations that obtain between teachers and students, readers and authors. These issues, which writers on hypertext have long discussed, also arose in questions I encountered when delivering invited talks on my experiences in teaching with hypertext. One of the administrators at my own university, for example, asked a question I at first thought rather curious but have since encountered frequently enough to realize is quite typical for those first encountering the medium. After I had shown some of the ways that hypertext enabled students to follow far more connections than ever before possible between texts and context, she asked if I was not worried because it limited the students too much, because it restricted them only to what was available on the system. My first response then as now was to remark that as long as I used print technology and the limited resources of a very poor university library, no administrator or member of the faculty ever worried that I found myself unable to suggest more than a very limited number of connections, say, five or six, in a normal class discussion; now that I can suggest six or ten times that number, thus permitting students a far richer, less controlled experience of text, helpful educators suddenly begin to worry that I am "limiting" students by allowing them access to some potentially totalitarian system.

One part of the reason for this reaction to educational hypertext lies in a *healthy skepticism. Another appears in the way we often judge new approaches* to pedagogy as simultaneously ineffective, even educationally useless, and yet overpoweringly and dangerously influential. Nonetheless, the skeptical administrator raised important questions, for she is correct that the information available limits the freedom of students and general readers alike. At the early, still experimental stage in the development of hypertext when I was asked that question, one had to pay great attention to ensuring a multiplicity of viewpoints and kinds of information. For this reason I emphasize creating multiple overviews and sets of links for various document sets, and I also believe that one must produce educational materials collaboratively whenever possible; as I have suggested, such collaboration is very easy to carry out between individual instructors in the same department as well as between those in different disciplines and different institutions. Now

that the World Wide Web includes so much information, finding the multiple points of view and learning how to evaluate them become crucial.

Several key features of hypertext systems intrinsically promote a new kind of academic freedom and empowerment. Reader-controlled texts permit students to choose their own way. The political and educational necessity for this feature provides one reason why hypertext systems must always contain both bidirectional links and efficient navigational devices; otherwise developers can destroy the educational value of hypertext with instructional systems that alienate and disorient readers by forcing them down a predetermined path as if they were rats in a maze. A second feature of hypertext that has crucial political implications appears in the sheer quantity of information the reader encounters, since that quantity simultaneously protects readers against constraint and requires them to read actively, to make choices. A third liberating and empowering quality of (read-write) hypertext appears in the fact that the reader also writes and links, for this power, which removes much of the gap in conventional status relations between reader and author, permits readers to read actively in a much more powerful way—by annotating documents, arguing with them, leaving their own traces. As long as any reader has the power to enter the system and leave his or her mark, neither the tyranny of the center nor that of the majority can impose itself. The very open-endedness of the text also promotes empowering the reader.

The Political Vision of Hypertext;

or, The Message in the Medium

Does hypertext as medium have a political message? Does it have a particular bias? As the capacity of hypertext systems to be infinitely recenterable suggests, they have the corollary characteristic of being antihierarchical and democratic in several different ways. To start, as the pioneering authors of "Reading and Writing the Electronic Book" point out, in such systems, "ideally, authors and readers should have the same set of integrated tools that allow them to browse through other material during the document preparation process and to add annotations and original links as they progress through an information web. In effect, the boundary between author and reader should largely disappear." One sign of the disappearance of boundaries between author and reader consists in its being the reader, not the author, who largely determines how the reader moves through the system, for the reader can determine the order and principle of investigation. Hypertext has the potential, thus far only partially realized, to be a democratic or multicentered system in yet another way: as readers contribute their comments and individual documents, the

sharp division between author and reader that characterizes page-bound text begins to blur and threatens to vanish, with several interesting implications: first, by contributing to the system, users accept some responsibility for materials anyone can read; and second, students thus establish a community of learning, demonstrating to themselves that a large part of any investigation rests on the work of others.

Writing about electronic information technology in general rather than about hypertext in particular, McLuhan proposed: "The 'simultaneous field' of electronic information structures, today reconstitutes the conditions and need for dialogue and participation, rather than specialism and private initiative in all levels of social experience" (*Gutenberg Galaxy*, 141). McLuhan's point that electronic media privilege collaborative, cooperative practice, which receives particular support from hypertext, suggests that such media embody and possibly support a certain political system or construction of relations of power and status. J. Hillis Miller similarly argues that "one important aspect of these new technologies of expression and research is political. These technologies are inherently democratic and transnational. They will help create new and hitherto unimagined forms of democracy, political involvement, obligation, and power" ("Literary Theory," 20). Writing in the spring of 1989, Miller commented: "Far from being necessarily the instruments of thought control, as Orwell in 1984 foresaw, the new regime of telecommunications seems to be inherently democratic. It has helped bring down dictator after dictator in the past few months" (21).

Hypermedia seems to embody a truly decentered, or multiply centered, politics that seems the political equivalent of Richard Rorty's edifying philosophy whose purpose is "to keep the conversation going rather than to find objective truth . . . The danger which edifying discourse tries to avert is that some given vocabulary, some way in which people might come to think of themselves, will deceive them into thinking that from now on all discourse could be, or should be, normal discourse. The resulting freezing-over of culture would be, in the eyes of edifying philosophers, the dehumanization of human beings" (377).[11] Like Bakhtin and Derrida, Rorty presents his views as an explicit reaction against totalitarian centrism. Bakhtin had the example of Marxist-Leninism, particularly during the Stalin years, whereas Derrida and Rorty react against Plato and his heirs in a manner reminiscent of Karl Popper in *The Open Society and Its Enemies*.[12] Hypertext is potentially the technological embodiment of such a reaction and such a politics.

Gregory Ulmer comments that "the use of communications technology is a concretization of certain metaphysical assumptions, consequently that it

is by changing these assumptions (for example, our notion of identity) that we will transform our communicational activities" (*Applied Grammatology*, 147). We may add that the use of communications technology is also a concretization of certain political assumptions. In particular, hypertext embodies assumptions of the necessity for nonhierarchical, multicentered, open-ended forms of politics and government.

Hypertext and Postcolonial Literature, Criticism, and Theory

Postcolonial literatures, criticism, and theory have numerous important relations both to hypertext as a medium and to hypertext as a theoretical paradigm. These connections range from the cultural applications of this new computing technology to the use of the hypertext paradigm within postcolonial theory.

First of all, hypertext in its most commonly encountered form, the World Wide Web, provides a particularly important way for the empire to write back. As Susan Nash Smith has shown in her work on Azerbaijan, former colonies use the Internet as a means of defining and communicating a newly recreated identity. In essence, the smallest country with access to the Internet can speak for itself in ways impracticable if not virtually impossible in the world of print. Take the example of Zimbabwe. When I went to Harare in August 1997 with Gunnar Liestøl and Andrew Morrison of the University of Oslo to help set up a local website and discuss educational applications of the Web, I discovered that not only did Zimbabwe have a rich postcolonial literature, quite different from that of, say, Nigeria, but it also had its literary critics. Nothing particularly surprising here, perhaps, except that like so much scholarship and criticism produced by citizens of former colonies, it remained unknown to European and American postcolonialists because it never entered the distribution channels for printed books and periodicals outside Africa. In other words, Zimbabwe had its own literary critics who could write about their country's literature, but there was little chance of postcolonial scholars in the West ever reading their essays.

Since I had already begun to create a section about Zimbabwe in my *Postcolonial Literature and Culture Web,* I obtained permission from Rino Zhuwarara, chair of the department of English at University of Zimbabwe, to include his substantial "Introduction to Zimbabwean Fiction in English," which I divided into ten sections for its appearance on the web, and at the same time Anthony Chennells contributed his "Rhodesian Discourse, Rhodesian Novels and the Zimbabwean Liberation War." Sometime later, Irene Staunton, then publishing director of Baobab Books, donated both her essays on the literary aftermath of Zimbabwe's seventeen-year civil war and her *Mothers of the*

Revolution, an oral history of women's experience of the conflict. During the next few years, Naume M. Ziyambi contributed sections of her study of women's groups in Zimbabwe while Maurice Taonezvi Vambe added his "Gender and Class Issues in the Postcolonial Zimbabwean Novel." As I was writing this section, Phillip Chidavaenzi, a Zimbabwean journalist, sent in another essay.

The chief value of placing these essays online is simply that Zimbabweans can speak—or rather, write—for themselves rather than having critics from the Europe, the United Kingdom, and the United States write for them. Such self-representation on the Web will not solve the current terrible problems in Zimbabwe, nor will it instantly rival publications produced by major European and American presses. It will, however, lessen the degree to which postcolonial criticism tends to repeat the pattern of colonizers, imposing cultural definitions from Europe upon the local scene. To a small extent, this and similar projects begin to fulfill Geert Lovinck's claim that "future media politics is about empowerment, not about representing the Other. The goal of the democratization of the media is the elimination of all forms of mediated representation and artificial scarcity of channels. There are now the technical possibilities to let people speak for themselves" (*Dark Fiber,* 39).

The political value of placing such materials on a website (whose servers incidentally reside in Singapore and the United States) lies in the fact that these essays become location independent, accessible from anywhere in the world to someone connected to the Internet. Such location independence also means that they evade censorship by local authorities, something that contributors to the site appreciate. The *Postcolonial Literature and Culture Web* receives contributions from Nigerians living in South Africa, South Africans living in Ghana, and a host of contributors from Canada, South Asia, Australia, and so on.

Several times now I have found myself letting contributors redefine the scope of the *Postcolonial Literature and Culture Web,* which I originally intended to include only Anglophone literature, after they wrote to me pointing out that they could find no other sites to include their work. Newly added sections for Canada, Sri Lanka, and the Caribbean obviously fit the original description of the site, but when Louise Vijoen, who teaches in the department of Afrikaans and Dutch, University of Stellenbosch, submitted materials on writing in Afrikaans and others sent in essays on francophone culture, I found room for them on the site, too. Writings on contemporary Nepali literature followed, but the biggest stretch appears in the section on Morocco, where the languages discussed are Arabic, Berber, and French. This addition

came about after attendees at a conference in Casablanca, who had heard me talk about the case of Zimbabwean self-representation, asked if I'd put up some of their materials. And so it goes.

In the almost two decades since I began working with the cultural and educational uses of hypertext, I have not infrequently encountered skepticism about its value. The way that the World Wide Web permits those in postcolonial countries to represent themselves, thus partially redressing a major imbalance in postcolonial studies, strikes me as one undoubted success.

Infotech, Empires, and Decolonization

It is perhaps fitting that hypertext and the Web, late-twentieth-century information technologies, offer some solutions to postcolonial dilemmas, since much eighteenth- and nineteenth-century colonialism depended on the imposition of writing and printing on indigenous oral cultures. According to McLuhan, of all the clashes of civilizations that produce "furious release of energy and change, there is none to surpass the meeting of literate and oral cultures." In fact, the arrival of "phonetic literacy is, socially and politically, probably the most radical explosion that can occur in any social structure" (*Understanding Media*, 55). Postcolonial fiction, which often describes this "explosion," takes differing approaches to this change of information regimes.

First, novelists like Yvonne Vera and Charles Mongoshi make the collision of oral and writing cultures a significant part of their narratives. In Vera's *Nehanda*, a novel about the Chimurenga, Zimbabwe's nineteenth-century war of independence, the chief argues that his people's oral culture has a life and truth missing from "the stranger's own peculiar custom"—writing on paper. Sounding much like Plato's Socrates, the chief tells his listeners because "our people know the power of words,"

they desire to have words continuously spoken and kept alive. We do not believe that words can become independent of the speech that bore them, of the humans who controlled and gave birth to them. Can words exchanged today on this clearing surrounded by waving grass become like a child left to be brought up by strangers? Words surrendered to the stranger, like the abandoned child, will become alien—a stranger to our tongues.

The paper is the stranger's own peculiar custom. Among ourselves, speech is not like rock. Words cannot be taken from the people who create them. People are the words. (39–40)

Vera makes the additional point that although the Shona do not possess European alphanumeric writing, they do employ multiple systems of written

signs. The narrator explains that the chief "bears proud marks on his fore-head, and on his legs," and although "the stranger" sees only scars, these marks "distinguish him," signifying his individuality and status. In addition, he occasionally "bears other signs that are less permanent, painted for particular rituals and festivities. He can even invent signs that will immediately be understood by his people as his own. Indeed, these signs help to communicate sacred messages among the people" (40).

The gap between Shona and British attitudes toward language produces confusion and comedy when a well-meaning Anglican priest tries to convert Kaguvi, one of the leaders of the Chimurenga, to Christianity. Yvonne Vera brilliantly dramatizes a clash of cultures in which two sincere, believing individuals misconceive each other's positions. Kaguvi, whom Vera presents as the embodiment of oral culture, finds the notion that a printed book could contain divinity intensely problematic, in part because for him, like Socrates, writing separates the words of the speaker from his or her presence. Since he does not come from a print culture, the kind of multiplicity characteristic of a book puzzles him, and as he points out to the Christian, his is a "strange" god who "is inside your book, but he is also in many books." In contrast, to this book-bound divinity, he explains: "My god lives up above. He is a pool of water in the sky. My god is a rain-giver. I approach my god through my ancestors and my mudzimu. I brew beer for my god to praise him, and I dance. My mudzimu is always with me, and I pay tribute to my protective spirit" (105).[13]

In Charles Mungoshi's *Waiting for the Rain,* which is set half a century after *Nehanda,* another wise old man rejects the white man's information technology. Mungoshi, who refuses to sentimentalize either modern or traditional ways, creates complex portraits of the gap between generations as the *second Chimurenga,* or *war of liberation,* begins. When the young would-be revolutionaries approach the Old Man in hopes that he will tell them what he recalls from the first uprising against British colonial oppression, he refuses to pass on his knowledge, in part because they badly misread his character, in part because he feels their acceptance of Western ways dooms them from the start. Mungoshi presents the Old Man's refusal as fundamentally related to his rejection of modern information technologies, which he sees as inhuman, though he first presents this rejection as a matter of moral values. Because the young men made the mistake of telling him that they would put what he tells them in a book, the publication of which might make him "rich and famous," he first focuses on that, since he claims that "by the way he said it to me it seems that's all he is interested in. Riches and fame. As if that were

everything. As if we haven't seen enough destruction through those two things." Although his rejection at first seems to derive entirely from a kind of moral superiority, what he says next immediately complicates our judgment of him and his interpretations of political and cultural reality, since the Old Man in part seems merely defeatist:

And even if I were to talk to them, what can he and his friends do? Take up arms and fight the white man? They will be defeated before they even fire the first shot. They are already defeated. What kind of fighting is it when you are clutching and praying to your enemy's gods? I don't know what he was talking about but he is certainly playing someone else's drum. Each time I see my wife Japi take in a handful of sugar, I know how complete and final the white man's conquest has been.

According to the Old Man, then, any modern rebellion would fail since the rebels have adopted Western ways. Given that Mungoshi wrote this novel after the war for liberation had been won, the reader has to question the speaker's views. Does he mean that any rebellion would fail, or that any rebellion, even if apparently successful, would only produce a pseudo-victory since traditional culture would have been lost?

In one sense, or at one level, this statement appears to reflect the simple xenophobia of the defeated: anything from outside the group is bad, dangerous, destructive. Thus he finds his gluttonous wife's love of refined sugar, like the widespread habit of drinking tea or listening to radios, equally dangerous because each represents something from outside his culture, though he does not mention that many of his people's basic foodstuffs, such as maize, also come from outside—in this case from the Americas.

In another sense, however, the Old Man raises the basic political issues implicit in different information technologies: he accepts the value only of speech within a small group, and any technologies of cultural memory that permit thoughts to be recorded or transported out of the presence of the speaker seem to him fundamentally wrong. Whether in the form of handwriting, book, or radio, modern information technology removes the need for one person to be in the presence of another for them to communicate. Like Socrates (as Derrida reminds us), the Old Man emphasizes the human costs but not the benefits of such technology.

In addition to making the collision of oral and writing cultures a paradigm of the colonial experience, African, Maori, Samoan, and other novelists self-consciously try to create the effect of an oral culture in their works, often by the use of proverbs, rituals, and formal orations. Chidi Okonkwo points

out that "the importance of orality in the first generation of [postcolonial] novels certainly eluded the first generation of readers and critics, whose responses defined European approaches to the novel for half a century" (33). Jayalakshmi V. Rao has catalogued dozens of the proverbs Chinua Achebe cites in *Arrow of God, Things Fall Apart,* and *No Longer at Ease,* and she also shows his use of folktales in his writings. In *Antills of the Savannah,* Ikem's speech to his countrymen who have come to the capitol to inform the government of their plight, like many such addresses in recent African novels, attempts to recreate the glories of an oral culture within the novel, the genre that epitomizes print culture. Duzia's funeral oration for Adda in Ken Saro-Wiwa's "A Death in Town," though far briefer, works in much the same way by demonstrating the force and elegance of the speaker's words.

The central importance of the colonial importation—and imposition—of writing and print on indigenous oral cultures problematizes Ngugi Wa Thiong'o's famous decision to abandon writing novels in English and thenceforth write only in his native language, Gikuyu. Ngugi's declaration prompted a fiery, often bitter debate, containing, as it had to, claims of authenticity and revolutionary commitment. I don't propose to rehearse these debates again, but I would like to draw attention to a set of associated issues, which place the entire subject in an important light. Following McLuhan and Goody, I want to emphasize that the movement from an oral to a print culture brings such radical changes in conceptions of self, authorship, society, and verbal arts that the question of which language is more authentic to a particular indigenous people seems incredibly ill-conceived. Whether writing in Gikuyu or English, Ngugi thinks and expresses himself in a way foreign to precolonial times. This is not all. The modern novel, a literary genre that derives from—and epitomizes—print culture, represents a major European influence on a colonized people. The novel, in other words, is a major colonial imposition on African and other oral cultures. One can appropriate it, and turn it against its originators: think of *Wide Sargasso Sea*'s rewriting of *Jane Eyre* or *Jack Maggs* as a rebuttal to *Great Expectations.* But one simply cannot *write* an authentic work of orality. Of course, there are many political justifications for promoting the language of a nation newly freed from an imperial power, and one does not have to go to Africa for examples of languages that countries have revived or even created as an act of decolonization: the invention of Norwegian after Norway's independence from Denmark in the nineteenth century and Gaelic after Ireland's independence from Britain in the twentieth.

Having observed a few examples of the way existing hypermedia projects do in fact answer some needs of various postcolonial countries, I'd now like to examine the usefulness of hypertext as a paradigm for understanding postcolonial (or decolonized) cultures. It is hardly surprising that hypertext and postcolonial theory, both of which have important parallels to poststructuralist thought, have much in common, but because hypertext lexias take part in a networked structure, resist simple linearity, and show that a complex entity can exist within multiple contexts without losing its identity they have proved particularly useful when discussing postcolonialities. Although my students and I created an early version of *The Postcolonial Web* in 1992, I don't think I realized the full implications of hypertext for postcolonial theory until Jaishree K. Odin, associate professor at the University of Hawaii, Manoa, sent in her essay, "The Performative and Processual: A Study of the Hypertext/Postcolonial Aesthetic." Drawing on the first version of *Hypertext,* Odin pointed out how this information technology modeled key issues of postcolonial theory:

The postcolonial critique of unitary models of subjectivity reveals that all such models are based on binary thinking that creates categories like self and other, male and female, first world and third world where the first term is always the privileged term. Rejecting binary models, postcolonial theorists describe both subjectivity as well as experience decentered and pluralistic. The electronic media can be used as metaphor for describing what is happening to the culture at large as the Culture (represented by the dominant group) is being displaced by minority cultures which demand recognition of their histories as well as cultural productions. Just as in networked computers diverse, sometimes contradictory information, can exist simultaneously in hypertext format, so it is in culturally diverse societies with different, sometime contradictory narratives. The person's location based on race, class, and gender determines what perspective will be taken.

The rejection of oversimplifying, even falsifying binary oppositions has, I would urge, an immediate practical consequence. Postcolonial theory and practice is riddled with less-than-helpful oppositions, pre- and postcolonial being just one of them. As Neal Lazarus pointed out in his pioneering *Resistance in Postcolonial African Fiction* (1990), the reductive rhetoric of anticolonialism led to serious postliberation problems because it did not prepare the newly freed countries for differences of attitude and approach among former allies. "It implied that there was only one struggle to be waged, and it was a negative one: a struggle *against* colonialism, not a struggle *for* anything

specific." In a desire "above all to remain free of ideological factionalism," anti-colonial rhetoric in Africa relied too heavily on empty abstractions. "To it, there was only today and tomorrow, bondage and freedom. It never paused long enough to give its ideal of 'freedom' a content. Specifically, it implicitly rationalized, exposed the movement to the risk of division. Typically, there-fore, the radical anticolonial writers tended to romanticize the resistance move-ment and to underestimate—even theoretically to suppress—the dimensions within it." Unaware of "groups and individuals working with quite different, and often incompatible, aspirations for the future" (5), many of the revolu-tionaries set themselves up for failure and disillusionment.

The history of how the terrible situation in Zimbabwe has been reported in Western mass media provides an example of the way a clichéd binary opposition—here black African versus white European—long prevented the world from understanding what was taking place. As Richard Mugabe's gov-ernment plunged further into corruption and inefficiency, he proclaimed that he was satisfying the demands of Zimbabweans for land that had been appropriated by the British during the days when the country was a British colony called Rhodesia. The international media, which likes its news pre-packaged, immediately presented Mugabe's version of events because, after all, isn't the split between black and white, colonized and colonizer, rich farmer and poor, dispossessed farm worker the central fact of this situation? Well, actually it isn't. In fact, it doesn't exist. As a black Zimbabwean contrib-utor to *The Postcolonial Web* (she identifies herself publicly only as "Fliss") pointed out in a series of communications in May 2000, Mugabe brilliantly manipulated the racial bigotries of the international press:

1. "Contrary to popular belief, the white commercial farmers do *not* own 70% of the fertile land in Zimbabwe. 900 farms comprising roughly 2 million hectares were acquired by the government for redistribution and they were indeed distributed—to the cronies and relatives of President Mugabe, in some cases in such ridiculous portions that one minister owns 17 farms."

2. "The farms of mixed and black people have also been invaded in a pattern that suggests the invasions are political rather than racial, eg. the farm work-ers that are beaten and harassed are those that support the opposition, the white farmers that were killed were prominent supporters of the main oppo-sition party as were all the black people killed so far."

3. [Those who attacked white and black farmers were not, as the press re-ported, veterans of the war of independence, most of whom were in their six-

ties.] "Except for a very few exceptions, these so-called war veterans average 18 years of age, and unless there's a war that happened a couple of years ago of which the rest of Zimbabwe has never heard . . . The 'war veterans' are transported by government vehicles to each new farm, armed and paid by the government."

4. "This is not the first time that Zanu PF (Robert Mugabe's ruling party) has attempted what might be seen as an 'ethnic cleansing.' In the mid-late '80s, Mugabe unleashed his Cuban-trained 5th brigade on the Matabele peoples in the South of the country, committing genocides on a scale that rivals any in Kosovo or Rwanda. Zimbabwe is made up of several different ethnic and racial groups. The Shona speaking ones are the Karanga, the Mazezuru, and the Manica. There are also the Ndebele (Matabele), Tonga, Batoka, N'dau. Then there are the Asians, Coloureds (mixed people) and Whites. Mugabe is of the Mazezuru as are all his cabinet, all his ministers, actually anyone in his government or party of any importance."

5. "Many of the people who own farms today bought them legitimately after independence at fair market value. Many of them are fourth generation Zimbabweans who embraced the hand of reconciliation that Mugabe offered at independence. Why is he choosing to take the land back now when he's had twenty years with willing co-operation from the British and the white farmers?"

6. "60% of the population is below the age of 40, well-educated and looking for a future, a job, trade and industry, not a subsistence small land-holding."

Obviously, I am not claiming that hypertext-as-paradigm can produce political miracles by simply changing habits of thought dependent on falsifying binaries. Actual hypertext, hypertext as an information technology in the form of the World Wide Web, can at least permit individual voices to be heard. Summoning skepticism and hypertextual habits of mind can, however, lead us to ask, "What connections (links) are missing? What complex network of events percolates up through the linear political narrative we've been offered?"

Geert Lovink, who reports in his experience with Net activism in Albania, Taiwan, and India, rejects usual formulations of

the problem of the local and global. Net activists and artists are confronted with the dilemma between the supposedly friction-free machinic globality and the experience that social networks, in order to be successful, need to be rooted in local structures. Internet culture pops up in places where crystals of (media) freedom have been found before. At the same time the net is constantly subverting the very same local ties it

grows out of while creating new forms of "glocality." The choice of global or local is a false one. (*Dark Fiber,* 63)

Users of the Internet, particularly in postcolonial regions, experience the simultaneous advantage and dilemma of existing as a complex palimpsest of identities, locations, and responsibilities. Lovink, who is well aware of problems of accessibility, commercialization of the Internet, and the difficulties of using the Internet to foster democracy, nonetheless describes examples of success.[14]

Forms of Postcolonialist Amnesia

The crude binary oppositions that permeate so much of colonial and postcolonial studies produce three especially scandalous forms of historical amnesia. First, displaying a blatant disregard of modern history, postcolonialists all too often write as though the British empire of the eighteenth and nineteenth centuries is the major, and often the only, form of European colonialism that existed, or at least the only one worthwhile studying. After surveying discussions of subject on the World Wide Web, Eric Dickens complained, "Most of the websites, pages, searches, etc., concentrate on countries where the British Empire had colonies. Even when conferences are held in Finland, it's still British culture, British Black literature, and so forth, which are the focus. And the research itself is often done in Australia or the United States, where a British colonial past dominates, if subliminally. Whatever happened to discussing Portuguese, Spanish, French, Dutch, Belgian, Russian, Swedish, Danish, Roman, etc., etc., colonialism over the centuries?" In other words, instead of conceiving colonialism and its aftermath as a complex network of relations, too many postcolonialists present their field in terms of a simple opposition that omits much of European history.

Second, too much of postcolonial studies not only focuses exclusively on England and its empire but this narrowness appears in a crude eurocentrism. Chidi Okonkwo, a postcolonial scholar originally from Nigeria who writes about African, Oceanic, and Maori texts, points out the importance of recognizing both contemporary and historical "imperial ambitions among non-European peoples." Looking at the present, Okonkwo reminds us that "Indonesia's annexation of East Timor in 1975, with the attendant atrocities by which the colonial occupation has been perpetuated (about a third of the indigenous population), provides a stark reminder that neither the imperialist nor the genocidal impulse is exclusively European" (25). Okonkwo, who shows no interest in justifying European imperialism, argues that ignorant

eurocentrism of most colonial and postcolonial scholarship omits central facts in the history of the colonized:

> Though the field of postcolonial studies is focused on Euro-Christian imperialism and colonialism, the spread of Islam into Africa (and Europe) by Arabs of the Arabian peninsula constitutes a colonization enterprise whose beginnings predate that of Europe and whose efforts have proved equally enduring. It is a failure of postcolonial theory, and further proof of its Eurocentrism, that it ignores this major dimension of history. (26)

European, much less the British, projects of colonial expansion did not, in other words, take the form of a linear, isolated narrative. Take this history of South and Southeast Asia as an example of imperial complexities. In the eighteenth century the Burmese, whom Western journalists often quaintly and condescendingly characterize as a gentle people, had major imperial ambitions that resulted in war with Thailand and the consequent destruction of the great Thai capital of Sukothai (which prompted the later founding of Bangkok as a new capital). The Burmese, who wished to expand toward India, collided with the British who were trying to protect their trade routes. The British had no particular interest in colonizing Burma, but its imperial ambitions led to three Anglo-Burmese wars, in each of which the Burmese lost more territory. My point is that one has to know something about the layered, often confusing local history of a nation to write with any authority about its colonial and postcolonial identities.

This essential need for both comparative and historical knowledge appears when studying Soviet Russia and its former colonies, which represent yet another crucial part of the story missing from most postcolonial studies. According to Dickens, Finland and the Baltic states—Estonia, Lithuania, and Latvia—"finally shook off colonial rule in 1917. By the end of World War II, only Finland remained a free country and has flourished ever since. The other three were once again swallowed up until 1991 by the Soviet Union. Surely here again there are fruitful comparisons to be drawn and lessons to be learnt for newly independent states in Africa and Asia." The creation of new national identities for themselves remains a fundamental problem for such decolonized nations.

These post-Soviet attempts to create the sense and identity of a nation obviously bear some interesting parallels to the situation in Africa and Asia, but many of these Eastern bloc postcolonialists emphasize significant differences between the British and Soviet empires. For example, in *Imperial Knowledge: Russian Literature and Colonialism*, Ewa Thompson claims that Soviet-

era colonies, such as Belarus and the Ukraine, never were able to redefine the center/margin relation of empire and colony:

> Unlike Western colonies, which have increasingly talked back to their former masters, Russia's colonies have by and large remained mute, sometimes lacking Western-educated national elites and always lacking the encouragement of Western academia that foregrounding issues relevant to them would afford. They continue to be perceived within the paradigms relevant to Russia, the objects of Russian perception rather than subjects responding to their own histories, perceptions, and interests. In that connection, the perception of postcolonialist commentators that history is "the discourse through which the West has asserted its hegemony over the rest of the world" is incorrect.

In fact, Thompson argues, both pre-Soviet and Soviet Russian ideology has so permeated European and American discourse that we readily employ the misleading division into "West and non-West" that disregards Russia's successful "effort to manufacture a history, one that stands in partial opposition to the history created by the West on the one hand, and on the other to the history sustained by the efforts of those whom Russia had colonized. In doing so, Russia has successfully superimposed portions of its own narrative on the Western one."

Hypertext as Paradigm in

Postcolonial Theory

The example of the mass media's misinterpretation of the current situation in Zimbabwe, like the problems inherent in the rhetoric of African liberation, demonstrates how easily we fall into the habit of binary thought. Derrida's deconstruction reminds us that many of the concepts and categories we routinely oppose—powerful/weak, colonizer/colonized, male/female, inside/outside—actually share many qualities that, when recognized, weaken the force of the original contrast. In fact, many such culturally affirmed oppositions are like the standard use of red and green in traffic lights: the contrast has its practical uses, certainly, but in reality these colors exist along a spectrum and not in binary opposition. Binary oppositions are generally rhetorical techniques or thought-forms that have limited practical and political uses, just as long as they are not misunderstood.

The value of hypertext as a paradigm exists in its essential multivocality, decentering, and redefinition of edges, borders, identities. As such, it provides a paradigm, a way of thinking about postcolonial issues, that continually serves to remind us of the complex factors at issue. As Odin convincingly argues, "The perpetual negotiation of difference that the border subject

engages in creates a new space that demands its own aesthetic. This new aesthetic, which I term 'hypertext' or 'postcolonial', represents the need to switch from the linear, univocal, closed, authoritative aesthetic involving passive encounters characterizing the performance of the same to that of non-linear, multivocal, open, non-hierarchical aesthetic involving active encounters that are marked by repetition of the same with and in difference." In "The Performative and Processual: A Study of the Hypertext/Postcolonial Aesthetic," the study in which Odin advances her proposal to use hypermedia as an effective means of understanding various aspects of postcolonial situations, she concentrates on analyses of Leslie Silko and Shelley Jackson. Looking at some problematic aspects of liberation rhetoric, as Lazarus has done, as well as the fiction and autobiography of major decolonization writers demonstrates the value of her approach. Antoinette's problems with her double or triple identity in *Wide Sargasso Sea*, Soyinka's more joyous presentation of his complex multiple heritages in *Ake* and *Isara: A Voyage around Essay*, and Kerewin's complex ethnic, sexual, and artistic identity in Hume's *The Bone People* all testify to the need in postcolonial situations for what Odin terms "non-linear, multivocal, open, non-hierarchical aesthetic involving active encounters that are marked by repetition of the same with and in difference."

The writings of Salman Rushdie, Sara Suleri, and many others support Odin's claim that "the intertextual and interactive hypertext aesthetic is most suited for representing postcolonial cultural experience because it embodies our changed conception of language, space, and time. Language and place are here no longer seen as existing in abstract space and time, but involve a dynamic interaction of history, politics, and culture." Rushdie's meditations in *Shame* on roots, rootlessness, migration, and being between exemplify what Odin means. Rushdie's narrator explains that he knows "something of this immigrant business. I am an emigrant from one country (India) and a newcomer in two (England, where I live, and Pakistan, to which my family moved against my will)." According to him, if gravity equates with belonging somewhere, he and other wanderers among various cultures "have come unstuck from more than land. We have floated upwards from history from memory, from Time" (90–91). The best thing about people who have moved between worlds, say, Rushdie, is "their hopefulness," the worst "the emptiness of their luggage." Here many postcolonial novelists would disagree, for they find that they travel with too much baggage rather than too little.

In *Meatless Days*, for example, Suleri blends languages, geographies, and life stories emphasizing the heavy weight of public and private histories. Occasionally, multiple identities defined by their simultaneous existence in

too many contexts produce tragedy, as when she introduces the possibility that her father's political views may have played a part in her sister's murder; more often, Suleri produces comedy, or at least a wry glance at her multiple worlds—for example, when discovering that *kapura* are testicles and not sweetbreads, she find her relationship with her Welsh mother, family, various homes, and nationalities become threateningly complex and incoherent. She, like Rushdie, Hume, and so many other postcolonial novelists, creates narratives "composed of cracks, in-between spaces, gaps where linearity and homogeneity are rejected in favor of heterogeneity and discontinuity." Like writers of hyperfiction, such as Jackson and Joyce, postcolonial novelists "use strategies of disruption and discontinuity" in multilinear narratives in which "meaning does not lie in the tracing of one narrative trajectory, but rather in the relationship that various tracings forge with one other." As Sage Wilson, one of the undergraduate contributors to *The Postcolonial Web*, put it, "postcolonial thought refuses to wipe the slate clean." Past traditions, oral culture, English colonial education, syncretic religions, personal identities are all contaminated, mixed, hybrid, and one has to find ways of depicting—and living with—such complexity. Hypertext as paradigm at least offers an effective, understandable means of thinking about this congeries of complex and conflicting issues.

The Politics of Access: Who Can Make Links, Who Decides What Is Linked?

Mixed with the generally democratic, even anarchic tendencies of hypertext is another strain that might threaten to control the most basic characteristics of this information medium. Readers in informational hypertext obviously have far more control over the order in which they read individual passages than do readers of books, and to a large extent the reader's experience also defines the boundaries of the text and even the identity of the author, if one can conveniently speak of such a unitary figure in this kind of dispersed medium.

The use of hypertext systems like the Web involves four kinds of access to text and control over it: reading, linking, writing, and networking. Access to the hypertext begins with the technology required to read and produce hypertext, and this technology has only recently become widely available in the limited form of blogs. Once it becomes widespread enough to serve as a dominant, or at least major, form of publication, issues of the right and power to use such technology will be multiplied.

One can easily envision reading a text for which one has only partial per-

mission, so that portions of it remain forbidden, out of sight, and perhaps entirely unknown. An analogy from print technology would be having access to a published book but not to the full reports by referees, the author's contract, the manuscript before it has undergone copyediting, and so on. Conventionally, we do not consider such materials to be *part* of the book. Electronic linking has the potential, however, radically to redefine the nature of the text, and since this redefinition includes connection of the so-called main text to a host of ancillary ones (that then lose the status of ancillary-ness), issues of power immediately arise. Who controls access to such materials, the author, the publisher, or the reader?

Linking involves the essence of hypertext technology. Already we have seen the invention of web software that provides the capacity to create links to texts over which others have editorial control. This ability to make links to lexias for which one does not possess the right to make verbal or other changes has no analogy in the world of print technology. One effect of this kind of linking is to create an intermediate realm between the writer and the reader, thus further blurring the distinction between these roles.

When discussing the educational uses of hypertext, one immediately encounters the various ways that reshaping the roles of reader and author quickly reshape those of student and teacher, for this information medium enforces several kinds of collaborative learning. Granting students far more control over their reading paths than does book technology obviously empowers students in a range of ways, one of which is to encourage active explorations by readers and another of which is to enable students to contextualize what they read. Pointing to such empowerment, however, leads directly to questions about the politics of hypertext.

Hypertext demands the presence of many blocks of text that can link to one another. Decisions about relevance obviously bear heavy ideological freight, and hypertext's very emphasis on connectivity means that excluding any particular bit of text from the metatext places it comparatively much farther from sight than would be the case in print technology. When every connection requires a particular level of effort, particularly when physical effort is required to procure a copy of an individual work, availability and accessibility become essentially equal, as they are for the skilled reader in a modern library. When, however, some connections require no more effort than does continuing to read the same text, *un*connected texts are experienced as lying much farther away, and availability and accessibility become very different matters.

Complete hypertextuality requires gigantic information networks of the kind now taking form on the Web. This vision of hypertext as a means of

democratic empowerment depends ultimately on the individual reader-author's access to enormous networks of information. As Norman Meyrowitz admits, "Down deep, we all think and believe that hypertext is a vision that sometime soon there will be an infrastructure, national and international, that supports a network and community of knowledge linking together myriad types of information for an enormous variety of audiences" (2). The person occupying the roles of reader and author must have access to information, which in practice means access to a network—the Internet. For the writer this access becomes essential, for in the hypertext world access to a network is publication.

Considered as an information and publication medium, hypertext presents in starkest outline the contrast between availability and accessibility. Texts can be available somewhere in an archive, but without cataloguing, support personnel, and opportunities to visit that archive, they remain unseen and unread. Since search tools have made materials within a hypertext environment much easier to obtain, it simultaneously threatens to make any of those not present seem even more distant and more invisible than absent documents in the world of print are felt to be. The political implications of this contrast seem clear enough: gaining access to a network permits a text to exist as a text in this new information world. Lyotard, who argues that knowledge "can fit into the new channels, and become operational, only if learning is translated into quantities of information," predicts that "anything in the constituted body of knowledge that is not translatable in this way will be abandoned and that the direction of new research will be dictated by the possibility of its eventual results being translatable into computer language" (*Postmodern Condition*, 4). Antonio Zampolli, the Italian computational linguist and past president of the Association of Literary and Linguistic Computing, warns about this problem when he suggests an analogy between the Gutenberg revolution and what he terms the *informatization* of languages: "Languages which have not been involved with printing, have become dialects or have disappeared. The same could happen to languages that have not been 'informatized'" (47) transferred to the world of electronic text storage, manipulation, and retrieval. As Lyotard and Zampolli suggest, individual texts and entire languages that do not transfer to a new information medium when it becomes culturally dominant will become marginalized, unimportant, virtually invisible.

Although a treatise on poetry, horticulture, or warfare that existed in half a dozen manuscripts may have continued to exist in the same number of copies several centuries after the introduction of printing, it lost power and status, except as a unique collector's item, and became far harder to use than

ever before. Few readers cared to locate, much less make an inconvenient, costly, and possibly dangerous trip to peruse an individual manuscript when relatively far cheaper printed books existed close at hand. As habits and expectations of reading changed during the transition from manuscript to print, the experience of reading texts in manuscript changed in several ways. Although retaining the aura of unique objects, texts in manuscript appeared scarcer, harder to locate, and more difficult to read in comparison with books. Moreover, as readers quickly accustomed themselves to the clarity and uniformity of printed fonts, they also tended to lose or find annoying certain reading skills associated with manuscripts and certain of their characteristics, including copious use of abbreviations that made the copyist's work easier and faster. Similarly, book readers who had begun to take tables of contents, pagination, and indices for granted found locating information in manuscripts particularly difficult. Finally, readers in a culture of print who have enjoyed the convenience of abundant maps, charts, and pictures soon realized that they could not find certain kinds of information in manuscripts at all.

In the past, transitions from one dominant information medium to another have taken so long—millennia with writing and centuries with printing—that the surrounding cultures adapted gradually. Those languages and dialects that did not make the transition remained much the same for a long time but gradually weakened, attenuated, or even died out because they could not do many of the things printed languages and dialects could do. Because during the early stages of both chirographic and typographic cultures much of the resources was devoted to transferring texts from the earlier to the current medium, this masked these transitions somewhat. The first centuries of printing, as McLuhan points out, saw the world flooded with versions of medieval manuscripts in part because the voracious, efficient printing press could reproduce texts faster than authors could write them. This flood of older work had the effect of thus using radically new means to disseminate old-fashioned, conservative, and even reactionary texts.

We can expect that many of the same phenomena of transition will repeat themselves, though often in forms presently unexpected and unpredictable. We can count on hypertext and print existing side by side for some time to come, particularly in elite and scholarly culture, and when the shift to hypertext makes it culturally dominant, it will appear so natural to the general reader-author that only specialists will notice the change or react with much nostalgia for the way things used to be. Whereas certain inventions, such as vacuum cleaners and dishwashers, took almost a century between their initial development and commercial success, recent discoveries and inventions,

such as the laser, have required less than a tenth the time to complete the same process. This acceleration of the dispersal of technological change suggests, therefore, that the transition from print to electronic hypertext, if it comes, will therefore take far less time than did earlier transitions.

The history of the print technology and culture also suggests that as the Web becomes even more culturally important than it already is, it will do so by enabling large numbers of people either to do new things or to do old things more easily. Furthermore, such a shift in information paradigms will see another version of what took place in the transition to print culture: an overwhelming percentage of the new texts created, like Renaissance and later how-to-do-it books, will answer the needs of an audience outside the academy and hence will long remain culturally invisible and objects of scorn, particularly among those segments of the cultural elite who claim to know the true needs of "the people." The enormous number of online diaries, political and other parodies, examples of self-published fiction and poetry, and conversion-tales by people with alternative lifestyles reveals that for many such a change has already taken place. The active readers hypertext creates can meet their needs only if they can find the information they want, and to find that information they must have access to the Internet and local text- and databases that require special access. Similarly, authors cannot fully assume the authorial function if they cannot place their texts on a network, something at first impossible on the World Wide Web unless the author had access rights to a server. Blogs with comment functions, as we have observed, allow the Web reader to act as a Web author, too.[15]

Slashdot: The Reader as Writer and Editor in a Multiuser Weblog

Slashdot, the famous multiuser site that uploaded almost 13,000 blogs in 2003, represents an important experiment in online democracy and large-scale collaboration because it uses its readers to moderate submissions. Ron "CmdrTaco" Malda, one of its founders and editor-in-chief, explains how the editors gradually devised a system to screen readers' contributions. The site grew rapidly, the number of comments increased, and "many users discovered new and annoying ways to abuse the system. The authors had but one option: Delete annoying comments. But as the system grew, we knew that we would never be able to keep up. We were outnumbered." At first Malda invited a few people to help, but the number soon increased to 25, and when they no longer could handle the thousands of posts that arrived every day, "we picked more the only way we could. Using the actions of the original 25 moderators, we picked 400 more. We picked the 400 people who had posted good comments: com-

ments that had been flagged as the cream of Slashdot." When numbers continued to grow, Malda decided to have anyone who logged in to *Slashdot* and "read an average number of times—no obsessive compulsive reloaders, and nobody who just happened to read an article this week"—serve as a moderator.

Moderators receive "points of influence" that expire after three days, or when they use up their allotment, since "each comment they moderate deducts a point. When they run out of points, they are done serving until next time it is their turn." In evaluating comments, *Slashdot* moderators select "an adjective from a drop down list that appears next to comments containing descriptive words like 'Flamebait' or 'Informative.' Bad words will reduce the comment's score by a single point, and good words increase a comment's score by a single point. All comments are scored on an absolute scale from –1 to 5," although they are adjusted according to one's past performance, or "karma."[16] Malda emphasizes to moderators, who are urged to judge impartially, that they should "concentrate more on promoting than demoting," since their goal should be to "sift through the haystack and find needles. And to keep the children who like to spam Slashdot in check." The editors, who still moderate about 3 percent of contributions, try to protect the user-moderators by screening major spammers, since "a single malicious user can post dozens of comments, which would require several users to moderate them down, but a single admin can take care of it in seconds."

Slashdot has several means to prevent abuse by moderators, the most simplest and basic of which is the rule that they cannot participate in a discussion they moderate. The more complex means involves metamoderation, or M2, which the site uses to check the quality of decisions, removing bad moderators and rewarding good ones with additional mod points. Any active user who has been a member of the site for at least several months can serve as a metamoderator as well as a moderator.

Slashdot represents a fascinatingly successful experiment in large-scale online collaboration and reader empowerment. It does not, however, embody cyber-utopian Internet anarchy, for, as Malda's history of the site reveals, he quickly discovered that *Slashdot* needed a moderator to protect it from vandals. Furthermore, as soon as he and the other editors tried to share power with users, they realized that they had "to limit the power of each person to prevent a single rogue from spoiling it for everyone." Although the editors still maintain control of *Slashdot* and have final say on overall policies, they have transformed it into a collaborative venture, which means that in large part, they have turned most of the enterprise over to the users, who act at different times as contributors, readers, moderators, and judges of the moderators.

Comparing this multiuser blog to offline publishers, one realizes that it has retained certain features of the print world, such as editors with separate responsibilities, but at the same time it shares editorial authority with its large body of users, making most of *Slashdot* an example of decentered, distributed power. Interestingly enough, protecting the communal enterprise while sharing power and responsibility proved as crucial to the enterprise as software. Although *Slashdot* obviously employs many links, its hypertextuality appears chiefly in its changing network of reader-user-editors.

Pornography, Gambling, and Law on the Internet—Vulnerability and Invulnerability in E-Space

The Associated Press reported on December 5, 1994, that Robert and Carleen Thomas, who operated a computer bulletin board in California, were convicted in Memphis, Tennessee, on eleven counts of transmitting obscene materials to a members-only computer bulletin board via a telephone line. "The prosecution of the Thomases marked the first time that operators of a computer bulletin board were charged with obscenity in the city where the material was received, rather than where it originated." The Thomases, who live in Milpitas, California, near San Francisco, claimed that the prosecutors shopped around until they found a Bible Belt jurisdiction to increase chances of conviction. "If the 1973 Supreme Court standard is applied to cyberspace," the AP story continues, "juries in the most conservative parts of the country could decide what images and words get onto computer networks, said Stephen Bates, a senior fellow with the Annenberg Washington Program, a communications think-tank." To be sure this case involves digital networked culture and not hypertext itself since the crime with which the Thomases were charged involved a commercial bulletin board rather than the Web. Nonetheless, the same issues are involved.

In the Thomas case the virtual space that permits disseminating information at great speed turned out, according to the presiding judge, also to have extended the legal and hence physical space, grotesquely many have argued, in which one is legally vulnerable. The Internet in effect was understood to have dissolved one kind of legal boundary—that of the more liberal municipal authorities and of the state of California—while simultaneously extending that of Tennessee to override wishes of voters and judiciary in another state.

The Thomases' conviction's legal implications certainly have more importance to the United States with its conflicting legal jurisdictions than to many other countries. Their case also presents some odd features, one of the most obvious being that local Tennessee Internet providers offering the same kind

of sexually explicit materials were supposedly not prosecuted either before or after the prosecutor went after the California couple. But the issue of jurisdiction in virtual space reminds us that in cyberspace the basic definitions of rights and responsibilities, law and its limits, are currently up for grab—and, as James Boyle suggests, since law works by analogy to often outmoded conditions, one can expect that crucial precedents will be made by those unaware of differences between physical and virtual space.

Granted that many people find such erotica offensive, the recent hysteria about pornography and exploitation of children on the Internet seems more than a little fishy, particularly given the fact that an astonishing amount of similar, equally degrading material is available via telephone chat-lines. Unless I have missed that article in my local newspaper, I don't recall reading that politicians and local law enforcement officers have proposed to imprison the CEOs of ATT, the Baby Bells, and local phone companies, much less seize phone lines and equipment. One common interpretation of the high moral dudgeon about possibilities of seduction and corruption on the Internet is that it involves asserting control of the vast great financial potential of its resources. In an article in *PC Magazine* (which I encountered in its World Wide Web form), John C. Dvorak convincingly argues that the entire Thomas case has little to do with the ostensible issues of moral standards: "the purpose of this interstate arrest was to set a legal precedent for all interstate activity done over a computer network. Authorities hope the result of this case (along with that of a parallel case against Thomas pending in the Utah courts) will be effective control of interstate banking, interstate sales tax collection for on-line mall activity, and interstate gambling for the purpose of collecting taxes (which authorities would like to ban outright)."

In this and other ways authorities might hope to control financial resources, in essence using virtual space to reshape physical and legal space within the boundaries of the United States. What can they do, however, when illegal activities originate outside the country? Dvorak sees the entire Thomas matter related essentially to the desire by individual states to control—that is, tax—gambling and other financial transactions by Americans on the Internet, but offshore servers have already shown how difficult this might be in an open society.

The easy, convenient access to Internet resources provided by the Web has, as one might expect, quickly produced distant gambling casinos that, however virtual themselves, require real money—as if money were itself not always virtual! In addition to providing advertising for legal gambling in Las Vegas (Vegas.Com!) and books on the subject, the World Wide Web also hosts both

discussion groups and several virtual gambling casinos whose servers are located outside the United States. WagerNet, based in Belize, and Sports International, based in Antigua, permit one to place sports wagers—$50 minimum bet for Sports International—and the Caribbean Casino, which is based in Turks and Caicos Islands, offers blackjack and lotteries as well as wagering on sports. These establishments escape local American laws against gambling both because it takes place in virtual space and because the server lies outside a boundary that would permit law enforcement. According to William M. Bulkley, "the Justice Department says cyberspace casinos are illegal. But the companies' offshore venues may protect them. And authorities will have a tough time detecting who's actually betting because many people will be playing the same games for free" (B1). The effect of cyberspace, in other words, here is the opposite of that observed in the Thomas case: whereas in the pornography case, local authorities (with the assistance of the U.S. postal authorities) asserted their control over another jurisdiction, in this case the limits of U.S. sovereignty means that no control is possible. Perhaps the Thomases should move offshore. Many spammers have already done so.

A decade has passed since the appearance of online casinos, and Matt Richtel reports that "a new generation of online services like Betfair has emerged to allow sports bettors to wager not against the house but directly against each other." Such peer-to-peer betting, which has become popular in Europe, Asia, and Australia, thus far takes two forms: Betfair, a British website, permits would-be bettors to contact each other, whereas Betbug, a newer American Internet service, "is remarkably similar to file-sharing programs like Kazaa and Morpheus, which let people exchange music and other media over the Internet. Anyone downloading the Betbug software will be able to propose a wager, then reach out to everyone else on the network to find a taker for the bet." The Internet services make their money by receiving a small percentage of the winning bet. John O'Malia, "an American entrepreneur based in London," claims that he violates no American laws "because he is not acting as the sports bookmaker by setting the odds or participating in the wager."

"What becomes of government in an electronic revolution?" asks James K. Glassman, who asserts that "government's regulatory functions could weaken, or vanish. It's already a cinch on the Internet to get around the rules; censorship, telecommunications restrictions and patent laws are easily evaded. Even tax collection could become nearly impossible when all funds are transferred by electronic impulses that can be disguised." Glassman describes the cyberpunk science-fiction worlds of William Gibson, Bruce Sterling, and Neal Stephenson, in which the new information technologies prevent na-

tional governments from controlling the flow of money and information, thereby inevitably destroying them and transferring their power to other entities, such as multinational corporations and organized crime.

The apparently odd collocation of politics and pornography that appears so explicitly in China and Singapore turns out to be a common theme in the intertwined histories of information technology, democratization, and modernity. In fact, as Lynn Hunt has shown, "pornography as a regulatory category was invented as a response to the perceived menace of the democratization of culture . . . It was only when print culture opened the possibility of the masses gaining access to writing and pictures that pornography began to emerge as a separate genre of representation" (12–13). If one defines pornography as "explicit depiction of sexual organs and sexual practices with the aim of arousing sexual feelings," then it almost always appears accompanied by "something else until the middle or end of the eighteenth century. In early modern Europe, that is, between 1500 and 1800, pornography was most often a vehicle for using the shock of sex to criticize religious and political authorities" (10), and it was therefore linked "to freethinking and heresy, to science and natural philosophy, and to attacks on absolutist political authority" (11).

As these examples suggest, the World Wide Web and the Internet bring with them the threat and promise of democratized access to information— all sorts of information, not all of it savory or sane—but the degree to which information technology will change culture, government, and society very much remains an open question. If, as we have observed, the very slightest changes in technology (the size of a screen, the presence or absence of color, forms of linking) often have surprisingly major effects on the way we read, write, and think in e-space, then one cannot predict if governments will finally control the forms of hypertext we shall encounter, or if they will appear in forms that will prove too powerful for present conceptions of space, power, and the laws that shape them.

Access to the Text and the Author's Right (Copyright)

Access to a network implies access to texts "on" that network, and this access raises the issue of who has the right to have access to a text—access to read it as well as to link to it. Problems and possibilities come with the realization that authorship as it is conventionally understood is a convention. Conceptions of authorship relate importantly to whatever information technology currently prevails, and when that technology changes or shares its power with another, the cultural construction of authorship changes, too, for good or for ill.

A related problem concerns the fate of authorial rights. Michael Heim

has pointed out that "as the model of the integrated private self of the author fades, the rights of the author as a persistent self-identity also become more evanescent, more difficult to define. If the work of an author no longer carries with it definite physical properties as a unique original, as a book in definite form, then the author's rights too grow more tenuous, more indistinct" (*Electric Language*, 221). If the author, like the text, becomes dispersed or multivocal, how does society fairly assign legal, commercial, and moral rights?

Before we can begin to answer such a question, we have to recognize that our print-based conceptions of authorial property and copyright even now do harm as well as good. They produce economically irrational effects, hindering as well as stimulating invention. Indeed, as James Boyle reminds us in his splendid book about law and the construction of an information society,

> copyright is a fence to keep the public out as well as a scaffolding for the billboards displayed in the marketplace of ideas; it can be used to deny biographers the ability to quote from or to paraphrase letters; to silence parody; to control the packaging, context, and presentation of information. To say that copyright promotes the production and circulation of ideas is to state a conclusion and not an argument. At the very least we might wonder if, *in our particular copyright regime*, the gains outweigh the losses. (18–19)

Boyle forcefully argues that the author paradigm, which provides the center of copyright law and our current visions of intellectual property, "produces effects that are not only unjust, but unprofitable in the long term" (xiv), in part because it only rewards certain kinds of creation to the detriment of others.

Using the examples of the way Western scientists and corporations copyright materials based on information derived from communities in the Third World, he demonstrates how laws supposedly intended to promote innovation by rewarding creators recognize only creativity and originality based on romantic authorship.

> Centuries of cultivation by Third World farmers produces wheat and rice strains with valuable qualities—in the resistance of disease, say, or in the ability to give good yields at high altitudes. The biologists, agronomists, and genetic engineers of a Western chemical company take samples of these strains and engineer them a little to add a greater resistance to fungus or a thinner husk . . . The chemical company's scientists fit the paradigm of authorship. The farmers are everything authors should not be—their contribution comes from a community rather than an individual, from tradition rather than innovation, from evolution rather than transformation. Guess who gets the copyright? Next year the farmers may need a license to resow the grain from their crops. (126)

In a situation marked by diametrically opposed conceptions of intellectual property, each side believes the other has stolen from it. Whereas countries like the United States and Japan, that base their conceptions of intellectual property on the author paradigm, accuse Third World nations of pirating their ideas, these countries in turn accuse the United States and Japan of stealing something that belongs to an entire community.

This situation appears particularly bizarre when viewed from the vantage point of American history, since, as Vincent Mosco points out, the United States "was the supreme intellectual property pirate of the nineteenth century" (47). It neither respected foreign copyright, such as that on Dickens's novels, nor gave copyright protection to foreigners unless they published first in the United States. In fact, "it was not until 1891, when the U.S. had a thriving publishing industry and literary culture of its own, that it extended copyright protection to foreign work." Mosco then asks the difficult question: "If, as most analysts admit, this was a key to successful national economic development then, why is it wrong for Mexico, India, Brazil, or China to follow this model now? What makes copying CDs in China theft, when copying *Great Expectations* in nineteenth-century America was deemed simply good business practice?" (47).

An even more crucial problem with copyright is that notions of intellectual property based on the author paradigm, which supposedly reward and hence stimulate originality, "can actually *restrict* debate and slow down innovation—by limiting the availability of the public domain to future users and speakers" (155). Those who write about intellectual property often point out that many corporations elect to rely on trade secrets rather than copyright law to protect their inventions, and, anyway, as Boyle urges, "innovators can recover their investment by methods other than intellectual property—packaging, reputation, being first to market, trading on knowledge of the more likely economic effects of the innovation, and so on" (140). If electronic information technology threatens to reconfigure our conceptions of intellectual property, we can take reassurance from several things, among them not only that our fundamentally problematic ideas of copyright often do not achieve what they are supposed to do but also that other means of rewarding innovation already exist.

As we have observed, one problem challenging print-based conceptions of intellectual property in an age of the digital word and image involves our changing understanding of authorship. A second problem concerning intellectual property derives from the nature of virtual textuality, any example of which by definition exists only as an easily copiable and modifiable version—

as a derivative of something else or as what Baudrillard would call a simu-lacrum. Traditional conceptions of literary property derive importantly from ideas of original creation, and these derive in turn from the existence of multiple copies of a printed text that is both fixed and unique. Electronic text processing changes, to varying degrees, all aspects of the text that had made conceptions of authorial property practicable and even possible. Heim correctly warns that an outmoded conception of "proprietary rights based on the possession of an original creation no longer permits us to adapt ourselves to a world where the technological basis of creative work makes copying easy and inevitable," and that to protect creativity we "must envision a wholly new order of creative ownership" (*Electric Language,* 170). But the problem we face, Boyle warns, is that our "author-vision" of copyright and intellectual property "downplays the importance of fair use and thus encourages an absolutist rather than a functional idea of intellectual property" (139).

As Steven W. Gilbert testified before a congressional committee, technology already both extends conventional conceptions of intellectual property and makes its protection difficult and even inconceivable:

It may soon be technically possible for any student, teacher, or researcher to have immediate electronic access from any location to retrieve and manipulate the full text (including pictures) of any book, sound recording, or computer program ever published—and more. When almost any kind of "information" in almost any medium can now be represented and processed with digital electronics, the range of things that can be considered "intellectual property" is mind-boggling. Perhaps the briefest statement of the need to redefine terms was made by Harlan Cleveland in the May/June 1989 issue of *Change* magazine: "How can 'intellectual property' be 'protected'? The question contains the seed of its own confusion: it's the wrong verb about the wrong noun." (16)

Attitudes toward the correct and incorrect use of a text written by someone else depend importantly on the medium in which that text appears. "To copy and circulate another man's book," H. J. Chaytor reminds us, "might be regarded as a meritorious action in the age of manuscript; in the age of print, such action results in law suits and damages."[17] From the point of view of the author of a print text, copying, virtual textuality, and hypertext linking must appear wrong. They infringe upon one person's property rights by appropriating and manipulating something over which another person has no proper rights. In contrast, from the point of view of the author of hypertext, for whom collaboration and sharing are of the essence of "writing," restrictions on the availability of text, like prohibitions against copying or linking, appear

absurd, indeed immoral, constraints. In fact, without far more access to (orig-inally) print text than is now possible, true networked hypertextuality cannot come into being.

Difficult as it may be to recognize from our position in the midst of tran-sition from print to electronic writing, "it is an asset of the new technology," Gilbert reminds us, "not a defect, that permits users to make and modify copies of information of all kinds—easily, cheaply, and accurately. This is one of the fundamental powers of this technology and it cannot be repressed" (18). Therefore, one of the prime requisites for developing a fully empower-ing hypertextuality is to improve, not technology, but laws concerning copy-right and authorial property. Otherwise, as Meyrowitz warned, copyrights will "replace ambulances as the things that lawyers chase" (24). We do need copyright laws protecting intellectual property, and we shall need them for the foreseeable future. Without copyright, society as a whole suffers, for with-out such protection authors receive little encouragement to publish their work. Without copyright protection they cannot profit from their work, or they can profit from it only by returning to an aristocratic patronage system. Too rigid copyright and patent law, on the other hand, also harms society by permitting individuals to restrict the flow of information that can benefit large numbers of people.

Hypertext demands new classes or conceptions of copyright that protect the rights of the author while permitting others to link to that author's text. Hypertext, in other words, requires a new balancing of rights belonging to those entities whom we can describe variously as primary versus secondary authors, authors versus reader-authors, or authors versus linkers. Although no one should have the right to modify or appropriate another's text any more than one does now, hypertext reader-authors should be able to link their own texts or those by a third author to a text created by someone else, and they should also be able to copyright their own link sets should they wish to do so. A crucial component in the coming financial and legal reconception of authorship involves developing schemes for equitable royalties or some other form of payment to authors. We need, first of all, to develop some sort of usage fee, perhaps of the kind that ASCAP levies when radio stations trans-mit recorded music; each time a composition is broadcast the copyright owner earns a minute sum that adds up as many "users" employ the same information—an apposite model, it would seem, for using electronic infor-mation technology on electronic networks.

Gilbert warns us that we must work to formulate new conceptions of copyright and fair use, since "under the present legal and economic conven-

tions, easy use of the widest range of information and related services may become available only to individuals affiliated with a few large universities or corporations" (14). Thus, dividing the world into the informationally rich and informationally impoverished, one may add, would produce a kind of techno-feudalism in which those with access to information and information technology would rule the world from electronic fiefdoms. William Gibson, John Shirley, and other practitioners of cyberpunk science fiction have convincingly painted pictures of a grim future, much like that in the movie *Blade Runner,* in which giant multinational corporations have real power and governments play with the scraps left over. Now is the time to protect ourselves from such a future. Like many others concerned with the future of education and electronic information technology, Gilbert therefore urges that we must develop *"new economic mechanisms to democratize the use of information, and economic mechanisms beyond copyright and patent.* It would be a tragedy if the technology that offers the greatest hope for democratizing information became the mechanism for withholding it. We must make information accessible to those who need it . . . Any pattern that resembles information disenfranchisement of the masses will become more obviously socially and politically unacceptable" (17–18).

Most of the discussions of copyright in the electronic age that I have encountered recently fall into two sharply opposing camps. Those people, like Gilbert, who consider issues of authorial property from the vantage point of the hypertext reader or user of electronic text and data emphasize the need for access to them and want to work out some kind of equitable means of assigning rights, payment, and protection to all parties. Their main concern, nonetheless, falls on rights of access. Others, mostly representatives of publishers, often representatives of university presses, fiercely resist any questioning of conventional notions of authorship, intellectual property, and copyright as if their livelihoods depended on such resistance, as indeed they well might. They argue that they only wish to protect authors and that without the system of refereed works that controls almost all access to publication by university presses, standards would plummet, scholarship would grind to a halt, and authors would not benefit financially as they do now. These arguments have great power, but it must be noted that commercial presses, which do not always use referees, have published particularly important scholarly contributions and that even the most prestigious presses invite thesis advisors to read the work of their own students or have scholars evaluate the manuscripts of their close friends. Nonetheless, publishers do make an important point when they claim that they fulfill an important role by vetting and

then distributing books, and one would expect them to retain such roles even when their authors begin to publish their texts on networks.

Although almost all defenses of present versions of copyright I have encountered clearly use the rights of the author or society in large part as a screen to defend commercial interests, one issue, that of the author's moral rights, is rarely discussed, certainly not by publishers. As John Sutherland explains in "Author's Rights and Transatlantic Differences," Anglo-American law treats copyright solely in terms of property. "Continental Europe by contrast enshrines moral right by statute. In France and West Germany the author has the right to withdraw his or her work after it has been (legally) published— something that would be impossible in Britain or the United States without the consent of the publisher . . . In [France and West Germany], publishers who acquire rights to the literary work do not 'own it,' as do their Anglo-American counterparts. They merely acquire the right to 'exploit' it."[18]

The occasion for Sutherland's article raises important questions about rights of the hypertext as well as the print author. In 1985 an American historian, Francis R. Nicosia, published *The Third Reich and the Palestine Question* with the University of Texas Press, which subsequently sold translation rights to Duffel-Verlag, a Neo-Nazi publisher whose director "is (according to Nicosia) identified by the West German Interior Ministry as the publisher of the *Deutscher Monatschefte*, a publication that, among other matters, has talked about 'a coming Fourth Reich in which there will be no place for anti-Fascists. The path to self-discovery for the German people will be over the ruins of the concentration camp memorials.'" Believing that an association with Duffel-Verlag will damage his personal and professional reputation, the author has complained vigorously about his American publisher's treatment of his book. Traditional Anglo-American law permits the author no recourse in such situations, but Sutherland points out that "on October 31, 1988, Ronald Reagan signed into law America's ratification of the Berne Convention," which grants the author moral rights including that which prevents a publisher from acting in ways "prejudicial to his honour and reputation."

The question arises, would an author whose text appears on a hypertext environment, such as the Web, find that text protected more or less than a comparable print author? At first glance, one might think that Nicosia would find himself with even fewer rights if his work appeared as a hypertext, since anyone, including advocates of a Fourth Reich, could link comments and longer texts to *The Third Reich and the Palestine Question*. In 1991 when I was thinking in terms of full read-write systems like Intermedia, I wrote that such an answer is incorrect for two reasons. First, in its hypertext version Nicosia's

monograph would not appear isolated from its context in the way its print versions does. Second (and this is really a restatement of my previous point), a read-write hypertext version would permit Nicosia to append his objections and any other materials he wished to include. Linking, in other words, has the capacity to protect the author and his work in a way impossible with printed volumes. Allowing others to link to one's text therefore does not sacrifice the author's moral rights. The problem with this response is that since we've ended up with the current World Wide Web, my original argument turns out to be of only theoretical value. The one way on the Web that an author could state (publish?) his objections to what someone else has done to his work involves creating a site in which he explains them. Since those interested in the relationship of Nazi Germany to the Middle East who are reading a Web version would likely search the Internet, his response would appear in search results very close to his book.

On the Web, links can also associate one's work with unexpected or unwanted materials. Exploring focus.com, an online museum of experimental digital photography, which includes one of my images, I followed links to the sites of other photographers, looked at galleries of their work, and then clicked on a link for recommended sites, which brought me to a one called "CNPN-Best Erotic Nudes—Nude Gallery—Fine Art Nude Photography," which contains links to dozens of photographers' sites, including that of Kim Weston, grandson of the great master of landscape and the nude. What I found jarring, however, was that above the list of art photographers appeared links to hardcore pornographic sites. In all fairness I have to mention that all the art photographers listed appear against a blue background, whereas all the porno ads appear in black boxes (except for some in sidebars). Checking the supposed art sites, I found that they in fact belonged to an international group of photographers who did the kind of work one finds in galleries and museums. These sites, almost all of which were extremely elegant, included artists' biographies, lists of exhibitions, and statements about their work as well as Web galleries containing selections from it. Although some of the images I encountered could be described as erotic, a large number were experimental, highly abstract, or emphasized landscape settings—hardly the kind of material that would interest anyone seeking pornography. Curious about how such professional work ended up juxtaposed to hardcore pornography, I e-mailed more than a dozen photographers. In response, one replied that he did not know that CNPN listed him, but most of them responded that when they agreed to be listed on CNPN the site contained no links to pornography. Some were very angry or disappointed and removed return links on their sites to CNPN,

others were resigned. Hans Molnar, a German photographer who had joined in earlier days, pointed out that "no one is in control of the internet and can dictate where links end up . . . Do a search with any search engine [and] porn links are also listed amongst real fine art nude photography, so the only way to avoid the whole thing [is] just don't have a web site and remain unknown."

The one photographer who asked to join the list after CNPN added prominent links to hardcore for-pay sites explained that he felt forced to do so in order to publicize his work because apparently more relevant (and more respectable) sites refused to include his work because they classified nudes with pornography! The obvious power of Internet portals to censor the sites they choose shows one side of the Internet. Students of photography can of course still search for "nude photography," but many will be put off when they encounter a document that places advertisements for sexually explicit sites first— or they will follow links to them before those of the art photographers. Here is a case where censorship falls prey to the law of unintended circumstances.

When considering the implications of Internet linking for these art photographers, I pointed out that "on the Web, links can also associate one's work with unexpected or unwanted materials." A far more disturbing fact is that on the Web, other people can add links to your documents! When applied to the World Wide Web, the open hypermedia systems described in chapter 1 permit others to add links to any document. Of course, only users with access to a website with a server that has the requisite link services can read your documents with links inserted by someone else, but such websites can be giant Internet portals like Yahoo, or they can be websites maintained by political parties, militant groups, NGOs, or individuals anywhere on the political spectrum. Any person or organization using Active Navigation's Portal Maximizer has the power to place links in product advertisements, proposed legislation, political speeches, educational materials, newspaper articles, and scientific and scholarly writing. Imagine political opponents annotating each other's speeches, or Holocaust memorialists and Holocaust deniers annotating each other's sites. Of course, the original Web document remains unaffected— these are virtual documents, remember—but search engines like Google can rate the annotated document higher than the original one if enough people read it and link to it. True, websites using Portal Maximizer or similar software must be open to public access, or they could not influence large numbers of readers, but password-protected sites have their own danger: original Web authors have no way of knowing that their writings have been annotated, and hence they cannot respond. A final "of course": readers do not have to follow the inserted links. Still, the ability to link unmoderated commentary to

another author's text markedly reduces the authority of that author, and if only one party has access to a tool like Portal Maximizer, the original author is at a great disadvantage. One can view such technology as potentially democratizing, or, if it is only available to a few, as potentially dangerous, which raises the question,

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Is the Hypertextual World of the Internet Anarchy or Big Brother's Realm?

At the present moment, it shows the potential to be both, perhaps even at the same time. In countries like China, Singapore, and Zimbabwe, which have a history of Internet censorship and surveillance, Big Brother already seems present, and as technology develops it might allow ways to either thwart him or produce the means that ensure he cannot be thwarted. At the moment, throughout most of the world information anarchy seems to reign, at least according to those who would rein it in: anyone with Google or other search tools can locate Michael Moore's attacks on George W. Bush, multiple treasure troves of literature, denials of the Holocaust, health information, egotistical ramblings of twenty-five-year-olds convinced that everyone should care about their daily lives, underground fiction of all kinds, the anti-Americanism of *Baghdad is Burning,* detailed computer information of a high professional standard, maps to museums and restaurants, and means of purchasing almost anything one does and doesn't want.

We face two great dangers, as many commentators have long pointed out, the first of which is that the best information, the finest art, and the most valuable new ideas will be swamped by the sheer mass of material—something analogous to the supposedly terrible effects of the explosion of cheap reading enabled by high-speed printing that, Cardinal Newman complained, was destroying *real* culture, or the way the Jet Propulsion Lab (JPL) finds itself swamped by tapes of messages sent back from unmanned missions throughout the solar system that will almost certainly decay before they have been deciphered. The other contrary possibility is that the newest versions of data mining and computer-based surveillance will permit those with control of *the machines* total control over all information and the people who read, write, and exchange it. Some, like the opponents of Gmail, claim the systems are already in place for total surveillance, but the experience of the JPL and the recent failures of U.S. intelligence suggest that such is not the case. I certainly don't have the answers, but, as I write, now that the rain has stopped and the sun has come out in Providence at 6:07 p.m. on July 19, 2004, I have enough hope to believe that the libratory potential of hypermedia will enable good things to happen. I could be wrong.

Notes

Chapter 1. Hypertext

1. An important caveat: here, right at the beginning, let me assure my readers that although I demonstrate that Barthes and Derrida relate in interesting and important ways to computer hypertext, I do not take them—or semiotics, poststructuralism, or, for that matter, structuralism—to be essentially the same.

2. In fact, some of the most exciting student projects and published examples of hypermedia take the form of testing, applying, or critiquing specific points of theory, including notions of the author, text, and multivocality. Cicero Ignacio da Silva's *Plato On-line: Nothing, Science and Technology* (2003–4) exemplifies a particularly carnivalesque, rambunctious experiment with conventional attitudes toward authorship and its relation to conceptions of a work. The Brazilian scholar explains in *Plato On-line*, which has no pagination, that "in order to test my hypothesis that there is no work without a 'signature,' and there is no 'safe' means to authenticate the signature of a text and in a text on the internet," he created "hundreds" of websites for fictional research institutes, scientific journals, and survey centers "hosted by free-of-charge providers (geocities, tripod, among others)" upon which he placed computer-generated texts created by a combination of "PERL and Java Script programming" from "fragments of text from the internet." Each text is signed with "Algorithm [author's name]," such as "Algorithm Giles Deleuze," and the resultant text is "purposefully unstructured and rarely makes any sense." All the texts he keeps on the Internet appear in Portuguese, which Babelfish then translates into English, French, German, and Japanese. Finally, *Plato On-line* makes the element of spoof quite clear when it announces that it is "a serious journal interested only in publishing texts written by electric generators. This magazine does not have the intention to publish anything that makes sense . . . The names of the authors are not true and all the names are not from authors who exist [but from] programmed algorithms." Nonetheless, da Silva has discovered that readers persist in submitting "articles, reviews on articles, and comments on the texts, etc." Moreover, despite the fact that

his computer-generated texts signed with a clearly suspicious-sounding name do not make sense, he has found that readers take them seriously enough to quote them in both blogs and scholarly work, such as graduate theses. The presence of what da Silva calls a signature—a name similar to that of an established author—convinces readers that they are reading a genuine text, even if it does not make grammatical and other sense. (I would add that the appearance of these jumbled texts on sites that supposedly represent serious-sounding, if fictional, institutions also convinces people that authorship and text are genuine.)

3. Although the following pages examine some aspects of the history of hypertext theory, they do not provide a history of earlier pioneering systems, such as NLS, Augment, HES, FRESS, Guide, and Hyperties, and later developments, since valuable basic surveys can be found in Nielsen, *Multimedia and Hypertext* and Hall, Davis, and Hutchings, *Rethinking Hypermedia*, 11–32.

4. A second important caveat: by hypertext I mean only one of at least five possible forms of the digital word. In addition to hypertext, there are four other important kinds of electronic textuality, each of which can exist within hypertext environments, though not itself hypertextual:

1. Graphic representations of text. Using computer graphics to represent text produces images of it that cannot be searched, parsed, or otherwise manipulated linguistically. The resulting images can be animated, made to change in size, accompanied by sound, and so on. This kind of e-text, which is familiar from television advertising, is often created using Macromedia Director and Flash.

2. Simple alphanumeric digital text. This form of electronic text, which functions linguistically, appears in electronic mail, bulletin boards, and word-processing environments.

3. Nonlinear text. In contrast to hypertext, which enables multisequential reading, this form is best thought of as nonlinear. According to Espen Aarseth (whose "Nonlinearity and Literary Theory," in *Hyper/Text/Theory*, ed. Landow, provides the essential discussion of its subject) the various forms of nonlinear textuality include (a) computer games, (b) text-based collaborative environments, such as Multi-User Domains (MUDs) and Multi-User Domains that employ Object-Oriented programming methods (MOOs), and (c) cybertext, or text generated on the fly. See essays by Carreño, Donguy, Lenoble, Vuillemin, and Balpe in *A:\ Littérature: Colloque Nord Poésie et Ordinateur.* See Meyer, Blair, and Hader for a MOO for the World Wide Web.

4. Simulation. Text in simulation environments can range from computationally produced alphanumeric text (and hence have much in common with the nonlinear form) to instances of fully immersive virtual (or artificial) reality. For discussions of the educational use of such simulation environments within electronic books, see my "Twenty Minutes into the Future, or How Are We Moving beyond the Book?" For general discussions of virtual reality, see Benedikt, ed., *Cyberspace;* Heim, *The Metaphysics of Virtual Reality;* Earnshaw, Gigante, and Jones, eds., *Virtual Reality Systems;* and Wexelblat, *Virtual Reality.*

5. A third (and last) caveat: as I pointed out in the introduction to *Hyper/Text/ Theory,* some hypertext environments, which are not chiefly text- or image-based, employ logical and conceptual links as a means of assisting organization, collaborative work, and decision making. Systems like Xerox PARC's Acquanet and IDE thus far have appealed to workers in computer and cognitive science investigating the business applications of information technology. For Acquanet, see the articles by Catherine C. Marshall listed in the bibliography; for IDE see those by Daniel Russell. Clara Mancini's 2003 doctoral dissertation includes a brief summary with screen shots of various systems of semantic hypertext.

6. The developers of Microcosm, currently the most advanced hypertext system yet developed, similarly argue: "*There should be no artificial distinction between author and reader.* Many systems have an authoring mode and a reader mode; such a system is not open from the reader's point of view. We believe that all users should have access to all parts of the system; this does not imply that one user will be able to access or change another's data, but implies that this aspect should be controlled by the granted rights of access to the operating system. Users should be able to create their own links and nodes within their private workspace, then change the access rights so that other users may view or edit them as required" (Hall, Davis, and Hutchings, *Rethinking Hypermedia,* 30).

7. The original text here read, "Intermedia, the hypertext system with which I work," but shortly after the print publication of *Hypertext,* my students and I found ourselves forced to use several other systems after Apple Computers, which had funded a portion of the project, fundamentally changed its version of UNIX, thus halting development—and eventually even the use—of Intermedia. Two fully illustrated articles describe IRIS Intermedia in detail: Yankelovich, Meyrowitz, and Drucker, "Intermedia"; and Bernard J. Haan, Kahn, Riley, Coombs, and Meyrowitz. "IRIS Hypermedia Services." The Intermedia section of my *Cyberspace, Hypertext, and Critical Theory* website, which contains a detailed introduction to the system with many screenshots, can be found at http://www.cyberartsweb.orgt/ht/HTatBrown/Intermedia.html. This URL also provides information about obtaining Paul Kahn's archival video, *Intermedia: A Retrospective,* from the Association of Computing Machinery.

8. One could make the same point about contributors to discussion lists, but since these lists are intended to take the form of group discussions, new contributions don't seem unusual, and one experiences what seems a very different form of collaboration.

9. Writers have offered other classifications of links, often in terms of binary oppositions. Thus in 1988, Paul Kahn compared objective to subjective links, an opposition chiefly relevant to so-called legacy text—text, that is, translated into hypertext from print or other paper presentation. According to Kahn, footnotes and cross references represent objective links, because they are present in the original text structure, whereas subjective links are added by the person translating the document into hypertextual form. Kahn's objective versus subjective links appear closely related to Anna Gunder's analog and digital links ("Aspects of Linkology," 112–13). Gunder also distinguishes between internal and external links: "Links within a work are called *internal* links while links running between works are labeled *external* links" (113).

10. Such media reversals continue today, though for different reasons: Geert Lovink's *Dark Fiber: Tracking Critical Internet Culture*, which MIT Press published in 2002, reproduces essays that appeared on various Internet discussion groups between 1995 and 2001. In this case, the characteristic qualities of networked digital text discussed later in this section have been exchanged for the relative fixity and stability of print.

11. At conferences I've several times found myself defending Bolter and Grushin's valuable idea of remediation from charges that it is too simple or limiting. Markku Eskelinen and Raine Koskimaa, for example, claim that "the concept of remediation carries worrying stabilizing effects with it. Whatever new form, mode or medium there is, there's no time to study it and build a decent scholarship around it, as we supposed to be immediately stuck with remediating it" (9). I don't see how pointing out that various information technologies remediate one another has any limiting effects, and Bolter and Grushin's emphasis that we have to consider the place of any particular form of IT (such as hypertext) within a media ecology, strikes me as an essential place to begin, in large part because it goes a long way toward preventing misunderstandings about supposed total oppositions of earlier and later technologies (such as, say, print and hypertext).

12. *In Writing Space,* Bolter explains some of these costs: "Electronic text is the first text in which the elements of meaning, of structure, and of visual display are fundamentally unstable. Unlike the printing press, or the medieval codex, the computer does not require that any aspect of writing be determined in advance for the whole life of a text. This restlessness is inherent in a technology that records information by collecting for fractions of a second evanescent electrons at tiny junctions of silicon and metal. All information, all data, in the computer world is a kind of controlled movement, and so the natural inclination of computer writing is to change" (31).

13. Terry Eagleton's explanation of the way ideology relates the individual to his or her society bears an uncanny resemblance to the conception of the virtual machine in computing: "It is as though society were not just an impersonal structure to me, but a 'subject' which 'addresses' me personally—which recognizes me, tells me that I am valued, and so makes me by that very act into a free, autonomous subject. I come to feel, not exactly as though the world exists for me alone, but as though it is significantly 'centred' on me, and I in turn am significantly 'centred' on it. Ideology, for Althusser, is the set of beliefs and practices which does this centring" (*Literary Theory,* 172).

14. Marie-Laure Ryan's *Narrative and Virtual Reality,* which provides a valuable discussion of virtuality with specific emphasis on its relation to immersion (25–47), suggests "three distinct senses of *virtual:* an optical one (the virtual as illusion), a scholastic one (the virtual as potentiality), and an informal technological one (the virtual as computer mediated)" (13).

15. Hayles's demand that we recognize the importance of embodiment and materiality in a digital age derives from her recognition of the absurdity of some postmodern claims: "Every epoch," she points out, "has beliefs, widely accepted by contemporaries, that appear fantastic to later generations . . . One contemporary belief likely to stupefy future generations is the postmodern orthodoxy that the body is

primarily, if not entirely, a linguistic and discursive formation . . . Although researchers in the physical and human sciences acknowledged the importance of materiality in different ways, they nevertheless collaborated in creating the postmodern ideology that the body's materiality is secondary to the logical or semiotic structures it encodes" (192). Compare J. David Bolter and Diane Gromola's discussions of "the myths of disembodiment" in *Windows and Mirrors*, 117–23.

16. Mitchell wittily narrates the evolution of computers (rather than monitors or displays) from the vantage point of an architect-designer: "Mainframes were designed as large-scale items of industrial equipment, and at their best—in the hands of Charles Eames, for example—achieved a tough, hard-edged, machine-age clarity of form. They were often put on display in special, glass-enclosed rooms. The bulky computer workstations of the 1970s and 1980s were medium-scaled wheeled furniture—not too different from writing desks, pianos, and treadle sewing machines, but styled for laboratory rather than domestic environments. PCs evolved from clumsy beige boxes to sleekly specialized, various colored and shaped versions for offices, classrooms, and homes. Now that they are fading into history, after a life of approximately twenty years, they look increasingly like surrealist constructions— the chance encounter of a typewriter and a television on a desktop. Portables started out mimicking luggage (right down to the handles and snaps), then appropriated the imagery of books that could open, close, and slip into a briefcase" (*Me++*, 70–71).

17. Mitchell points out that the effect on work-practice of such location-independent information has turned out differently than many predicted: "The emerging, characteristic pattern of twenty-first-century work is not that of telecommuting, as many futurists had once confidently predicted; it is that of the mobile worker who appropriates multiple, diverse sites as workplaces" (153).

18. This brings up the entire subject of computer humor and parody, often directed at Microsoft products. Anyone who's found annoying the Microsoft Office Assistant in earlier versions of Word, which pops up with the intrusive statement that you seem to be writing a letter and asks if you want help, will appreciate Dave Deckert's parody: one encounters what appears to be a screenshot of a document from an earlier version of Microsoft Word (5.1?), in which a user has typed "Dear World, I just can't take it anymore. I've decided"—at which point a cartoon image of dancing paperclip pops up on the screen accompanied by the message "Looks like you're committing suicide," followed below by the text "Office Assistant can help you write a suicide note. First, tell us how you plan to kill yourself." This text appears above two rows of buttons, the top one of which offers the options "Pills," "Jump," "Pastry," and the bottom row has "Tips," "Options," and "Close" (dgd-filt@visar.com, 2000). Another parody, apparently by a British user, mocks both the instability of the Microsoft Windows operating system and its often unexpected hidden settings. On a panel labeled "Hidden Settings (Not to be edited)," one discovers a series of options that purports to explain difficulties users encounter every day. The first line has a box containing a check next to "Crash every 2 Hours," the "2" and "Hours" appearing within option boxes, and the following lines contain in similar format the instruction to crash after 5000 "bytes of un-saved changes." Other factory-set options include those for "Save," which produces "incredibly large files" and Auto Recovery

that "takes Bloody Ages." The final factory-set option involves "Annoy me with the sodding paper clip" either constantly or "when I least expect it."

Cartoons published worldwide, which show how much computing has become part of our everyday lives, similarly present users' attitudes toward personal computers. In a brilliant four-panel *Doonesbury* cartoon, Gerry Trudeau conveys the frustrations of people who installed Windows 95. In the first panel, which shows the communal nature of personal computing by so-called early adaptors, Mike approaches two co-workers, one of whom is seated at a PC and is told, "We're loading in the new Windows 95 operating system," and when he asks in the next panel how it's going, the bearded, bespectacled man seated at the computer replies, "Don't know yet. I'm still trying to clear enough memory for it." In the third panel, in which the three men appear in white silhouette against black background, we receive the software installer's message: "Attention User: You call this capacity? Reboot when you're ready to play."—a fine parody of the error messages those trying to install Windows 95 on older machines often received! The final panel effectively dramatizes the way users came to fear both their PCs and the company that created their operating systems as the man seated at the computer exclaims, "Son of a . . . It's dissing my hard drive!" only to be cautioned by the man behind him, "Back off, Hank. Don't want to make it lose face . . ." Yet other cartoons satirize Microsoft's monopolistic practices. In Bill Arend's *Foxtrot* the older of two brothers comes upon his sibling sitting at a computer "reading about a big Windows source code leak," 600 Mb of which are "all over the internet." In the third panel the younger brother points out that people probably have already guessed "some of what's in it," after which the final panel shows the parody code onscreen:

```
             BEGIN
             IF browser_type=
             "Internet_Explorer"
    THEN  smooth.sailingELSE
             IF (browser_type=
             "Netscape") AND
             "justice_department NOT looking)
    THEN
             REPEAT
             Crash (random)
```

Computer cartoons have many other subjects, including crashes that destroy home and office work, the youth of skilled computer users, overblown claims about the World Wide Web, annoying animated graphics, and suggestions that the devil invented computing—or at least is a heavy user: an Italian cartoon of the 1980s shows a devil seated at a computer terminal in Hades. Some parodies mock the user's expectations more than they satirize software manufacturers' products. In another parody that presents a fantasy version of Microsoft Word, the drop-down menu labeled "Tools" contains the following options: "Undo stupid changes," "Take Back Flippant Comment," "Create Brilliant Idea," "Extend Deadline," "Read Bosses' Minds," "Terminate Smart-ass IT Technician," "Increase Salary," "Reclaim Wasted

Evenings," "Extend W̲eekend," and, finally, "Find P̲erfect Mate." This parody, which says more about Microsoft users than about the company, suggests that the cyberspace myth and the dotcom crash derive in large part from our secret desires that computers make our lives better without much effort on our part.

19. Janet Murray asserts the importance of agency in true interactivity: "Because of the vague and pervasive use of the term *interactivity,* the pleasure of agency in electronic environments is often confused with the mere ability to move a joystick or click on a mouse. But activity alone is not agency . . . As an aesthetic pleasure, as an experience to be savored for its own sake, it is . . . more commonly available in the structured activities we call games" (128–29).

20. Maurie-Laure Ryan offers a critique of Baudrillard from another vantage point (31–25).

21. Scott Blake's *Bar Code Jesus* (1999) plays interestingly with computer-related codes as the basis of a visual reality composed of the images we see on a computer screen. In this piece, Blake manipulates the ubiquitous bar code (as opposed to the far "deeper" machine code) to take us in stages from a recognizable image to the codes that produce it. The viewer first encounters a fairly low-resolution image of the face of Jesus, above which appears a panel that permits the viewer to zoom in seven states or stages, enlarging a portion of the image in its frame each time. Diving into the image with the control panel transforms it from a recognizable face to three successive images that resemble mosaic until, at the fifth level, one arrives at barcodes. The next two zooms resolve the image barcodes until the viewer arrives at one-inch-high vertical lines (bars) and the number associated with each. In an animated version, the zooming in and out occurs at a dizzying pace. The playfulness of the project appears in the fact that these barcodes would not actually produce an image when read by a computer; Blake is just using their visual appearance as building blocks.

22. Chartier, *The Culture of Print,* 139. Chartier bases his remarks in part on Marie-Elizabeth Ducreux, "Reading unto Death: Books and Readers in Eighteenth-Century Bohemia," also in *The Culture of Print,* 191–230.

Chapter 2. Hypertext and Critical Theory

1. I am thinking of Richard Rorty's description in *Philosophy and the Mirror of Nature,* 378, of edifying philosophy as a conversation: "To see keeping a conversation going as a sufficient aim of philosophy, to see wisdom as consisting in the ability to sustain a conversation, is to see human beings as generators of new descriptions rather than beings one hopes to be able to describe accurately. To see the aim of philosophy as truth—namely, the truth about the terms which provide ultimate commensuration for all human inquiries and activities—is to see human beings as objects rather than subjects, as existing en-soi rather than as both pour-soi and en-soi, as both described objects and describing subjects." To a large extent, Rorty can be thought of as the philosopher of hypertextuality.

2. Examples include GodSpeed Instant Bible Search Program from Kingdom Age Software in San Diego, California, and the Dallas Seminary CD-Word Project, which builds upon Guide™, a hypertext system developed by OWL International

(Office Workstations Limited). See Steven J. DeRose, "Biblical Studies and Hypertext," in *Hypermedia and Literary Studies*, ed. Delany and Landow, 185–204.

3. Borges, "The Aleph," in *The Aleph and Other Stories*, 13: "In that single gigantic instant I saw millions of acts both delightful and awful; not one of them amazed me more than the fact that all of them occupied the same point in space, without overlapping or transparency. What my eyes beheld was simultaneous, but what I shall now write down will be successive, because language is successive . . . The Aleph's diameter was probably little more than an inch, but all space was there, actual and undiminished. Each thing (a mirror's face, let us say) was infinite things, since I saw it from every angle of the universe."

4. For a description of early networks that preceded the Internet, see LaQuey, "Networks for Academics." For a description of the proposed National Research and Education Network, see Gore, "Remarks on the NREN"; and Rogers, "Educational Applications of the NREN."

5. Gregory L. Ulmer pointed this fact out to me during our conversations at the October 1989 Literacy Online conference at the University of Alabama in Tuscaloosa.

Chapter 3. Reconfiguring the Text

1. In fact, a primitive form of hypertext appears whenever one places an electronic text on a system that has capacities for full-text retrieval or a built-in reference device, such as a dictionary or thesaurus. For example, I wrote the manuscript of the first version of the book you are reading on an Apple Macintosh II, using a word-processing program called Microsoft Word; my machine also ran On Location, a program that quickly located all occurrences of an individual word or phrase, provided a list of them, and, when requested, opened documents containing them. Although somewhat clumsier than an advanced hypertext system, this software provides the functional analogue to some aspects of hypertext.

2. When I first used *intratextuality* in an article some years ago to refer to such referential and reverberatory relations within a text, or within a metatext conceived as a "work," I mistakenly believed I had coined the term. So did my editor, who was not enthusiastic about the coinage. But we were both wrong: Tzvetan Todorov used it in "How to Read" (1969), which appears in *The Poetics of Prose*, 242.

3. IBM mainframe computers running the CMS operating system call each user's electronic mailbox or message center the "reader."

4. To indicate the presence of one or more links, Intermedia placed a link marker, which took the form of a small horizontal rectangle containing an arrow, at the beginning of a passage. Apple's HyperCard permitted a wide range of graphic symbols ("buttons") to indicate the unidirectional links that characterize this program. *CD Word*, which was based on an amplification of Guide, employed an ingenious combination of cursor shapes to indicate linked material. For example, if one moved the cursor over a word and the cursor changed into a horizontal outline of an arrow, one knew the cursor was on a reference button, and clicking the mouse would produce the linked text. Following this procedure on the title page and clicking the cursor when on *Bibles* produced a list of abbreviations that included versions of the scriptures. Then, moving the cursor over RSV changed it to a crosshair shape, which in-

dicated the presence of a replacement button; clicking the mouse button produced the phrase "Revised Standard Version."

5. Bolter, *Writing Space*, 63–81, provides an excellent survey of visual elements in writing technologies from hieroglyphics to hypertext. The periodical *Visible Language*, which has appeared since 1966, contains discussions of this subject from a wide variety of disciplines, ranging from the history of calligraphy and educational psychology to book design and human/computer interaction.

6. In discussing Barthes's *Elements of Semiology*, Lavers exemplifies the usual attitude toward nonalphanumeric information when she writes that Barthes's notion of narrative "acknowledges the fact that literature is not only 'made of words' but also of representational elements, although the latter can of course only be conveyed in words" (134). That pregnant "of course" exposes conventional assumptions about textuality.

7. Geert Lovink caustically complains: "Interaction design seems to have lost its battle against interface stupidity. The office metaphor of the previous decade has been exchanged for an adaptation of the newspaper front page outlook as the dominant information architecture" ("Cyberculture in the Dotcom Age," in *Dark Fiber*, 334)

8. These pieces greatly resemble the student projects in Macromedia Director carried out at the Rhode School of Design in the mid-1980s in digital typography courses conducted by Krystoff Lenk and Paul Kahn. These projects, which I have discussed elsewhere, take the form of animating the texts of poems by Berthold Brecht and Mary Oliver, so that lines move across the screen, appear and disappear, in ways that perform the poem. Occasionally, sound was added to the text as well.

9. One of the most important pioneering discussions of the importance of fixity in print culture is McLuhan's *Gutenberg Galaxy*. See also Eisenstein, *Printing Press*; and Bolter, *Writing Space*.

10. These paragraphs are directly inspired by Noah Wardop-Fruin's eloquent talk at Brown University's *E-fest* (April 2004), reminding us that Nelson's stretchtext demonstrates he does not limit hypertext to that created by links.

Chapter 4. Reconfiguring the Author

1. For a discussion of to what degree hypermedia in both read-only and read-write forms does or does not empower readers, see chapter 8.

2. Marie-Laure Ryan makes some properly forceful observations about extreme claims that hypertext makes readers into writers: "To the skeptical observer, the accession of the reader to the role of writer . . . is a self-serving metaphor that presents hypertext as a magic elixir: 'Read me, and you will receive the gift of literary creativity.' If taken literally—but who really does so?—the idea would reduce writing to summoning words to the screen though an activity as one, two, three, click . . . Call this writing if you wish; but if working one's way through the maze of an interactive text is suddenly called writing, we will need a new word for retrieving words from one's mind to encode meanings" (9). The context of this astute warning makes clear that Ryan mistakenly includes me among critics who believe in the complete merging of reader and writer. As the complete sentence she quotes makes clear, the phrase she emphasizes with italics—"*of ourselves* as authors"—refers to the way

linking changes the author's conception of his or her power and authority. In fact, the sentence implies a distinction between readers and authors.

3. See the final sections of chapter 8 for a discussion of the political implications of open hypermedia applications for the Web.

4. Lévi-Strauss's observation in a note on the same page of *The Raw and the Cooked* (12) that "the Ojibiwa Indians consider myths as 'conscious beings, with powers of thought and action'" has some interesting parallels to remarks by Pagels on the subject of quasi-animate portions of neural nets: "Networks don't quite so much compute a solution as they settle into it, much as we subjectively experience our own problem solving . . . There could be subsystems within supersystems—a hierarchy of information and command, resembling nothing so much as human society itself. In this image the neuron in the brain is like an individual in society. What we experience as consciousness is the 'social consciousness' of our neuronal network" (126, 224).

5. Lévi-Strauss also employs this model for societies as a whole: "Our society, a particular instance in a much vaster family of societies, depends, like all others, for its coherence and its very existence on a network—grown infinitely unstable and complicated among us—of ties between consanguineal families" (*Scope of Anthropology*, 33).

6. Said in fact prefaces this remark by the evasive phrase, "it is quite possible to argue," and since he nowhere qualifies the statement that follows, I take it as a claim, no matter how nervous or half-hearted.

7. I originally wrote in 1991 that Heim would be correct only "in some bizarrely inefficient dystopic future sense—'future' because today [1991] few people writing with word processors participate very frequently in the lesser versions of such information networks that already exist, and 'bizarrely inefficient' because one would have to assume that the billions and billions of words we would write would all have equal ability to clutter the major resource that such networks will be." The reason for Heim's prescience comes, as we shall observe in chapter 8, from the new technologies of Internet surveillance, web browser cookies, Google-like search tools, and data mining.

8. An example of the way changes in an author's beliefs weaken the value of the author function—the traditional conception of the unitary author—appears in the works of Thomas Carlyle: whereas in *The French Revolution* he clearly accepts the necessity of violence and sympathizes with lower classes, he became increasingly reactionary and racist in his later works. In arguing for the unity of any particular Carlylean text one cannot casually refer to "Carlyle" unless one specifies to which Carlyle one refers.

9. According to the scientists that Galegher, Egido, and Kraut studied, people in these fields work collaboratively not only to share material and intellectual resources but also because "working with another person was simply more fun than working alone. They also believed that working together increased the quality of the research product, because of the synthesis of ideas it afforded, the feedback they received from each other, and the new skills they learned. In addition to these two major motives, a number of our respondents collaborate primarily to maintain a preestab-

lished relationship. In a relationship threatened by physical separation, the collaboration provided a reason for keeping in touch. Finally some researchers collaborated for self-presentational or political reasons, because they believed that working with a particular person or being in a collaborative relationship per se was valuable for their careers. Of course, these motives are not mutually exclusive" (152).

10. For a classical statement of the historicizing elements in humanistic study, see Erwin Panofsky, "The History of Art as a Humanistic Discipline," *Meaning in the Visual Arts*, 1–25.

11. The large number of individuals credited with authorship of scientific papers—sometimes more than one hundred—produces problems, too, as does the practice of so-called honorary authorship according to which the head of a laboratory or other person of prestige receives credit for research whose course he or she may not have followed and about which he or she may know very little. In this latter case problems arise when the names of such scientists of reputation serve to authenticate poor quality or even falsified research. See Walter W. Stewart and Ned Feder, "The Integrity of Scientific Literature," *Nature* 15 (1987): 207–14; cited by Ede and Lunsford.

12. According to Joanne Kaufman's article in the July 21, 2004 *Wall Street Journal*, despite the recent success of more than a dozen "double-bylined novels . . . concerns about the bottom line continue fueling resistance to double bylines," particularly in novels. Mary O'Shaunessy recalls that publishers told the sisters "that they couldn't think of any best sellers in recent history that had two authors' names. They originally wanted to use Pam's name because she was a Harvard law school graduate and, with the book a legal thriller, it seemed like it would be an easier sale in terms of the reader. We had to fight to get any recognition for me." Kaufman quotes several publishers with reasons for putting single-author bylines on collaboratively written books, including "a feeling that novels should be written by one person and could only come from one mind and one point of view." This attitude does seem to be changing. More important, an increasing number of authors write books together.

Chapter 5. Reconfiguring Writing

1. Coover, who is known for his postmodern experimental fiction, argues that the linear narrative of the traditional novel is an obsolete, politically offensive genre:

> For all its passing charm, the traditional novel, which took center stage at the same time the industrial mercantile democracies arose—Hegel called it "the epic of the middle class world"—is perceived by its would-be executioners as being the virulent carrier of patriarchal, colonial, canonical, proprietary, hierarchical, and authoritarian values of a past which is no longer with us.
>
> Much of the novel's alleged power is imbedded in *the line*, that compulsory author-directed movement from the beginning of a sentence to its period, from the top of the page to the bottom, from the first page to the last. Of course, through print's long history, there have been countless counter-strategies to the line's power from marginalia and footnoting to the creative innovations of novelists like Sterne, Joyce, Queneau, Cortàzar, Calvino, and Pavic, and not excluding the form's father Cervantes himself, but true freedom from the tyranny of the line is perceived as only really possible now at last with the advent of *hyper-*

text, where the line in fact does not exist unless one invents and implants it. ("End of Books," 1, 11)

I hardly agree with the overheated charge that the traditional novel served only as "the virulent carrier of patriarchal, colonial, canonical, proprietary, hierarchical, and authoritarian values," in part because the narratives of many traditional novels, particularly those with multiple plots, are not accurately described as linear and in part because much postcolonial fiction appears in the form of the traditional novel—so much so that African novelists have complained of the difficulties of publishing more experimental fiction in the West, since publishers, they claim, expect a traditional realistic novel.

2. Unfortunately, when one returned to one of them, older versions of Netscape deleted the intervening document titles, thereby turning what been Ariadne's thread into Hansel and Gretel's breadcrumbs. Furthermore, Netscape and similar browsers not only did not retain records of the complete reading path when one backtracked, they also deleted it entirely both after each session and when users closed the viewer window, even though one hadn't quit the application.

3. Intermedia provided two forms of preview information. First, its web view announced destinations of all links from the current lexia; activating a link marker with a single mouse click—clicking *twice* followed the link—darkened the icons for all the lexias linked to it. Intermedia also permitted authors to attach descriptions to each anchor, and these descriptions appeared in menus automatically generated when one followed a link leading to two or more lexias. In contrast to Intermedia, Storyspace allows authors to attach descriptions, not to anchors but to links themselves, though the reader perceives the result as much the same. As useful as these features were and are, hypermedia authors still have to assist readers by employing various techniques that constitute a rhetoric of departure.

4. Clara Mancini's Ph.D. thesis, "Towards Cinematic Hypertext," devotes several chapters to surveying various attempts to define coherence by psycholinguistics and gestalt psychology. Although she does not mention the fact, almost all the proposed "discourse coherence relations," such as "exemplifies," "supports," and "disproves," precisely match the forms of typed links proposed in pioneering technical papers about hypertext systems. Taking a different approach, Marie-Laure Ryan emphasizes total hypertext structures, which she suggests can take eight different forms, including the graph network, tree, maze, flow chart, braided plot, hidden story, and vector with side branches (246–58).

5. In my earlier work, beginning in 1987, I attempted to sketch out the beginnings of a rhetoric of hypertext and hypermedia, and one way of answering the question, "Is this hypertext any good?" involves looking at the degree to which a particular hypertext observes some of these minimal stylistic rules. This discussion, however, tries to broaden the question, looking for other sources of aesthetic pleasure and success.

6. Is this the result of following a link? If one means by "following a link" that when one carries out this action (clicking) new text appears, then by definition one has followed a link, but in fact it is not clear that one has activated a link or another computational procedure. Both the HTML and Storyspace versions of *(box(ing)*

actually involve links, so that, as in early Hypercard projects, clicking a link actually replaces one document with another, though the reader receives the illusion that the document remains the same and a new word or phrase appears within it. One cannot tell whether or not *Vniverse* works the same way or generates text on the fly, but from the vantage point of the viewer a replacement link or what we may term an *action link* appear identical.

7. Lyons adds: "Thus, the parentheses and interactive interface follow mutually compatible rules to establish what I hope are complementary contributions from writ language on the screen and script code behind the scenes . . . My aim here was simply to make good use of computers to get this ridiculous poem more legible, even as the interactive capability makes a greater range of (potentially confounding) meanings more accessible. You can think of it as magnetic poetry with rules."

8. Strickland's concern with reader empowerment appears in the detailed introduction she has appended to the project.

Chapter 6. Reconfiguring Narrative

1. Dorothy Lee argues that the language of Trobriand Islanders reveals that they "do not describe their activity lineally; they do no dynamic relating of acts; they do not use even so innocuous a connective as and" (157). According to Lee, they do not use causal connections in their descriptions of reality, and "where valued activity is concerned, the Trobrianders do not act on an assumption of lineality at any level. There is organization or rather coherence in their acts because Trobriand activity is patterned activity. One act within this pattern gives rise to a preordained cluster of acts"—much as, Lee explains, when knitting a sweater the "ribbing at the bottom does not cause the making of the neckline" (158). Similarly, "a Trobriander does not speak of roads either as connecting two points, or as running from point to point. His paths are self-contained, named as independent units; they are not to and from, they are at. And he himself is at; he has no equivalent for our to or from" (159). Appropriately, therefore, when an inhabitant of the Trobriand Islands "relates happenings, there is no developmental arrangement, no building up of emotional tone. His stories have no plot, no lineal development, no climax" (160), and this absence of what we mean by narrativity relates directly to the fact that "to the Trobriander, climax in history is abominable, a denial of all good, since it would imply not only the presence of change, but also that change increases the good; but to him value lies in sameness, in repeated pattern, in the incorporation of all time within the same point" (161).

Lee, incidentally, does not claim that the people of the Trobriand Islands cannot perceive linearity, just that it possesses solely a negative value in their culture and it is made difficult to use by their customs and language. If one accepts the accuracy of her translations of Trobriand language and her interpretations of Trobriand culture, one can see that what Lee calls nonlineal thought based on the idea of clustering differs significantly from both linear and multilinear thought. Placed on the spectrum constituted by Trobriand culture at one extreme and Western print culture at the other, hypertextuality appears only a moderate distance from other Western cultural patterns. Lee's description of Trobriand structuration by cluster, however, does possibly offer means of creating forms of hypertextual order.

2. Lyotard also proposes that "the decline of narrative can be seen as an effect of the blossoming of techniques and technologies since the Second World War, which has shifted emphasis from the ends of action to its means; it can also be seen as an effect of the redeployment of advanced liberal capitalism after its retreat under the protection of Keynesianism during the period 1930–60, a renewal that has eliminated the communist alternative and valorized the individual enjoyment of good and services" (*Postmodern Condition*, 37–38). His use of "can be seen as" suggests that Lyotard makes less than a full commitment to these explanations.

3. Hypertext is not the first information technology to make closure difficult. In *Writing Space*, Bolter reminds us that "the papyrus scroll was poor at suggesting a sense of closure" (85).

4. I have not substantially added to the following discussion of Joyce's pioneering hyperfiction, since it has been the subject of numerous detailed discussions since I first wrote about it. See, in particular, the chapters by J. Yellowlees Douglas and Terence Harpold in Landow, *Hyper/Text/Theory* as well as Clement, "Afternoon, a Story"; and Coover, "And Now, Boot Up the Reviews," 10.

5. The term *prosopopoeia*, Miller explains, describes "the ascription to entities that are not really alive first of a name, then of a face, and finally, in a return to language, or a voice. The entity I have personified is given the power to respond to the name I invoke, to speak in answer to my speech. Another way to put this would be to say that though my prosopopoeia is a fact of language, a member of the family of tropes, this tends to be hidden because the trope is posited a priori" (*Versions of Pygmalion*, 5).

6. The phrase is from Culler, *Structuralist Poetics*, 207. For Propp, see Vladimir Propp, "Fairy Tale Transformations" (1928), in *Readings in Russian Poetics*, 94–114; *Morphology of the Folktale* (1958); and Propp sections in Groden and Kreisirth, *Guide to Literary Theory*. See also Scholes, *Structuralism in Literature*, 59–141.

7. Janet Murray provides another instance of the way in which people construct connections and coherence from juxtaposition: "In the 1920s the Russian film pioneer Lev Kelshov demonstrated that audiences will take the same footage of an actor's face as signifying appetite, grief, or affection, depending on whether it is juxtaposed with images of a bowl of soup, a dead woman, or a little girl playing with a teddy bear" (160).

8. Goldberg continues: "In *Simulacra and Simulation*, Baudrillard who claims that 'of all the prostheses that mark the history of the body, the double is doubtless the oldest,' discusses science's desire to create life artificially:

> Cloning radically abolishes the Mother, but also the Father, the intertwining of their genes, the imbrication of their differences, but above all, the joint act that is procreation. The cloner does not beget himself: he sprouts from each of his segments. One can speculate on the wealth of each of these vegetal branchings that in effect resolve all oedipal sexuality in the service of 'nonhuman' sex, of sex through immediate contiguity and reduction—it is still the case that it is no longer a question of the fantasy of auto-genesis. The Father and the Mother have disappeared, not in the service of an aleatory liberty of the subject, but in the service of a matrix called code. No more mother, no more father: a matrix. And it is

the matrix, that of the genetic code, that now infinitely 'gives birth' based on a functional mode purged of all aleatory sexuality.

"This statement has many implications for both hypertext and critical theory, particularly about the relationship between the author and her work. The author does not beget herself: she sprouts from each of her segments" ("Comments on *Patchwork Girl*").

9. Williams continues: "Perhaps one may see this tension between order and disorder most clearly in life. *Patchwork Girl*'s functioning mirrors a cell's life. The cytoplasm of links serves as a permeable medium through which disparate parts pass signs. Its global disorder accommodates the local structure of organelles, which may have been conceived autonomously, but together rely on one another's differentiated function to achieve their fullest existence. Cells that incorporated subunits with diverse textures—wrinkled mitochondria, knotted DNA, smooth and rough endoplasmic reticulum—had sufficient complexity as biological collages to form entities such as readers of texts."

10. In his lexia Lars Hubrich argues that in *Patchwork Girl* scars become more than emblems of disfigurement, since we encounter "the story of a long struggle, of an emancipation that ends not in a mourning about the lost battles but in new strength, as the monster explains:

> Scar tissue does more than flaunt its strength by chronicling the assaults it has withstood. Scar tissue is new growth. And it is tougher than skin innocent of the blade.

"In fact, the scars become a new, living organ, opening up a new sensorium that goes straight into the chest of the monster. The scars are hot, responding to other people's input. And they have the ability to share their experience, to inscribe themselves on someone else's skin.

"The scars hold together the individual parts, each one having its own history, and gain their strength from the parts' experiences. But they do not point back, they rather are signs of an active, progressive look into a future that has learned from history.

"I have a navel like any other person. Does Shelley's monster have one? Of course, it has to. Not that it gets mentioned, though, as far as I have read *Patchwork Girl*. It would be rather odd for a monster like the one in the story to have a navel. Its origins lie somewhere else, not at one single point.

"And then we realize what those scars really are: birthmarks. Birthmarks of a new history, arisen from endless struggles. Donna Haraway would smile" ("Stitched identity").

11. In his lexia entitled "A Spotlight on the Haze: Notions of Origin in *Patchwork Girl*," Brian Perkins claims, however, that "hypertext is not so much a harbinger of the new possibilities, but a spotlight on the old machinations. It makes manifest the problems involved in defining the author as producer and the reader as consumer, problems which are not specific to hypertext, but which encompass all of language and signification. The transmission of meaning has forever been a blurry and complicated phenomenon. Hypertexts like *Patchwork Girl* are not novel because the

reader is decisive in determining their meaning, they are novel because they more clearly demonstrate the process which has always been at work."

12. Greco continues: "Any claim that hypertext is a privileged preserve of female or even feminist writing is suspicious for other reasons as well. Who is to say how and why hypertext might in some essential way fulfill a dream of an equal or even superior voice and representation for a group whose voices, interests, and hopes are themselves diverse and difficult to define? Those who make this claim commit themselves to a patronizing ideology of dominance masquerading as support and concern; for it is the privilege of the powerful to appropriate domains of discourse on behalf of others. Moreover, discovering alternatives to 'rational linearity' is not the same as resisting and transforming the structures whose power and authority give rise to the need for alternatives in the first place" (88).

13. There is one way that hypertext has proved clearly relevant to role-playing games, though it tells us more about the use of the World Wide Web than it does about computer games: some of those who participate in continuing non-computer-based role-playing games create websites for both the gameworld and individual characters. For example, one participant of a game set in the nineteenth century has a site in which his character, a Victorian physician, displays the contents of his medical bag.

14. Aarseth makes a much harsher attack on game studies based on literary and cinematic theory:

> The sheer number of students trained in film and literary studies will ensure that the slanted and crude misapplication of "narrative" theory to games will continue and probably overwhelm game scholarship for a long time to come. As long as vast numbers of journals and supervisors from traditional narrative studies continue to sanction dissertations and papers that take narrativity for granted and confuse the story-game hybrids with games in general, good, critical scholarship on games will be outnumbered by incompetence. ("Genre Trouble," in *First Person*, 54)

Henry Jenkins, one of those scholars who comes from film studies, responds in kind:

> Much of the writing in the ludologist tradition is unduly polemical: they are so busy trying to pull game designers out of their "cinema envy" or define a field where no hypertext theorist dares to venture that they are prematurely dismissing the use value of narrative for understanding their desired object of study. For my money, a series of conceptual blind spots prevent them from developing a full understanding of the interplay between narrative and games. ("Game Design as Narrative Architecture," in *First Person*, 120)

15. See my *Elegant Jeremiahs*, 82–115, for discussions of brief narratives with blatantly symbolic meaning in nineteenth- and twentieth-century Anglo-American prose. One chapter, "The Sage as Master of Experience" (132–53), examines passages in the writings of John Ruskin, D. H. Lawrence, Tom Wolfe, and Norman Mailer in which these writers of nonfiction use narrative to create protocinematic forms of description.

16. Kristoffer Gansing, who wants to include games in his theories of interactive cinema, agrees with Aarseth that "we should not be afraid to study gaming for gaming's own sake," but still asserts "there are computer games where narrative has a foregrounded, *explicit* role (adventure games) . . . [and] there are many games where narrative could be described as being *implicit* in game structure (strategy games). If the explicit role is somehow contradictory to the nature of gaming, I leave others to decide, opting instead to focus on narrative simply because it is integral to the idea of an interactive film" (53–54).

17. The article by Henderson, Pruett, Galper, and Copes describing the project states that the simulation does not permit the trainee to kill a patient, for a supervising physician steps in and takes over when that might happen. During the demonstration of the project at a Sloan Foundation–sponsored conference at Dartmouth College in October 1988, two years after the publication of article describing it, I believe the speaker stated that the patient could die; I may be misremembering this point.

18. In the second part of the *Iowa Review* interview, Wardrip-Fruin explains the role of each member of the team and the evolution of the project.

The Brown cave takes the form of an open cube, each of whose surfaces measures 8×8 feet, and is the result of successful application in 1997 to the National Science Foundation for a project entitled "Acquisition of a Cave and Shared Memory Supercomputer." The project, which had thirteen principal investigators from the departments of chemistry, applied math, physics, computer science, and geology, was funded by a $1 million National Science Foundation grant with significant additional cost-sharing from Brown University.

Chapter 7. Reconfiguring Literary Education

1. We have been observing ways that hypertext embodies literary theory, and we should also notice that it also instantiates related pedagogical theory. The hypertextual read-author, for instance, matches R. A. Shoaf's claim that "every reader, in fact, from the beginning student to the seasoned professional, is also a writer, or more accurately a rewriter—and must be aware of that" (80).

2. In 2002 George Lorenzo pointed out in an article in *University Business* that eArmyU "has set out to deliver online distance education to 80,000 soldier-students . . . The program now includes 23 schools and 85 online degree programs . . . All registrations are handled through eArmyU's portal. On-base counselors provide support" (37). I suspect that very few universities realize that one of the biggest experiments with higher education is taking place.

3. "The modularity in question emerges when the Americans take something the Europeans considered as a whole, namely undergraduate education, and break it up into small, self-contained and implicitly recombinable units commonly called course credits or credit hours . . . The implications of the new system show up most clearly in the new artifact to which they give rise: the student transcript . . . The transcript, by tracing one person's passage through the curriculum, is an additive record bounded by the number of credits required for graduation. Equivalence of parts dictates that a course is a course is a course, though locally defined restraints on com-

binability (majors, distribution requirements, and the like) may sometime lead a student to accumulate more credits than the minimum required for graduation" (Blair, 11, 20). A full hypertext version of the present book would, at this point, link to the entire text of Blair's book (most likely through a section or chapter that, in turn, would link to the entire text) and also to the enormous body of internal reports produced in recent decades by individual American colleges and universities discussing the results of such modular approaches.

4. That part of the Intermedia development plan funded by the Annenberg /CPB Project included an intensive three-year evaluation carried out by a team of ethnographers, who taped, attended, and analyzed all class meetings and who frequently surveyed and interviewed students for the two years before the introduction of the hypertext component and for the year following. Many of my observations on conventional education and the educational effects of hypertext on it derive from their data and from conversations with Professor Heywood. See Beeman and colleagues, *Intermedia.*

5. *Hypertext 2.0*, 235–45, narrates in detail the evolution of a small Intermedia collaborative learning project on the poetry of Wole Soyinka to *The Postcolonial and Literature and Culture Web,* and readers interested in the ways such a project developed should consult the earlier work. This website now has about 15,000 documents and images, many of them by contributors from Australia, Canada, India, Japan, Nigeria, Singapore, South Africa, Zimbabwe, and other countries. In the past few years, instructors from various American universities, including Northwestern and DePauw, have had their students submit essays.

6. Hugh Kenner, "The Making of the Modernist Canon," in *Canons,* 371. Writing in terms of the broadest canon, that constituted by the concept of literature and the literary, Eagleton observes: "What you have defined as a 'literary' work will always be closely bound up with what you consider 'appropriate' critical techniques: a 'literary' work will mean, more or less, one which can be usefully illuminated by such means of enquiry" (*Literary Theory,* 80).

7. In 1968, for example, Random House, which purchased seventy-four pages of advertisements to Harper's twenty-nine, "had nearly three times as many books mentioned in the feature 'New and Recommended' as Doubleday or Harper, both of which published as many books as the Random House group" (381). Ohmann also points out "it may be more than coincidental" that in the same year in the *New York Review of Books,* founded by a Random House vice president, "almost one-fourth of the books granted full reviews . . . were published by Random House (again, including Knopf and Pantheon)—more than the combined total of books from Viking, Grove, Holt, Harper, Houghton Mifflin, Oxford, Doubleday, MacMillan, and Harvard so honored; or that in the same year one-fourth of the reviewers had books in print with Random House and that a third of those were reviewing other Random House books, mainly favorably; or that over a five-year period more than half the regular reviewers (ten or more appearances) were Random House authors" (383).

8. According to Hugh Kenner, "Since Chaucer, the domain of English literature had been a country, England. Early in the 20th century its domain commenced to be a language, English" (366).

9. More than a dozen years after hearing this statement, I came upon Vincent Mosco's statement that new technologies only become truly powerful once they become unnoticeable: "The real power of new technologies does not appear during their mythic period, when they are hailed for their ability to bring world peace, renew communities, or end scarcity, history, geography, or politics; rather their social impact is greatest when technologies become banal—when they literally (as is the case of electricity) or figuratively withdraw into the woodwork . . . Indeed, it was not until we stopped looking at electricity as a discrete wonder and began to see it as a contributor to all other forces in society that it became an extraordinary force. Electricity achieved its real power when it left mythology and entered banality" (19–20). Many years ago someone told me that computing would never reach its potential until people entering one's office or home ceased remarking, "I see you have a computer." PCs have truly achieved ordinariness.

10. For a fuller discussion of the University Scholars Program's hypertext paradigm in the context of institutional history and goals, see my essay "The Paradigm is More Important than the Purchase."

Chapter 8. The Politics of Hypertext

1. Nicholas Negroponte, the founder of MIT's Media Lab, is one of Mosco's main targets. According to him, Negroponte "provides one of the more extreme versions of this radical break with history viewpoint. In *Being Digital* (1995) he argues for the benefits of digits (what computer communication produces and distributes) over atoms (us and the material world) and contends that the new digital technologies are creating a fundamentally new world that we must accommodate. In matter-of-fact prose, he offers a prophet's call to say goodbye to the world of atoms, with its coarse and confining materiality, and welcomes the digital world, which its infinitely malleable electrons, able to transcend spatial, temporal, and material constraints" (36). Mosco is more than a little unfair to Negroponte, many of whose predictions have proved correct and whose observations have proved sound—even if they did help stimulate the dotcom mania. Negroponte's discussion of economic factors related to the print demonstrates that he often sounds like a cheerleader for the digital: "A book has a high-contrast display, is lightweight, easy to 'thumb' through, and not very expensive. But getting it to you includes shipping and inventory. In the case of textbooks, 45 percent of the cost is inventory, shipping, and returns. Worse, a book can go out of print. Digital books never go out of print. They are always there" (13). The last two sentences are just silly, since the only reason "Digital books never go out of print" is that they were never literally in print! But publishers, such as my own, do permit e-texts like my *Hypertext-in-Hypertext* to sell out and become unavailable. In all fairness to Negroponte, one must admit that although he does not say so, he probably means that in some future digitized, fully networked world "books never go out of print," but the experience of the World Wide Web hardly makes this seem likely. In the course of managing three large websites, I've observed that sites to which authors invited me to link frequently disappear or change their URLs. Nonetheless, despite this and similar exaggerations, *Being Digital* makes many astute judgments that Mosco fails to acknowledge.

2. Martha McCaughey and Michael D. Ayers's collection of essays, *Cyberactivism: Online Activism in Theory and Practice,* contains discussions of the political uses of the Internet by Amnesty International, NOW, and the Zapatistas, and protests against the World Bank as well as theoretical approaches, such as a Habermasian analysis of the relations of democracy and the Internet. The editors point out that "the Ku Klux Klan (KKK) and other radically conservative organizations have also colonized cyberspace in hopes of achieving their goals" (3).

3. A few years after I offered my speculations about the future of newspapers, Negroponte prophesied a somewhat different vision. Pointing out that both broadcast television and newspapers are produced "with all the intelligence" (19) at the transmitting part of the communicative relationship, he proposes that to change news media for the better we must create "computers to filter, sort, prioritize, and manage multimedia on our behalf—computers that read newspapers and look at television for us, and act as editors when we ask them to do so" (20; see also 84). The results of this filtering would produce a daily news source custom-tailored to each reader's interests, something in fact very close what one receives from the *New York Times* online after one has created a user profile identifying subjects of highest priority. Negroponte's emphasis on filtering, preselection, produces a very different kind of news media than one based on user-directed hypertext. In his vision, users receive only the news that they want to read; in mine, users can also obtain more information when they need it. There is another important difference: whereas Negroponte's filter-centered vision concentrates on current news, a hypertext-centered new media creates more of a communal memory because one can follow links to historical contexts.

4. Eagleton, *Criticism and Ideology,* 44–63. Although Eagleton never cites McLuhan or other students of the history of information technology, he several times compares manuscript and print cultures within the context of Marxist theory; see 47–48, 51–52.

5. Ryan, 60. Ryan also offers an oddly limited description of technology when he writes: "Technology is the human mind working up the natural world into machines. And, as I have argued, it is motivated by the desire of a class of subjects—capitalists—to maintain power over another class of subjects—workers" (92). The problems with this statement include, first, the fact that Ryan confuses "capitalists" with "owners of production" even though he makes clear elsewhere that what he calls the Leninist tradition also relies on heavy technology; and second, such a bizarrely narrow definition apparently restricts technology to heavy machinery, thereby omitting both everything before the Industrial Revolution and everything in the electronic and atomic age other than old-fashioned rust-belt manufacturing. The context makes it difficult to determine whether Ryan's dislike of technology or capitalism leads him to such an obsolete definition.

6. Elizabeth L. Eisenstein makes a particularly astute point when discussing arguments about the role of print technology in radical social change during the Reformation: "Given the convergence of interests among printers and Protestants, given the way that the new media implemented older evangelical goals, it seems pointless to argue whether material or spiritual, socio-economic or religious 'factors' were important in transforming Western Christianity. Not only do these dichotomies

seem to be based on spurious categories, but they also make it difficult to perceive the distinctive amalgam which resulted from collaboration between diverse pressure groups" (406). One does not have to espouse pluralism to recognize that Marxist analyses could easily incorporate evidence provided by Eisenstein.

7. Nelson, *Computer Lib*, 1/4. Nelson also points out: "Tomorrow's hypertext networks have immense political ramifications, and there are many struggles to come. Many vested interests may turn out to be opposed to freedom . . . For rolled into such designs and prospects is the whole future of humanity and, indeed, the future of the past and the future of the future—meaning the kinds of future that become forbidden, or possible" (3/19).

8. In *The Gutenberg Galaxy*, 216, McLuhan quotes Harold Innis, *The Bias of Communication* (Toronto: University of Toronto Press), 29: "The effect of the discovery of printing was evident in the savage religious wars of the sixteenth and seventeenth centuries. Application of power to communication industries hastened the consolidation of vernaculars, the rise of nationalism, revolution, and new outbreaks of savagery in the twentieth century."

9. In print this thrust appears with particular clarity in the radical new discovery that the best way to preserve information lies in disseminating large numbers of copies of a text containing it rather than keeping it secret; see Eisenstein, *Printing Press*, 116.

10. Professor Ulmer made these comments in the course of the 1988 University of Alabama conference *Literacy Online*.

11. He continues on the same page: "The edifying philosophers are thus agreeing with Lessing's choice of the infinite striving for truth over 'all of Truth.' For the edifying philosopher the very idea of being presented with 'all of Truth' is absurd, because the Platonic notion of Truth itself is absurd."

12. Popper, *The Open Society and Its Enemies*, argues that Plato developed his conceptions of humanity, society, and philosophy in reaction to the political disorder of his time. Plato's "theory of Forms or Ideas," according to Popper, has three main functions within his thought: (1) as a methodological device that "makes possible pure scientific knowledge"; (2) as a "clue" to a theory of change, decay, and history; and (3) as the basis of a historicist "social engineering" that can arrest social change (30–31). Popper argues that Plato bases his ideal state on Sparta, "a slave state, and accordingly Plato's best state is based on the most rigid class distinctions. It is a caste state. The problem of avoiding class war is solved, not by abolishing classes, but by giving the ruling class a superiority which cannot be challenged" (46). Popper, who attacks Plato for providing the ultimate ideological basis of fascism, claims that in *The Republic* Plato "used the term 'just' as a synonym for 'that which is in the interest of the best state'. And what is in the interest of this best state? To arrest all change, by the maintenance of a rigid class division and class rule. If I am right in this interpretation, then we should have to say that Plato's demand for justice leaves his political programme at the level of totalitarianism" (89).

13. Working hard to find some point of agreement, the priest adds that his god also "is in the sky," but he then makes a theological claim that appears completely bizarre and inappropriate from a Shona point of view when he tells the man

he wishes to convert that "my God is the true God. He is the way to eternal happiness" (105). Two aspects of Christian belief here puzzle his listener—first, that happiness could be eternal and, second, that hard work is bad and that any form of happiness might involve freedom from what he takes to be a crucial, pleasurable human activity.

14. Lovink quotes a member of a South Asian media collective, who takes an optimistic view of the problem: "I would never use a term like 'digital divide.' We have a print divide in India, an education divide, a railway divide, an airplanes divide. [But] the new economy of India is definitely not conceived as a divide" (210). On commercialization of the Internet, see "Introduction: Twilight of the Digerati," 3, 11–12, and "Information Warfare: From Propaganda Critique to Culture Jamming," 309, 330, both in *Dark Fiber.* For the Amsterdam experiments in using the internet to empower citizens, see "The Digital City—Metaphor and Community," 42–67, in *Dark Fiber.*

15. Earlier versions of *Hypertext* followed the preceding discussion with a short story, "Ms. Austen's Submission," whose heroine encounters the darker implications of a future hypertext author's attempt to gain access to the Net. Anyone wanting to read about the world of future e-publishing as a dystopia, should consult *Hypertext* or *Hypertext 2.0.*

16. Thus, "logged-in users start at 1 (although this can vary from 0 to 2 based on their karma) and anonymous users start at 0." Malda explains: "Slashdot tracks your 'karma.' If you have Positive, Good, or Excellent karma, this means you have posted more good comments than bad, and are eligible to moderate. This weeds out spam accounts. The end result is a pool of eligible users that represent (hopefully) average, positive Slashdot contributors. Occasionally (well, every 30 minutes actually), the system checks the number of comments that have been posted, and gives a proportionate number of eligible users 'tokens' [or moderation points]. When any user acquires a certain number of tokens, he or she becomes a moderator. This means that you'll need to be eligible for many of these slices in order to actually gain access. It all works to make sure that everyone takes turns, and nobody can abuse the system, and that only 'regular' readers become moderators (as opposed to some random newbie)."

17. Chaytor, *From Script to Print,* 1. Cited by McLuhan, *Gutenberg Galaxy,* 87, and credited on the previous page as "a book to which the present one owes a good deal of its reason for being written."

18. Sutherland, "Author's Rights," 554. Sutherland quotes E. Plowman and L. C. Hamilton's explanation in *Copyright* (1980) that in France and Germany moral rights include "the rights to determine the manner of dissemination, to ensure recognition of authorship, to prohibit distortion of the work, to ensure access to the original or copies of the work, and to revoke a license by reason of changed convictions against payment of damages." This and all subsequent quotations from this article in the main text come from page 554.

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George P. Landow is a professor of English and art history at Brown University.

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