Hamlet on the Holodeck

The Future of Narrative in Cyberspace

Updated edition

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For my son, William

Part I

A New Medium for Storytelling

Chapter 1

Lord Burleigh's Kiss

In a far distant corner of the galaxy sometime in the twenty-fourth century, the brisk and competent Kathryn Janeway, captain of the starship *Voyager,* is taking a break from her duties with her favorite "holonovel." Exchanging her spandex-sleek Starfleet uniform for a hugely crinolined Victorian dress, Janeway enters one of the ship's "holosuites," which is running a three-dimensional simulation of a richly furnished English drawing room, complete with cozy armchairs and a roaring fire. Brooding by the fire is the handsome romantic hero, who greets her as she enters as his governess, Lucy Davenport. He gives her a meaningful look, and she returns it earnestly.

"Lord Burleigh, is something wrong?"

"Yes, terribly wrong."

He suddenly steps toward her, takes her in his arms, and kisses her passionately. "I have fallen in love with you, Lucy." They stare deeply into one another's eyes.

But it is teatime, and they are interrupted by the arrival of the sinister housekeeper and Lord Burleigh's two anxious and secretive young children. His little daughter, Beatrice, drops her teacup with alarm when questioned about the mysterious piano music that Lucy has been hearing.

Beatrice's precocious brother, Henry, is quick to silence her.

As soon as they are again alone, Lucy confronts Lord Burleigh: "What's happening in this house? How can you not know that Beatrice plays the piano? Why shouldn't I go to the fourth floor? What's up there?"

"Those are questions you must not ask," he declares imperiously.

"But I am asking them," comes her fervent reply. "I'm worried about the children. Beatrice fantasizes that her mother is still alive."

"Don't pursue this, I beg you," he says, looking deep into her eyes.

The confrontation is escalating dramatically and Lucy is breathless with excitement when suddenly another voice is heard:

"Bridge to Captain."

"Freeze program," says Lucy/Janeway, reluctantly backing away from the now frozen image of Lord Burleigh. "Janeway here."

"We've been hailed by a representative of the Bothan government. They'd like to talk to you."

"I'll be right there."

As she turns to leave, Janeway pauses before the stilled hologram of her would-be lover. "Sorry, my lord. Duty calls," she says, grinning, before striding back to resume command of the ship.[1]

Captain Janeway's Victorian excursion takes place on *Star Trek: Voyager,* the latest of four *Star Trek* television series in which gloriously equipped starships and space stations serve the ideals of the peace-seeking interplanetary United Federation of Planets.[2] There are many technical wonders in the *Star Trek* vision of the future, including lightspeed travel; photon weapons; medical "tricorders," which diagnose and heal with the wave of a wand; the well-known "transporter" room, in which technicians "beam" the crew up and down from dangerous planets by decomposing and reassembling their molecular patterns; and the conveniently wall-mounted "replicators," which can materialize hot and cold

snacks on demand. The holodeck is an appropriate entertainment medium for the fortunate citizens of such a world: a utopian technology applied to the age-old art of storytelling.[3]

First introduced on *Star Trek: The Next Generation* in 1987, the holodeck consists of an empty black cube covered in white gridlines upon which a computer can project elaborate simulations by combining holography with magnetic "force fields" and energy-to-matter conversions. The result is an illusory world that can be stopped, started, or turned off at will but that looks and behaves like the actual world and includes parlor fires, drinkable tea, and characters, like Lord Burleigh and his household, who can be touched, conversed with, and even kissed. The *Star Trek* holodeck is a universal fantasy machine, open to individual programming: a vision of the computer as a kind of storytelling genie in the lamp. In the three series in which the holodeck has been featured, crew members have entered richly detailed worlds, including the tribal manor house of the Old English *Beowulf* saga, a gaslit London street, and a San Francisco speakeasy, in order to participate in stories that change around them in response to their actions.[4]

Lucy Davenport (as we can call Janeway's unnamed adventure) is in many ways typical of the holonovel form. It is a period piece and a work of genre fiction in which the elaborate set design and recognizable story conventions (an arrival in the rain, ghostly noises at the window, a forbidden attic) are playfully savored, as if put there by a very thorough and well-read programmer. Holonovels provide customized entertainment for a variety of tastes. They reveal unexpected sides of familiar characters. Just as Jean-Luc Picard, the highly cultured captain of *Star Trek: The Next Generation,* enjoys film noir, his android crewman, Commander Data, identifies with Sherlock Holmes, and the sensitive Dr. Julian Bashir of *Star Trek: Deep Space Nine* prefers James Bond spy adventures, so the conscientious Captain Janeway turns to gothic fiction in her well-earned leisure hours.

But Janeway's holonovel marks a milestone in this virtual literature of the twenty-fourth century as the first holodeck story to look more like a nineteenth-century novel than an arcade shoot-'em-up. Unlike virtually all the holodeck stories run by male crew members, *Lucy Davenport* is not focused on a violent central conflict that is resolved within a single Star Trek episode. Instead, Janeway is involved in a more leisurely and open-ended exploration of the Burleigh household, a continuing avocation that she takes up regularly on her days off and that is presented over several episodes.[5] From Janeway's references to events that are not dramatized, it seems that she is spending long periods of time in the household, participating in a daily routine, giving lessons to the children, having tea at regular hours, and getting to know each individual character. Like *Jane Eyre,* Charlotte Brontë's 1847 novel, which established the governess gothic genre, *Lucy Davenport* takes place in a mysteriously haunted household and emphasizes the perils of the governess's intense social relationships rather than the physical terrors of the situation. When Janeway is shown relishing a verbal contest with the sinister housekeeper, promising the reluctant Henry that she will be a challenging math teacher, or trying to assuage the grief of the clearly anguished young Beatrice, we can understand what engages the resourceful starship captain in this particular virtual world. As her name implies, Janeway has much in common with her fictional predecessor Jane Eyre, including a strong resistance to being bullied, a willingness to stand on principle, and the courage to face fear and isolation head-on. The Lucy Davenport story therefore suits her well, making the holodeck form itself seem worthy of adult attention.

Janeway's attraction to the illusory Lord Burleigh is taken seriously as an exercise posing psychological and moral questions for her. After she is surprised by his teatime embrace, Janeway is tormented by visions of the holonovel characters walking around the ship. She thinks she is hallucinating until it is discovered that

a telepathic enemy alien is fabricating these visions as a way of incapacitating the crew members and taking over the starship. At the dramatic climax of the episode, almost all of *Voyager*'s crew are lost in hallucinatory trances, transfixed by apparitions of distant spouses welcoming them home or disapproving parents sapping their confidence.

Janeway responds to the crisis much like a Victorian gothic heroine: she holds firmly to reason and duty, though all around her are going mad. But then the alien appears to her in the shape of her lover, Mark, whom she may never see again since her ship is stranded at the farthest corner of the known galaxy. The apparition tries to embrace her, but she pushes him away:

"Mark": What's the matter? You used to love it when I kissed you there.

Janeway: I don't know who you are, what you are. But I won't let you touch me.

"Mark": What about the man on the holodeck? You didn't seem to mind him touching you, did you? In fact, I think you liked it. Now I ask you, Kath, is that fair to me? I stayed faithful to you. I vowed to wait for you no matter how long it takes. Shouldn't you do the same?

Janeway: (stung, and turning to him) I haven't been unfaithful.

"Mark": Oh, Kath ...

She kisses him and enters a catatonic trance.

The story of the rational and courageous Captain Janeway seduced and undone by a simulated kiss reflects a common anxiety about the new technologies of simulation. Do we believe that kissing a hologram (or engaging in cybersex) is an act of infidelity to a flesh-and-blood partner? If we could someday make holographic adventures as compelling as *Lucy Davenport,* would the power of such a vividly realized fantasy world destroy our grip on the actual world? Will the increasingly alluring narratives spun out for us

by the new digital technologies be as benign and responsible as a nineteenth-century novel or as dangerous and debilitating as a hallucinogenic drug?

Alien Kisses

The paralyzing alien kiss is the latest embodiment of the fear with which we have greeted every powerful new representational technology—from the bardic lyre, to the printing press, to the secular theater, to the movie camera, to the television screen. We hear versions of the same terror in the biblical injunction against worshiping graven images; in the Homeric depiction of the alluring Sirens' songs, drawing sailors to their death; and in Plato's banishing of the poet from his republic because "he stimulates and strengthens an element which threatens to undermine the reason" with his fraudulent "phantasms."[6] All the representational arts can be considered dangerously delusional, and the more entrancing they are, the more disturbing. The powerful new storytelling technologies of the twentieth century have brought on an intensification of these fears. While the *Star Trek* writers imagine holodeck versions of *Beowulf* and *Jane Eyre*, a widely read and influential dystopian tradition has depicted such futuristic entertainment forms as intrinsically degrading.

Aldous Huxley's *Brave New World* (1932), set six hundred years from now, describes a society that science has dehumanized by eliminating love, parenthood, and the family in favor of genetic engineering, test-tube delivery, and state indoctrination. Books are banned, and science has come up with a substitute form of storytelling to delight the masses. In one of the novel's most memorable scenes the unspoiled hero, called the Savage (since he grew up with a biological mother in a far-off American Indian village), goes on a date to the "feelies" with Lenina, a satisfied child of the state. They are seated in the popular Alhambra theater, which is a kind of high-tech version of the plush movie palaces of the 1930s:

> Sunk in their pneumatic stalls, Lenina and the Savage sniffed and listened ...
>
> The house lights went down; fiery letters stood out solid and as though self-supported in the darkness. THREE WEEKS IN A HELICOPTER. AN ALL-SUPER-SINGING, SYNTHETIC-TALKING, COLOURED, STEREOSCOPIC FEELY. WITH SYNCHRONIZED SCENT-ORGAN ACCOMPANIMENT.
>
> "Take hold of those metal knobs on the arms of your chair," whispered Lenina. "Otherwise you won't get any of the feely effects." (P. 134)

The attraction of the feely is an extension of the attraction of the movie and the talkie. The exuberant musicals of the early sound era are parodied by Huxley's description of the feely's foolish plot, which relies on arresting helicopter views, lots of sex, and characters who are constantly bursting into song. Writing in the age of the Hollywood star, Huxley describes the feely actors as simultaneously larger than life and less than human: a "gigantic Negro" and "a golden-haired young brachycephalic Beta-Plus female" who look "dazzling and incomparably more solid-looking than they would have seemed in actual flesh and blood, far more real than reality" (p. 134). When these too-real characters kiss, the Savage experiences for the first time the wonders of erotic engineering:

> The Savage started. That sensation on his lips! He lifted a hand to his mouth; the titillation ceased; let his hand fall back on the metal knob; it began again.... "Ooh-ah! Ooh-ah!" the stereoscopic lips came together again, and once more the facial erogenous zones of the six thousand spectators in the Alhambra tingled with almost intolerable galvanic pleasure. "Ooh ..." (Pp. 134–35)

After the movie, the Savage feels debased by his own arousal. He rejects the eager Lenina and goes home instead to read *Othello*.

The horror of the feely theater lies in knowing that your intense responses have been calculated and engineered, in knowing that a technician has set the male voice at "less than 32 vibrations per second" to achieve an automatic erotic effect and has reduced the lips of all the individual audience members to just so many "facial erogenous zones" to be stimulated by galvanic means, like so many light bulbs to be flipped on.

Ray Bradbury offered a remake of the same media nightmare at the beginning of the television era. In *Fahrenheit 451* (1953), a

future dictatorship keeps the populace amused and docile with raucous "televisors," sound and image systems embedded in living room walls at great expense and dedicated to incoherent but arresting entertainment. Televisor parlors are primitive holodecks in which housewife viewers converse with on-screen characters by reading from scripts in answer to their cues. Bradbury's hero, Montag (named after a paper company), is a "fireman" whose job is burning books. The novel charts his awakening from destroyer to preserver of book culture. Montag's wife, who has forgotten all the actual events of her life, has pressured him into buying three televisor walls and is pleading for the fourth so that she can be with her "parlor families" all day. In one key scene, Montag observes his wife and her friends sitting in rapt enjoyment of the disturbingly nonlinear televisor presentations:

> On one wall a woman smiled and drank orange juice simultaneously. How does she do both at once? thought Montag, insanely. In the other walls an x-ray of the same woman revealed the contracting journey of the refreshing beverage on its way to her delighted stomach! Abruptly the room took off on a rocket flight into the clouds, it plunged into the lime-green sea where blue fish ate red and yellow fish. A minute later, Three White Cartoon lowns chopped off each other's limbs to the accompaniment of immense incoming tides of laughter. Two minutes more and the room whipped out of town to the jet cars wildly circling an arena, bashing and backing up and bashing each other again. Montag saw a number of bodies fly in the air. (Pp. 93–94)

As the housewives exclaim with delight at the entertainment, Montag pulls the switch, causing the images to drain away "as if the water had been let from a gigantic crystal bowl of hysterical fish." But the damage remains, for when Montag tries to engage them in conversation about the coming war, the women cannot take in the reality of the situation. "It's always someone else's husband dies," they agree, fidgeting anxiously before the now empty walls (p. 94). Like Janeway and her crew in the grip of the alien hallucination, the televisor viewers are mesmerized by an illusion so intense that it blocks out imminent danger.

The housewives' psychological and moral paralysis is a direct consequence of the virtues of the technology, namely, its power to appeal to the senses of vision and hearing with stunning immediacy. In the words of Montag's mentor, Faber (named for the pencil), the televisors are evil because they create "an environment as real as the world." Books are praised as a better representational technology by virtue of their limitations; their meager sensory input makes their illusions easier to resist. "You can shut them and say, 'Hold on a moment'" (p. 84). But with the new multisensory media, the populace is overpowered.

For Huxley and Bradbury, the more persuasive the medium, the more dangerous it is. As soon as we open ourselves to these illusory environments that are "as real as the world" or even "more real than reality," we surrender our reason and join with the undifferentiated masses, slavishly wiring ourselves into the stimulation machine at the cost of our very humanity. In this dystopian view, the new entertainment technologies are a means of stripping away the language and culture that give life meaning and of reducing us to a state of abject bestiality. When the Savage complains that he prefers the works of Shakespeare because the feelies "don't mean anything," the spokesman for the technostate assures him that "they mean a lot of agreeable sensations for the audience" (p. 391). Why would the docile populace want a narrative art form that helps them to better understand themselves when they can enjoy a love scene on a sensuous bearskin rug whose "every hair ... [can] be separately and distinctly felt"?

Starting in the 1970s and 1980s, the same fears provoked by the advent of film and television began to be expressed against videogames, which added interactivity to the sensory allures of sight, sound, and motion. Critics have condemned the too-easy stimulation of electronic games as a threat to the more reflective delights of print culture. A prominent film critic, for instance, recently lamented the fact that his sons have deserted Dickens for

shoot-'em-up computer games, which "offer a kind of narrative, but one that yields without resistance to the child's desire for instant gratification."[7] In recent dystopian literature, the computer screen or virtual reality helmet is as addictive and delusional as the feely or televisor. The nightmare vision of a future totalitarian state has been replaced by the equally frightening picture of a violently fragmented world organized around cyberspace, where ruthless international corporations, secret agencies, and criminal conspiracies struggle for control.

These accounts of a digital dystopia both eroticize and demonize the computer. Cyberpunk surfers are like cowboys on a new frontier or motorcycle hoodlums with a joystick in their hand instead of a motorcycle between their legs. They are outlaw pirates on an endless voyage of exploration throughout the virtual world, raiding and plundering among the invisible data hoards of the world and menaced by the stronger pirate barons who reach in and reprogram their minds. In this world, first popularized in William Gibson's *Neuromancer,* (1983) the addictive delusional experience is vividly imagined as "jacking in," that is, wiring your neurons directly into the immaterial world of "cyberspace," a word coined by the novelist to describe the virtual terrain of databanks along a surfable Internet. The popular entertainment form in Gibson's gritty world is the "simstim," a way of riding in someone else's consciousness and thus experiencing the world through that person's sensorium by seeing, hearing, and feeling whatever he or she does. Case, the hero of *Neuromancer,* is addicted to the thrill of jacking in to the cyberspace data banks but is bored by the simstim as a mere "meat toy," for meat is what the body becomes when the mind finds its narcissistic love object within the machine. Yet it is hard to know which of these virtual experiences—jacking in to cyberspace or hitching a ride in a simstim—is more disturbing. In *Neuromancer* the human condition is to be faced with such choices and to flip back and forth between them with a kind of ultimate

feely knob. The illusory world has become so powerfully enticing that it has subsumed physical reality itself.

But it is not just the essayists and novelists who have expressed their terrors of the emerging virtual landscape. Television shows and films have also targeted the computer as a dehumanizing representational technology. The television series *Tek War* (produced in the early 1990s by William Shatner, the actor who played the optimistic and heroic Captain Kirk on the original *Star Trek* series) is set in a future America destroyed by the illegal traffic in Tek, a hallucinogenic technology resembling a virtual reality headset. In the first episode of the series, for instance, the hero is paralyzed by powerful Tek programs, bought on the black market, that simulate his ex-wife returning to love him. When his partner arrives to tear off the helmet and bring him back to chasing bad guys, it is a scene very like the classic Western cliché of the sheriff sobering up the drunken deputy but with darker urban overtones suggesting a heroin or cocaine habit. Throughout the *Tek War* series, virtual reality technologies are explicitly equated with lethal drugs as the source of addiction, destitution, bad trips, overdose deaths, and gangster violence.

Movies have been even more lurid in their depiction of computer-based entertainment. Perhaps the most explicit filmic statement of the dangers of cyberspace is *Lawnmower Man* (1992), in which a virtual reality researcher turns a simpleminded gardener into a digital monster. In this retelling of the Frankenstein story, Dr. Larry Angelo experiments with Jobe Smith with the intention of expanding his mental abilities. Larry's first step in sending Jobe down the road to psychosis is to invite him in to play virtual reality videogames that speed up his mind, awakening neurons the rest of us leave dormant. Soon Jobe rejects books as too slow a means of learning and listens to music by jumping from one short excerpt to another. Once he has left the world of linear media behind, he quickly turns to horror-movie-style slaughter, accomplished by the

sheer power of his unnaturally augmented brain. The movie climaxes with Jobe leaving his body and entering the machine, where he appears as a kind of videogame character. The virtual Jobe easily outfights the virtual image of his creator and eventually escapes into the Internet. At the very end of the movie, we hear the sound of all the telephones in the world ringing simultaneously, signaling that this superior being is on the verge of taking over the planet. In effect, the videogame will play *us* from now on. *Lawnmower Man* is the most extreme version of the dystopian vision: the representational technology as both diversion and dictator all in one.

The Thinking Woman's Feely

Which vision of digital storytelling are we to believe? Will the literature of Cyberspace be continuous with the literary traditions of the *Beowulf* poet, Shakespeare, and Charlotte Brontë as the *Star Trek* producers portray it, or will it be the dehumanizing and addictive sensation machine predicted by the dystopians? Is the optimistic *Star Trek* view too pat and sentimental to be credible at all in the light of Huxleyan criticism?

We can certainly see Captain Janeway's experience as dystopian. The holodeck is in many ways exactly the sort of entertainment machine Huxley dreaded: a masterpiece of engineering aimed at inducing delusional physical sensations. No doubt the appropriate moisture and temperature of Lord Burleigh's kiss have been as carefully calculated as the sensations produced by the feely knob. But unlike the helpless fantasy addicts of the dystopian stories, Janeway is the master of the apparatus that is creating the illusion. This is made clear when she returns to the holodeck after her initial hallucinations to check it for a malfunction and is eagerly greeted by her virtual lover:

Burleigh: Lucy, thank God you've come back. *(Notices her uniform)* But why are you dressed so strangely?

Janeway: It's a costume.

Burleigh: You'd look lovely in anything. *(Takes her hand)* I've thought of you constantly, remembered your touch, your perfume, your lips.

Janeway: *(Eyes closed, as if surrendering to his magnetism)* Computer, delete character!

Even as she swoons in an embrace, Janeway is in control of the mirage. In Bradbury's terms, she can shut the book. Lord Burleigh is deliciously enticing but unenslaving, just as movie and television heart throbs from Clark Gable's Rhett Butler to George Clooney's Dr. Doug Ross have proved to be, despite dystopian fears.

The *Star Trek* story can be seen as a fable differentiating humane and meaningful digital storytelling from the dehumanizing illusions that the dystopians warn about. Janeway is paralyzed by her hallucination of her lover, Mark, because it is too literal a transcription of her fantasies. The alien treats human consciousness like a stimulus-response machine. The holonovel, on the other hand, is aimed not at Janeway's neurons but at her imagination. Although it offers the pleasures of an art form "more real than reality," it is clearly make-believe. At the end of the episode, Janeway is skipping her regular visit to the holodeck to think about the issues the enemy hallucinations have raised. Now that the alien is defeated by the superior telepathic powers of another female crew member, Janeway thinks, "In a way, maybe he did us all a favor. Maybe it's better to look those feelings in the eye than to keep them locked up inside." The holodeck, like any literary experience, is potentially valuable in exactly this way. It provides a safe space in which to confront disturbing feelings we would otherwise suppress; it allows us to recognize our most threatening fantasies without becoming paralyzed by them. Like a magical starship designed for safely exploring the distant quadrants of the galaxy, the holodeck is an optimistic technology for exploring inner life.

For Captain Janeway, a person of Victorian integrity, such an exploration brings the benefit of self-knowledge. It is not paralyzing. It sends her back to the real world all the stronger.

The holonovel offers a model of an art form that is based on the most powerful technology of sensory illusion imaginable but is nevertheless continuous with the larger human tradition of storytelling, stretching from the heroic bards through the nineteenth-century novelists. The feely (and its successors) offers an opposing image of a sensation-based storytelling medium that is intrinsically degrading, fragmenting, and destructive of meaning, a medium whose success implies the death of the great traditions of humanism, or even a fundamental shift in human nature itself. Neither vision of the future refutes the other. Together they sum up the hopes and fears aroused by the increasingly visceral representational technologies of the twentieth century. As these Utopian and dystopian fictions remind us, we rely on works of fiction, in any medium, to help us understand the world and what it means to be human. Eventually all successful storytelling technologies become "transparent": we lose consciousness of the medium and see neither print nor film but only the power of the story itself. If digital art reaches the same level of expressiveness as these older media, we will no longer concern ourselves with how we are receiving the information. We will only think about what truth it has told us about our lives.

Lord Burleigh's Kiss: 2016 Update

Some further observations on three reference points for design discussed in this chapter:

The holodeck remains a useful reference for thinking about the unlimited future of interactive narrative, and the stories about holodeck misadventures, particularly those in the *Star Trek: Voyager* series, can be seen as parables for exploring our hopes and fears for richly immersive and interactive entertainment. The holodeck is often spoken of by computer scientists as the "holy grail" for artificial reality systems. For example, the USC Institute for Creative Technologies created a holodeck-like Gunslinger Project (http://ict.usc.edu/prototypes/gunslinger) with a physical mock-up of a western-movie-style saloon fitted with large-screen displays of characters who respond to gestures and natural language input from an interactor armed with a prop pistol and a cowboy hat with electronic tracking. When I visited in February 2011, I felt at first as if I were stepping into my childhood fantasies. But the interaction design lagged behind the high-tech visual representation and back-end language processing, making it less than satisfying to attempt to engage with the insufficiently responsive bartender and poker player. Only the gunfight portion of the

installation produced an appropriate level of dramatic agency since it had clearly motivated actions with highly readable results in the form of projected blood splatter.

The technological abjection of Huxley's feelies, discussed in this chapter, is echoed in *The Matrix* (1999), another dystopian depiction of the threat to the individual from increasing powers of representation. James Cameron's blockbuster hit *Avatar* (2009), on the other hand, emphasizes the pleasure of transgressing the boundary between the real and the digital, both in its successful use of 3-D filmmaking for a mass audience, and in its story line, in which the protagonist chooses to abandon his human body and merge with his avatar out of love for a princess in a utopian world. CGI and 3-D technologies are increasingly combined to create film experiences that evoke the excitement of immersive gaming, such as the escape thriller *Gravity* (2013), while open world game like Rockstar's gangster-themed Grand Theft Auto series (1997–2014) and western fantasy Red Dead Redemption (2010) exploit film techniques to create the illusion of exploring a limitless cinematic reality. Less successful explorations of the animation/reality border, such as the unnervingly artificial-but-too-close-to-real characters in *The Polar Express* (2004) are examples of the design concept of the uncanny valley (https://en.wikipedia.org/wiki/Uncanny_valley).

Fantasies of robots or computer-generated characters as ideal companions (see Chapter 12 of *Inventing the Medium*) continue to find expression in fiction, such as the unseen consciousness that becomes the love interest for Joaquin Phoenix's character in the movie *Her* (2013). They also have expression in the proposed deployment of robotic companions for the elderly (http://www.bbc.com/news/technology-24949081), a development that Sherry Turkle has greeted with appropriate skepticism (Turkle 2011). Most recently, the announcement that Sony would no longer be supplying repair parts for Aibo, the robot dog introduced in 1999,

has caused distress among owners and even Buddhist funerals for the dogs (as documented in this article in the *Guardian*: https://www.theguardian.com/commentisfree/2015/mar/12/mourn-robotic-dog-human-sony and this video essay in the *New York Times*: http://www.nytimes.com/2015/06/18/technology/robotica-sony-aibo-robotic-dog-mortality.html).

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Chapter 2

Harbingers of the Holodeck

The final quarter of the twentieth century marks the beginning of the digital age. Starting in the 1970s, computers have become cheaper, faster, more capacious, and more connected to one another at exponential rates of improvement, merging previously disparate technologies of communication and representation into a single medium. The networked computer acts like a telephone in offering one-to-one real-time communication, like a television in broadcasting moving pictures, like an auditorium in bringing groups together for lectures and discussion, like a library in offering vast amounts of textual information for reference, like a museum in its ordered presentation of visual information, like a billboard, a radio, a gameboard, and even like a manuscript in its revival of scrolling text. All the major representational formats of the previous five thousand years of human history have now been translated into digital form. There is nothing that human beings have created that cannot be represented in this protean environment, from the cave paintings of Lascaux to real-time photographs of Jupiter, from the Dead Sea Scrolls to Shakespeare's First Folio, from walk-through models of Greek temples to Edison's first movies. And the digital domain is assimilating greater powers of

representation all the time, as researchers try to build within it a virtual reality that is as deep and rich as reality itself.

The technical and economic cultivation of this fertile new medium of communication has led to several new varieties of narrative entertainment. These new storytelling formats vary from the shoot-'em-up videogame and the virtual dungeons of Internet role-playing games to the postmodern literary hypertext. This wide range of narrative art holds the promise of a new medium of expression that is as varied as the printed book or the moving picture. Yet it would be a mistake to compare the first fruits of a new medium too directly with the accustomed yield of older media. We cannot use the English theater of the Renaissance or the novel of the nineteenth century or even the average Hollywood film or television drama of the 1990s as the standard by which to judge work in a medium that is going through such rapid technical change.

In 1455, Gutenberg invented the printing press—but not the book as we know it. Books printed before 1501 are called incunabula; the word is derived from the Latin for swaddling clothes and is used to indicate that these books are the work of a technology still in its infancy. It took fifty years of experimentation and more to establish such conventions as legible typefaces and proof sheet corrections; page numbering and paragraphing; and title pages, prefaces, and chapter divisions, which together made the published book a coherent means of communication. The garish videogames and tangled Web sites of the current digital environment are part of a similar period of technical evolution, part of a similar struggle for the conventions of coherent communication.[1]

Similarly, new narrative traditions do not arise out of the blue. A particular technology of communication—the printing press, the movie camera, the radio—may startle us when it first arrives on the scene, but the traditions of storytelling are continuous and

feed into one another both in content and in form. The first published books were taken from the manuscript tradition. Malory's *Morte d'Arthur,* written in manuscript in 1470, drew on prose and poetry versions of the Camelot legend in both French and English, which in turn drew on centuries of oral storytelling. The elements of the story were all there already: the rise and fall of the hero Arthur, the gallantry of the knights, the love between Guinevere and Lancelot, and the destruction of the Round Table through civil war. But Malory's prose brought these elements together and introduced colloquial dialogue, more consistent plotting, and a pervasive tone of nostalgia. Fifteen years later, William Caxton took Malory's separate tales and bound them together into a single volume, with descriptive chapter headings that lured readers into the story. Only then, after such long episodic narratives were commonplace in publishing, could Cervantes write a contemporary tale like *Don Quixote* (1605), which marks the beginning of the European novel.

We can see the same continuities in the tradition that runs from nineteenth-century novels to contemporary movies. Decades before the invention of the motion picture camera, the prose fiction of the nineteenth century began to experiment with filmic techniques. We can catch glimpses of the coming cinema in Emily Brontë's complex use of flashback, in Dickens' crosscuts between intersecting stories, and in Tolstoy's battlefield panoramas that dissolve into close-up vignettes of a single soldier. Though still bound to the printed page, storytellers were already striving toward juxtapositions that were easier to manage with images than with words.

Now, in the incunabular days of the narrative computer, we can see how twentieth-century novels, films, and plays have been steadily pushing against the boundaries of linear storytelling. We therefore have to start our survey of the harbingers of the holodeck with a look at multiform stories, that is, linear narratives straining

against the boundary of predigital media like a two-dimensional picture trying to burst out of its frame.

The Multiform Story

I am using the term *multiform story* to describe a written or dramatic narrative that presents a single situation or plotline in multiple versions, versions that would be mutually exclusive in our ordinary experience. Perhaps the best-known example of a multiform plot is Frank Capra's beloved Christmas story, *It's a Wonderful Life* (1946), in which hardworking, benevolent George Bailey, as played by Jimmy Stewart, is given a vision of what his town would have been like if he had never lived. The film juxtaposes two divergent pictures of George's hometown: the present-time Bedford Falls, in which George has saved his father's small savings and loan bank, married the town librarian, and been a benefit to his community, and a town originally called Bedford Falls but renamed Pottersville by the evil big banker Potter, a town in which there is no savings and loan to offer mortgages, the librarian is a bitter old maid, and everyone's life is poorer and meaner without George's compassionate guidance. The movie as a whole pivots around the moment when George, facing ruin and remembering all the disappointments of his life, is standing on a bridge contemplating suicide. The whimsical angel Clarence persuades him to live by running a kind of simulation experiment—a replay of the past thirty years in Bedford Falls as it would have turned out if George had never been born. In this film the multiform story format works as a kind of scientific proof of the meaning of one person's life.

But for many postmodern writers, the quintessential multiform narrative is the much darker story in Jorge Luis Borges's "The Garden of Forking Paths" (1941). Here the pivotal moment is a seemingly meaningless act of murder. The narrator, Dr. Yu Tsun, is

a German spy during World War I who knows that he is on the verge of capture. He resolves to murder a man named Steven Albert, whose name he has selected from the phone book. Albert, by coincidence, has devoted his life to studying an incoherent novel (which is also called *The Garden of Forking Paths*) written by Ts'ui Pên, an ancestor of the narrator. As Albert explains to Yu Tsun, the story of the forking path is really a labyrinth because it is based on a radical reconception of time:

> In all fiction, when a man is faced with alternatives he chooses one at the expense of the others. In the almost unfathomable Ts'ui Pên, he chooses—simultaneously—all of them. He thus *creates* various futures, various times which start others that will in their turn branch out and bifurcate in other times. (P. 98)

Time in Ts'ui Pên's world is not an "absolute and uniform" line but an infinite "web" that "embraces every possibility." Albert tells his future murderer that they are living in a world of similarly bifurcating time, full of many alternate realities:

> We do not exist in most of them. In some you exist and not I, while in others I do, and you do not, and in yet others both of us exist. In this one, in which chance has favored me, you have come to my gate. In another, you, crossing the garden, have found me dead. In yet another, I say these very same words, but am an error, a phantom. (P. 100)

As Yu Tsun gets closer to committing the murder, he is aware of a "pullulation," a splitting of reality. Like the characters in Ts'ui Pên's story, he is choosing multiple alternatives, creating various futures simultaneously:

> It seemed to me that the dew-damp garden surrounding the house was infinitely saturated with invisible people. All were Albert and myself, secretive, busy and multiform in other dimensions of time. (Pp. 100–101)

The notion of multiple possible worlds seems at first to absolve the narrator of moral responsibility and to make the deed much easier. He murders the unsuspecting Albert while his back is turned, choosing his moment in order to be as merciful as possible. It is a dispassionate crime, a triumph of cryptography. Yu Tsun has succeeded in sending a message alerting the Germans to attack a city

named Albert by causing his own name to appear linked with the name of his victim in newspapers. Since Yu Tsun does not believe in the German cause, the murder is a deeply meaningless act of pure communication. Yet the story ends with the narrator full of "infinite penitence and sickness of heart" (p. 101). The fact that Yu Tsun's experience of life is only a slender thread in the infinite web of his possible lives does not change the fact that he is firmly embedded in his single lived reality.

A similarly pullulating moment underlies Delmore Schwartz's chilling story "In Dreams Begin Responsibilities," first published in 1937. The story is told by a 21-year-old narrator who is dreaming that he is watching a silent movie of the day his father proposed to his mother on a date at Coney Island. His parents are engagingly vulnerable and hopeful, though it is achingly clear that they will make one another quite miserable. In the central scene of the story, the narrator watches as his father confidently orders an ocean-view table in the best restaurant on the boardwalk and awkwardly makes his proposal; his mother weeps with joy as she accepts. At this moment the narrator rises from his seat in the theater and begins to shout at the characters on the screen: "Don't do it. It's not too late to change your minds, both of you. Nothing good will come of it, only remorse, hatred, scandal, and two children whose characters are monstrous" (p. 6). But the usher forces him to sit down while the unchangeable past continues to unfold on the screen.

Near the end of the story, the narrator's mother feels compelled to enter a palmistry booth. His father grudgingly waits around with her until the fortune-teller appears.

> But suddenly my father feels that the whole thing is intolerable; he tugs at my mother's arm, but my mother refuses to budge. And then, in terrible anger, my father lets go of my mother's arm and strides out, leaving my mother stunned. She moves to go after my father, but the fortune-teller holds her arm tightly and begs her not to do so, and I in my seat am shocked more than can ever be said, for I feel as if I were walking a tight-rope a hundred feet over a circus-audience and suddenly the rope is showing signs of breaking, and I get up from my seat and begin to shout once more the first words I can think of to communicate my terrible fear ... and I keep shouting: "What are they doing? Don't they know what they are doing? Why doesn't my mother go after my father? If she does not do that, what will she do? Doesn't my father know what he is doing?" (P. 8)

As these alternate futures pullulate around his mother in the fortune-teller's booth, the dreamer is scolded by the usher in words that sum up his feelings of panic. "You can't carry on like this," he is told. "Everything you do matters too much" (pp. 8–9). The danger for the narrator is the same one George Bailey faces: the danger of wishing never to have been born and having your wish come true. The story ends here as he wakes up "into the bleak winter morning" of his twenty-first birthday, into the reality that is the result of his mother's moment of choice.

Schwartz's story was arresting when it came out, as Irving Howe remembers, in its depiction of the inexorability of the past as a movie reel that "must run its course; it cannot be cut; it cannot be edited."[2] But from the perspective of the 1990s, we can see that the originality of the story also lies in its dramatization of the narrator's position in the audience as he attempts to turn a linear, passive medium into an interactive one. The question that is tormenting him is not whether he can bear to witness the past by watching the painful film unroll, but whether he would choose to change it if he could. Would the dreamer redream his parents' unhappy love story knowing that if he did so he might never wake up? The multiform story is an expression of the anxiety aroused by posing such choices to oneself.

To explore such questions concretely in linear media, we usually have to enter the realm of science fiction. In fact, Schwartz's narrator's disturbing fantasy of undoing his parents' marriage by interrupting their moment of betrothal is replayed as a farcical adventure in the Robert Zemeckis hit film *Back to the Future* (1985). When the hero, teenager Marty McFly, time-travels back to the 1950s, his

photograph of himself and his siblings starts to fade as his bumbling actions make his parents' marriage less and less likely. To survive his adventure, Marty must make sure his parents kiss at a particular moment of the upcoming high school dance, and he is appalled to realize just how unlikely their union seems to be. The moment of the kiss is so pivotal that it is repeated in the sequel movie, with a *second* time-traveling Marty seeing it (and risking its disruption) all over again. As George McFly stands on the dance floor in the school gym, unable to work up the courage to embrace his very willing partner, Marty No. 1, who has been playing guitar onstage to keep the mood going, starts to fade out of existence, a victim of his father's sexual cowardice. In the sequel version, Marty No. 2 is suspended on the catwalk over the stage, fleeing the villain and in danger of falling, much like Schwartz's narrator, who feels suspended on a mental "tightrope" as his mother stands between the fortune-teller and her fate.

Of course, in the Hollywood version of the disrupted proposal story there is a much happier ending: not only do Marty's father and mother get together, but George McFly, who would otherwise remain an ineffectual and cowardly nerd, rescripts his life when he makes a fist and hits the evil bully, Biff. Marty returns to a world in which his father is a successful science fiction writer, his mother is thin and cheerful, his sister is popular, his brother has a good job, and he has unrestricted access to the family car. He has achieved a familiar twentieth-century adolescent fantasy: to totally remake his family according to his own desires.

Part of the impetus behind the growth of the multiform story is the dizzying physics of the twentieth century, which has told us that our common perceptions of time and space are not the absolute truths we had been assuming them to be. The emotional conundrums of the Einsteinian view have been most explicitly explored in Alan Lightman's *Einstein's Dreams* (1993), which offers poetic vignettes of human life as it might be under other

systems of time. For instance, in a world in which "time has three dimensions, like space," a man stands on a balcony in Berne thinking about a woman in Fribourg. "His hands grip the metal balustrade, let go, grip again. Should he visit her. Should he visit her?" (pp. 18–19). In one world he decides not to go and instead "keeps to the company of men" until three years later he meets a nice woman in a clothing shop in Neuchâtel who eventually comes to live with him and with whom he contentedly grows old. In another he decides he "must see" the woman in Fribourg despite her volatility; he leaves his job and moves to Fribourg, where they live stormily together and "he is happy with his anguish." In the third world he is also driven to see her but they merely talk for an hour and then she says she must leave; he returns to his balcony feeling empty. How do people live in a world where they are conscious of the world splitting in three at every decision point, a world in which there are infinite alternatives to every situation? Lightman imagines it this way:

> Some make light of decisions, arguing that all possible decisions will occur. In such a world, how could one be responsible for his actions? Others hold that each decision must be considered and committed to, that without commitment there is chaos. Such people are content to live in contradictory worlds, so long as they know the reason for each. (P. 22)

Lightman's story, like Borges's, is a haunting evocation of the world of ordinary experience, of our own perception of moments of choice that teem with multiple possibilities, all of which seem authentic—if not in their "quantum signatures" (as science fiction writers would say), then in their emotional signatures. We know what it feels like to stand on that balcony and consider three possible lives that all feel real. We are outgrowing the traditional ways of formulating this experience because they are not detailed or comprehensive enough to express our sense of the pullulating possibilities of life.

The most successful attempt to portray multiple alternate realities within a coherent linear story is Harold Ramis's farcical movie

Groundhog Day (1993), in which a selfish and bitter weatherman named Phil is forced to relive a single winter's day in a hick Pennsylvania town until he gets it right. The film works in part because it never attempts to explain why Phil keeps waking up on the same day.[3] It just puts him in this absurd situation and watches what he does about it. The day is detailed as a series of witty variations on a set of comic motifs. Rushing to do a broadcast about the appearance of the groundhog, Phil is accosted by an overfriendly high school friend, Ned, who tries to sell him insurance. In his haste to get away from the irritating Ned, Phil steps off a curb and into a deep puddle of water. The scene is shown four times with interesting variations, including one in which Phil embraces Ned first and with so much intensity that Ned is the one to run away. The pleasure for the audience is in savoring the variations, wondering how Phil is going to play it this time. Phil's life is not an inexorable film reel, like the Coney Island date in Schwartz's dream-movie, but an endless series of retakes. When he sets out to seduce his producer, Rita, he repeats his date with her endlessly, revising every aspect of it to suit her tastes and fantasies, only to wind up slapped and rejected many times over. Eventually Phil learns to live his one day as a better person; he takes up the piano, prevents the accidents he knows are due to happen, and opens his heart to the people he formerly looked on with contempt. Once he gets the day right, he wins Rita's love and finally wakes up on February 3.

Groundhog Day is, in its way, an updating of the familiar marriage plot, like the ones in Jane Austen's novels, in which courtship is depicted as a process of moral education. Because Phil is a man of the 1980s, his learning is conducted in the form of an educational simulation—the opposite of the one the angel Clarence runs for George Bailey—in which the town is held constant and only the protagonist changes. Because of his simulation structure, *Groundhog Day,* though it has none of the shoot-'em-up

content of videogames, is as much like a videogame as a linear film can be.

Multiform stories often reflect different points of view of the same event. The classic example of this genre is *Rashomon* (1950), the Kurosawa film in which the same crime is narrated by four different people: a rape victim; her husband, who is murdered; the bandit who attacks them; and a bystander. The increasing moral confusion of their accounts in part reflects the postwar cultural crisis in Japan. Similarly, in Milorad Pavic's *Dictionary of the Khazars* (1988) the impending dissolution of Yugoslavia is prefigured by the fragmentary account of a mythical lost tribe whose history is known through conflicting Christian, Jewish, and Moslem versions. The book is designed as three incomplete "dictionaries" (really more like encyclopedias), which represent the three religious traditions and have conflicting entries for the same events. Although published in a bound volume, the book is not meant to be read in consecutive order, as the author tells the reader:

> The three books of this dictionary ... can be read in any order the reader desires; he may start with the book that falls open as he picks up the dictionary ... *The Khazar Dictionary* can also be read diagonally, to get a cross-section of all three registers—the Islamic, the Christian, and the Hebrew ... He may move through the book as through a forest from one marker to the next ... He can rearrange it in an infinite number of ways, like a Rubik cube ... Each reader will put together the book for himself, as in a game of dominoes or cards, and as with a mirror, he will get out of this dictionary as much as he puts into it. (Pp. 12–13)

The fragmentation of the story structure represents patterns of historical fragmentation, and the patterns of readings echo the characters' efforts to reconstruct the past in order to restore a lost coherence.

As this wide variety of multiform stories makes clear, print and motion picture stories are pushing past linear formats not out of mere playfulness but in an effort to give expression to the characteristically twentieth-century perception of life as composed of parallel possibilities. Multiform narrative attempts to give a

simultaneous form to these possibilities, to allow us to hold in our minds at the same time multiple contradictory alternatives. Whether multiform narrative is a reflection of post-Einsteinian physics or of a secular society haunted by the chanciness of life or of a new sophistication in narrative thinking, its alternate versions of reality are now part of the way we think, part of the way we experience the world. To be alive in the twentieth century is to be aware of our alternative possible selves, of alternative possible worlds, and of the limitless intersecting stories of the actual world. To capture such a constantly bifurcating plotline, however, one would need more than a thick labyrinthine novel or a sequence of films. To truly capture such cascading permutations, one would need a computer.

The Active Audience

When the writer expands the story to include multiple possibilities, the reader assumes a more active role. Contemporary stories, in high and low culture, keep reminding us of the storyteller and inviting us to second-guess the choices he or she has made. This can be unsettling to the reader, but it can also be experienced as an invitation to join in the creative process.

Italo Calvino's *If on a Winter's Night a Traveler* (1979) is a novel in the form of a long meditation on fiction making, a story that keeps unraveling and restarting itself. In a world that is perceived as a vast interconnected web, how is the author to know which thread to pull on first? How can he hope "to establish the exact moment in which a story begins"?

> Everything has already begun before, the first line of the first page of every novel refers to something that has already happened outside the book.... The lives of individuals of the human race form a constant plot, in which every attempt to isolate one piece of living that has a meaning separate from the rest—for example, the meeting of two people, which will become decisive for both—must bear in mind that each of the two brings with himself a texture of event, environments, other people, and that from the meeting, in turn, other stories will be derived which will break off from their common story. (P. 153)

The beginning of any story is fraught with possibilities:

> On the wall facing my desk hangs a poster somebody gave me. The dog Snoopy is sitting at a typewriter, and in the cartoon you read the sentence, "It was a dark and stormy night...." Every time I sit down here I read, "It was a dark and stormy night ..." and the impersonality of that *incipit* seems to open the passage from one world to the other, from the time and space of here and now to the time and space of the written word; I feel the thrill of a beginning that can be followed by multiple developments, inexhaustibly. (Pp. 176–77)

The commitment to any particular story is a painful diminution of the intoxicating possibilities of the blank page. Calvino's fiction is offering a new kind of story pleasure, a delight not in the tale but in the fertile mind of the writer.

It is not just intellectual fiction that has become so self-aware. Evidence of the same tendency in popular fiction is as close at hand as one of my son's recent Christmas presents. Popular comic book writer Mike Baron introduces a collection of the first five *Nexus* issues with a chatty description of his collaboration with his graphic artist partner, Steve Rude. He shares with the readers his perspective on one of the main villains of the ongoing story: "I think Nexus' universe would be a duller place without Ursula, but the Dude is constantly howling for her blood. I've saved her life several times in impassioned late-night phone calls." When the writer talks about her in this way, Ursula loses credibility as a fictional character but she becomes more interesting as an aspect of her creators' imagination. The important contest for the reader, the focus of dramatic suspense, is not the one between Nexus and Ursula but between Baron and Rude.

Giving the audience access to the raw materials of creation runs the risk of undermining the narrative experience. I lose patience with Calvino when he repeatedly dissolves the illusion. When in *Groundhog Day* the conversation at a bar between Phil and Rita is repeated over and over again to show how Phil changes his

pickup routine over several days, the sequence looks confusingly like a series of retakes of a single movie scene; I am reminded that I am watching Bill Murray and Andie MacDowell repeating lines for the camera. Nevertheless, calling attention to the process of creation in this way can also enhance the narrative involvement by inviting readers/viewers to imagine themselves in the place of the creator.

Murder mysteries, for example, count on the reader to be aware of the conventions of the form and to anticipate multiple arrangements of the elements provided by the author. Is that odd-looking woman outside the murder scene an important witness? A murderer? The next victim? Is she perhaps not a woman at all but a man in disguise? Serial narratives like Victorian novels or contemporary television shows also sustain audience involvement between installments by skillfully setting up plot patterns that encourage speculation on which possibilities will be developed. Comic book franchises acknowledge and encourage the audience's free-form fantasies by publishing special series devoted to events that are contrary to the official history of the characters but full of interesting narrative possibilities. Marvel Comics uses its "*What If ...* ?" monthly series to explore such questions as "What if Spiderman's uncle had not died?" and "What if Spiderman had never gotten superpowers?"; and DC Comics uses its forty-eight-page *Elseworlds* issues (twice the size of the usual monthly) to imagine Superman transported to the Metropolis of Fritz Lang's 1926 film or Batman born into Victorian England and fighting Jack the Ripper. These efforts assume a sophistication on the part of the audience, an eagerness to transpose and reassemble the separate elements of a story and an ability to keep in mind multiple alternate versions of the same fictional world.

Although television viewers have long been accused of being less actively engaged than readers or theatergoers, research on fan culture provides considerable evidence that viewers actively

appropriate the stories of their favorites series.[4] Fan culture has grown over the past decades through conventions, underground magazines, and the trading of home videos. The Internet has accelerated this growth by providing a medium in which fans can carry on (typed) conversations with one another and often with the producers, writers, and stars of ongoing series. Much of this discourse is focused on the consistency of the shows, with careful debate on such issues as whether a supporting character on a sitcom is a widower or a divorcé or which fictional New York City cop most deserves a promotion.

In addition to sharing critical commentary and gossip, fans create their own stories by taking characters and situations from the series and developing them in ways closer to their own concerns. *Star Trek* fans in particular have produced a vast literature of alternate adventures over the thirty years since the original series aired. Women writers have created stories in which the female characters take over the ship or refuse the advances of the notoriously lecherous Captain Kirk. The romantic rivalry of the aggressive Worf and the egotistical Riker for the voluptuous Deanna Troi has inspired many more fan-written stories than episodes of the *Next Generation* series in which it was introduced. With the advent of the VCR, a new branch of fan literature has arisen in which actual scenes from the broadcast programs are reedited into new stories. Kirk and Spock, whose friendship is a centerpiece of the original series, have been reinterpreted as lovers through the magic of videotape. This "textual poaching," as media critic Henry Jenkins has called it, has become even more widespread on the World Wide Web, which functions as a global fanzine. Although some copyright holders have protested, fans have little trouble obtaining digital images and even digital video clips from their favorite series, which they put to their own use on personal Web pages. The imaginative involvement of fans gives them a strong sense of entitlement to the images associated with

their favorite shows. When the Microsoft Network closed off its official *Star Trek* Web site, "*Star Trek* Continuum," to users with non-Microsoft Web browsers, fans organized a protest campaign and enjoyed pointing out how superior their own Web pages were to the official site.

The most active form of audience engagement comes in role-playing clubs. Fans of fantasy literature from Tolkien to space operas have joined together for live-action role-playing (LARP) games in which they assume the roles of characters in the original stories to make up new characters within the same fictional universe. This youthful gaming world, which began with twelve-year-olds playing *Dungeons and Dragons* in the 1970s, has grown by the 1990s to include long-standing, organized role-playing groups composed of dozens of college students and young professionals.[5] Some of these games, like a San Francisco vampire group of post-college-age players, last for several years, with players maintaining the same character over the course of the game. Others, like many of those created for the Assassins' Guild, a role-playing club at MIT, can be over in an intense weekend. Some of the games focus on jousts and ambushes, others on elaborate political negotiation, and still others on skillful improvisations of dramatic scenes. In all of them, the players share a sense of exploring a common fictional landscape and inventing their stories as they go along.

Role-playing games are theatrical in a nontraditional but thrilling way. Players are both actors and audience for one another, and the events they portray often have the immediacy of personal experience. For instance, in a live-action game at MIT set in a world populated by characters based on Shakespeare's plays, Seth McGinnis, a graduating senior, had the secret identity of Puck from *Midsummer Night's Dream*. Puck was disguised from the other players as a member of a troupe of traveling actors who stage a performance of the Pyramus and Thisbe scene from *Midsummer Night's Dream* with Puck playing the role of the lover Pyramus. Seth

decided to take advantage of the confusion that occurs as everyone leaves the "theater" to use his fairy powers to create an illusory wall between a prisoner and his guards, thus allowing the prisoner to escape. Puck's wall actually consisted of one of the game masters standing for five minutes with arms stretched across the entrance to a stairway leading from the MIT classroom designated as a town square to the MIT classroom designated as the tavern. Pyramus and Thisbe talk to one another through a similar illusory wall, portrayed by a comically clumsy actor who uses his fingers to make a chink through which the lovers whisper. The crudely portrayed wall is an enduringly charming bit of stage business within the original play and a gentle reminder of the make-believe of theater itself. The wall in the game, like the wall in the play, was a consensual reality. The players joined in the creation of the illusion by poking at the wall, expressing amazement at its sudden appearance, and proclaiming that they could not see around it. But unlike actors in a play, the players were also genuinely puzzled about how the wall was created and by whom. Puck's wall had the arresting presence of a spontaneous event. It will not last as long as Shakespeare's, but for the people playing the game that night it was even more dramatically compelling.

Live theater has been incorporating the same qualities of spontaneity and audience involvement for some time. Improvisational groups solicit suggestions from audience members and offer them the pleasure of performance combined with the pleasure of witnessing creative invention. Participatory dinner theater casts the members of the audience as bit players in a group event, such as a comic wedding, jury trial, or wake. Mainstream audiences have recently accepted being addressed from the stage as schoolchildren or PTA members, and have even followed actors around a New York townhouse.[6] Commercial role-playing games mix actors with paying guests who solve a mystery or enact a spy drama over a weekend at a vacation resort. In all of these gatherings,

the attraction lies in inviting the audience onto the stage, into the realm of illusion. These are all holodeck experiences without the machinery.

And the machinery—all but three-dimensional holograms—seems not that far away. Since the 1980s, gaming environments called MUDs (Multi-User Domains) have allowed distant players on the Internet to share a common virtual space in which they can "chat" with one another (by typing) in real time.[7] Words typed by fellow players all over the planet appear on each player's screen as the players improvise scenes together and collectively imagine fictional worlds. As the social psychologist Sherry Turkle has persuasively demonstrated, MUDs are intensely "evocative" environments for fantasy play that allow people to create and sustain elaborate fictional personas over long periods of time. Every day, and particularly every night, thousands of people forsake real life (RL) and meet in virtual space "in character" (IC) to play out stories based on favorite books, movies, or television shows. This new kind of adult narrative pleasure involves the sustained collaborative writing of stories that are mixtures of the narrated and the dramatized and that are not meant to be watched or listened to but shared by the players as an alternate reality they all live in together.

Movies in Three Dimensions

We do not have to wait for *Star Trek*'s fanciful molecular replication technology or the "emotional engineers" of *Brave New World* to see three-dimensional fictional characters standing before our eyes. The Sony IMAX Theater across from Lincoln Center in New York City is the very model of Huxley's Alhambra. Entering a lobby ringed with video screens and ticket machines, you ascend through an atrium of multistory escalators and pass through a seemingly limitless expanse of theaters until you reach, at the very top, "the BIGGEST movie screen on earth." How big is it? A video

monitor is winking away over the waiting area to bombard you with the statistics. The 3-D screen is eight stories high and 100 feet wide, the size of seven elephants; the special film is ten times the size of 35mm film, is stored in a canister that is 7.5 feet in diameter, and runs in a projector that weighs 500 pounds and uses 18,000 watts of electricity. Inside you sit in a cheerful, spacious, banked theater facing the indeed enormous screen, and though there are no feely knobs, you are provided with a pair of plastic 3-D goggles with liquid crystal lenses and built-in speakers that create a "personal sound environment." The goggles are engineered so that an undetectable shutter action takes place many times a second, blanking out one eye and then the other, to send two separate images to the imaging centers of your brain. It is the combination of the slightly different left and right images that produces the appearance of three-dimensional space.

When the movie starts, the sensation is not of size or gadgetry but of a magical apparition, for the 3-D movies that are shown in this new Alhambra make conventional movies look like daguerreotypes. The world that is displayed through those lightweight and soon forgotten goggles has the depth and dimension of the actual world, where you can see around things, look left and right, and shift your focus from back to front within the same image. The size of the film means an increase in information, offering a richer and therefore more persuasive visual illusion. It is not merely a larger image but a more present reality.

For a short feature this sense of presence is exciting in itself. When I saw my first 3-D movie at Disney World's Epcot Center in the 1980s, I held my breath when a little blue bird flew out of the screen and landed right in front of my nose. I and everyone else in the audience reached out a hand to touch the bird, for we each, at our different locations, saw it right in front of us. During the viewing of a long feature, the reaching eventually subsides as the audience comes to take for granted a representational world with

persuasive depth but no solidity. The question then becomes, What kinds of stories is such a high-sensory technology suited to tell us? Filmmakers have just begun to answer that question, but the first two feature films made with the IMAX technology look much more like *Star Trek*'s Lucy Davenport than like Huxley's *Three Weeks in a Helicopter.*

Across the Sea of Time (1995) is a modest story of a Russian immigrant boy, Tomas, who has magically arrived in contemporary New York to trace the path of an immigrant relative with the help of stereopticon photos from the turn of the century. The story provides a pretext for spectacular photography, including the helicopter shots Huxley was already lamenting in the 1930s, here accompanied by the sound of violin crescendos as we swing across the Brooklyn Bridge. But these panoramas, like the billboard ads and insurance blimps caught by the camera, are there to pay the rent by making the film serve as a good tourist attraction. They are not that much more striking than the familiar two-dimensional versions or the large-format films shown in amusement parks or planetariums. The three-dimensional panoramas do become striking, however, when they are anchored by the foreground figure of the young boy. When Tomas is standing on the parapet of a skyscraper and looking at the vast spaces of the city, we are taken out of the generic landscape of tourist spectacle and placed in a very present dramatic moment. Such moments indicate that this is a technology that is ready to tell more intimate stories.

A large part of the pleasure of the film lies in the original black-and-white stereopticon photos. Even though the people in these photos appear rather like cutouts in a diorama-like scene box, the establishing of multiple planes animates them. The three-dimensional projection becomes a resurrection of the dead; we are given the ability to see them and to see the world through their eyes with stunning immediacy. The joy of a particular day on the beach at Coney Island is made palpable in the way a pair of lovers are

leaning toward one another and in the weight of a girl's arm around her friend's shoulder as they laugh and enjoy their holiday. The sensation of resurrection is even stronger in a photo taken of three workers, two white and one black, digging a tunnel for a subway. We enter the deep tunnel and feel the dank, claustrophobic confinement. We look at the posture and feel the exhausting labor. Here is the very antithesis of the feely, yet it is delivered in the exact technology Huxley distrusted. These stereopticon images wedded to film are used not to distance us from reality or to present oversized, dehumanized "stars," but to bring us close to the plain working folk whose experiences make up the true but hidden history of a great city. The technology does not make them larger than life, only more present to us.

One of the reasons the subway scene works so well is that three-dimensional photography is particularly impressive for enclosed spaces. Perhaps the most successful dramatic moment comes early in the film when the boy is a stowaway on a boat leaving Ellis Island. As Tomas cowers in the cramped hull of the ship, surrounded by the cold metal of the ship's pipes and machinery, a huge but kindly-looking stranger opens the door of his hiding place, reaches forward and extends to the boy a paper lunch bag. Sitting in the audience I could almost feel the lunch bag in my lap, and I experienced the generosity of the moment almost personally because I was so physically grounded in the boy's surroundings. In a conventional movie such a moment would have to be emphasized by close-up shots of the boy's face expressing his feelings of gratitude. In a 3-D film, the audience can be so closely identified with the situation of a character that such reaction shots are unnecessary.

But at this very moment in the film comes an event that I found quite jarring. When the lunch bag is placed before us, a small hand reaches, as if from behind us, to take it. The audience sees only the back of the hand, which we recognize as belonging to the boy—but

I also immediately thought of operating it, as if it were a cursor in a videogame! Similarly, toward the end of the movie we are on a wonderfully realized street in contemporary Greenwich Village. It is a documentary shot—at street level, no spectacular helicopters, just life on that street corner at that moment. A couple in what would ordinarily be the background crosses the street. But there is no background. I am there. My attention is caught, and I want to follow that couple and see what *their* story is. Instead, the camera relentlessly drags me into a bar on the corner with the young boy. Again, I see a wonderfully detailed environment. Behind the bar are prints of some of the same stereopticon photos we have been seeing. I want to move closer, to lean into the shot and get a better view, but the camera stays with the dramatic action of the scene, namely, Tomas's conversation with the bartender. I am uncomfortable at these moments because the three-dimensional photography has put me in a virtual space and has thereby awakened my desire to move through it autonomously, to walk away from the camera and discover the world on my own.

The tension between watching a movie and being in a virtual place is even stronger in the more ambitious but less successful *Wings of Courage* (1995), a full-length IMAX feature that tells the story of the pioneer aviator Henri Guillaumet, who crashed his biplane in the Andes in 1930 and walked for six days and five nights through the snow to his rescue. Huxley's helicopter rules again in spectacular flight sequences that emphasize the fragility of the small planes against the vastness of the lonely mountains. But my immersion in these scenes was constantly disrupted by the director's shifting from interior to exterior shots and from one point of view to another. Such frequent cuts would be good practice for a conventional film (they would help the audience see the full picture), but they are out of place in a three-dimensional film, which can place me so concretely in space I become dizzy when shifting my point of view.

Again, it is the smaller places in the film that are the most arresting—a romantic period café, a cluttered office, Henri's girlfriend's cozy parlor. When the camera puts the audience at the same café table as the actors, the edge of the table is in the foreground and we can see to the left and right as well as across the table. When the waiter moves around the table, we see him from all angles. It is only when the camera angle switches that we are unpleasantly jarred from our trance of feeling that we are actually there.

Perhaps the most compelling environment in the film is the cave that Henri makes beside the wreckage of the plane. It is here that I experienced a surprising intimation of the dramatic potential of this medium. The hero Henri is describing, in voice-over, his plans for survival, carefully calculating the distance he must walk to safety and the time it will take to get there, as if he is writing in a pilot's logbook. His public voice is full of stoic resolve. But from the back of my headset comes a fearful whisper: "It can't be done. It simply can't be done." The filmmaker has taken me inside Henri's mind with startling effect. In some ways it is a Huxleyan moment. The audience is plugged into a sound machine, and it is goosing us. But in the context of the film, Henri's whisper of self-doubt is a moment of unmediated intimacy. It gave me chills not because of the gimmickry but because it brought me into unexpected closeness with this particular human being in his struggle for courage. At this one moment in an otherwise uninvolving story, I could sense the potential of this technology to take us seamlessly into a character's mind. The three-dimensional sound and images held out the possibility of a dramatic art form that can juxtapose the inner and the outer life as easily and gracefully as prose.

Riding the Movies

Huxley's fears are more fully realized in the sensation-oriented amusement park attractions that promise to let you "ride the

movies." In this increasingly popular entertainment, the rider is placed on a hydraulically controlled movable platform or seat that tilts, twists, pitches, and shakes in synchronization with large moving images and environmental sound; an apparatus that seems very much like Huxley's pneumatic feely stalls. The concept of "riding" a movie fits the general strategy of entertainment industry conglomerates to create multiple "marketing windows" for the same imaginative product. If audiences loved to watch the DeLorean in *Back to the Future* or the motorcycle chases in *Robocop* or the magic carpet ride in *Aladdin,* they are primed to spend their money on rides based on these films. The first such attraction was the four-minute *Star Tours,* a ride developed in the early 1980s by two masters of cross-merchandising, Walt Disney Company and Lucasfilm. *Star Tours* was an immediate success.

The "movie ride" is engineered for strong visceral effects. It combines the surprises of the funhouse with the terrors of the roller coaster. According to Douglas Trumbull, who went from doing special effects in science fiction movies to making simulator rides, the aim is "to create an environmental total sensory experience that throws you right into the screen and you go into the movie."[8] As with three-dimensional films, the marketing emphasis is on the midway—bigger is better and biggest is best. So part of the attraction of Back to the Future, a ride that cost $16 million and uses three hundred speakers, twenty laser disc players, fifty miles of electrical wire, sixty video monitors, two 80-foot projection screens, and twenty computers, is that it is carefully engineered to provide the maximum thrill, to leave the rider breathless. "This ride can exert up to 1.8 Gs of force as it tilts and twists," says the Web page for the ride. "Compare the lowly airline jet, which rarely reaches 1.5 Gs!"

But the movie-rides are providing evidence that audiences are not satisfied by intense sensation alone. Once people do go "into" the movie, they want more than a roller-coaster ride; they want a

story. Developers have lately been expanding the duration of the rides and are adding more characters and incidents to them to meet the rider's expectation of dramatic action. Most ambitiously, they are giving the rider more freedom to direct the ride and more opportunity to affect the unfolding story. The model is changing from one in which a rider is swept along in an exciting action to one in which a "guest" is paying a visit to an enticing place. For instance, on the Aladdin ride at Walt Disney World based on the animated feature film, you are seated on a magic carpet and allowed to move freely through the fantasy city of Agrabah. Because the developers had dynamically generated computer images rather than photographs, they were able to expand the world of film and to create an attraction that allows for multiple possible experiences. Guests are drawn into the town by the charm of its minarets, the mysteries of its back streets, and the presence of animated characters. They are given a role in the story, and their movements are motivated by the task of finding a hidden scarab. The Aladdin model suggests the possibility of a new kind of movie-ride, an adventure experience that is driven by the guests's curiosity and the beauty of the explorable world rather than by rushes of adrenaline.

Aladdin is an exception to the general trend, however, if only because of the high level of technical resources that Disney has poured into it, including special Silicon Graphics computers to generate the images in real time. For every one such attraction there will probably be hundreds of minirides based on limited movement, and much sketchier environments and focused on combat between customers within the virtual environment. Furthermore, the proliferation of even the high-end imaginative rides still raises the discomforting specter of a universe of entertainment products that advertise one another. See the movie! Ride the simulator! Play the game! The more successful such tactics prove, the more often movies will incorporate action sequences designed

specifically for development as other "market windows." This may produce an entertainment paradise for fifteen-year-old boys, but it would mean an emotionally impoverished narrative form composed of many helicopter shots and far fewer moments of closeness with a particular human being.

Dramatic Storytelling in Electronic Games

While linear formats like novels, plays, and stories are becoming more multiform and participatory, the new electronic environments have been developing narrative formats of their own. The largest commercial success and the greatest creative effort in digital narrative have so far been in the area of computer games. Much of this effort has gone into the development of more detailed visual environments and faster response time, improvements allowing players to enjoy more varied finger-twitching challenges against more persuasively rendered opponents. The narrative content of these games is thin, and is often imported from other media or supplied by sketchy and stereotypical characters. This lack of story depth makes even wildly popular figures like the Mario brothers of the *Mortal Kombat* fighters impossible to translate into successful movie heroes.

In fact, in many maze-based games the story works against involvement in the game. One teenage fan of the X-Men, for instance, enjoyed the fighting moves of the characters in the *Clone Wars* game, which involves an invasion by the evil Phalanx, but found that the story line was inhibiting his ability to play. The game is structured so that the player is one of the X-men, who must save Earth from an invasion by the evil Phalanx forces. The X-men need the help of Magneto, a superhero who lives in a satellite stronghold. But in order to reach Magneto, the X-men must battle Magneto's soldiers in maze level after murderous maze level while receiving regular bulletins on the many countries that have

fallen to the Phalanx. "Why should I want to kill these guys?" the player wanted to know. "We should all be working together." In order to make the conflict with the Phalanx the climax of the game, the developers had come up with a story of futile killing. As in many such games, the *Clone Wars* plot is contained in brief segments of text shown between the maze levels. The teenager wound up turning the story segments off altogether, as many players do with fighting games.

Electronic puzzle games rely less on violence than do twitch games. They also have a slower pace of engagement, since the player must figure out how to work the magic lever or where to search for the secret key. Although puzzle games can subordinate the story to the game play, just as the fighting games do, many puzzle games take advantage of this slower pace to offer a richer level of story satisfaction. In playing the early but still lovingly remembered text-based adventure game *Planetfall* (Infocom, 1983), you are a lowly deckhand on the spaceship *Feinstein,* which is soon destroyed by an explosion. Landing on a mysteriously deserted planet, you must survive long enough to figure out how to get away. In an abandoned laboratory, you find a deactivated robot, Floyd. Once you figure out how to turn Floyd on again, you are no longer alone. Wherever you go from then on within this baffling and dangerous world, Floyd is always there, chattering affectionately, begging for attention, playing with a rubber ball, and eagerly providing information and small services. After living through many adventures with Floyd, you reach the door of the radiation lab that contains a crucial piece of equipment. Inside the room are loud and dangerous mutants. As you stand outside the door listening to the murderous clamor, Floyd volunteers with characteristic childlike loyalty—"Floyd go get," he says—and rushes into the deadly chamber without giving you a chance to stop him. After accomplishing his mission, Floyd emerges "bleeding" oil and dies in your arms.

At this point the game changes from a challenging puzzle to an evocative theatrical experience. The escape from the planet continues, but without Floyd's company the player feels lonely and bereaved.

The memory of Floyd the Robot's noble self-sacrifice remains with players even years later as something directly experienced. "He sacrificed himself for me," is the way one twenty-year-old former player described it to me. Even those who speak of it less personally ("When you get to that room, he goes in to save you") convey a sense of wonder at the unexpected and touching quality of the gesture. The death of Floyd is a minor milestone on the road from puzzle gaming to an expressive narrative art. It demonstrates that the potential for compelling computer stories does not depend on high-tech animation or expensively produced video footage but on the shaping of such dramatic moments.

On the other hand, some game designers are making good use of film techniques in enhancing the dramatic power of their games. For instance, the CD-ROM game *Myst* (1993) achieves much of its immersive power through its sophisticated sound design. Each of the different areas of the game is characterized by distinctive ambient sounds, like the whistling of wind through the trees or the lapping of waves on the shore, that reinforce the reality of fantasy worlds, which are really just a succession of still images. Individual objects are also rendered more concrete by having them ping, thump, and whirr appropriately when manipulated. Wandering through a sinister fortress hideaway, I hear a musical motif that gets darker and more foreboding with each step and reaches an emotional peak when I uncover a severed head. The music track works as a game technique: it provides a clue that I am mouse-clicking along in the right direction, like the hot and cold clues in a game of treasure hunt. But it is not gamelike in tone. Instead, the solemnity of the music reinforces my feeling of having come in immediate contact with a terrible act of depravity. The music

shapes my experience into a dramatic scene, turning the act of discovery into a moment of dramatic revelation. Games hold the potential for more powerful moments of revelation than they currently make use of. Some years ago I was drawn into playing a compelling arcade game while on vacation with my husband and children. We had just entered the game room to give the kids a treat, when I spotted a large-format TV screen in front of a laser gun in the shape of a six-shooter. On the screen a cowboy was standing in front of a low-cost version of the kind of TV Western set I spent much of my childhood watching. "Howdy, partner," he said, and asked for some help in running some bad guys out of town. I was immediately hooked. It was clear to me that this was the game I'd been waiting for all my life. I shot my way cheerily through the jail, saloon, livery stable, and bank, knocking off the bad guys not quite as fast as the game knocked off my supply of quarters. I was lost in a state of deep reverie. Eventually my son and daughter ran out of quarters and came to find me. As I turned toward them, I was conscious of being two very different people: the fervently pacifist mother who had taken them on peace marches and forbidden all military toys and guns and the six-shooting cowgirl who had grown up identifying with Annie Oakley and Wyatt Earp. I would not claim that *Mad Dog McCree*, the game I was playing, was a masterful piece of storytelling. But the moment of self-confrontation it provoked, the moment in which I was suddenly aware of an authentic but disquieting side of myself, seems to me to be the mark of a new kind of dramatic experience.

Although economic and social forces may never move the established game industry far past the lucrative shoot-'em-ups and puzzle mazes, there is no reason why more sophisticated developers could not make stories that have more dramatic resonance and human import to them, stories that, unlike Huxley's feelies, mean something, just as Floyd's death is meaningful in the adventure

game *Planetfall,* the revelation of murder is meaningful in *Myst,* and the revelation of my own capacity for violence was meaningful to me in that arcade.

Story Webs

The accessibility of the World Wide Web has introduced a growing audience to hypertext fiction. Hypertext is a set of documents of any kind (images, text, charts, tables, video clips) connected to one another by links. Stories written in hypertext can be divided into scrolling "pages" (as they are on the World Wide Web) or screen-size "cards" (as they are in a Hypercard stack), but they are best thought of as segmented into generic chunks of information called "lexias" (or reading units).[9] Paper pages are bound into books in a single sequence; paper index cards must be arranged with no more than one card before and one after them even though they can be more easily searched in nonsequential order. But screen-based pages and cards become lexias: they occupy a virtual space in which they can be preceded by, followed by, and placed next to an infinite number of other lexias. Lexias are often connected to one another with "hyperlinks" (or "hot words"), that is, words that are displayed in color to alert the reader/viewer that they lead someplace else. For example, if I were writing this book as a hypertext, I would display the word *lexias* in the third sentence of this paragraph in color as a hot link instead of placing a superscript number next to it to indicate an endnote. Mouse-clicking on the word would bring up a new screen displaying the information on who invented the term and who applied it to electronic text, information that is now hidden at the back of the book. Another hyperlink might lead out of my book entirely and straight into a book by Roland Barthes or George Landow, or it could lead to a short bibliographical annotation that would pop up on the screen like a sticky note, appearing and disappearing at the will of the reader. A

single lexia may contain many links, or it may contain no links at all, thereby gluing readers to the page or allowing them to move only forward or backward, as the pages of a book do. The existence of hypertext has given writers a new means of experimenting with segmentation, juxtaposition, and connectedness. Stories written in hypertext generally have more than one entry point, many internal branches, and no clear ending. Like the multiform life stories imagined by Borges and Lightman, hypertext narratives are intricate, many-threaded webs.

Hypertext formats are not new as intellectual structures. The Talmud, for instance, is a giant hypertext consisting of biblical text surrounded by commentaries by multiple rabbis. Literary works are hypertextual in their allusions to one another. In the twentieth century the allusiveness has grown so dense that a work like James Joyce's *Ulysses* is almost impossible to understand without accompanying pointers to other works, including a map of Dublin. *The Dictionary of the Khazars,* one of the multiform texts discussed earlier, is a print-based hypertext with entries that point to one another, making possible many coherent reading sequences. Although hypertext is not new as a way of thinking and organizing experience, it is only with the emergence of the computer that hypertext writing has been attempted on a large scale.

The hypertext formats of the 1990s support many kinds of narrative writing, from voyeuristic soap operas aimed at advertising revenues to postmodernist experimental fiction for university students. The first widely successful hypertext narrative is *The Spot,* a sexually titillating soap opera about a group of West Coast yuppies living in a beach house who post their diary entries regularly on the Web.[10] Readers can hop through the various diaries to compare different versions of the same event; can search through past events to catch up on the plot; and can even participate in the story by posting opinions, advice, or their own stories to a bulletin board in which the simulated characters participate along with fans. The

characters in *The Spot* play to the prurient interests of the fans with a kind of self-mocking soft-core exhibitionism. For instance, in answer to one fan's challenge to prove that the diaries are being written in real time, a character posted a picture of herself, as directed, standing in a bikini in front of the refrigerator and holding a strawberry. This cyberspace striptease, however appalling, is also indicative of the real innovation behind this otherwise banal and poorly written soap. The dramatic action is not in the canned story created by the writers alone but in the spontaneously improvised exchanges between the simulated characters and the participating fans. In defter hands such audience engagement could provide imaginative, not just sexual, excitement.

The literary publisher Eastgate Systems distinguishes its products from both pornographic "Web soaps" and games by calling them "serious hypertext." The pioneering work in this genre is Michael Joyce's *Afternoon* (1987), written in the Storyspace hypertext system, which he codesigned with Jay David Bolter and John Smith specifically for the purpose of writing narrative as a set of linked text blocks. *Afternoon* contains 539 carefully crafted lexias and begins with one (although it does not necessarily come first) entitled "I Want to Say"; this lexia consists of a single compelling sentence: "I want to say I may have seen my son die today." From here the reader is sent clicking through the cardlike lexia to find out more.

There is a lot to learn about the narrator, Peter, and about his ex-wife, lovers, and friends, but most readers are not able to determine whether his son is alive or dead or what Peter may have seen at the site of a roadside accident. Instead, the reader circles through a complex web of lexia, each of which has several possible links to follow, including a default "next" lexia, which appears in answer to a tap of the return key. There is no overview of the work's structure, and the "hot word" links do not offer much of a clue to the content to which they lead. To complicate things further, Joyce has

programmed some of the links to force the reader to return to the same lexia again and again in order to be permitted to go to new places in the story. This continual circling through a confusing and contradictory space, freighted with anxiety about the death of a child and irritation at Peter's self-absorbed behavior, is reminiscent of a familiar *Star Trek* plot—the one where the holodeck malfunctions; the characters act out of role; and no matter what the crew members try, they cannot get out of the system.

But to the postmodernist writer, confusion is not a bug but a feature. In the jargon of the postmodern critics, Joyce is intentionally "problematizing" our expectations of storytelling, challenging us to construct our own text from the fragments he has provided. In the most praised effect of the story, he conceals a key section in a way that mirrors the protagonist's self-deceit. Only after repeated evasions can readers reach the lexia in which Peter will call his therapist and face his memory of his own culpability in the accident. For readers who enjoy the textured verbal labyrinth of *Afternoon,* there is a particular pleasure in coming to this section, although it does not have the finality of an ending or of an unambiguous solution to a mystery. Instead it deepens the range of possible interpretations of Peter's morning and afternoon.[11] The architectural playfulness of *Afternoon,* its construction as a series of discrete lexia linked by overlapping paths, and the poetic shaping of its individual lexia mark it as the first narrative to lay claim to the digital environment as a home for serious literature in new formats.

Much of the writing on the World Wide Web in 1996 is in standard short story format, perhaps with a few pictures or graphics added in; most writers have taken only limited advantage of the opportunity to write in hypertext structures. But the generation now in college grew up using encyclopedias on CD-ROMs and even making hypercard projects in the computer lab. In college, where they have an Internet connection that is faster than what

they had at home, they use the World Wide Web as their primary source of reference material. They make their own hypertext self-portraits, in the form of personal "home pages," which they publish on the Web. Meanwhile, elementary and high schools are hooking up to the Internet in greater numbers every year. Unlike the first users of the medium, the next generation of writers will take the hypertext format for granted. As they come into greater expressiveness, they will bring the tangled structures of the current Web into more coherent order.

Computer Scientists as Storytellers

While dramatic and written narrative traditions have moved closer to the computer and computer-based entertainments have become more storylike, computer science itself is moving into domains that were previously the province of creative artists. Researchers in fields like virtual reality and artificial intelligence, who have traditionally looked to the military for technical challenges and funding, have recently turned from modeling battlefields and smart weapons to modeling new entertainment environments and new ways of creating fictional characters. These changes promise to greatly expand the representational power of the computer.

For instance, at Mitsubishi Electronics Research Laboratory researchers have created an appealing software environment that lets people at distant locations move through the same imaginary landscape. Diamond Park appears on large display screens as a grassy gathering place with bike trails, an outdoor restaurant, and inviting gazebos drawn in a vaguely turn-of-the-century style.[12] The bike trails are important because one of the first interfaces to this environment is a stationary bicycle equipped with a video display screen. You can move along the virtual trails by pedaling, just as you would move down a racecourse in an arcade driving game by stepping on the pedals of the car. But the difference here is that

instead of racing forward, you can move in any direction (even off the paths), and the picture before you will change appropriately, reflecting your own position. You will also appear on the screen of other users, and they will appear on your screen as "avatar" figures (in this case, as animated drawings of people riding bicycles). Wearing a small microphone and headphones, you can talk to the other people as they come near; you can also pick up ambient sound, like music playing in the café. The bicycle interface acts like the vehicles in a movie-ride in that it makes the distances seen on the screen seem much more concrete by tying the visual movement to a kinetic environment. However, here the world is not built for adrenaline rushes but for socializing and exploration. Sites like these (with or without bicycles) mark the future of the MUDs and chat rooms of the current Internet.

How present could we be in such environments? We could have our actual faces photographed in real time and mapped onto the avatars in the software. We could experience the virtual world not as a flat screen but as a virtual reality (VR) "pod" that surrounds us on six sides, like the holodeck. Although we would not have a holodeck chair to sit on, we could have something like a feely knob. We could wear clothing equipped with "tactors" that push back at us with the same pressure and texture as real objects. We could even hook the tactors up to distant objects, so that wearing a special glove we would "feel" the weight of an actual moon rock being lifted by a robot equipped with special sensors. Or we could hook up surgical instruments with tactors and attach them to a computer model of a patient, so that the images we would see would be reinforced by the appropriate feel of living tissue. Gamemakers are already adopting tactor technology to make more viscerally satisfying joysticks, and although the joysticks will not convey the sensation of a kiss, they will make for a more satisfying gun recoil or car collision.

Even without these force sensors, some VR installations of the 1990s are so visually present that interactors think they have touched things in the virtual world, including one another, even when they have not. One of the most intriguing such installations is the *Placeholder* world created by Brenda Laurel and Rachel Strickland for Interval Research Corporation in California.[13] Laurel, who holds the world's first Ph.D. in interactive narrative, has been designing games and user interfaces since the 1970s.[14] A critic of the conventional VR navigation system (in which users navigate by moving their hand or jiggling their head), Laurel designed an environment in which the system follows the changing full-body positions of people who move around in a natural way. Interactors wear VR helmets (which contain the three-dimensional visual display) and body sensors and must limit their movements to a "magic circle" marked out by rocks on the floor (an echo of the fairy ring, which is a traditional place of enchantment). Once inside the Placeholder world, they can enter the bodies of virtual animals and move as they move. For instance, if a woman in the crow's body spreads her arms, she sees her crow wings extend and her perspective changes as her crow body lifts off the ground. By swooping and banking appropriately she can take an exhilarating flight along a waterfall. Placeholder uses visual and sound motifs from the world of mythology to encourage collaborative imaginative play between pairs of interactors. It purposely avoids the commercial characters and weapon-driven competitive games of the movie-rides and arcade-style simulators. Placeholder suggests that reality technology can create a kind of stage set for adult improvisational play.

Perhaps the least encumbered holodeck experience available right now is in front of the twelve-foot computer screen set up by the ALIVE project of MIT's Media Lab as a "magic mirror" in which interactors see their own reflection placed beside the cartoon images of virtual characters designed in the lab.[15] In one

scenario a little puppetlike child follows you around and tries to get your attention. In another a hamster scurries around, coming to you when you pick up some virtual food and hiding behind you when a foxlike predator is released. In a third a frisky dog named Silas will play fetch with you.[16] These attractive creatures live within the magic mirror as if it were a real three-dimensional space, an alternate reality echoing the rug area on which the interactor moves.

The Wonderland creatures on the other side of this looking glass are called "intelligent agents." They are computer-based characters with complex inner lives who can sense their environment, experience appetites and mood changes, weigh conflicting desires, and choose among different strategies to reach a goal. They are persuasively alive because their behaviors are complicated and spontaneous. They are quite life-size and they appear to be in real space with the interactor. Although they are still a very long way from Captain Janeway's romantic Lord Burleigh, such agents do have an independent existence of sorts and are significant steps on the road to believable holodeck characters.

When I play with Silas and his friends in front of the giant screen, they seem as alive as the animated figures in a movie—except that I am also in the movie. I have been prepared for this experience by watching so many movies that mix live and animated figures. However, it is much easier for me to suspend my disbelief in the existence of these creatures when someone else is interacting with me. The little puppetlike girl, for instance, came completely to life for me on the day when I was with a group showing the actress Lily Tomlin through the lab. Tomlin sat down on the carpet and patted the place beside her as the little figure shyly moved closer; the actress's gesture turned the interaction into a relationship, the beginning of a story of a developing intimacy. But seeing myself in the mirror, in my own ordinary clothes, which tell me I am in

Cambridge rather than in Wonderland, I have a harder time sustaining the illusion.

Nevertheless, a floor-to-ceiling computer screen is an impressive way to display a virtual world. When the Media Lab setup is not in use for these advanced projects, graduate students play *Doom* by projecting its cavelike landscape on the screen and standing in front of it holding a plastic gun. The camera attached to the screen tracks the player's actions and sends messages to the game as if the player were holding a joystick. On the day I took a turn playing, the gun was not firing, but the fluid navigation through the enormous three-dimensional spaces was rapturous in itself.

In addition to creating vivid virtual worlds we can enter and fictional characters we can interact with, researchers are also developing complex computer models of plot. For instance, at Carnegie Mellon University, the Oz group, led by Joseph Bates, applies artificial intelligence techniques to storytelling.[17] One project of the group is based on an existing text-based computer game called *Deadline*.[18] Their goal is to customize the events of the murder mystery for each individual player so that the clues, red herrings, and revelations arrive at a satisfying pace, no matter what the player chooses to do. *Deadline* takes place in a mansion where there are suspects to be interviewed and physical evidence to discover. It is designed around a time scheme, so that if the detective does nothing to prevent it, a second murder takes place midway through the story. The Oz group analyzed all of the possible paths a player might take through the story and identified the ones that are the most satisfying. They then fed this information to a complex mathematical procedure called "adversary search," which is similar to the algorithms used in chess-playing systems, and which can calculate the optimal response to any action of the player in order to coax the player toward the most interesting narrative paths. A story system based on this design would eliminate the confused thrashing that accompanies much computer game

playing by moving the interactor forward, not necessarily toward the solution to the puzzle but toward the most dramatically engaging encounters.

All of this research is still in the laboratory for now, but it is exciting to think about what it might add up to if all these technologies are combined. Imagine a visit to an entertainment venue of the late twenty-first century, the equivalent of a movie theater. The equivalent of a hit movie for the year 2097 might perhaps begin with a walk through a three-dimensional projected environment looking much like the theme-based restaurants and parks of our time or like the digital sets that are increasingly common in contemporary movies. We would be able to move the images around by moving our hands; for example, we might pick an illusory apple from a bowl of fruit or move an illusory chair. We would feel the weight and texture of these objects, although we could not eat the apple or sit on the chair. We would meet characters within this world who would sense our presence and converse with us; they would become as familiar to us as the characters in a beloved book or film. We would enter the story, and the plot would change according to our actions while still sustaining its power to surprise and delight us. What would such stories be like? How would we know what to do if we found ourselves inside one? Although we cannot predict how far the technology will take us, it is irresistible to speculate on such possibilities.

Even the near-term prospects are compelling. We are on the brink of a historic convergence as novelists, playwrights, and filmmakers move toward multiform stories and digital formats; computer scientists move toward the creation of fictional worlds; and the audience moves toward the virtual stage. How can we tell what is coming next? Judging from the current landscape, we can expect a continued loosening of the traditional boundaries between games and stories, between films and rides, between broadcast media (like television and radio) and archival media (like books or videotape),

between narrative forms (like books) and dramatic forms (like theater or film), and even between the audience and the author. To understand the new genres and the narrative pleasures that will arise from this heady mixture, we must look beyond the formats imposed upon the computer by the older media it is so rapidly assimilating and identify those properties native to the machine itself.

Harbingers of the Holodeck: 2016 Update

In this chapter I offered the term "multiform" for stories that exist as variations on a single scenario. In a well-constructed multiform story each individual instantiation should stand alone as a coherent narrative. But the design opportunity is to motivate the viewer/interactor to replay the same scenario in order to access the deeper meanings that can emerge from well-formed variations. The author's challenge is to create suspenseful anticipation and surprise by playing off the expectations raised by repetition of the same dramatic elements, as illustrated by the masterly variations on the Ned Ryerson/puddle scene in *Groundhog Day* (1993).[1] I have been using this film in my teaching since it came out because it establishes such clear, quickly referenced landmarks across a single repeated day, allowing the viewer to savor the inventive variations. I do not know of an interactive narrative that does as good a job, although I am very impressed with Emily Short's coherent organization of multiple variants in the well-segmented experimental AI narrative *Blood and Laurels*.

I avoid the use of "nonlinear" for multiform stories because it emphasizes the disruption of the legacy pattern rather than the creative construction of the new variant structure. As I tell my

students, it is not helpful to aim at creating something that is "nonlinear" because you cannot base good design on negative qualities like the lack of linear organization. Since I am particularly interested in the potential of using computers to create more complex structures of organization, I have favored the terminology "unisequential" over "linear" for bound books, conventional movies, etc., and "multisequential" for stories that allow the interactor to navigate through multiple sequences, all of them coherent. The terms "multiform" and "multisequential" are overlapping; one emphasizes variations in composition (like replacing blueberries with chocolate chips in a recipe) and the other emphasizes variations in navigation (like a garden with forking paths). By choosing terms that are more descriptive than "nonlinear," we can encourage a conscious design process focused on the careful construction of complex and coherent story forms.

Multiform and multisequential storytelling has flourished since this chapter was written. Jordan Mechner's *The Last Express* (1997), recently reissued for smartphones and tablets, was one of the earliest attempts at cinematic gameplay, and it remains impressive in its exploitation of the spatial constraint of a set of railway cars and the well-defined time intervals of a rail journey to structure interactive storytelling. The blockbuster console game *L.A. Noir* (2011), created by Team Bondi and published by Rockstar, offered impressively detailed motion capture of actors' performances, including readable facial expressions that did not fall into the uncanny valley of earlier attempts at computer graphics. Even the first-person shooter became more filmic and story-oriented in the first decade of the twenty-first century, with Rockstar's milestone *Grand Theft Auto III* (2001) inaugurating a new category of "open world" gameplay in which the player can roam through an inexhaustible fictional landscape, choosing plot-driven goal-oriented tasks, or just enjoying the freedom of driving fast, blowing things up, and generally misbehaving within the make-believe of

the gangster genre. For console gamers who preferred a world in which actions had moral consequences, the detailed dystopian sci-fi fantasy Irrational Games' *BioShock* (2007) offered a critique of Ayn Rand's ideology of selfishness and provided the satisfaction of three different endings based upon the player's willingness to sacrifice childlike characters.[2]

The widespread audience familiarity with game structure has had consequences for traditional media forms as well, allowing novelists and playwrights to find relatively mainstream audiences for what used to be forbiddingly experimental forms. For example, the Punchdrunk theater (http://www.punchdrunk.com) has been successfully mounting productions in London and New York with sustained runs of more than a year that invite theatergoers to wander around multiple stage sets within a fictionally constructed multifloor space. *Sleep No More* (2011–15) turns an abandoned New York hotel into Macbeth's castle, and the London production of *The Drowned Man* (2013–14) turns a cavernous former postal sorting station into an abandoned movie studio. The plays are a form of "promenade theater"—in which the audience member is expected to "promenade" around the space, usually by chasing after actors as they zoom from one fictional location to another. The hallmark of this kind of theater is simultaneously performed scenes making for many choice points and for much variety in the experience of individual theatergoers. The Punchdrunk productions also include detailed set designs that mimic the interactive spaces of mystery-themed adventure games in which objects are meant to be examined and evaluated as potential solutions to game puzzles, often involving revelations of backstory. These spaces encourage solitary exploration, and often include sexually titillating encounters (a lap dance, a near embrace) that play with the separation between audience and player.

We can think of the Punchdrunk productions as a kind of holodeck experience in real space. But the digital world is not far

behind. The interest in exploiting 3-D spaces, discussed in this chapter in relation to IMAX films and virtual reality installations, has increased. 3-D spaces are becoming increasingly detailed and populated: not just passive 3-D films for theatrical and home presentations (which will someday be available without the barrier of geeky glasses), but also virtual landscapes and dense information spaces whose z-axis is available for active navigation.

We have seen the growth of digital environments that offer us the pleasure of building detailed virtual objects and owning virtual places, e.g., *The Sims* (2000–), *Second Life* (2003), and *Minecraft* (2011). There is a powerful charm in moving through fanciful landscapes, especially if we can soar as in Second Life or buoyantly float as in the oddly spiritual *Journey* (2012). Virtual reality equipment that changes display as you move is now the subject of consumer product development, like the Oculus Rift or viewers based on smart phones like the Mattel View-Master or Google's Project Tango. Computer scientists and perceptual psychologists are experimenting with ways to fool players confined to small play areas into thinking that they have reversed direction or covered long distances. Often this work explicitly references the *Star Trek* model, leading to headlines like "Holodeck Becomes a Reality" (*Guardian*, July 24, 2014). But the conventions of games and 3D movies are not enough to guide us in creating 3D interactive narratives. As Oculus developer Saschka Unseld found out, what is funny in 2D is disturbing in 3D when the character seems present in the same space with you, with no clearly defined fourth wall. We have yet to discover what Unseld calls the "grammar" of 3D interactive storytelling.[3]

There are many design opportunities in this growing field of spatial narrative. As we become more at ease with imagining ourselves within these virtual spaces, designers will be able to refine conventions for allowing interactive audiences to change point of view, to choose which of two or more simultaneous actions to

witness, or to explore a simulated location for evidence of past events. Game environments offer a rich palette of conventions for such actions that can be more fully exploited for dramatic effect. The switching of audio feeds described in this chapter is a promising area that has yet to be exploited, even in games. Simultaneous alternate dialog could also be rendered as text feeds on synchronized second screens for interactive television or customized movie viewing. For example, a "whispering" channel (audio or text) could be made available to only part of the audience from a privileged point of view, such as the spoken thoughts of detective or suspect, or as secret text correspondence or voice mails between characters.

The web soaps discussed in this chapter paved the way for today's webisodes of conventional TV shows and for the proliferating and increasingly ambitious independent web serials. These dramas and comedies, freed from conventional television formats, can experiment with episodes' length and loosely connected stories, such as the well-reviewed *High Maintenance* (2012–14), which focuses on customers of a marijuana dealer in New York.

Social media and media-sharing sites like Facebook, Twitter, YouTube, and Tumblr provide frameworks for aggregating shorter segments and segments from multiple authors into shared narrative structures. Blogging software has made the web diary and video blog into widely available, established narrative forms, and the ubiquitous surveillance camera is now an established storytelling trope in films, TV shows, and games. All of these conventions are available as an extended palette for storytelling, sometimes coming together into new narrative forms, such *The Lizzie Bennet Diaries* (2012–13), an inventive social media-based adaptation of Jane Austen's *Pride and Prejudice*.

Journalists have only scratched the surface of digital affordances for storytelling. Pervasive digital video cameras and social media structures have created an influential citizen journalism practice,

and there is an important design opportunity in creating new structures for knitting together contributions from multiple eyewitnesses to a single event. The UN-funded documentary *Clouds Over Sidra* (2015) uses 3D presentation to simulate a visit to a Syrian refugee camp in an effort to create a sense of immediacy and heightened empathy with the displaced families. The award-winning *New York Times* multimedia account of an avalanche disaster "Snowfall" (2012), for example, is basically an enhancement of an existing long print piece with digital add-ons like a map of the area and video of a ski run from a head-mounted camera. There are many design opportunities for a digitally native journalism. For example, an avalanche disaster story might be structured as a simulation presented as an aerial view of the terrain with a timeline slider to take interactive viewers through the event in significant timesteps, with markers for the position of each of the people involved in the disaster. The simulation might reposition according to the point of view of the individual actors and witnesses, allowing for multisequential navigation of the same event. A digitally native multiform story might also dramatize contrary-to-fact scenarios in which different choices might have led to survival of the victims.

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Industry and Design Resources

Dale Herigstad talk on YouTube: "Discovering New Media Space: Dale Herigstad at TEDX Transmedia" (2014), https://www.youtube.com/watch?v=mabgFkt9scg.

Tracy Swedlow's Interactive TV Today Newsletter, http://www.itvt.com.

Future of Storytelling conference with videos from presenters: https://futureofstorytelling.org.

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Chapter 10

Hamlet on the Holodeck?

We return to the question raised by Aldous Huxley at the moment movies began to speak: Will the stories brought to us by the new representational technologies "mean anything" in the same way that Shakespeare's plays mean something, or will they be "told by an idiot"? We have seen that the emerging cyberdrama entertainment forms need not resemble Huxley's "feelies" but could instead offer satisfactions continuous with those we receive from established narrative formats. Can we also imagine a cyberdrama that would develop beyond the pleasures of a compelling entertainment to attain the force and originality we associate with art?

We often assume that stories told in one medium are intrinsically inferior to those told in another. Shakespeare and Jane Austen were once considered to be working in less legitimate formats than those used by Aeschylus and Homer. One hundred years after its invention, film art still occupies a marginal place in academic circles. The very activity of watching television is routinely dismissed as inherently inferior to the activity of reading, regardless of content.[1] But narrative beauty is independent of medium. Oral tales, pictorial stories, plays, novels, movies, and television shows can all

range from the lame and sensationalist to the heartbreaking and illuminating. We need every available form of expression and all the new ones we can muster to help us understand who we are and what we are doing here.

The real literary hierarchy is not of medium but of meaning. We focus so inappropriately on the worth of the various media in part because the last quarter of the twentieth century has brought a general crisis of meaning. As Toni Morrison has so aptly put it, we are living in a time when "to mean anything is not in vogue."[2] Commercial forces favor simplistic stories over more authentic engagement with the world. Academic theorists reduce literature to a system of arbitrary symbols that do not point to anything but other texts. But in our ordinary lives, we do not experience the world as a succession of signifiers any more than we experience it as a succession of car chases. In our ordinary lives, we turn to stories of every kind, again and again, to reflect our desires and sorrows with the heightened clarity of the imagination. We will bring these same expectations to digital narrative.

In trying to imagine Hamlet on the holodeck, then, I am not asking if it is possible to translate a particular Shakespeare play into another format. I am asking if we can hope to capture in cyberdrama something as true to the human condition, and as beautifully expressed, as the life that Shakespeare captured on the Elizabethan stage.

Procedural Authority

The most important element the new medium adds to our repertoire of representational powers is its procedural nature, its ability to capture experience as systems of interrelated actions. We are now engaged in establishing the building blocks of a procedural medium, the musical figures that may someday grow into a symphonic form. We are learning how to create characters by

modeling their behaviors, how to create plots by establishing the rules by which things should happen, and how to structure the participation of the interactor into a repertoire of expressive gestures.

The notion of a procedural medium that provides the satisfactions of art takes some getting used to. We will need time to grow accustomed to combining participation with immersion, agency with story, and to perceiving the patterns in a kaleidoscopic fictional world. Most of all, the procedural medium will challenge our notions of authorship. In a print model, we think of an authored environment as fixed and not open to variation. A mutable, kaleidoscopic world can feel to some like an unauthored world.

We like to know that there is a ruling power in control of an imaginary universe, and it makes us uncomfortable if the author seems to abdicate the role. Some experiments with nonlinear form in linear media have violated this expectation. When the movie *Clue* was released in multiple versions, each with a different solution to the murder, viewers felt cheated rather than intrigued. When Italo Calvino mutates his plot and characters with every chapter of *If on a Winter's Night a Traveler,* my students lose interest in the story. People who get great pleasure from books and film are often hostile to the very idea of digital narrative because they expect it to be disappointing in just this way.

Yet once we understand simulations as interpretations of the world, the hand behind the multiform plot will feel as firmly present as the hand of the traditional author. With familiarity we will come to realize that the procedural author can shape a juxtaposition or a branch point in a multiform story as artfully as a traditional author shapes a speech in a play or a chapter in a novel. Already in the gaming world there are clear auteurs, creators with characteristic and original style as well as strong technical mastery. To play *Mario Brothers* or *King's Quest* or *Myst* is to open ourselves to the vision of the shaping author in the same way we

open ourselves to the author's voice in a novel.[3] Just as we have only recently learned to think of the solitary reader as playing an active role through imaginative engagement with the story, so too are we just beginning to understand that the interactor in digital environments can be the recipient of an externally authored world.

A George Eliot or Leo Tolstoy or William Shakespeare of the future could create kaleidoscopic worlds of dazzling variety that will display the coherence and unified vision we associate with great fiction. Cyberdramatists will exercise authorial control through the techniques of procedural authorship (described in chapters 7 and 8), which would let them dictate not just the words and images of the story but the rules by which the words and images would appear. But would we feel silly playing a role within an environment created by a great artist? Will we feel called upon to act like Olivier or to produce Bard-like lines? Not necessarily. Future audiences will take it for granted that they will experience a procedural author's vision by acting within the immersive world and by manipulating the materials the author has provided them rather than by only reading or viewing them. They will welcome the choice-points in the narrative as dramatically heightened moments shaped for them with the same artistry that we now expect in the editing of a film. They will accept their exercise of agency as part of the aesthetic experience in the same way that we now take it for granted that we have to walk around a Degas sculpture to experience its full beauty rather than merely stand in front of it as we do with his paintings.

Traditions of Virtuosity

The model of authorship I have just elaborated is that of the single genius, the hero-writer celebrated by the Romantic poets, a model we have come to associate most strongly with the figure of

Shakespeare, just as we have come to associate him with the noblest achievements of culture, achievements many feel to be threatened with oblivion by the "brave new world" of technology. We forget that Shakespeare did not write books; he wrote plays and spent his life in the collaborative medium of the theater, shaping his characters to fit the strengths of his acting company.

The Shakespearean stage, with its thrillingly scripted text and single author, is often contrasted with the other great theatrical achievement of the time, the Italian commedia dell'arte, which derived its power from the improvisational performance skills of its actors. In a high culture model of art, what gets preserved is a particular story in a fixed form, to be repeated verbatim. In a folk model, like the bardic tradition discussed in chapter 8, it is the forms that get passed down, to be altered and repurposed by each succeeding generation.

Shakespeare's plays are still performed and read. Although they reflect the formulaic theater of his time and the acting strengths of particular members of his company, and although they exist in variant versions and are full of appropriated material, we recognize them as expressing the vision of a single virtuoso mind. The commedia dell'arte plays are now rarely performed, but the theatrical traditions of the commedia can be seen in Mozart's *Figaro* or in a Marx brothers skit or in the improvisational moviemaking of Robert Altman or Mike Leigh. Its artistry took the form not of the single controlling genius but of virtuoso collaboration.[4]

Cyberdrama presents us with the possibility for both kinds of virtuoso authorship and for many mixtures of the two. Today's role-playing environments (electronic and live action) are like the commedia in that they base their dramatic improvisations on written materials. For though the commedia was a folk form, it was very much a product of the age of print in that it was performed by highly literate actors who had memorized passages of poetry and prose, which they repeated verbatim or used as models for

improvised creation. Like the role-playing interactors in the MUDs, the commedia dell'arte actors used their literary models as quarries from which to draw material that helped them elaborate their characters.

Shakespeare is our touchstone for literary art because his stories move us across centuries and even across cultures. But a tradition of narrative art is also fed by stories that enjoy a much more circumscribed audience, such as a small circle of friends or family members. The Brontë children began by making up their imaginary kingdoms for one another. Without Angria and Gondal there would have been no Thornfield or Wuthering Heights. Orally transmitted stories often have a stronger resonance for members of their originating culture than they can ever have for outsiders. The stories that people make up collaboratively in virtual environments are of this tribal nature; they may seem trite or derivative to an outsider, but they can be riveting and emotionally resonant for the participants.

Like other folk traditions, the role-playing tradition aims for ephemeral performance that preserves not particular scenes but the conventions of interaction. Over the next century these conventions may rapidly evolve into a more expressive repertoire of improvisational structures. We may come to think of cyberdrama in all its variations as an essentially collaborative art form. Perhaps a group of role-players will be like a commedia dell'arte troupe, more skillful in combination than any of them would be alone. Perhaps such groups will coalesce around a few star performers whose invention and dramatic force provide creative direction for the less skillful interactors. Perhaps, in time, role-playing might experience a Homeric transition: a consolidation of a collectively improvised tradition into a single repeatable work. But whether or not this happens, the on-line role-playing contributions of amateur improvisers will lead to new formulas of interactions that will feed into the general expressiveness of the medium.

Formulaic Invention and Originality

In thinking about both narrative traditions and computational environments, we have necessarily been thinking in terms of formulas. The creation and refinement of narrative formulas are the necessary preconditions for the creation of any great work of art. Without those repetitive revenge plays that are now only read in graduate school, we would not have *Hamlet*. Nor could *Jane Eyre*'s psychological realism exist without the simplistic gothic tradition of menaced heroines locked up in spooky castles. Literary stereotypes are like rough sketches of the world, which the next generation or the more capable artist can modify and elaborate. The eighteenth century, confronting the demons of the psyche for the first time in a postreligious framework, created salacious stories of blaspheming villains imprisoning virgins; the nineteenth century drew on these story elements to express the courage of the nascent feminists. Entertainment forms try to give energy and novelty to stereotypical formulas, but art reshapes the formulaic to conform more closely to the world of experience. Yet these activities are closely intertwined and dependent upon one another. We could not have the breakthrough achievement of a work of lasting art without the originality and inventiveness of less ambitious stories. Formulaic entertainment and form-shattering art are both embedded in a cultural repertoire of story patterns. Electronic narrative will only translate that repertoire into a new arena.

Charlotte Brontë's adolescent stories were powerfully moving to her and her brother. The characters of Angria were so strong for her that she sometimes experienced them as a hallucination. But if she had died before she wrote *Jane Eyre,* her visions would not have passed into the general culture. The difference between the Brontë juvenilia (discussed in chapter 6), and *Jane Eyre* is the difference between derivative and rigidly formulaic expression and an original work of transforming genius. When Caroline Vernon

carries her mother upstairs, it is a powerful expression of Brontë's own conflicts and a sharply rendered fantasy. When Jane Eyre cries out, "I care for myself!" and rushes from Rochester's mansion, it is a powerful expression of Victorian social realities and of the enduring human conflict between passion and autonomy. Charlotte Brontë could not have written *Jane Eyre* solely within the formulas of her juvenilia any more than she could have written it solely within the form of the courtship novel as Jane Austen had perfected it. Her work survives because it transcended both kinds of restrictions: the limitations of privatized, formulaic expression and the limitations of a preexisting exemplary narrative format.

We may be at the juvenilia stage of electronic narrative for some time yet, as we gain practice in procedural virtuosity. But we have come far enough in establishing the traditions that will nourish future storytellers that we can begin to speculate on what the medium might someday offer us in a more realized art.

New Beauty, New Truth

Every age seeks out the appropriate medium in which to confront the unanswerable questions of human existence. We cannot limit ourselves to Elizabethan or Victorian forms any more than Shakespeare could have written within the conventions of the Aristotelian tragedy or the medieval passion play. When Hamlet stands alone on the stage, pondering whether "to be or not to be," he personifies, among other things, the Renaissance fascination with thinking itself and with the separateness of the individual life. Shakespeare's extensive use of soliloquy in *Hamlet* is an appropriate technical innovation to capture this newly experienced solitude. Soliloquy on the Elizabethan stage was used mostly for letting the villain or revenge seeker tell the audience what he was up to, but in *Hamlet* Shakespeare uses it to make what his protagonist is thinking more dramatic than what he is or is not doing. Although

Hamlet is not the first character to reveal his thoughts on stage or to utter a soliloquy, his particular expression of meditative self-consciousness is both original and universal. It represents a truth about human experience that could not be told before.[5]

Hamlet's soliloquies, like Jane Eyre's rush away from Thornfield, epitomize what a new narrative format can offer us. What similarly revealing construction of the world might we expect from a fully realized cyberdrama? What aspects of our inner and outer lives await the expression of a future cyberbard?

The most ambitious promise of the new narrative medium is its potential for telling stories about whole systems. The format that most fully exploits the properties of digital environments is not the hypertext or the fighting game but the simulation: the virtual world full of interrelated entities, a world we can enter, manipulate, and observe in process. We might therefore expect the virtuosos of cyberdrama to create simulated environments that capture behavioral patterns and patterns of interrelationships with a new clarity. The tragic story of the suicide described in chapter 6 suggests the kinds of subject matter that might be appropriate for expression as a complex system: the thought patterns of a particular mind, the web of family relationships. But perhaps the new medium can take us even further in both directions, looking deeper into the human mind and encompassing even more of the external social world.

One major trend in literary history from the time of Shakespeare onward can be imagined as a camera tracking in from a medium shot to an extreme close-up on human consciousness itself. After reading the wildly digressive monologue of Sterne's Tristram Shandy or the exquisite moral discriminations of a Henry James heroine or the richly textured stream of consciousness captured by Virginia Woolf, it is hard to believe that we could penetrate any further into the workings of the mind. But twentieth-century science has challenged our image of ourselves and has perhaps outrun

our ability to imagine our inner life. A linear medium cannot represent the simultaneity of processing that goes on in the brain—the mixture of language and image, the intimation of diverging possibilities that we experience as free will. It cannot capture the secrets of organization by which the inanimate somehow comes to life, by which the neural passageway becomes the thought.

Perhaps a great procedural virtuoso of the next century will be able to bring these elusive patterns of the mind into sharper focus. A stream-of-consciousness cyberdrama (like the exploration of Rob's mind, described in chapter 6) could perhaps center on the miracle of conversion, on how we can sometimes shift our perceptions of the world from a momentary revelation, or on how we manage to transform ourselves by redescribing who we are at just the right level of self-awareness.[6] Perhaps a James Joyce of the electronic age will find a way to take us so deeply into a single particular consciousness that we will be able to trace the exact border between what we think of as brain and what we think of as mind. Perhaps a future Dickens will create a set of chatterbots so comically expressive of the mechanical nature of human thought and yet so endearing that the humblest circuits of the amygdala will come to hold a whimsical charm for us. We fear the computer as a distorting fun house mirror of the human brain, but with the help of the narrative imagination it might become a cathedral in which to celebrate human consciousness as a function of our neurology.

The narrative imagination has the power to play leapfrog with analytical modes of understanding. Ancient myths described the power of the sun god before we understood photosynthesis or the physics of light. Shakespeare created *Hamlet* without benefit of Freud. In the same way, the coming cyberdrama may help us reconcile our subjective experience of ourselves with our rapidly expanding scientific knowledge of biology. It may come up with the metaphors of process that will restore the sense of human

individuality to our model of the mind. A computer-based literature might help us recognize ourselves in the machine without a sense of degradation.

The kaleidoscopic powers the computer offers us, the ability to see multiple patterns in the same elements, might also lead to compelling narratives that capture our new situation as citizens of a global community. The media explosion of the past one hundred years has brought us face-to-face with particular individuals around the world without telling us how we are to connect with them. The exploration of space has taught us that we are all part of a single society but not how to find our place in it. The capaciousness and specificity of the computer offers us a way to model the behavior of single individuals within great groups of people, to make up fictional worlds in which we can enact the confusions of membership in a newly visible yet overwhelmingly various worldwide humanity.

D. H. Lawrence argued that "the novel is the highest example of subtle inter-relatedness that man has discovered. Everything is true in its own time, place, circumstances, and untrue out of its own time, place, circumstances."[7] The novel can put things in their place, can let us figure out what is right and wrong by offering us a specific context for human behaviors. But in a global society we have outgrown our ability to contextualize. We are tormented by our sense of multiple conflicting frameworks for every action. We need a kaleidoscopic medium to sort things out.

Not only is the computer the most capacious medium ever invented, but it also allows us to move around the narrative world, shifting from one perspective to another at our own initiative. Perhaps this ability to shift perspectives will lead to the technical innovation that will rival the Shakespearean soliloquy. Cyberdramatists of the future could present us with a complex world of many characters (like a global Victorian novel) and allow us to change positions at any moment in order to see the same event from the

viewpoint of another character. Or they could let us enter a particular town over and over again in the guise of many different individuals, enabling us to see how differently the same people present themselves to us. We might be given a compelling role within the environment that confers upon us the ability to fluidly switch between viewing the world through our own character's eyes and viewing our character through the eyes of others. Or perhaps a cyberdramatist of the future will find a way to show us not just the large battlefield and the single soldier (as Tolstoy does in *War and Peace*) but also the processes by which large historic events emerge as the sum of many much smaller causes (as Tolstoy strove to convey in his interpolated essays but could not dramatically capture). All of these story patterns would be ways of enacting the contemporary human struggle to both affirm and transcend our own limited point of view.

Finally, the experience of the Habitat community described in chapter 9 suggests that the collective virtuosity of the role-playing worlds may provide a tradition of stories around the themes of violence and community. The violent gaming culture that now characterizes much of cyberspace is likely to spread as the Internet gains speed and bandwidth. Teams of combatants from every corner of the globe will blast each other's avatars with ever more macho digital weapons; the narrative formulas of combat tied to disturbingly lurid images will continue to proliferate. At the same time, the communal aspects of cyberspace are also growing rapidly, with people eager to construct utopian fantasy worlds that they can share with one another. The Internet is therefore likely to serve as a global stage for conflicts between these two groups, turning the struggle between the blasters and the builders into a kind of worldwide morality play.

There are probably not two more difficult things to predict in this world than the future of art and the future of software. These visions of the future can only be speculations, extrapolations from

the current environment, which is shifting even as I write. The computer is chameleonic. It can be seen as a theater, a town hall, an unraveling book, an animated wonderland, a sports arena, and even a potential life form. But it is first and foremost a representational medium, a means for modeling the world that adds its own potent properties to the traditional media it has assimilated so quickly. As the most powerful representational medium yet invented, it should be put to the highest tasks of society. Whether or not we will one day be rewarded with the arrival of the cyberbard, we should hasten to place this new compositional tool as firmly as possible in the hands of the storytellers.

Hamlet on the Holodeck?: 2016 Update

The past decade has offered ample evidence that digital formats can provide an expansion of our storytelling powers. Digital-transmission technologies are now the norm for text, voice, and images and have given rise to new formats for capturing, segmenting, and aggregating both personal and professionally authored stories. Digital story forms are commonplace in marketing and entertainment, and practitioners have formed diverse communities of practice around "transmedia producing," "electronic literature," game design, and "indie" art. Digital artifacts are routinely recognized with Emmy and Peabody awards and are the focus of academic courses and scholarly conferences.

At the same time, the global challenges of the twenty-first century continue to cry out for more complex forms of storytelling that can help us to understand multiple points of view and to imagine alternate futures. We have not yet fully exploited the potential of digital representation to exchange kaleidoscopic, transformative stories, but we are assembling the building blocks of this emerging medium artifact by artifact, maybe even tweet by tweet. Pervasive social media applications and mobile recording devices are spreading a new kind of digital literacy that includes not just text and

images, but also extensive organizing and tagging strategies (geotagging, hashtags, message threading, signed postings, and opt-in following), for the aggregation of contributions from multiple sources into a shared storytelling system.

Some critics continue to lament this new literacy as less focused, personal, or thoughtful than older forms of expression (Carr 2010; Turkle 2011). It is true that the ease of digital composition and transmission has led to an explosion of story content vying for our attention, including much that is merely distracting—celebrity gossip, intrusive marketing, political bombast, narcissistic oversharing. But it is a mistake to take this prolific production as evidence that digital formats are intrinsically superficial and interruptive, or to claim, as some have done, that our vastly magnified access to human knowledge has somehow made us stupider. The exponential increase in available information makes us dizzy, because it has overrun our existing print-era systems of organization. This is a good problem to have, the kind of problem we have found solutions to before. Just as we created page numbers and chapter titles to make individual books more coherent, and developed library catalog systems to organize collections of books, as well as course syllabi and degree programs to discipline the process of imparting our burgeoning areas of knowledge, we will continue to build more coherence into the new digital systems of information transmission. And we will continue to exploit the affordances of digital inscription and transmission for the purposes of the age-old practice of storytelling.

I remain optimistic about the future of narrative in cyberspace, and I am more aware than ever of the diversity of expression that these new storytelling affordances are making possible. Social media applications have created a new category of "citizen journalists" who have made distant events immediate and made visible acts of injustice that would otherwise have gone undocumented. The spread of procedural literacy has created a rich auteur

practice at the intersection of stories and games, including such diverse designers, activists, theorists, and educators as Emily Short, Celia Pearce, Tracy Fullerton, Mary Flanagan, Gonzalo Frasca, Daniel Benmergui, Paolo Pedercini, Jenova Chen, and Jane McGonigal. The past two decades have resulted in the domestication of digital expression, making interactivity second nature, like reading or listening to popular music, which, in addition to opening commercial opportunities for mainstream media, has created receptive audiences for a wide variety of serious experimental artifacts from Gonzalo Frasca's antiwar newsgame *September 12* (2003) to Anna Anthropy's *Dys4ia* (2012), a touching "interactive journal" of gender dysphoria and hormone replacement therapy, to Ian Bogost's *Cow Clicker* (2011), a witty parody of Facebook games culminating in the very dramatic "rapture" of all the players' appealingly whimsical assets in a cathartic Cowpocalypse, to Loveshack's *Framed* (2014), a puzzle game in which the interactor helps a thief to escape capture by rearranging sequences of still frames that become animated as the protagonist walks through them. Such highly personal, handcrafted, often single-author story games are very different from one another and from high-resource artifacts like artificial intelligence systems built in computer science labs or the latest release of an open world blockbuster game franchise.

This diversity of digital practice is producing a rich creative palette for a future cyberbard to draw upon. We may look back on this period as a blossoming of digital storytelling, similar to the blossoming of print and theatrical formats in the century or so before Shakespeare and Cervantes produced their masterpieces. The modern novel can trace its heritage back to the miscellany that flooded into circulation with the invention of the printing press in 1455, including bawdy comic tales known as fabliaux, courtly love ballads, moralistic saints' lives, religious autobiographies, historical chronicles and traveler's accounts, as well as to the growing

private practice of letter writing. The commedia dell'arte street theater of the Renaissance was very different from the English religious mystery play, and both were very different from Senecan tragedy or historical pantomimes, but Shakespeare freely borrowed from all of these traditions of practice, building on and repurposing a host of storytelling conventions in the service of his own truth. The coming cyberbard will be able to do the same.

Storytelling is a constant of human society, allowing us to share meaning across the campfire, the proscenium stage, the printed page, the glowing screen, or the VR headset. As we increase our modes of engagement from listening, reading, and viewing to include navigating, enacting, and interacting, the future of narrative remains the same as it ever was: to deepen human understanding and widen our circles of connectedness. We need stories in every medium we can master, truth and fiction, ephemeral and enduring, unilinear and interactive, secret stories between lovers or family members, mass entertainments shared by millions. We need this creative practice for its own sake, but more than that, we need the process of continuously expanding our means of storytelling, because it allows us to expand our ability to know who we are and to collectively reimagine who we might become.

Related Works

Carr, N. G. *The Shallows: What the Internet Is Doing to Our Brains*. New York: W. W. Norton, 2010.

Koenitz, H., G. Ferri, T. I. Sezen, and D. Sezen. *Interactive Digital Narrative: History, Theory and Practice*. New York: Routledge, 2015.

McGonigal, J. *Reality Is Broken: Why Games Make Us Better and How They Can Change the World*. New York: Penguin Press, 2011.

Turkle, S. *Alone Together: Why We Expect More from Technology and Less from Each Other*. New York: Basic Books, 2011.

Notes

Preface to the 2016 Updated Edition

1. For example Sven Birkerts's online literary magazine: https://www.bu.edu/agni/authors/S/Sven-Birkerts.html; Stuart Moulthrop's Flash "rage-game" "sc-4da1 in new media": http://iloveepoetry.com/?p=8974; and Espen Aarseth's "A Narrative Theory of Games," FDG '12 *International Conference on the Foundations of Digital Games*, 201.

Introduction

1. Lawrence, "Why the Novel Matters," 105.

2. For instance, I wrote about the works of the feminist Victorian novelist George Meredith and edited reprint editions of *The Englishwoman's Review,* the Victorian feminist magazine of record, and of *Miss Miles,* a feminist novel written by Charlotte Brontë's closest friend, Mary Taylor.

3. Murray, *Strong-Minded Women.*

4. I was particularly influenced by the work of Claire Kramsch, who pioneered communicative language learning methods, and Peter Elbow and Linda Flowers, both of whom pioneered the teaching of writing as a process-centered, rather than product-centered, activity.

5. The programming language was LISP (LISt Processing language), a language designed in the 1950s by John McCarthy for use in artificial intelligence research. The introductory software engineering course at MIT (6.001) uses a dialect of LISP to train students in designing software systems. The instructors have been known to wear wizards' hats and to display yin/yang signs to describe the almost magical interpenetration of data and procedures in LISP. See Abelson and Sussman, *Structure and Interpretation of Computer Programs.*